

Seventh Edition

HANDBOOK OF
CHILD
PSYCHOLOGY AND
DEVELOPMENTAL
SCIENCE

VOLUME 3

Socioemotional
Processes

Volume Editor

Michael E. Lamb

Editor-in-Chief

Richard M. Lerner

WILEY

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Volume 3 *Socioemotional Processes*

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*Mary D. S. Ainsworth,
E. Mavis Hetherington,
Lewis P. Lipsitt,
Eleanor E. Maccoby,
Michael Rutter,
and
Edward F. Zigler*

*Pioneering developmental
scientists who nurtured
the careers of many
scholars represented
in this volume*

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Foreword to the *Handbook of Child Psychology and Developmental Science*, Seventh Edition

WILLIAM DAMON

THE HANDBOOK'S DEVELOPING TRADITION

Development is one of life's optimistic ideas. It implies not just change but improvement, progress, forward movement, and some sense of positive direction. What constitutes improvement in any human capacity is an open, important, and fascinating question requiring astute theoretical analysis and sound empirical study. So, too, are questions of what accounts for improvement; what enhances it; and what prevents it when it fails to occur. One of the landmark achievements of this edition of the *Handbook of Child Psychology and Developmental Science* is that a full selection of top scholars in the field of human development have offered us state-of-the-science answers to these essential questions.

Compounding the interest of this edition, the concept of development applies to scholarly fields as well as to individuals, and the *Handbook's* distinguished history, from its inception more than 80 years ago to the present edition, richly reveals the development of a field. Within the field of human development, the *Handbook* has had a long and notable tradition as the field's leading beacon, organizer, and encyclopedia of what's known. This latest *Handbook* edition, overflowing with insights and information that go well beyond the scientific knowledge available in previous editions, is proof of the substantial progress made by the field of human development during its still-short (by scholarly standards) history.

Indeed, the history of developmental science has been inextricably intertwined with the history of the *Handbook*. Like many influential encyclopedias, the *Handbook* influences the field it reports on. Scholars—especially younger ones—look to it to guide their own work. It serves as an

indicator and as a generator, a pool of received findings, and a source for generating new insight.

It is impossible to imagine what the field would look like if Carl Murchison had not assembled a ground-breaking collection of essays on the then-almost-unknown topic of child study in his first *Handbook of Child Psychology*. That was 1931, at the dawn of a scholarly history that, like every developmental narrative, has proceeded with a combination of continuity and change. What does this history tell us about where the field of developmental science has been, what it has learned, and where it is going? What does it tell us about what's changed and what has remained the same in the questions that have been asked, in the methods used, and in the theoretical ideas that have been advanced to understand human development?

The First Two Editions

Carl Murchison was a star scholar/impresario who edited the *Psychological Register*, founded important psychological journals, and wrote books on social psychology, politics, and the criminal mind. He compiled an assortment of handbooks, psychology texts, and autobiographies of renowned psychologists, and even ventured a book on psychic phenomena (Sir Arthur Conan Doyle and Harry Houdini were among the contributors). Murchison's initial *Handbook of Child Psychology* was published by a small university press (Clark University) in 1931, when the field itself was still in its infancy. Murchison wrote:

Experimental psychology has had a much older scientific and academic status [than child psychology], but at the present time it is probable that much less money is being spent for pure

research in the field of experimental psychology than is being spent in the field of child psychology. In spite of this obvious fact, many experimental psychologists continue to look upon the field of child psychology as a proper field of research for women and for men whose experimental masculinity is not of the maximum. This attitude of patronage is based almost entirely upon a blissful ignorance of what is going on in the tremendously virile field of child behavior. (Murchison, 1931, p. ix)

Murchison's masculine allusion is from another era; it might supply good material for a social history of gender stereotyping. That aside, Murchison was prescient in the task that he undertook and the way that he went about it. At the time this passage was written, developmental psychology was known only in Europe and in a few forward-looking U.S. labs and universities. Nevertheless, Murchison predicted the field's impending ascent: "The time is not far distant, if it is not already here, when nearly all competent psychologists will recognize that one-half of the whole field of psychology is involved in the problem of how the infant becomes an adult psychologically" (Murchison, 1931, p. x).

For this first 1931 *Handbook*, Murchison looked to Europe and to a handful of American research centers for child study—most prominently, Iowa, Minnesota, University of California at Berkeley, Columbia, Stanford, Yale, and Clark—many of which were at the time called *field stations*. Murchison's Europeans included a young "genetic epistemologist" named Jean Piaget, who, in an essay on "Children's Philosophies," cited data from his interviews with 60 Genevan children between the ages of 4 and 12 years. Piaget's chapter would provide U.S. readers with an introduction to his soon-to-be seminal research program on children's conceptions of the world. Another European, Charlotte Bühler, wrote a chapter on young children's social behavior. In her chapter, which still is fresh today, Bühler described intricate play and communication patterns among toddlers—patterns that developmental scientists would not rediscover until the late 1970s. Bühler also anticipated critiques of Piaget that were to be again launched during the sociolinguistics heyday of the 1970s:

Piaget, in his studies on children's talk and reasoning, emphasizes that their talk is much more egocentric than social...that children from three to seven years accompany all their manipulations with talk which actually is not so much intercourse as monologue...[but] the special relationship of the child to each of the different members of the household is distinctly reflected in the respective conversations. (Bühler, 1931, p. 138)

Other Europeans include Anna Freud, who wrote on "The Psychoanalysis of the Child," and Kurt Lewin, who wrote on "Environmental Forces in Child Behavior and Development"—both would gain worldwide renown in coming years.

The Americans that Murchison chose were equally notable. Arnold Gesell wrote a nativistic account of his twin studies—an enterprise that remains familiar to us today—and Stanford's Lewis Terman wrote a comprehensive account of everything known about the "gifted child." Harold Jones described the developmental effects of birth order, Mary Cover Jones wrote about children's emotions, Florence Goodenough wrote about children's drawings, and Dorothea McCarthy wrote about language development. Vernon Jones's chapter on "children's morals" focused on the growth of *character*, a notion that was to become mostly lost to the field during the cognitive-developmental revolution, but that has reemerged in the past decade as a primary concern in the study of moral development.

Murchison's vision of child psychology included an examination of cultural differences as well. His *Handbook* presented to the scholarly world a young anthropologist named Margaret Mead, just back from her tours of Samoa and New Guinea. In this early essay, Mead wrote that her motivation in traveling to the South Seas was to discredit the claims that Piaget, Lévy-Bruhl, and other "structuralists" had made regarding what they called *animism* in young children's thinking. (Interestingly, about a third of Piaget's chapter in the same volume was dedicated to showing how Genevan children took years to outgrow their animism.) Mead reported data that she called "amazing": "In not one of the 32,000 drawings (by young 'primitive' children) was there a single case of personalization of animals, material phenomena, or inanimate objects" (Mead, 1931, p. 400). Mead parlayed these data into a tough-minded critique of Western psychology's ethnocentrism, making the point that animism and other beliefs are more likely to be culturally induced than intrinsic to early cognitive development. This is hardly an unfamiliar theme in contemporary psychology. Mead offered a research guide for developmental field workers in strange cultures, complete with methodological and practical advice, such as the following: (1) translate questions into native linguistic categories; (2) do not do controlled experiments; (3) do not try to do research that requires knowing the ages of subjects, which are usually unknowable; and (4) live next door to the children whom you are studying.

Despite the imposing roster of authors that Murchison had assembled for this original *Handbook of Child*

Psychology, his achievement did not satisfy him for long. Barely 2 years later, Murchison put out a second edition, of which he wrote: “Within a period of slightly more than 2 years, this first revision bears scarcely any resemblance to the original *Handbook of Child Psychology*. This is due chiefly to the great expansion in the field during the past 3 years and partly to the improved insight of the editor” (Murchison, 1933, p. vii). The tradition that Murchison had brought to life was already developing.

Murchison saw fit to provide the following warning in his second edition: “There has been no attempt to simplify, condense, or to appeal to the immature mind. This volume is prepared specifically for the scholar, and its form is for his maximum convenience” (Murchison, 1933, p. vii). It is clear that Murchison, despite his impresario urges, was willing to sacrifice accessibility and textbook-level sales for scientific value in this instance.

Murchison exaggerated when he wrote that his second edition bore little resemblance to the first. Almost half of the chapters were virtually the same, with minor additions and updating. (For the record, though, despite Murchison’s continued use of masculine phraseology, 10 of the 24 authors in the second edition were women.) Some of the authors whose original chapters were dropped were asked to write about new topics. So, for example, Goodenough wrote about mental testing rather than about children’s drawings, and Gesell wrote a general chapter on maturational theory that went well beyond his own twin studies.

But Murchison also made certain abrupt changes. He dropped Anna Freud entirely, prompting the marginalization of psychoanalysis within U.S. academic psychology. Leonard Carmichael, later to play a pivotal role in the *Handbook* tradition, made his appearance as author of a major chapter (by far, the longest in the book) on prenatal and perinatal growth. Three other physiologically oriented chapters were added as well: one on neonatal motor behavior, one on visual–manual functions during the first 2 years of life, and one on physiological “appetites” such as hunger, rest, and sex. Combined with the Goodenough and Gesell shifts in focus, these additions gave the 1933 *Handbook* a more biological thrust, in keeping with Murchison’s long-standing desire to display the hard-science backbone of the emerging field.

The Early Wiley Editions

Leonard Carmichael was president of Tufts University when he organized Wiley’s first edition of the *Handbook*. The switch from a university press to the long-established

commercial firm of John Wiley & Sons was commensurate with Carmichael’s well-known ambition; and indeed Carmichael’s effort was to become influential beyond anything that Murchison might have anticipated. (The switch to Wiley meant that what was to become known as Wiley’s first edition was actually the *Handbook*’s third edition—and that what is now called the seventh edition is really the *Handbook*’s ninth.) Carmichael renamed the volume the *Manual of Child Psychology*, in keeping with Carmichael’s intention of producing an “advanced scientific manual to bridge the gap between the excellent and varied elementary textbooks in this field and the scientific periodical literature” (Carmichael, 1946, p. vi).

Despite the small title change, there was significant continuity between the Murchison and Carmichael’s editions. Carmichael acknowledged this in the prefaces to both of his editions, the 1946 and 1954 *Manuals*:

Both as editor of the *Manual* and as the author of a special chapter, the writer is indebted . . . [for] extensive excerpts and the use of other materials previously published in the *Handbook of Child Psychology, Revised Edition*. (Carmichael, 1946, p. vi)

Both the *Handbook of Child Psychology* and the *Handbook of Child Psychology, Revised Edition*, were edited by Dr. Carl Murchison. I wish to express here my profound appreciation for the pioneer work done by Dr. Murchison in producing these handbooks and other advanced books in psychology. The *Manual* owes much in spirit and content to the foresight and editorial skill of Dr. Murchison. (Carmichael, 1954, p. v)

The first quote comes from Carmichael’s preface to the 1946 edition, the second from his preface to the 1954 edition. It is not known why Carmichael waited until the 1954 edition to add the personal tribute to Carl Murchison. Perhaps a careless typist dropped the laudatory passage from a handwritten version of the 1946 preface and its omission escaped Carmichael’s notice. Or perhaps 8 years of further development increased Carmichael’s generosity of spirit. It is also possible that Murchison or his family complained. In any case, Carmichael always acknowledged the roots of his *Manual*, if not always their original editor.

Leonard Carmichael took his 1946 *Manual* in the same direction established by Murchison back in 1931 and 1933. First, Carmichael appropriated five Murchison chapters on biological or experimental topics such as physiological growth, scientific methods, and mental testing. Second, he added three new biologically oriented chapters on animal infancy, on physical growth, and on motor and behavioral maturation (a tour de force by Myrtle McGraw that instantly made Gesell’s chapter in the same volume

obsolete). Third, he commissioned Wayne Dennis to write a chapter that focused exclusively on physiological changes associated with puberty. Fourth, Carmichael dropped Piaget and Bühler, who, like Anna Freud years earlier, were becoming out of step with then-current experimental trends in U.S. psychology.

The five Murchison chapters on social and cultural influences in development were the ones Carmichael retained: two chapters on environmental forces on the child (by Kurt Lewin and by Harold Jones), Dorothea McCarthy's chapter on children's language, Vernon Jones's chapter on children's morality (now entitled "Character Development—An Objective Approach"), and Margaret Mead's chapter on "primitive" children (now enhanced by several spectacular photos of mothers and children from exotic cultures around the world). Carmichael also stuck with three other psychologically oriented Murchison topics (emotional development, gifted children, and sex differences), but he selected new authors to cover them.

Carmichael's second and final *Manual* in 1954 was very close in structure and content to his 1946 *Manual*. Carmichael again retained the heart of Murchison's original vision, many of Murchison's original authors and chapter topics, and some of the same material that dated all the way back to the 1931 *Handbook*. Not surprisingly, the chapters that were closest to Carmichael's own interests received the most significant updating. As Murchison had done, Carmichael leaned toward the biological and physiological whenever possible. He clearly favored experimental treatments of psychological processes. Yet Carmichael still retained the social, cultural, and psychological analyses by Lewin, Mead, McCarthy, Terman, Harold Jones, and Vernon Jones, even going so far as to add a new chapter on social development by Harold and Gladys Anderson and a new chapter on emotional development by Arthur Jersild.

In 1946, when Carmichael had finished his first *Manual*, he had complained that "this book has been a difficult and expensive one to produce, especially under wartime conditions" (Carmichael, 1946, p. vii). But the project had been well worth the effort. The *Manual* quickly became the bible of graduate training and scholarly work in the field, available virtually everywhere that human development was studied. Eight years later, now head of the Smithsonian Institution, Carmichael wrote, in the preface to his 1954 edition: "The favorable reception that the first edition received not only in America but all over the world is indicative of the growing importance of the study of the phenomena of the growth and development of the child" (Carmichael, 1954, p. vii).

The Murchison and Carmichael volumes make fascinating reading, even today. The perennial themes of the field were always there: the nature/nurture debate; the generalizations of universalists opposed by the particularizations of contextualists; the alternating emphases on continuities and discontinuities during ontogenesis; and the standard categories of maturation, learning, locomotor activity, perception, cognition, language, emotion, conduct, morality, and culture—all separated for the sake of analysis, yet, as authors throughout each of the volumes acknowledged, all somehow joined in the dynamic mix of human development.

These things have not changed. Yet much in the early *Handbooks/Manuals* is now irrevocably dated. Long lists of children's dietary preferences, sleeping patterns, elimination habits, toys, and somatic types look quaint and pointless through today's lenses. The chapters on children's thought and language were done prior to the great contemporary breakthroughs in neurology and brain/behavior research, and they show it. The chapters on social and emotional development were ignorant of the processes of social influence and self-regulation that soon would be revealed through attribution research and other studies in social psychology. Terms such as *cognitive neuroscience*, *neuronal networks*, *behavior genetics*, *social cognition*, *dynamical systems*, *information processing*, and *developmental psychopathology* were unknown. Margaret Mead's rendition of the primitive child stands as a weak straw in comparison to the wealth of cross-cultural knowledge available in today's "cultural psychology."

Most tellingly, the assortments of odd facts and normative trends were tied together by very little theory throughout the Carmichael chapters. It was as if, in the exhilaration of discovery at the frontiers of a new field, all the facts looked interesting in and of themselves. That is what makes so much of the material seem odd and arbitrary. It is hard to know what to make of the lists of facts, where to place them, which ones were worth keeping track of and which ones are expendable. Not surprisingly, the bulk of the data presented in the Carmichael manuals seems not only outdated by today's standards but, worse, irrelevant.

Carmichael's second and final *Manual* had a long life: Not until 1970 did Wiley bring out a third edition. Carmichael was retired by then, but he still had a keen interest in the book. At his insistence, his own name became part of the title of Wiley's third edition: The edition was called, improbably, *Carmichael's Manual of Child Psychology*, even though it had a new editor and an entirely new cast of authors and advisors.

Mussen's Transformation

Paul Mussen was editor of the 1970 edition; once again the project flourished. Now a two-volume set, the 1970 third edition swept the social sciences, generating widespread interest in developmental psychology and its related disciplines. Rarely had a scholarly compendium become both so dominant in its own field and so familiar in related disciplines. The volumes became essential sources for graduate students and advanced scholars alike. Publishers referred to Mussen's 1970 *Carmichael's Manual* as the standard against which other scientific handbooks were compared.

By 1970, the importance of theory for understanding human development had become apparent. Looking back on Carmichael's last *Manual*, Mussen wrote: "The 1954 edition of this Manual had only one theoretical chapter, and that was concerned with Lewinian theory which, so far as we can see, has not had a significant lasting impact on developmental psychology" (Mussen, 1970, p. x). The intervening years had seen a turning away from the norm of psychological research once fondly referred to as "dust-bowl empiricism."

The 1970 handbook—still called, as noted above, *Carmichael's Manual*—had an entirely new look. The two-volume set carried only one chapter from the earlier books, Carmichael's updated version of his own long chapter on the "Onset and Early Development of Behavior," which had made its appearance under a different title way back in Murchison's 1933 edition. Otherwise, as Mussen wrote in his preface, "It should be clear from the outset...that the present volumes are not, in any sense, a *revision* of the earlier editions; this is a completely new *Manual*" (Mussen, 1970, p. x).

And it was. In comparison to Carmichael's last edition 16 years earlier, the scope, variety, and theoretical depth of the Mussen volumes were astonishing. The field had blossomed, and the new *Manual* showcased many of the new bouquets that were being produced. The biological perspective was still strong, grounded by chapters on physical growth (by J. M. Tanner) and physiological development (by Dorothy Eichorn), and by Carmichael's revised chapter (now made more elegant by some excerpts from Greek philosophy and modern poetry). But two other cousins of biology also were represented, in a chapter on ethology by Eckhard Hess and a chapter on behavior genetics by Gerald McClearn. These chapters were to define the major directions of biological research in the field for at least the next three decades.

As for theory, Mussen's *Handbook* was thoroughly permeated with it. Much of the theorizing was organized around the approaches that, in 1970, were known as the "three grand systems": (1) Piaget's cognitive-developmentalism, (2) psychoanalysis, and (3) learning theory. Piaget was given the most extensive treatment. He himself reappeared in this *Manual*, authoring a comprehensive (some say definitive) statement of his own theory, which now bore little resemblance to his 1931/1933 catalog of children's intriguing verbal expressions. In addition, chapters by John Flavell, by David Berlyne, by Martin Hoffman, and by William Kessen, Marshall Haith, and Philip Salapatek, all gave major treatments to one or another aspect of Piaget's body of work.

Several other theoretical approaches were represented in the 1970 *Manual* as well. Herbert and Anne Pick explicated Gibsonian theory in a chapter on sensation and perception, Jonas Langer wrote a chapter on Werner's organismic theory, David McNeill wrote a Chomskian account of language development, and Robert LeVine wrote an early version of what was to become "culture theory."

With its increased emphasis on theory, the 1970 *Manual* explored in depth a matter that had been all but neglected in the *Manual's* previous versions: the mechanisms of change that could account for, to use Murchison's old phrase, "the problem of how the infant becomes an adult psychologically." In the process, old questions such as the relative importance of nature versus nurture were revisited, but with far more sophisticated conceptual and methodological tools.

Beyond theory building, the 1970 *Manual* addressed an array of new topics and featured new contributors: peer interaction (Willard Hartup), attachment (Eleanor Maccoby and John Masters), aggression (Seymour Feshbach), individual differences (Jerome Kagan and Nathan Kogan), and creativity (Michael Wallach). All of these areas of interest are still very much with us.

Wiley's fourth edition, published in 1983, was redesigned to become once again the *Handbook of Child Psychology*. By then, Carmichael had passed away. The set of books, now expanded to four volumes, became widely referred to in the field as "the Mussen handbook."

If the 1970 *Manual* reflected a blossoming of the field's plantings, the 1983 *Handbook* reflected a field whose ground cover had spread beyond any boundaries that could have been previously anticipated. New growth had sprouted in literally dozens of separate locations. A French garden, with its overarching designs and tidy compartments, had turned into an English garden, unruly but often glorious in

its profusion. Mussen's two-volume *Carmichael's Manual* had now become the four-volume *Mussen Handbook*, with a page-count increase that came close to tripling the 1970 edition.

The grand old theories were breaking down. Piaget was still represented in 1983 by his 1970 piece, but his influence was on the wane throughout other chapters. Learning theory and psychoanalysis were scarcely mentioned. Yet the early theorizing had left its mark, in vestiges that were apparent in new approaches, and in the evident conceptual sophistication with which authors treated their material. There was no return to dust-bowl empiricism. Instead, a variety of classical and innovative ideas were coexisting: ethology, neurobiology, information processing, attribution theory, cultural approaches, communications theory, behavioral genetics, sensory-perception models, psycholinguistics, sociolinguistics, discontinuous stage theories, and continuous memory theories all took their places, with none quite on center stage. Research topics now ranged from children's play to brain lateralization, from children's family life to the influences of school, day care, and disadvantageous risk factors. There also was coverage of the burgeoning attempts to use developmental theory as a basis for clinical and educational interventions. The interventions usually were described at the end of chapters that had discussed the research relevant to the particular intervention efforts, rather than in whole chapters dedicated specifically to issues of practice.

The Fifth and Sixth Editions

There was a long hiatus between the fourth edition in 1983 and the fifth edition, which was not to appear until 1998. The fifth edition fell to me to organize, and this was not at my own initiative. Two Wiley editors—Herb Reich, a legendary figure in academic publishing, and Kelly Franklin, an up-and-coming innovative star—approached me about reviving the project, which they correctly believed had a vital tradition behind it, but that they also believed was in danger of falling by the wayside. I had been editing the Jossey-Bass series that I founded, *New Directions for Child and Adolescent Development*, and the two Wiley editors believed that if we could impart a “new directions” tone to a new *Handbook* edition, the project could regain its past appeal. I agreed, and I proposed that this next edition be organized in an intuitively simple four-volume design: a theory volume, a volume on cognitive and linguistic development, a volume on social and personality development, and a volume on child psychology in practice.

When Wiley accepted my proposal, my first action as general editor was to invite an incredibly talented group of volume editors—Nancy Eisenberg, Deanna Kuhn, Richard Lerner, Anne Renninger, Robert Siegler, and Irving Sigel—to collaborate on the selection and editing of chapters. The edition was to become the result of a partnership among all the editors; and the same team collaborated again to produce the sixth edition of the *Handbook* in 2006, with Richard Lerner assuming an added role as my co-editor-in-chief. The 2006 edition closely followed the model of the 1998 edition, with some important additions, such as chapters on the positive youth development approach, on artistic development, and on religiosity and faith in human development.

Our team approached the 1998 and 2006 editions with the same purpose that Murchison, Carmichael, and Mussen before us had shared: “to provide,” as Mussen wrote, “a comprehensive and accurate picture of the current state of knowledge—the major systematic thinking and research—in the most important research areas of the psychology of human development” (Mussen, 1983, p. vii). We assumed that the *Handbook* should be aimed “specifically for the scholar,” as Murchison declared, and that it should have the character of an “advanced text,” as Carmichael defined it. We expected that our readership would be interdisciplinary, given the tendency of scholars in human development to do work across the fields of psychology, cognitive science, neuroscience, history, linguistics, sociology, anthropology, education, and psychiatry. In Volume 4, we hoped that research-oriented practitioners would be among the scholars for whom the *Handbook* had value.

By the time of the 1998 and 2006 editions of the *Handbook*, powerful theoretical models and approaches—not quite unified theories like the “three grand systems” that had marked earlier editions—were again organizing much of the field’s research. There was great variety in these models and approaches, and each was drawing together significant clusters of work. Among the powerful models and approaches prominent in the 1998 and 2006 *Handbooks* were the dynamic system theories, life-span and life-course approaches, cognitive science and neural models, the behavior genetics approach, person–context interaction theories, action theories, culture theory, ecological models, and neo-Piagetian and Vygotskian models. Although some of these models and approaches had been in the making for some time, by the end of the 20th century they had fully come into their own: Researchers were drawing on them more directly, taking their implied

assumptions and hypotheses seriously, using them with specificity and control, and exploiting all of their implications for practice.

The Present

The seventh Wiley edition of the *Handbook* continues and strengthens the trends toward specific theoretical analyses of multiple developmental processes, even highlighting this focus by including the term “processes” in three of the four volume’s titles, a designation new to the *Handbook*’s history. The volumes present a rich mix of classic and contemporary theoretical perspectives, but I believe it is fair to say that the dominant views throughout are marked by an emphasis on the dynamic interplay of all relational developmental systems that co-act across the life span, incorporating the range of biological, perceptual, cognitive, linguistic, emotional, social, cultural, and ecological levels of analysis. At the same time, the chapters together consider a vast array of topics and problems, ranging from sexuality and religiosity to law, medicine, war, poverty, and education. The emerging world of digital experience is also given a fuller treatment than in any previous *Handbook* edition, commensurate with our present-day technological revolution. All this gives this seventh edition of the *Handbook* a timely feel.

The present *Handbook*’s combination of theoretical and methodological sophistication and topical timeliness resolves an old tension evident in the *Handbook*’s prior cycling between theoretical-methodological and problem-centered approaches. My impression is that, rather than leaning in one direction or the other, this *Handbook* manages to be *both* more theoretical-methodological *and* more topical than the previous editions. As a developmental phenomenon, this puts the *Handbook* in a class of organisms that develop toward adaptive complexity rather than toward one or another contrasting polar dimension.

I wonder what Carl Murchison would think of the grown-up child that he spawned before the field of human development had become a mainstream endeavor in research and teaching around the world. Murchison’s idiosyncratic assortment of fascinating studies bears little resemblance to the imposing compendium of solidly grounded knowledge in the present *Handbook*. Yet each step along the 83-year way followed directly from what had gone before, with only occasional departures or additions that may have seemed more like gradual revisions at the time. Over the long haul, the change in the *Handbook* has been dramatic, but the change process itself has been marked by substantial continuities. If Murchison were to come back to life today, he may be astonished by the size and reach of his child, but I believe he would recognize it—and proudly so.

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2014

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Preface

Across its editions, the title of this handbook has changed, now, five times: *A Handbook of Child Psychology*; *Manual of Child Psychology*; *Carmichael's Manual of Child Psychology*; *Handbook of Child Psychology*; and *Handbook of Child Psychology and Developmental Science*. As well, the field of scholarship represented in the *Handbook* has also been labeled differently: child psychology, child development, developmental psychology, and, today, developmental science. The rationales for the use of these labels involve historically changing ontological and epistemological assumptions.

During the latter years of the 19th century and for much of the past two thirds of the 20th century, and perhaps especially in the United States and Western Europe, the study of human development was a visible subfield of psychology (see Cairns & Cairns, 2006, for a review; see also Damon, in the Foreword to this edition of the *Handbook*). In this literature, and its antecedents in philosophy (see Baltes, 1983; Overton, 2006 for reviews), development was envisioned to be a life-span phenomenon (e.g., Erikson, 1959; Hall, 1904, 1922). However, the majority of the scholarship about human development in the United States and Western Europe was focused on the early years of life (infancy and childhood) (e.g., Binet & Simon, 1905a, 1905b; Gesell, 1929; Piaget, 1923; Preyer, 1882; Terman, 1925).

As a consequence, across this historical period, child psychology emerged as a specific subarea of psychology, spurred on by the research of scientists studying this age period; by the founding of several university centers and institutes devoted to the study of children (e.g., in Iowa, involving scholars such as Boyd R. McCandless; and in Minnesota, involving scholars such as Dale B. Harris); and by the work in the field of home economics, which was focused on children (and families), that was occurring within land-grant universities in the United States

(Cairns & Cairns, 2006; Lerner & Simon, 1998). At the same time, many of the contributors to child psychology also created a purportedly multidisciplinary instantiation of scholarship devoted to the study of children, that is, child *development*. In 1933, the Society for Research in Child Development (SRCD) was founded to promote such a multidisciplinary approach to the study of children (and to the application of child development research) but, in actuality, SRCD was from its outset and remains today dominated by scholars whose training is in psychology. It is not surprising, then, that, whether labeled child psychology or child development, the study of the early portion of the life span was approached in very similar ways by scholars studying children.

At its inception, the child development (or child psychology) field was framed by Cartesian-split conceptions of change across ontogeny and by reductionist accounts of the bases of human development (Overton, 2013a, 2013b; Overton & Müller, 2013). The core conceptual issues of child development were the nature-nurture, the continuity-discontinuity, and the stability-instability controversies (Lerner, 2002), and “solutions” to these debates involved, for instance, reducing development to being a phenomenon explained by either nature variables (genes or maturation; e.g., Hamburger, 1957) or by operant or respondent stimulus-response connections (e.g., Bijou & Baer, 1961). This split, reductionist ontology about development meant that the epistemological route to learning about the basis of development was to identify the essential (nature *or* nurture) explanatory variable(s). Accordingly, the study of development was also marked by variable-centered analyses, as exemplified by the tables of contents of the editions of this *Handbook* published during this period (e.g., Carmichael, 1946, 1954; Murchison, 1931, 1933; Mussen, 1970, 1983; see also Damon, in the

Foreword to this edition), as well as by the tables of contents of other major compendiums published during this period (e.g., Reese & Lipsitt, 1970; Stevenson, 1963).

However, as early as 1970, Mussen, the editor of the third edition of the *Handbook* published by Wiley, pointed to the potential meaning of a growing interest among some scientists to move away from a reductionist approach, involving descriptions of the variables purportedly accounting for ontogenetic structure and function, and toward an approach that viewed development as involving interrelations among variables (from multiple levels of organization). Mussen (1970) said that “the major contemporary empirical and theoretical emphases in the field of developmental psychology . . . seem to be on *explanations* of the psychological changes that occur, the mechanisms and processes accounting for growth and development” (p. vii). By pointing to the interest in change processes, Mussen was implying that we needed something more to explain the process of development, unless we believed that nature or nurture variables explained themselves in structure or function.

That “something more” was already emerging within the study of development—for instance, at a series of conferences held at the University of West Virginia in the late 1960s and early 1970s about the nature and implications of a life-span view of human development (e.g., Baltes & Schaie, 1974; Nesselroade & Reese, 1973; Schaie, 1970). These West Virginia University conferences, the edited books that derived from them, and the associated articles published in both theoretically oriented journals (e.g., *Human Development*, *Developmental Review*) and empirically oriented journals (e.g., *Child Development*, *Developmental Psychology*, *International Journal of Behavioral Development*, and *Journal of Research on Adolescence*) discussed the philosophical, theoretical, and methodological problems associated with split/reductionist accounts of development. In addition, they introduced ideas about the potential for plasticity (i.e., the potential for systematic change) in development across life, and pointed to the role of potentially mutually influential relations between individuals and their normative age- and history-graded experiences and, as well, their non-normative experiences, in instantiating this plasticity. Finally, they underscored the fundamental necessity of studying intraindividual changes (and interindividual differences in intraindividual changes) involved in these individual-context relations in order to describe, explain, and optimize the course of human development. These ideas would act synergistically with growing scholarship

in Europe that provided theory and data fostering a “reversal” of focus for developmental inquiry—from variable-centered to person-centered approaches to human development (e.g., Magnusson, 1999). These ideas were also synergistic with work in sociology that demonstrated that the course of life was shaped by historical events that one encountered at particular times and in particular places (Elder, 1974).

When taken together, the dimensions of human development scholarship that crystallized and coalesced between the 1970s and 1990s pointed to the vacuity of split/reductionist models (and their attendant methodologies). In turn, these ideas underscored the importance of time and place, person–context relations, plasticity, and the need for a focus on longitudinal (change-sensitive) methods to study intraindividual change across life and, as well, the diverse life paths of these intraindividual changes. These ideas, when considered together, presented a major challenge to the then-dominant metatheoretical and theoretical ideas in the field. Indeed, the new ideas about human development that found an impetus at the West Virginia University conferences grew in influence across the field and together, across the last three decades of the 20th century, created a Kuhn-like (Kuhn, 1962) paradigm shift (Overton, 2013a, 2013b; Overton & Lerner, 2012).

The shift in conceptual and empirical foci attendant to this paradigm shift was multifaceted. As I noted, Mussen (1970) observed that the field had been primarily descriptive and normative (Mussen, 1970), with the norms usually generated by studying only a small portion of humanity (i.e., European American middle-class children in the main; Hagen, Paul, Gibb, & Wolters, 1990). In addition, the “paradigm” framing this research was as likely (if not more likely) to use cross-sectional research to study development as it was to employ longitudinal methods. The use of cross-sectional designs (and data analysis methods, e.g., R-technique analyses; e.g., see Cattell, 1966, and for more current versions of these ideas see Molenaar & Nesselroade, 2014; Nesselroade & Molenaar, 2010) was predicated on the assumption of the applicability of the ergodic theorem (e.g., Molenaar, 2007; Molenaar & Nesselroade, 2014). The ergodic theorem holds that data sets are marked by: (a) homogeneity across individuals in a three-dimensional matrix that involves persons, variables, and time; and (b) stationarity of individuals’ scores on variables across time (Molenaar, 2007).

In contrast, the approach to the study of human development that was evidenced by the life-span and life-course perspectives involved research that documented the

presence of systematic variation in trajectories of intraindividual change, both within and across people. As such, the assumptions of homogeneity and stationarity of the ergodic theorem were rejected and developmental scientists placed greater importance on not only person-centered research but, as well, change-sensitive methodologies for both descriptive and explanatory efforts (Molenaar, 2007, 2010). What was distinctive about this research, however, was that it was both derived from and promoted diverse attempts to create theoretical models of human development associated with an emergent, relational paradigm (Overton, 2013a, 2013b; Overton & Müller, 2013), a conception that focused on the individual and on the course of his or her trajectories of reciprocal bidirectional relations with the multiple levels of the ecology of human development (represented as individual ↔ context relations). Examples were the bioecological model of Bronfenbrenner (e.g., 1979), the dialectical model of Riegel (e.g., 1975), the developmental contextual approach of Lerner (1982), the developmental systems concepts of Gottlieb (1997, 1998) and of Ford and Lerner (1992), the model of individual development proposed by Magnusson (1999), and the embodiment model presented by Overton (1994, 1997).

In short, these “strands” of theory merged in the 1970s, 1980s, and 1990s and shifted the predominant developmental “paradigm” away from reductionism, Cartesian-split conceptions, and methods predicated on ergodicity, and created a focus on models emphasizing the mutually influential relations between individuals and their contexts, on person ↔ context relations (Cairns & Cairns, 2006; Lerner, 2006). Such models involved the belief that time and place matter in regard to shaping the course of life (Bronfenbrenner, 2005; Elder, 1998; Elder & Shanahan, 2006), and emphasized that the scientific study of human development needed to study both the individual and the diversity of people in order to understand human development.

In sum, the relational paradigm that framed conceptions of the bases of human development was associated with the generation of several relational developmental systems models of human development (Lerner, 2006; Lerner & Overton, 2008; Overton, 2013a, 2013b; Overton & Müller, 2013), conceptions that were used to guide the study of individuals, contexts, and their dynamic interrelations across the life span. Table P.1 presents the defining features of such models.

This multilevel and multidisciplinary approach to studying human development was the basis of the view

that the field was best represented by the term developmental science. In turn, given this synergistic history of the links among theory, method, and research, it is not surprising that, at this writing, relational developmental systems theories are at the forefront of the study of human development (e.g., Lerner, 2012; Lerner & Benson, 2013a, 2013b; Overton & Lerner, 2012). Indeed, the fifth edition of the Wiley *Handbook* (Damon, 1998) had pointed to the growing prominence of such approaches to the study of human development and, in turn, the sixth edition (Damon & Lerner, 2006) noted that models derived from relational developmental systems thinking, and from a relational meta-model more generally, had become the predominant conceptual lens for the cutting-edge theory and methodological innovations guiding research in human development across the life span.

In the present seventh edition of the Wiley *Handbook*, this pathway of scholarly progression is continued. Key examples of relational developmental systems models are found across all four volumes of this seventh edition of the *Handbook*. Moreover, accompanying the use of these models are new methodologies to study individuals, to therefore capture the nonergodic character of human development and, as well, to study the developmental system within which individual ↔ context relations are embedded. Examples of these methods are also a prominent contribution of chapters in this edition of the *Handbook*.

Another key feature of the chapters in this edition of the *Handbook* is the applied use of relational developmental systems theoretical models. Based on ideas about the relative plasticity of individual ↔ context relations, this use of theory overcomes yet another traditional split within the study of human development—between theory-predicated explanations of human development and applications aimed at enhancing human development (Baltes, Reese, & Nesselroade, 1977; Lerner, 2002, 2012). For instance, to test explanations of developmental change, scholars need to institute or evaluate actions that are aimed at altering the bidirectional relations theoretically expected to produce changes in behavior and development. These actions must necessarily be embedded in the actual ecology of human development in order to have generalizability to the lived experiences of individuals (Lerner & Callina, 2014) and, as such, they constitute intervention (applied) research; at the same time, such research tests basic explanatory processes of human development. As such, in contemporary developmental science any splits between basic and applied research are regarded as anachronistic representations of the reductionist, Cartesian approaches of earlier eras.

TABLE P.1 Defining Features of the Relational Developmental Systems Paradigm**Relational Metatheory**

Predicated on a philosophical perspective that transcends Cartesian dualism and atomism, theories derived from the relational developmental systems paradigm are framed by a relational metatheory for human development. This focus includes an emphasis on process and a rejection of all splits between components of the ecology of human development (e.g., between nature- and nurture-based variables, between continuity and discontinuity, and between stability and instability). Holistic syntheses replace dichotomies, as well as reductionist partitions of the developing relational system, through the integration of three relational moments of analysis: the identity of opposites, the opposites of identity, and the syntheses of wholes. Deriving from the relational metatheory, relational developmental systems posit the organism as an inherently active, self-creating, self-organizing, and self-regulating nonlinear complex adaptive system, which develops through embodied activities and actions, as they co-act with a lived world of physical and sociocultural objects.

The Integration of Levels of Organization

Relational thinking, with the rejection of Cartesian splits, is associated with the idea that all levels of organization within the ecology of human development are integrated or fused. These levels range from the biological and physiological through the cultural and historical.

Developmental Regulation Across Ontogeny Involves Mutually Influential Individual ↔ Context Relations

As a consequence of the integration of levels, the regulation of development occurs through mutually influential connections among all levels of the developing relational system, ranging from genes and cell physiology through individual mental and behavioral functioning to society, culture, the designed and natural ecology, and, ultimately, history. These mutually influential relations may be represented generically as Level 1 ↔ Level 2 (e.g., Family ↔ Community), and in the case of ontogeny may be represented as individual ↔ context.

Integrated Actions, Individual ↔ Context Relations, Are the Basic Unit of Analysis Within Human Development

The character of developmental regulation means that the integration of actions—of the individual on the context and of the multiple levels of the context on the individual (individual ↔ context)—constitute the fundamental unit of analysis in the study of the basic process of human development.

Temporality and Plasticity in Human Development

As a consequence of the fusion of the historical level of analysis—and therefore temporality—in the levels of organization comprising the ecology of human development, the developing relational system is characterized by the potential for systematic change, by plasticity. Observed trajectories of intraindividual change may vary across time and place as a consequence of such plasticity.

Relative Plasticity

Developmental regulation may both facilitate and constrain opportunities for change. Thus, change in individual ↔ context relations is not limitless, and the magnitude of plasticity (the probability of change in a developmental trajectory occurring in relation to variation in contextual conditions) may vary across the life span and history. Nevertheless, the potential for plasticity at both individual and contextual levels constitutes a fundamental strength of all human development.

Intraindividual Change, Interindividual Differences in Intraindividual Change, and the Fundamental Substantive Significance of Diversity

The combinations of variables across the integrated levels of organization within the developmental system that provide the basis of the developmental process will vary at least in part across individuals and groups. This diversity is systematic and lawfully produced by idiographic, group differential, and generic (nomothetic) phenomena. The range of interindividual differences in intraindividual change observed at any point in time is evidence of the plasticity of the developmental system, and gives the study of diversity fundamental substantive significance for the description, explanation, and optimization of human development.

Interdisciplinarity and the Need for Change-Sensitive Methodologies

The integrated levels of organization comprising the developmental system require collaborative analyses by scholars from multiple disciplines. Interdisciplinary knowledge is a central goal. The temporal embeddedness and resulting plasticity of the developing system requires that research designs, methods of observation and measurement, and procedures for data analysis be change- and process-sensitive and able to integrate trajectories of change at multiple levels of analysis.

Optimism, the Application of Developmental Science, and the Promotion of Positive Human Development

The potential for and instantiations of plasticity legitimate an optimistic and proactive search for characteristics of individuals and of their ecologies that, together, can be arrayed to promote positive human development across life. Through the application of developmental science in planned attempts (interventions) to enhance (e.g., through social policies or community-based programs) the character of humans' developmental trajectories, the promotion of positive human development may be achieved by aligning the strengths (operationalized as the potentials for positive change) of individuals and contexts.

Source: Based on Lerner (2006) and Overton (2013a, 2013b).

In short, the application of developmental science (optimization) is a co-equal partner with description and explanation within developmental science as it now exists.

Once again, the chapters in this edition of the *Handbook* provide rich illustrations of the integrated foci of

developmental scholarship on the description, explanation, and optimization of human development across the life span.

Together, the metatheoretical, theoretical, methodological, and applied features of contemporary developmental

science that are represented across the four volumes of this seventh edition of the *Handbook* allow this reference work to continue its history of marking the best scholarship in our field and of specifying the key directions for scientific progress. These contributions of the *Handbook* emerge from the intellectual abilities and wisdom of the volume editors and the authors of the chapters involved in this edition. I am enormously indebted to Willis F. Overton and Peter C. M. Molenaar, editors of Volume 1, Lynn S. Liben and Ulrich Müller, editors of Volume 2, Michael E. Lamb, editor of Volume 3, and Marc H. Bornstein and Tama Leventhal, editors of Volume 4, for their broad and deeply erudite scholarship, vision, and leadership. Their knowledge and skills created and shaped the volumes they edited.

The volume editors and I are also profoundly grateful to the authors of the chapters in this edition. Their singular levels of expertise and mastery of their areas of scholarship are richly and compellingly conveyed in this edition. The work of these colleagues represents the best scholarship in developmental science, and we are deeply grateful for their truly field-defining contributions to this edition.

I wish to express particular gratitude to William Damon, for his thoughtful, illuminating, and generous Foreword to this edition of the *Handbook*. Professor Damon was the editor of the fifth and sixth editions of the *Handbook* and, as well, for five decades he has been a visionary intellectual leader of the field that we now term developmental science. He stands as a model of scholarly excellence, erudition, and wisdom, and I am deeply grateful to have his ideas frame the volumes in this edition.

In addition, as scholars contributing to reference works of the scope of the *Handbook* realize, their work cannot be crystallized, completed, or disseminated without the efforts of the professional editors and publishers who work with them. The editors and authors of the seventh edition have been exceedingly fortunate to have had superb support and, as well, collegial guidance, from our editors in the Institute for Applied Research in Youth Development at Tufts and at John Wiley & Sons.

Jarrett M. Lerner, the managing editor in the Institute at Tufts, was involved with the seventh edition since its inception. He has organized and advanced every facet of the editorial and production process. His professionalism, knowledge, organizational capacities, efficiency, commitment, and indefatigable, positive spirit were vital to the existence, and to any archival contributions, of this edition.

In addition, Patricia A. Rossi, the executive editor for psychology at Wiley, was a masterful and wise guide and

catalyst for the seventh edition, again from its inception. Her deep knowledge of the scholarly qualities that are required to produce a reference work that will set the standard of excellence for its field, and her enthusiasm and unflagging commitment to enabling editors and authors to attain this standard, were essential contributions to the development and completion of this edition. She and her colleagues at Wiley, who enacted a superbly organized, efficient, and invariantly high-quality production process, have enabled the scholarship of the authors and editors to be superbly presented to our readership.

Across the several years that I have worked on this edition of the *Handbook*, I have been blessed by having support, stimulation, and feedback from my colleagues in the Eliot-Pearson Department of Child Study and Human Development, and from my colleagues, staff, and students at the Institute for Applied Research in Youth Development, both at Tufts University. I am grateful for their inspiration and collaboration. I am also extremely fortunate to have had support for my scholarly work provided by the John Templeton Foundation, the Thrive Foundation for Youth, the Poses Family Foundation, the National 4-H Council, the Altria Group, Inc., the Bertelsmann Foundation, the National Science Foundation, the Gary and Joan Bergstrom family, and several individuals who have made private donations to the Institute to support its research. I thank them for their faith in me and for honoring me with their support. My family has been a vital resource of emotional and intellectual support—encouraging me when things seemed overwhelming and grounding me when, on rare occasions, things seemed to be going exceedingly well. My wife, Jacqueline Lerner, merits special recognition—as my life partner, as my chief scholarly collaborator, and my muse. I would have accomplished nothing in my career or my life without her.

Finally, the volume editors and I want to thank the colleagues and students who will read the chapters in this edition of the *Handbook* and who, we hope, will gain from the work presented across its four volumes. Many of these colleagues will find their contributions to developmental science represented in the pages of this edition. We thank them for these contributions. As well, we are grateful to them for another reason. Many of these colleagues will also be training the next generation of developmental scientists, young scholars whom we hope will be inspired by this edition of the *Handbook* to undertake scholarship that will make subsequent editions even better and more useful.

We wish these younger scientists well in this intellectual journey. As such, with the hope that their scientific

aspirations will be realized, we dedicate this seventh edition of the *Handbook of Child Psychology and Developmental Science* to them.

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January, 2014

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Volume 3 Preface

Like all the other volumes of this *Handbook*, Volume 3 was originally planned by two editors. Together, we drew up a list of the topics we wanted covered and sent invitations to the scholars we wanted to recruit. Early in the process, however, my coeditor, Cynthia García Coll, was offered the opportunity to assume editorship of the discipline's best-established journal, *Child Development*, and the burdens associated with that demanding and prestigious task made it impossible for Cynthia to continue with her role as editor of this volume. I certainly missed her advice and insights, and hope she is pleased with the way the volume developed.

In Cynthia's absence, I was even more reliant on the editor-in-chief, Richard Lerner, and his editorial team at

Tufts University. Rich's suggestions about contributors, along with wise counsel and tactful interventions when necessary to focus the attention of tardy contributors, have helped shape this volume in every respect, and the "back-office" team headed by Jarrett Lerner played an invaluable role in turning our aspirations into reality.

Last, but by no means least, I benefited from the goodwill, generosity, and persistence of 22 separate teams of scholars who created the chapters, accommodated multiple requests for revision, and worked with the editors to create the thoughtful, clear-eyed, and forward-looking chapters that make this volume an invaluable resource for the field.

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CHAPTER 1

Processes Underlying Social, Emotional, and Personality Development

A Preliminary Survey of the Terrain

MICHAEL E. LAMB

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INTRODUCTION

The aim of this volume is to provide a comprehensive assessment of developmental scientific scholarship in relation to social, emotional, and personality development. As with the other volumes in this *Handbook*, contributing authors were selected on the basis of their ability to summarize and synthesize what is known about their designated topics while identifying crucial issues that seem destined to become the focus of important theory-driven research in the years ahead. Whereas contributors to the first edition of this *Handbook* (then, the *Manual of Child Psychology*; Carmichael, 1946) could plausibly claim to have surveyed and cited essentially all scholarly work on their chosen topics, the voluminous literature that has accumulated with increasing pace in the decades since has made that aspiration not only impossible but also undesirable. Readers need informed guidance when either distinguishing between truly important and mundane contributions or discerning those interesting and important lines of inquiry likely to dominate scholarship in the immediate future. Time alone will tell whether our contributors have been prescient, but every reader can recognize the authors' mastery, synthetic ability, and interpretive perspectives.

The 22 chapters that follow provide authoritative and eloquent introductions to topics that lie at the forefront of

contemporary scholarship, and it would be impossible to do justice to their richness, originality, or points of intersection in this brief introduction. Instead, my goal is considerably more modest. In the next section, I draw attention to four overarching themes explored and illustrated in the chapters that follow. Thereafter, I briefly introduce each of the chapters, drawing attention to key themes or insights, especially those that might represent useful points of intersection or cross reference for readers and scholars eager to reassemble the developmental science necessarily disaggregated into the more manageably sized chunks and topically organized chapters of which this volume is comprised.

CROSS-CUTTING CONCEPTUAL ISSUES

The contributors to this volume explore a variety of topics, but their chapters share a number of significant features that are briefly highlighted in this introductory chapter.

Organizational Developmental Contextualism

Like contributors to the other volumes in the seventh edition of the *Handbook of Child Psychology and Developmental Science*, the contributors to this volume have all embraced organizational developmental contextual frameworks to

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guide their conceptualization of ontogenetic processes (see Overton & Molenaar, Chapter 1, this *Handbook*, Volume 1, for a discussion of the relational developmental systems paradigm within which these frameworks are conceptually embedded). This nearly universal convergence of theoretical orientation is noteworthy, representing as it does the transformation of a subdiscipline that was once dominated by the proponents and adherents of grand theories. Viewed in retrospect, there is little doubt that the research motivated by the grand theorists and conducted by themselves and their acolytes enormously advanced our understanding of human development, as documented in many of the landmark chapters published in previous editions of the *Handbook/Manual*, all the way back to the first edition in the Wiley series published about 70 years ago. By the same token, the steady accumulation of evidence held the keys to the destruction of these grand theoretical edifices, as it became apparent that their ability to account for significant portions of the variance in developmental outcomes left most of the variance unexplained.

One response to this realization was to incorporate ideas and findings central to competing theoretical frameworks, simultaneously expanding researchers' ability to explain aspects of development while undermining the purity and coherence of specific theoretical approaches. As documented more fully and eloquently in Volume 1, the frameworks that have since evolved reflect awareness that development is multiply determined and that single-minded focus on any one type of influence is almost certainly misleadingly incomplete. Instead, as several contributors show in the chapters that follow, human development is shaped by both those species-specific and individually differentiating biological processes that are the product of evolutionary and intergenerational transmission; that these biogenic propensities are shaped by sociogenic experiences of ancestors and of the individuals themselves from the time of conception; that each individual's phenomenological construction of interactions and relationships from the onset of postnatal life, constrained as they are by cognitive developmental structures, condition the effects of social experience on the developing sense of self and on a range of behavioral propensities; and that the behavior and beliefs of both the socialization agents and developing children are profoundly influenced by dynamically changing aspects of the behavioral and sociocultural context. It remains to be seen whether developmental scientists can create one or more theoretical frameworks that simultaneously represent and recognize the complexity of human developmental processes while generating testable predictions and hypotheses.

Few developmental scientists would contest the evidence regarding the importance of each of the formative factors mentioned above, although researchers (like the contributors to this volume) tend to focus their attention selectively on a subset of the formatively significant factors. This strategy has fueled explosive growth in the number of published papers exploring aspects of social, emotional, and personality development. The absence of strict and definitive theoretical predictions, however, have allowed researchers to focus attention on easily answered questions while sidestepping the more theoretically challenging and (often) more central questions. Whether developmental science continues to advance our understanding of human behavior in the next few decades will depend, in large part, on the success of efforts to address these complex but seldom explored interdisciplinary questions about poorly understood and vaguely described developmental processes. Readers who are so motivated will find the following chapters invaluable, because all of the authors have clearly identified not only what we (as a discipline) currently know and believe, but also what questions need to be framed and addressed if we are to advance our collective understanding.

The Focus on Individual Differences

The ascendance to prominence of the organizational contextual developmental framework was potentiated by a shift in the 1970s from a focus on normative aspects of social, emotional, and personality development to an emphasis on individual differences, a shift that made evident the inability of any of the grand theories to account for the rich diversity of developmental trajectories and outcomes that were readily apparent. This concern with individual differences continues to the present, and dominates each of the chapters in this volume, although the contributing authors painstakingly analyze the factors accounting for individual differences in the context of normative processes, thereby creating more coherent and persuasive portraits of human developmental processes than would otherwise be the case.

Diversity and Internationalism

By the same token, the nearly universal embrace of the developmental organizational contextual approach is responsible for another common feature of these chapters: Recognition that developmental trajectories and contexts are extremely diverse despite the fact that most of our knowledge has been derived from studies of individuals growing up in a small number of quite unrepresentative

socioecological contexts. Although developmental science is an increasingly international field, as the list of contributors makes clear, it has long been dominated by the United States, with disproportionate representation of research participants from relatively advantaged White European American backgrounds. Relative to that template, scholars decades ago began bemoaning the implicit assumption that those whose backgrounds deviated from this norm must be deficient in some ways, although serious focus on representative populations emerged much later, and until two decades ago, children growing up outside the United States were seldom studied except, on rare occasions, when select groups of children from other countries were misleadingly portrayed as representative of comparison cultures.

Meaningful cross-cultural research is increasingly common today, fortunately, supported by a growing number of developmental scientists who grew up outside North America, and the urgent need to recognize and study more diverse groups within and outside the United States is universally recognized. Although concerns with diversity have not animated scholarship on all aspects of developmental science equally, as perusal of the following chapters makes clear, it is widely recognized as a pressing need, and the amount of attention to this topic provides a sharp point of distinction between contributions to this as opposed to earlier editions of this *Handbook*.

Prominent Phases of Development

One final historical change that also deserves mention is the phase of development accorded the greatest attention by researchers and scholars. During the 1960s, students of social, emotional, and personality development focused most attention on children in early to middle childhood. There was relatively little concern with infancy, and when adolescents were studied, they were the university students who could easily be surveyed by instructors doubling as researchers. In the 1970s, however, the focus switched to infancy, driven in part by the publication of Bowlby's (1969) seminal treatise on attachment theory and the resultant spirited debates between attachment and social learning theorists about the ways in which early social relationships shaped development. Over the ensuing decades, the focus on infancy has declined and scholars have increasingly recognized the importance of adolescence, with more recent recognition that the newly designated phase, *early adulthood*, might deserve much more attention than it has been accorded hitherto. Readers of this volume will accordingly observe that the contributing authors

have predominantly focused on childhood and subsequent phases of development rather than on the earliest years of life. There are significant exceptions, however, with many contributors emphasizing the formative importance of infancy for aspects of development more typically associated with (and studied in) later years of life.

OUTLINE OF THE VOLUME

Contrasts between earlier editions and the seventh abound, and the differences are perhaps most dramatic and obvious when examining the methods employed by researchers seeking to explore social, emotional, and personality development. Particularly when seeking to understand the infant's mind, earlier generations relied on parental reports, fanciful speculation, and the occasional observational diary kept by distinguished biographers such as Darwin, Piaget, and Preyer. Only in the 1960s did researchers begin to deploy techniques such as visual preference and habituation paradigms to explore infant abilities and tendencies, especially in the perceptual realm, as evident in Kessen, Haith, and Salapatek's (1970) masterful and encyclopedic contribution to the third edition of the *Handbook/Manual* published the year after Bowlby's (1969) influential book on attachment and before the resultant wave of research on infant social and emotional development crested. Fittingly, the present volume—like the first in the Wiley series in 1946—opens with a broad and engaging introduction to the ingenious ways in which contemporary developmental scientists study social and emotional behavior in their efforts to elucidate developmental processes. In their chapter, Brownell, Lemerise, Pelpfrey, and Roisman (Chapter 2) describe in turn how and why researchers use observational, verbal report, and psychobiological measurement strategies, the strengths and weaknesses associated with each of these, and how researchers can maximize the reliability and validity of the information they obtain. Brownell and her colleagues make clear that the most useful insights have come, and surely will come in the future, from research driven by clear theories and hypotheses and from studies employing multiple complementary methods, rather than any single approach, with its inevitable weaknesses and limitations. Sadly, a scan of most journal tables of contents reveals how frequently contemporary researchers ignore these fundamental admonitions, whereas close readers of later chapters will observe just how frequently the seminal and enduring contributions to the scholarly literature are all marked by careful adherence to Brownell and colleagues' admonitions and guidance. Where Chapter 2 underscores

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the role of sound methodology in the generation of knowledge and understanding, Chapter 3 addresses a topic typically dominated by atheoretical and jumbled observation by illustrating the transcendent value of coherent and organizing theoretical frameworks. Specifically, Coall, Callan, Dickins, and Chisholm richly document how the prenatal period of human development has implications for later development by drawing on an evolutionary life history approach. Whereas evolutionary psychologists are often criticized for using a caricature of evolutionary theory to generate post-hoc and untestable explanations of contemporary human behavior, Coall and his colleagues powerfully demonstrate how a thorough understanding of biological processes at both the population and molecular levels (and everywhere in between) allows us to conceptualize the dynamic nature of the relationship between gestating mothers and the organisms (concepti, fetuses) growing within them in a coherent way that explains why, how, and how much experiences during the prenatal period influence later individual development, as well as the development of offspring and subsequent generations of descendants.

In recounting formative prenatal processes (which were, coincidentally, the focus of Carmichael's own contributions to the 1946, 1954, and 1970 editions of the manual that once bore his name), Coall and his colleagues focus attention on the hypothalamic-pituitary-adrenal (HPA) axis that, among other things, modulates and mediates reactions to psychological challenges and stresses. Discussion of the HPA axis is also at the heart of Chapter 4, in which Gunnar, Doorn, and Esposito introduce and explain the conceptualization of the psychoneuroendocrinology of stress. As noted by Brownell and her colleagues in Chapter 2, developmentalists (along with many other psychologists and neuroscientists) have taken advantage of the ease with which cortisol levels can be assessed noninvasively to add measures of cortisol to studies in which stress might be anticipated or feared. Gunnar and her colleagues clearly document how much we have learned about the developing HPA axis and its role in mediating individual reactions to psychological challenges. As we might expect, a burgeoning understanding has brought recognition that single measures of cortisol levels are often uninformative, even misleading, whereas careful and comprehensive assessments in which cortisol levels are viewed in relation to diurnal, individual, and contextual factors can render assessments richly informative about individual status as well as about developmental processes. Furthermore, advances in our understanding of stress reactivity, and

more particularly of the HPA axis's functions, have made necessary widespread recognition of the extent to which the future functioning of the axis can be powerfully, perhaps irrevocably, altered by excessive earlier activation in response to influential experiences, as Gunnar et al. explain, complementing Coall et al.'s discussion of prenatal experiences and their sequelae in Chapter 3. Taken together, the two chapters roundly and conclusively document the untenability of simplistic biogenetic determinism by illustrating the complex and bidirectional links between biology and experience.

This realization evokes memories of the nature–nurture dichotomy that long bedeviled developmental science by promoting a kind of dualism in the analysis of developmental processes. Nowhere was this more evident than in discussions of temperament and personality, the focus of Chapter 5 by Chen and Schmidt. Psychologists have been assessing personality almost as long as they have been assessing intelligence, and the early emerging individual differences in behavioral style known as temperament have fascinated parents, pediatricians, nurses, psychologists, and psychiatrists for more than half a century. Indeed, the classic New York Longitudinal Study was undertaken and reported by child psychiatrists Thomas and Chess (1977) to show that stable individual differences were evident from infancy. Since Thomas and Chess's pioneering work, Chen and Schmidt show, scholars have struggled to determine exactly how many distinct dimensions of temperament there are, how they originate, how they can best be assessed, whether and how they change over time, how they relate to the dimensions of personality that have been studied extensively in adulthood, and how they interact with environmental factors to determine adjustment. These issues and conundrums endure to the present, and growing recognition that temperament is neither immutable nor necessarily innate has been complemented by increasingly sophisticated attempts to understand both the associations between psychophysiological processes and behavioral manifestations and the extent to which these powerful individual differences shape and are shaped by experiences, beginning in utero and continuing across the life span.

The dynamic interactional processes involving young children and the adults charged with their care move to the foreground in Chapter 6, in which Thompson discusses research and theory in relation to early relationships and self-regulation. Building on a theme raised earlier by Gunnar and her colleagues, Thompson draws attention to the dependence of young infants on interventions by adults to regulate their states of arousal before showing

how researchers and scholars have elucidated the gradual transition of responsibility for emotion regulation to young children themselves. Studying these developmental processes, researchers have been particularly impressed by the magnitude of individual differences in the nurturing and regulatory behavior of different adults (especially parents) and the enduring impact of these individual differences on their offspring's development. Attempts to unpack the processes have dominated research on early social relationships for decades, as Thompson (1998, 2006) has documented in earlier editions of this *Handbook*, and we have thus learned a considerable amount about the developmental processes that underlie early social development and the emergence of self-control and regulation in the first few years of life.

The focus shifts in Chapter 7 from the ways in which individual developmental trajectories are shaped by experience to the factors and processes that minimize and mitigate harmful effects of adverse experiences. This topic has gained in prominence over the last several decades as we have simultaneously learned both how many factors, singly or in concert, can affect the course of development among children in risky circumstances and how variable the effects of these factors can be. Resilience in the face of adversity helps explain and reconcile these apparently contradictory bodies of knowledge, argue Luthar, Crossman, and Small in Chapter 7. They further show that, whereas resilience was once viewed as a characteristic of individuals somewhat akin to a dimension of temperament or personality, it is now viewed as a complex concept vested in the individual, his or her social and physical context, social history, and the interaction among these, although considerably more research remains to be completed before the multilevel complexity of resilience, and its implications for developmental science, will be understood. Luthar and her colleagues emphasize that research on resilience is fundamentally applied in nature, that protective factors have difficulty overcoming the pernicious and pervasive risks posed by chronic and severe maltreatment (a point underscored by Cicchetti and Toth in Chapter 13), and that successful interventions for children will require more focus on parental well-being and its correlates.

Chronic illness and disability are intrinsic characteristics that typically distinguish individuals from their relatives, rather than making them similar to one another, as Crnic and Neece show in Chapter 8, and they can have equally extensive and multifaceted effects on development. As noted in multiple chapters throughout this volume, however, these effects are both direct and indirect as well

as bidirectional. Many chronic conditions are associated with enduring differences in physical, cognitive, and emotional function that directly affect attainments and behavior throughout childhood and, indeed, across the life span. Equally, however, these conditions, and their associated effects on the affected individual's behavior, can powerfully affect the well-being, relationships, and behavior of other key people in their lives, most notably their parents and members of their families, and these can in turn affect the ways in which those people interact with the probands, indirectly affecting their experiences and their developmental trajectories. Broad individual differences of diverse origins among probands and family members, and the heterogeneity of the conditions that have been identified and studied, combine to ensure that our understanding of the processes, and especially of powerful variations therein, remains quite superficial, and thus have compromised our ability to develop, implement, and test interventions designed to ameliorate or reverse destructive developmental processes.

Unlike characteristics such as resilience, vulnerability, or chronic illness, race and ethnicity are ascribed characteristics and class is an inextricable aspect of family background. Where Luthar and her colleagues show in Chapter 7 how elements of the social environment can simultaneously produce change and buffer against those effects, the focus shifts even more emphatically to characteristics of the socioeconomic context in Chapter 9, in which Marks, Ejesi, McCullough, and García Coll explore the implications of discrimination for child and adolescent development. In the course of development, children soon become aware of some superordinate and externally evident categories (e.g., gender, race, ethnicity) into which people, including other children, can be sorted. They also learn, all too quickly, that these categories underlie patterns of discriminatory judgment and prejudice on the part of others, including adults, and that these judgments and prejudices often come to account both for the discriminatory treatment they receive from others to whom they are both similar and different, and for them to begin treating others in like fashion (see also Killen & Smetana, Chapter 17). Marks and her colleagues trace the developmental course from perceptual to social discrimination and review evidence of the ways in which prejudice and discrimination diminish and affect, to varying degrees, both those who are prejudiced and those against whom they discriminate. In a world characterized by a rapidly expanding population, increasing levels of migration, and dramatically evident differences in skin color, ethnicity,

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religion, gender, and language, the urgency of efforts to understand better the relevant developmental processes could hardly be exaggerated.

The twin processes of discrimination and prejudice are also at the heart of Chapter 10, written by McLoyd, Purtell, and Hardaway, which focuses more narrowly on the implications of race, class, and ethnicity for people making the transition from adolescence to adulthood. McLoyd and colleagues' overarching message is simple but powerful: Discrimination, especially against people of color and those from minority ethnic groups, profoundly limits the opportunities available to many individuals, and these restrictions have enduring—lifelong—implications, foreclosing educational and professional occupations for which they would otherwise be suited and thereby limiting their aspirations, achievements, incomes, and the opportunities that they can open up for their own children. McLoyd and her colleagues elucidate the extent to which constraints on the adult generation limit the social capital, including the social contacts and networks that play a crucial role in opening metaphorical doors for young adults in an increasingly competitive world. These intergenerational processes remain at least partially responsible for the failure of early interventions to have enduring transformational effects on the respondents' lives and for the perseveration, if not intensification, of intranational inequality in a growing proportion of both developed and developing countries around the world.

Discrimination attributable to race, class, and gender have tragically long histories, and have been the focus of both scholarly and impassioned multidisciplinary attention for centuries. By contrast, widespread awareness of discrimination on the basis of sexual orientation is of far more recent origin, even though individuals with non-heterosexual orientations must have existed for millennia, whether or not their freedom to act on their inclinations was severely constrained. Individuals with same-sex orientations have also had children far longer than is generally recognized, often in the context of heterosexual marriages consummated to satisfy individual, familial, or societal expectations. Within the last few decades, however, increasing numbers of gay and lesbian adults have made their orientations public and have sought to raise children, singly or in the context of same-sex relationships, and a substantial literature exploring the implications of their children's development is summarized by Golombok and Tasker in Chapter 11, within the context of a broader consideration of changing family environments. In a comparatively short period of time, Golombok and Tasker

report, developmental psychologists have come to recognize that the majority of children in Western countries grow up in nontraditional family environments, including households that do not involve married mothers and fathers with genetically related children. By examining the research literature on single, cohabiting, step, assisted reproduction, and same-sex parent families, Golombok and Tasker show that initial assumptions that any deviation from traditional family constellations would inevitably have adverse effects on children's development have proven unfounded. Nevertheless, some family structures are associated with enhanced risks of maladjustment on the part of children. The growing body of research helps document that family processes, rather than family structures, better explain developmental trajectories for children in different family contexts.

Almost all children grow up in some kind of family, making that environment of near universal relevance, whereas significantly fewer children have encounters with the legal system. Those children are the focus of Chapter 12, written by Lamb, Malloy, Hershkowitz, and La Rooy. These children are a heterogeneous group, who may enter the system as witnesses, victim witnesses, suspects, or as the focus of public or private law proceedings designed to make decisions about where the children should live. Lamb and his colleagues show in detail how a variety of interacting factors influence children's performance in legal contexts, regardless of the specific roles they are playing, and that the failures of various adult professionals to recognize the specific and unique capacities and limitations of children in legal situations help to stack the deck against them, reducing the chances of fair and equitable treatment and protection. By contrast, supportive practices that recognize developmental differences can dramatically affect children's level of performance. Accordingly, a sizable portion of Lamb et al.'s chapter recounts examples of ways in which important practices and procedures could be altered, informed by our growing understanding of children's developing characteristics.

Apart from the substantial number of children who have some (often tangential) contact with the legal system because their separating parents cannot agree on post-separation living arrangements, most of the children who encounter the legal system are the presumed victims of child maltreatment, and the effects this has on children's development are the focus of Cicchetti and Toth's chapter (Chapter 13). Decades of research, mostly conducted by these scholars, have elucidated in some detail exactly how histories of maltreatment adversely affect and compromise

children's development, and these findings are summarized in this chapter. Readers will be particularly struck by the amount of evidence now available to document the neurophysiological mechanisms whereby maltreatment affects children, and the extent to which studies documenting the adverse effects of maltreatment on children's development has also substantially enriched our understanding of normative developmental processes. Cicchetti and Toth's chapter further complements Gunnar et al.'s (Chapter 4) description of the ways in which neurophysiology can be transformed by repeated stressful experiences, and Luthar et al.'s (Chapter 7) analysis of individual differences in reactions to stressful life experiences, such as maltreatment, and particularly of the factors that promote resilience in such circumstances.

Following this series of chapters concerned with factors that affect children's development and performance, the focus shifts to specific aspects or "products" of development, beginning in Chapter 14 with Hughes and Devine's focus on "theory of mind," the ability to perceive that others do not know the world as we, as individuals, do. Since Wimmer and Perner (1983) first drew attention to an apparently abrupt transition in this regard around 4 years of age, and Frith (Frith & Happé, 1994; Frith, Happé, & Siddons, 1994) observed that this awareness was often lacking or deficient in children and adolescents labeled autistic a decade later, hundreds of studies have explored the emergence of theory-of-mind understanding in typically and atypically developing children, with most research underscoring just how important this aspect of development appears to be. In their chapter, Hughes and Devine show how an understanding of theory of mind grows out of everyday social interactions beginning in early infancy as well as how cultural differences in parental behavior parallel cultural differences in theory-of-mind understanding. Both sets of findings underscore the role of social experiences in fostering development in this domain and recent research examines how theory-of-mind understanding continues to develop from early childhood to adolescence.

As both Hughes and Devine (Chapter 14) and the authors of Chapter 15 agree, theory-of-mind understanding not only emerges from social interaction, but also powerfully affects social interaction. Nowhere is this more evident than with respect to prosocial behavior, which, as Eisenberg, Spinrad, and Knafo-Noam show conclusively in Chapter 15, becomes increasingly sophisticated over time. Extensive research, often drawing on observations of children interacting with peers and parents in experimental,

educational, and home settings, shows that prosocial behavior is evident from early in life, and that its continued development, as well as children's own understanding of what it means, are fostered by the reactions of parents, teachers, and peers who play increasingly important roles in this aspect of socialization. Eisenberg and her colleagues further underscore the extent to which this area of research has been enriched by efforts to understand the biogenetic factors that may underlie prosocial behavior, and in particular its neurophysiological correlates and bases. They rightly caution that both the biogenetic and socialization influences may often be mediated by their effects on individual differences in self-regulation, emotionality, and agreeableness as well as on the nature of their social relationships. In addition, it is clear that an enhanced understanding of prosocial beliefs and tendencies may also advance our understanding both of aggression and bullying as well as of effective forms of intervention, as noted by Eisner and Malti in Chapter 19.

Like prosocial behavior, achievement motivation and school engagement are influenced by agents of socialization both inside and outside the family (Wigfield, Eccles, Fredricks, Simpkins, Roeser, & Schiefele, Chapter 16). Despite continued engagement over time with significant socialization agents (parents, teachers) eager to promote achievement and school engagement, however, Wigfield and his colleagues draw attention to a significant decline over time in the extent to which adolescents around the world appear motivated to achieve. Their efforts to understand this surprising but robust developmental pattern are framed by an expectancy-value model of achievement that seeks to explain the development of motivation by showing how children's expectancies and values are influenced both by their own experiences when undertaking novel challenges as well as by the attitudes and expectations of those around them and how these, in turn, influence children's performance, persistence, and task choice. Furthermore, unlike most developmental models, the model explored by Wigfield and his colleagues includes cultural factors and historical events as intrinsic components.

Is prosocial behavior moral? To the extent that morality is centrally concerned with evaluations of the ways in which people treat others, the question is certainly appropriate. Of course, students of morality within philosophy and psychology have long debated whether morality merely involves behaving prosocially, or whether there are some universal features of morality, such as the principles of justice and equity, and there has been considerable focus over the last few decades on the cultural and subcultural

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differences in moral behavior and evaluation that Killen and Smetana explore in Chapter 17. In our increasingly integrated world characterized by ever-increasing international engagement and migration, these issues are particularly pertinent, and they also have major implications for developmental scientists. Killen and Smetana further show how students of morality have successfully identified the complexity of morality in early life, revealing that moral competencies are related to intentionality and emotion understanding, and explore the challenges posed to morality in childhood and adolescence by the stereotyping, interpersonal conflicts, and social inequalities encountered in everyday social life.

If morality defines the ways in which individuals seek to behave toward and to evaluate the behavior of others, then the focus of Chapter 18 on conceptualizations of the self is profoundly different. In the century and a quarter since William James (1890) published his seminal work on this topic, many psychologists have pondered the developmental processes by which individuals come to define the essence of their continuity, aspirations, background, and history, as well as of the ways in which these complex interrelated constructions are altered or elaborated in response to social experiences. In Chapter 18, Spencer, Swanson, and Harpalani address these universal and enduring issues from the perspective of minority youth in the United States, illustrating (as do McLoyd and her colleagues in Chapter 10) how the legacy of discrimination and inequality not only forecloses the concrete opportunities for many non-White youth but limits their self appraisals and aspirations in ways that have lifelong and intergenerational implications. By showing how individual trajectories are shaped by intrinsic as well as contextual factors, Spencer and her colleagues again illustrate the heuristic usefulness of the dynamic developmental contextual approach adopted by most contributors to this volume. Through a focus on minorities in the United States, with an emphasis on race, ethnicity, color, and gender, Spencer et al. draw attention to processes that affect youth regardless of cultural contexts, and highlight the implications of privilege for self-appraisal processes.

Aggressive and violent behavior is the focus of Eisner and Malti's review (Chapter 19). Students of aggressive behavior in childhood and adolescence have often worked alongside and have used the same methods and theoretical approaches as those studying the social-cognitive aspects and socialization of prosocial behavior (Chapter 15), interpersonal relationships (Chapter 22), and gender differences (Chapters 20 and 21), but the field has been

dominated by debates between those who emphasize the evolution and inevitability of aggressive behavior and those who focus on social factors, in the form of parental and peer behavior and social norms, that appear to regulate individual behavior. Proponents of both families of theories about the development of aggressive behavior can point to persuasive evidence of at least some limited significance, but adherents of both approaches have been shaken out of their metaphorical comfort zones by evidence that the levels of serious interpersonal violence have dropped precipitously worldwide, apparently regardless of tangible changes in economic, political, or criminal justice policy. As Eisner and Malti observe, such well-documented trends have revealed how much is still not understood about the determinants and developmental origins of violence and aggressive behavior.

The next two chapters are concerned with gender and sexuality. Specifically, gendered development is Hines's focus in Chapter 20. Gender is one of the so-called ascribed human characteristics, and there has long been controversy about the existence, extent, and provenance of behavioral differences between males and females. Hines shows that many of the gender differences studied by psychologists are quite small, and that mean-level differences between the sexes are often associated with substantial degrees of overlap, such that many females, say, have scores above and below the mean scores for males, and vice versa. For a long time, and in some circles even today, debates have ensued between those who assume that the differences are biologically determined and the others who believe that they are the result of social construction processes, and the vehemence with which these beliefs are held, along with the methodological difficulties associated with conducting definitive research on this complex topic, have inhibited careful research addressing these questions. As Hines shows, however, gendered behavior appears to be a classic example of the ways in which biological and social factors interact and complement one another, with ample evidence that both types of factors play important roles in the emergence and development over time of gender-differentiated behavior of all sorts.

In the succeeding chapter, Diamond, Bonner, and Dickenson (Chapter 21) ask a slightly narrower, though related, question about the development of sexuality, a topic that has attracted researchers' attention much more recently than have questions about gender differences more generally. In large part, scholars' failure to address this question until the 21st century can be attributed to a cultural unwillingness to recognize sexual feelings and

behaviors in children and adolescents, thereby leaving this important facet of development poorly explored and inadequately understood. Somewhat surprisingly, perhaps, progress in this field has also been hindered by basic disagreements among researchers about the operational definitions of various sexual orientations, with the different approaches adopted by different research groups accounting for contradictory answers to some apparently fundamental questions about, for example, the stability of sexual orientation. Diamond and her colleagues also draw attention to poorly recognized gender differences in the stability and meaning of sexual orientation and show how these may have important implications for our understanding of gender socialization more generally.

Sexuality and sexual orientation are enacted socially, in the context of interactions with others, including romantic relationships, but just as developmental researchers long shied away from careful examination of sexuality in childhood and adolescence, so too did they pay scant attention to the development of close friendships and romantic relationships in these phases of life, choosing instead to focus on social interactions with peers more generally. In Chapter 22, Furman and Rose focus on a growing body of research on the characteristics and development of friendships, romantic relationships, and other dyadic peer relationships. The review highlights the extent to which such relationships bring together individuals with unique personalities and histories whose backstories play important roles in shaping the parameters of their relationships as well as their developmental course and outcomes, including longevity. For the same reason, friendships and romantic relationships have much in common, although they have tended to be the focus of different research groups who regrettably overlook potential commonalities and have created bodies of literature that intersect less than would be desirable. One troubling theme, evident particularly in the research on emergent romantic relationships, highlights the surprisingly high levels of interpersonal violence in these relationships.

In Chapter 23, finally, King and Boyatzis discuss the role of spirituality and religion in childhood and adolescence. This topic is relatively new to developmental science, having made its debut in the Sixth Edition with a chapter focused on theoretical issues. As with many other contributors, King and Boyatzis use a developmental contextual framework that focuses on both individual and contextual factors to show that religion is a significant force in the lives of most American children and adolescents, that its salience is attributable to the family and (to a lesser

extent) community factors, and that individual differences in both spirituality and the commitment to religion are associated with individual differences in civic engagement, concern about others, and other indices of psychological adjustment. Interestingly, differences associated with the type of religion (e.g., Catholic, Jewish, Mormon) appear to be much less significant than might be expected, but there is a pressing need for research on the role of religion and spirituality in the understudied parts of the world (especially in Asia and Africa) where religious affiliation is a central component of self-identity and, often, ethnicity and political orientation. Indeed, perhaps because religion is a much more significant social institution in the United States than in other research-intensive countries, King and Boyatzis's chapter is dominated by research on and by Americans.

CONCLUSIONS

It is impossible to do justice to 22 richly insightful and thorough chapters so briefly, and the preceding paragraphs merely telegraph some key features of the contributions while drawing attention to some overarching themes and points of intersection. Each of the chapters will reward readers with an up-to-date knowledge and understanding of the topics covered, but it is perhaps worth ending this introduction with a word of caution. Increasing levels of specialization have led over the last several decades to a situation in which researchers and scholars master vast bodies of knowledge about narrower and narrower topics. To understand development fully, it is necessary to recognize that the processes or functions or behaviors that are the focus of any scholar's research co-occur alongside and inextricably affect the dozens of other processes, functions, or behaviors that are the focus of other researchers' work. As a result, although the salami-sliced child may be easier to study, it is important to acknowledge the inevitable risk of ignoring or overlooking the whole developing child and his or her sociocultural and historical environment.

If this introduction entices readers to reach beyond the chapters focused on their own narrow interests, to recognize some of the ways in which different aspects of development must be viewed in broader context, and to research previously unstudied topics and questions, then this chapter will have succeeded. Developmental science has never had more to offer, but the risk of centrifugal disintegration has never been greater. Along with the entire

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editorial team, I earnestly hope that this *Handbook* helps counteract the forces that threaten the field's coherence and integrity.

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CHAPTER 2

Measuring Socioemotional Development

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INTRODUCTION

From its scientific origins in the 19th century, the study of human development has grappled with issues of how to measure behavior, emotion, perception, and cognition in immature, often minimally verbal organisms, and how to do so in ways that capture change while at the same time preserving core constructs over periods of developmental transformation. Measurement must permit the study of

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normative, or interindividual changes in functioning with age, as well as ipsative, or intraindividual differences. This challenge is especially difficult because development occurs at multiple levels of organization, from molecular to group-level processes, all of which affect and are affected by socioemotional behavior and events. And children themselves produce distinct measurement challenges because of their many age-related immaturities, from attentional, cognitive, and linguistic to social, emotional, and self-regulatory, which demand unique, often age-specific assessment strategies.

G. Stanley Hall, one of the field's founding fathers, consigned the study of development to minor status because research with children in the 19th century relied on observational measures rather than reaction time, psychophysiological measures, and introspection, which

then characterized the new science of experimental psychology, a perspective shared by Wundt (Cairns, 1998). However, as detailed by Preyer (1888) in his acclaimed baby biography, *The Mind of the Child*, observational measures were indeed scientific if they adhered to several standards, including direct, unobtrusive data collection by multiple unbiased observers, conducted several times per day, with immediate, detailed recording. Preyer thus presciently foreshadowed many of the measurement standards adopted by developmentalists who have used observational methods over the ensuing century and a half. Hall and his students, meanwhile, put questionnaire methods to work, collecting hundreds of responses from thousands of children of various ages as well as their parents or teachers (e.g., Hall, 1893), thereby establishing another of the field's primary measurement approaches. The third major approach to capturing development, measures rooted in the child's physiological and neural response systems, also has its origins in the field's early history. Boring (1929), the great historian of psychology, traced the roots of experimental psychology to the experimental physiology of the late 18th and early 19th centuries. By the early 20th century, physiological techniques were being used with children. These included cardiac recording and electroencephalography (EEG) in newborns to identify normative response patterns; by mid-century, evoked cardiac and neural responses were used with infants and young children to study developing responsivity to auditory and visual stimuli (Eichorn, 1970; Kessen, Haith, & Salapatek, 1970).

These three measurement approaches characterize the study of most aspects of development, including socioemotional development, and they are used to organize the current chapter. We focus the chapter on these *sources* of measurement because these are the tools of the trade, the fundamental means by which we describe and attempt to understand change and continuity in development. A detailed analysis of the *facets* of measurement (Messick, 1983), such as types of scores, response categories and characteristics, or competence–performance distinctions, is beyond the scope of this chapter, but see Hartmann, Pelzel, and Abbott (2011) for a brief discussion of measurement facets in developmental research. The chapter also does not address design (e.g., longitudinal, quasi-experimental, or microgenetic designs) or analytic methods and issues (e.g., growth modeling, item response theory); for substantive treatments of these topics the reader is referred to Teti (2005) and Laursen, Little, and Card (2012).

BRIEF HISTORY OF MEASUREMENT IN THE STUDY OF SOCIOEMOTIONAL DEVELOPMENT

In the first *Handbook of Child Psychology* (Murchison & Anderson, 1931), John E. Anderson introduced the chapter on methods with this observation:

In the history of any science there can be discerned two trends, one consisting of the main body of fact and generalization... and the other of the methods and techniques by means of which problems are attacked. A problem... does not become a scientific problem until a method of attack can be set up. (p. 1)

Anderson thus recognized that efforts to understand development are only as good as the basic principles and available means of measurement. Measurement in socioemotional development has often meant trying to quantify what *cannot* be seen, including emotions and motivation, temperament and personality, beliefs and norms, and social perception and understanding, in addition to what *can* be seen such as emotion expression, aggression, prosociality, and relationship qualities. The perils of interpreting measures of the unseen, particularly in infants and young children, without benefit of converging language-based techniques, are very real (e.g., Perner, 2010) and have been recognized from the earliest era of developmental science (Koffka, 1924). However, advances in technology have produced new measurement options, especially for the unseen, opening both new opportunities and new challenges. For example, many social and emotional developmental processes can now be linked to genetic, biochemical, and brain activity correlates.

Measurement approaches have reflected the theoretical zeitgeist of the time. Early in the 20th century, during the period sometimes referred to as “dust-bowl empiricism,” observational methods were extensively used to describe children's social behavior and interaction in their everyday environments (Barker & Wright, 1951; Sears, 1975). This approach fell from favor with the rise and dominance of learning theories, including social learning theory, in the 1930s and 1940s, which emphasized laboratory experiments and constrained response options to specific events designed to address questions about social phenomena such as imitation and aggression (Cairns, 1998). In the 1950s, interviews and questionnaires were widely used to study childrearing attitudes and parenting practices (e.g., Whiting & Child, 1953). These mid-century measurement procedures were consistent with the theoretical emphasis on a unidirectional model emphasizing social influences

operating on a passive child. The goal was to identify factors in the social environment that explained social and emotional behavior.

Several theoretical shifts in the 1960s and 1970s changed the measurement landscape. With increasing recognition of Piaget's theoretical work, an emphasis on the active child began to take hold. Bell's (1968) classic paper on bidirectional effects, presaged and in part inspired by Sears's (1951) earlier call for the study of dyadic processes in social behavior, led to a growing focus on interactions, including the child's contributions. Simultaneously, concerns about the ecological validity of small-scale laboratory experiments with constrained response options and artificial stimuli (McCall, 1977) began to send investigators back into children's everyday environments (Bronfenbrenner, 1979), or to simulate those environments in the lab (e.g., Ainsworth & Bell, 1970), employing observational methods once again. This trend was further catalyzed by the rise of theories emphasizing the biological and evolutionary bases of behavior, accompanied by ethological methods that relied on naturalistic observation (e.g., Blurton-Jones, 1972). At the same time, other investigators were enlarging the theoretical space to include multiple levels of social context as determinants of development (Bronfenbrenner, 1979; Lewin, 1954), from family to neighborhood to culture, which also demanded observational procedures for capturing the formative features of settings and contexts. Current research in socioemotional development now uses the full range of measurement approaches that established the science of child development, including observational methodologies, verbal reports from interviews and questionnaires, and structured laboratory tasks.

In the past few decades, new methodologies have arisen, adding to measurement possibilities and ushering in new questions and levels of explanation. Many of these include the very measures whose absence Hall rued in the early days of the science, such as reaction and looking time measures, psychophysiological assessments of heart rate and vagal tone, pupillary dilation, and stress hormones. New measures of neural activity such as functional magnetic resonance imaging (fMRI) and near-infrared spectroscopy (fNIRS) have been added to the armory and, most recently, measures at the level of the genome and epigenome. Grounded in the biological correlates of behavior, these procedures permit us to measure psychological events and processes that are often not open to observation or self-report. The technologies making them available have been motivated in part by developmental questions about

the physiological and neural systems that regulate emotion and social behavior. Although these measurement procedures come with their own challenges, they also permit a truly multilevel approach to the study of socioemotional development, generating explanations that cut across all levels of organization and functioning from gene to brain to behavior. Notably, these approaches also permit us to examine more precisely the role of experience in development and how plasticity itself may develop (e.g., Dennis, Buss, & Hastings, 2012). Thus, developmental science has become progressively more multimethod, multilevel, and transactional in its approaches to measuring children's socioemotional functioning and the processes that produce both age-related change and individual differences.

CROSS-CUTTING THEMES IN DEVELOPMENTAL MEASUREMENT

The three sources of measurement that structure this chapter (observational, verbal report, and psychobiological measures) possess unique strengths and limitations. Developmental researchers must also confront a number of assessment issues that cut across measurement approaches; we review the most important of these below. First, we focus on general measurement concerns; then we consider issues surrounding specific methodological choices. Detailed consideration of each source of measurement and its specific issues then follows.

General Measurement Issues

Measurement quality determines the credibility of scientific inferences, whether the methodology is classic or cutting-edge. We discuss three issues that are central to measurement quality in developmental science: validity and reliability; characterizing individual differences in development as categories or as continua; and assessing stability and change over time.

Validity and Reliability

There is no more fundamental set of concepts in scientific measurement than validity and reliability. Validity refers to how *accurately* a measure of a construct assesses the latent entity of interest. Developmental psychology, like most of psychological science, was strongly influenced by the classic work of Cronbach and Meehl (1955), who outlined a general approach to demonstrating *construct validity*. In the original formulation, a measure acquires

construct validity based on its pattern of causal associations with other variables to the extent that these reproduce the pattern implied by a theory. Importantly, evidence of this sort comes in two distinct forms—*convergent* validity (a measure assesses what it should) and *discriminant* validity (a measure does not assess what it is not intended to; see Campbell & Fiske, 1959).

Reliability, in contrast, reflects *consistency* of measurement. Distinct reliability issues are associated with different types of measurement. The myriad diagnostics available for assessing measurement reliability must therefore be tailored to both the method and the question. For example, test-retest reliability indicates how consistently the same indicator applied to the same sample produces the same measure. In contrast, the key reliability concern for questionnaires is whether items that are combined to operationalize each construct show internal consistency—that is, whether items covary sufficiently to suggest that they are measuring a single latent entity, often determined using Cronbach's alpha. For observational measures, on the other hand, interrater reliability is of paramount concern—that is, the degree to which observers' scores on the behaviors of interest agree, typically assessed using kappa for categorical variables and the mathematically related intra-class correlation for continuously distributed measures. Absent measures with adequate validity and reliability, researchers lack the scientific basis for making inferences about human development: Invalid measures will mislead about how development is structured and what affects it; unreliable measures will produce potentially idiosyncratic, unrepeatable results.

Categories and Continua

Although much of developmental science has been devoted to measuring and explaining normative, age-related change, recent decades have increasingly focused on individual differences in children's functioning. This, in turn, has generated unique measurement challenges. One is the issue of *taxonicity*—that is, whether individual differences are distributed as discrete categories or as continua. Historically, developmental psychologists have tended not to think of this as an empirical question, but rather a matter of convenience, preference, or theoretical orientation. This is unfortunate because understanding whether variation is categorically or continuously distributed can have significant implications for empirical research. For example, it has been well documented that imposing a categorical structure on dimensional data can attenuate predictive validity by impairing statistical power (e.g., Fraley &

Spieker, 2003; MacCallum, Zhang, Preacher, & Rucker, 2002).

Methodological tools developed by Meehl (1995) allow researchers to determine whether individual differences in a latent variable represent naturally occurring categories or continuous variation. It is a positive sign that such tools are increasingly being used by developmental psychologists (e.g., Fraley & Spieker, 2003; Roisman, Fraley, & Belsky, 2007). Wider use of such *structure uncovering* methods is an especially important goal because typological methods, such as cluster and latent class analysis, reveal groupings in developmental data regardless of whether natural groupings actually exist.

Stability and Change

A critical measurement dimension relevant to developmental science is the stability and change in constructs *over time*. Assessments can demonstrate stability/continuity and change/discontinuity over development in several conceptually and empirically distinct ways. There are two especially crucial elements: (1) *rank order* continuity, and (2) *mean-level* stability (Caspi, 1998, provides an excellent taxonomy; for a detailed discussion, see Bates & Novasad, 2005).

Rank order (or differential) continuity refers to whether individuals maintain their order relative to other individuals in a given sample on a given construct over time, typically assessed using a correlation coefficient. The key challenge is that there may be different reasons for low rank order continuity. There may be real changes in the rank ordering among individuals; for example, the aggressive 3-year-old may become a nonaggressive adult. But a second reason is that the construct and its markers may change with age. For example, “bites others” may index aggression among preschoolers but it functions poorly for this purpose among adults. In this case, aggression takes different forms over time and the measurement of aggression must reflect this to be able to identify continuity and discontinuity over development. In short, to characterize what Sroufe (1979) described as the *coherence* of individual development, it is crucial that measurement decisions anticipate such “heterotypic” forms of continuity.

Mean-level stability and change, in contrast, reflect increases, decreases, or stability in the average level of an attribute over time, identified using paired-samples *t*-tests or growth-curve analysis of longitudinal measures. Mean-level change is instructive about the normative course of development, although good inference requires that the units of measurement can be meaningfully compared over

time. This means that the scale points for a given measure are anchored to observable behaviors or other nonarbitrary metrics (Blanton & Jaccard, 2006).

Choosing Measurement Methods: Issues and Considerations

A multitude of considerations enter into the choice of particular methods. We briefly discuss four concerns that cut across particular methods as they apply to developmental science: characteristics of children as participants; the use of multiple informants and levels of analysis to converge on a given developmental phenomenon; measurement equivalence across varying developmental contexts; and ecological validity of measures obtained from or about children.

Participant Characteristics

Children's age, cognitive level, and literacy often dictate measurement choices (Woolley, 2006). Looking-time measures are used with infants but rarely with children and adolescents. Similarly, observational methods are used frequently with infants and young children whereas interview methods are not appropriate, although the latter can be used with slightly older children. Observational measures of children's behavior or of parent-child interaction are often used in conjunction with parent or teacher reports. All are used less frequently with adolescents and adults for whom self-reports are more typical. Once participants are cognitively and linguistically mature enough to follow directions and fill out self-reports, other participant characteristics such as literacy or culture may influence measurement decisions. In many cases, converging methods and multiple informants may be optimal.

Multiple Informants and Multiple Levels of Analysis

Developmental scientists have become increasingly committed to the use of multiple informants and a multiple-levels-of-analysis approach to measurement. The complexity of developmental questions makes such approaches especially valuable. Because development entails adaptation across a wide range of contexts, multiple informants can provide more valid and reliable insight into socioemotional competence than can a single informant or self-report. Further, because developmental scientists are interested in mechanisms underlying the predictive strength of distal resources and experiences in children's lives, multiple methods are needed to capture social, emotional, cognitive, and physiological processes at varying levels of operation.

Multi-informant and multilevel approaches also bring unique challenges. Perhaps the most vexing is the degree to which assessments of a given child diverge across informants, even when measures are parallel and well validated. This has led to interest in the context specificity of behavior (see below) and in potential sources of informant bias. Similarly, although multilevel approaches have proven fruitful in many domains, they can generate almost limitless independent and dependent variables, mediators, moderators, and confounding variables, increasing the likelihood of finding statistically significant associations due to chance alone, particularly when samples and expected effect sizes are small (see Roisman, Booth-LaForce, Belsky, Burt, & Groh, 2013).

Context

Measurement always occurs in a specific context. Strictly speaking, this means that children's responses are unique to a given measurement procedure in a given setting, whether it is the particular relationship measured, the particular informant queried, the measurement type or location, or larger contextual factors such as participants' or experimenters' culture, language community, socio-economic status, school, or neighborhood. Effects may be stronger or weaker when measured in some contexts than others, or they may operate in different directions, or even be caused by different factors. If measures are not equivalent across measurement contexts, our assumptions about the universality of a given behavior, psychological characteristic, mode of functioning, or developmental process may be erroneous as a result (Henrich, Heine, & Norenzayan, 2010; Knight & Zerr, 2010; Norbury & Sparks, 2013).

Concerns about contextual influences on measurement differ from questions about contexts as causal factors in development. The latter focus on issues about how to measure context itself, which is not considered in this chapter (see Bronfenbrenner & Morris, 2006, or Lerner, Dowling, & Chaudhuri, 2005, for a discussion). It is nevertheless worth noting that certain theoretical perspectives have raised novel questions about how to conceptualize the nature of context and thus how it should be measured. For example, dynamic systems theories conceptualize context as an integral component of ongoing interactions rather than as a distal entity acting on individuals from without. From this perspective, context can vary moment-to-moment, as well as over longer time spans in the form of stable behaviors, relationships, and networks (Veenstra & Steglich, 2012).

There is no simple solution to the problem of context effects in measurement. Empirical study of the similarities and differences in the same construct measured in similar ways across populations (notwithstanding concerns about the cultural relevance of some measurement approaches), as well as patterns of similarities and differences within cultures and subcultures, increasingly inform both measurement and theory. Recognizing and understanding contextual factors in measurement must remain a high priority. This will require broadening the populations studied, the questions asked, and the measurement approaches used.

Ecological Validity

Related to questions about context effects in measurement are concerns about the ecological validity of measures. Although ecological validity is often considered in discussions of experimental design, juxtaposed against the need for experimental control, concerns also arise regarding how measures are obtained. For example, playground observations can capture children's natural play behaviors, prosocial behavior, aggressive behavior, and peer associations. Although similar measures can be obtained from structured observations in a standard laboratory setting, laboratory observations cannot duplicate many of the conditions that exist on the playground—such as large numbers of children with the option of choosing interaction partners or large, open play spaces—thereby imposing limits on the ecological validity of laboratory observations. At the same time, a structured laboratory task, such as having friends plan a trip or discuss something they disagree on, can be more ecologically valid than interview or self-report measures of relationship quality or conflict resolution.

Some laboratory measures may be particularly problematic for ecological validity. Psychophysiological and neurophysiological measures require children to provide responses in novel environments and to wear or be attached to unfamiliar equipment. The nature of the equipment may limit children's response options, for example requiring them to sit or lie still to minimize movement artifacts. As developmental psychologists increasingly use such methods, it will be important to consider how highly artificial laboratory environments alter the meaning of children's responses and how interpretation of the findings may be constrained by low ecological validity. Some investigators have begun to confront this issue by making such environments more comfortable and congenial, especially for younger children. For example, in one laboratory an astronaut space game and theme were used to "normalize" psychophysiological recording (Hubbard et al., 2002).

Many of these cross-cutting issues will be revisited in greater depth and further illustrated as we now turn to detailed discussion of each of the three primary sources of measurement: observational methods, verbal reports, and psychobiological approaches.

OBSERVATIONAL METHODS

Observational methods are widely used in studies of socioemotional development because they permit the study of both interactive processes and individual behavior. This is critical given that social interaction is a formative process in development, and socioemotional development is most fully understood within the larger social matrix in which it is embedded. Although human beings tend to observe and interpret one another's behavior continuously, doing so under the rigorous standards of science often proves challenging.

As noted earlier, the study of socioemotional development includes a long history of observing children's behavior and interactions to address both descriptive questions and theoretically derived hypotheses. The revival of observational methods in the 1970s was accompanied by advances in technology, including compact video-recording devices and digital keyboard data-collection devices, along with advances in data-analytic techniques to permit complex sequential and time-series analyses of interactions (Bakeman & Gottman, 1986). In the late 1970s, several influential volumes were published on the use of observational procedures in studies of socioemotional development (Cairns, 1979; Lamb, Suomi, & Stephenson, 1979; Sackett, 1978). Since then, observational methods have figured centrally in the study of most of the major constructs in socioemotional development, as evident in the other chapters of this volume. Sackett (1978) noted five critical criteria for determining the scientific utility of observational research: (1) fit between research questions and observed behaviors; (2) appropriateness of the observational context for addressing the research questions; (3) accuracy and reliability of observers; (4) generality of observations and measures over time and samples; and (5) appropriate statistical treatment of the measures. Here we focus on the first four of these.

Why Observe?

There are many reasons for using observational methods: (a) when participants cannot respond verbally (e.g., infants,

animals); (b) when instrumented or automated measurement techniques are unavailable or inappropriate (e.g., data collection in home or childcare); (c) when verbal report or standardized tests are not appropriate for the research question (e.g., infant-parent attachment) or the behavior is not typically available to conscious self-report (e.g., timing of postural adjustments or facial expressions during interaction); and (d) when the primary questions concern nonverbal behavior (e.g., emotion) or social behavior (e.g., sharing), particularly when these involve interactions unfolding in time together with others' behavior.

Observational methods are used to generate dependent measures within both correlational and experimental designs. They are also used to create independent variables in quasi-experimental designs as, for example, when comparing solitary, reticent, or outgoing preschoolers on aspects of temperament and psychophysiology (Henderson, Marshall, Fox, & Rubin, 2004). Thus, observational procedures assessing social and emotional functioning are used to test hypotheses about the effects of socioemotional processes on development, from behavior at the individual level, to relationships at the dyadic or triadic level, to group dynamics.

Technological advances have expanded the possibilities for what can be observed and how, from head-mounted cameras and eye-tracking technology (Frank, Vul, & Saxe, 2012; Yoshida & Smith, 2008), to synchronized behavioral observations and physiological measures (e.g., Hubbard et al., 2004; Smith, Hubbard, & Laurenceau, 2011), to automated facial recognition and coding (Messinger, Mahoor, Chow, & Cohn, 2009). In the NICHD Study of Early Child Care and Youth Development (NICHD Early Child Care Research Network, 2005), a 10-site intensive longitudinal study of development from birth through 15 years, observations at home, in the lab, and in child care or school constituted the core behavioral assessments at each age beginning at 6 months, attesting to their utility and relevance across childhood and adolescence, both as indicators of social and emotional processes that shape development and as measures of developmental outcome. Indeed, some have argued that direct observation of behavior constitutes the gold standard for psychological measurement (e.g., Kagan, 1998).

What to Observe?

Segmenting the stream of behavior and translating its dynamic qualities into measurable units requires a multitude of decisions. Observational research, like any other measurement approach, is affected by the investigator's

theoretical focus. Unlike instrumented assessments, standardized tests, or verbal report, observational methods rely on human perception, judgment, and evaluation. The apparent face validity of naturally occurring behavior can be misleading, requiring that special care be given to considering one's assumptions and underlying conceptual or theoretical biases when establishing systems to quantify complex behavior. We discuss these issues in greater detail in the "Measurement Quality of Observations" section.

Decisions About What to Record and How

Because behavior is continuous and dynamic, decisions about which aspects of behavior to record, when, and at what level of analysis, as well as how to interpret the recorded behavior, are partly based on the research question and partly on the researcher's particular lens. The pragmatics of the observation setting (e.g., live or in vivo observation versus video recording) might also constrain what is recorded. For example, live, real-time observations severely limit both the number of different events or attributes that can be coded and any sort of time-based or duration information. Issues of reactivity or visual access to events of interest may constrain video recordings of events like playground bullying or sleep-related behaviors, although newer technologies have shown promise (Pepler & Craig, 1995; Tapper & Boulton, 2002). Recording decisions carry important implications for analysis and interpretation (Lakes & Hoyt, 2008).

Observation systems are formal sets of rules for breaking down the stream of behavior into meaningful, quantifiable units of information. This includes selecting and defining the relevant behaviors and establishing the sampling method. Decisions include what will be recorded, how, when, and by whom, as well as the settings or conditions under which observations will occur. The measurement dimension comes from assigning a given code (e.g., attend to parent) to a particular behavior or behavior constellation (e.g., orient head and eyes toward parent's face for a given time). Observation systems are thus the concrete measuring tools or gauges that permit precise quantitative answers to specific empirical questions.

Common metrics include how often a behavioral event occurs (frequency); how long until it first occurs (latency); how long it continues once begun (duration); the time since the last occurrence (lag); the intensity, magnitude, or quality of the behavior, and other accompanying attributes or modifiers of the behavior (e.g., directionality).

Coded events may be mutually exclusive (e.g., attend to parent versus attend to object), or may overlap (e.g., attend to parent and smile), each with different implications for analysis (Bakeman & Gottman, 1986).

Dyadic or group-level events such as mutual gaze between parent and child, rather than the behavior of individuals, can be formally observed. One way to represent dyadic processes is by aggregating behavior coded at the individual level. For example, Kochanska (1997) captured cooperativeness and shared positive affect between parents and their children, which she labeled “mutually responsive orientation,” by compositing conceptually and empirically related behaviors of each individual during social interactions. However, aggregating behavior of individuals may not capture the unique qualities of interactions and relationships that emerge from partners’ dynamic mutual adaptations to one another over time and the fact that each individual’s behavior is incorporated in the other’s responses. An alternative is to observe and measure qualities of the dyadic interaction as a whole, using indices that take the behavior of both partners into account such as “synchrony,” “harmony,” “mutuality,” or “shared affect” (Aksan, Kochanska, & Ortmann, 2006; Fogel, 1993; Harrist & Waugh, 2002).

The measurement implications of these distinct ways to approach dyadic processes are not always obvious. To determine how the two approaches differ empirically, Moore et al. (2012) examined the factor structure of individual and dyadic measures for infants and parents interacting during semistructured face-to-face play. Individual measures included amount and duration of gaze and affect directed to the partner; dyadic measures reflected the degree of mutuality between the partners’ behavior in time, including matched affect, synchrony in affect changes, and flexibility in responding to one another’s affect changes. Dyadic measures largely loaded on different factors than individual measures of infants’ or parents’ behavior, suggesting that each contributed unique information about the interactions. Similarly, Aksan et al. (2006) found that individually coded social bids, response quality, and affect tapped features of parent–infant interaction distinct from dyadically coded measures of cooperation, coordination, and harmony. Nevertheless, some complex or temporally extended behavioral codes may capture enough of the partners’ behavior with each other that aggregating the behavior of individuals can appropriately represent dyadic processes (Patterson, 1982), or even group-level processes such as sex-segregation (e.g., Martin & Ruble, 2010). Thus, the extent to which dyadic characteristics and processes can be adequately portrayed by observing behavior at the

level of the individual depends on how behavior is observed and measured; at the same time, dyad- or relationship-level observations likely provide unique information. It must also be recognized that the behavioral interdependencies between interacting individuals produce statistical nonindependence, posing significant analytic challenges (Kenny, Kashy, & Cook, 2006).

A more substantive issue concerns the degree to which discrete molecular behaviors, whether counted or timed, adequately represent the nature and complexity of the construct being measured. For example, “social competence,” operationalized in terms of molecular behaviors such as frequency or duration of eye contact, smiling, or conversation between peers, has sometimes been difficult to validate. In response, some researchers use more molar measures, including children’s social orientation and behavioral flexibility, organization, and effectiveness under particular conditions (see Bierman & Welsh, 2000, for a review).

Interestingly, behavioral measures from molar observation systems tend to exhibit greater stability over time and to cohere more closely with other measures of children’s functioning than measures from molecular observations (Brown, Odom, & Holcombe, 1996; Cairns & Green, 1979). This is because molar observations are engineered to capture enduring characteristics of the individual as part of the coding, locating the individual within the presumed population distribution of the coded behavior or quality. Molecular coding, in contrast, captures momentary aspects of behavior that may be context- and person-specific.

A concern sometimes voiced about molecular coding is that it is too fine grained to represent actual psychological processes, or that it is the organization or patterning of behavior rather than its elemental components that governs socioemotional responses (Bierman & Welsh, 2000). However, dissecting behavior is often necessary to understand fully its higher-level organization or its temporal structure. Moreover, molecularly coded behavior can be composited across contexts, time, or partners to represent more stable characteristics of individuals and interpersonal or contextual influences on behavior. Most fundamentally, understanding socioemotional processes—what elicits, maintains, and regulates behavior and emotions intrapersonally and interpersonally—requires the use of multiple levels of observation and analysis, from molar to molecular.

Decisions About Sampling the Stream of Behavior

In addition to considering which behaviors and features of behavior to record, decisions must be made about how to sample behavior in time, that is, how often to record events. Under continuous recording, the targeted behaviors

are typically counted or timed as they occur (event sampling) to yield frequencies and rates. When events are not discrete and countable, such as bouts of sustained attention or participation in cooperative play, or when frequency counts are not meaningful representations of the behavior, then time-based records such as latencies or durations of behavior are important. But latencies and durations are less appropriate than event sampling for brief or fleeting behaviors or for high-frequency behaviors.

Sequences of behavior can also be recorded. For example, one might record “infant look away” → “parent talk” → “infant attend” as a sequence that occurs within some predefined period after the onset of the prior behavior (time lag). Sequences can also be defined by the number of behaviors that follows targeted antecedent behavior (event lag). Sequential analysis adds important information about interactive processes, including bidirectionality.

When continuous recording is not possible or would be unduly burdensome or costly, as with a large taxonomy of high-frequency events observed *in situ* such as playground or childcare observations, time or interval sampling may be appropriate. The stream of behavior is sampled in discrete, time-limited intervals, and observers record only whether a given event occurred or not within that interval. Intervals may be successive or discontinuous, as when the observer watches in one interval and records in the next. Sampling intervals can be of any length, from seconds to hours, with interval length scaled to the events being recorded. Long intervals are needed to capture low-frequency or highly variable events (e.g., physical aggression) but would be impractical for high-frequency events (e.g., smiles). However, long intervals will underestimate frequencies of short-duration events; short intervals, in contrast, will overestimate frequencies of long-duration events. Although this method loses the richness of continuous recording, it can still provide a reasonable approximation of event frequency as indexed by the number of recording intervals in which the event(s) of interest occurred.

When observing large groups of children, a technique called focal-child or scan sampling is sometimes used in which the behavior of a given child is recorded exclusively for a fixed period of time, after which the observer shifts focus to another child (usually randomly selected) and records that child’s behavior for the same amount of time until a fixed amount of observation time is accumulated for every child. When these samples are brief they are sometimes referred to as scan samples or momentary time sampling and a fixed number of scan samples is usually obtained. Focal-child sampling can provide substantial child-level information such as how often different

children on the playground are approached by or rebuff peers.

Finally, ratings of observed behavior are used to document qualitative features such as intensity, or aspects of behavior that cannot be identified with clear onsets and offsets, such as fear of novelty or parental sensitivity. Observations are typically conducted for longer intervals, over multiple interactions, sometimes over multiple partners and contexts. Observers then rate the qualities of the behavior on one or more Likert-type scales. Because rating scales are meant to capture more stable attributes or qualities of individuals, rather than moment-to-moment behaviors and interactions, they are often used in studies of individual differences, such as parental style or children’s social competence, whereas frequencies, sequences, or durations are more often used in studies of moment-to-moment processes and developmental change such as the form of parent–child communication. It is important to recognize that by their very nature rating systems are often developmental. This is because the age-appropriateness of the behavior is taken into consideration in defining the rating scale. For example, behaviors indicating parental sensitivity with an infant might be considered intrusive with an older child. Similarly, the same frequency and intensity of physical aggression would be rated as more extreme for an older child than it would be for a toddler. Thus, rating systems often cannot be used to detect normative, age-related change itself, although they can detect individual differences in changes from the norm over time. More molecular observation systems preserve the differences in actual behavior and thus are often more appropriate for the study of developmental change and context-sensitive differences in behavior (see Cairns & Green, 1979, for more detailed discussion of these distinctions).

The larger issue in sampling the stream of behavior is the nature of the correspondence between behavior and time. Behaviors are not uniformly distributed in time, but rather vary depending on the behavior and the context. Some behaviors—such as activity level or sensitive responsiveness—are distributed continuously. Other aspects of behavior, such as turn-taking in mother–infant interaction, are discrete and distributed discontinuously, but are still fairly regular and predictable. Still other behaviors, such as aggression or communicative bids, are distributed quite unevenly in time and some behaviors, such as impulsive responses or temper tantrums, are unpredictable. The complexity of this issue is compounded by the fact that even discrete behaviors occur over time and the same behavior may consume different amounts of

time on different occasions. A brief instance of aggression (quickly grabbing a toy from a peer) might have quite different meaning for both aggressor and victim than a more prolonged instance of aggression (disrupting a peer's play by grabbing or scattering the other child's toys over several minutes). Conversely, some behaviors may be conceptually discrete yet more continuous in actual practice. Peer cooperation, for example, although distinct from other types of behavior such as aggression, typically encompasses a range of behaviors that unfold in time and involve mutual accommodation and coordination of intentions as well as actions; it is only in the aggregate that a bout of cooperation can be identified. Continuous behavior, cyclical behavior, and sporadic behavior each pose unique recording challenges and demand different sampling strategies (see Radke-Yarrow & Zahn-Waxler, 1979, for a fuller discussion).

Who Does the Observing?

In observational research, humans serve as the measuring instruments. As with all measuring instruments, evidence for standard, consistent measurement (i.e., calibration) must be demonstrated. Human observers, though harder to calibrate than mechanical instruments, can provide more sensitive and nuanced measurement. To do so requires well-defined behaviors and coding criteria, thorough training, and regular assessment of reliability. Next we discuss issues related to the choice of observers, contrasting the utility of untrained observers versus trained observers. We also discuss the problem of reactivity in observational research.

In Situ Observers

Generally speaking, the gold standard in observational measurement is the use of trained observers. However, for practical reasons, untrained individuals have sometimes functioned as observers in children's natural settings. For example, mothers have kept records of their children's receptive language (e.g., Fenson et al., 1994) or prosocial behavior (e.g., Zahn-Waxler, Radke-Yarrow, & King, 1979). Teachers or camp counselors have also been employed (e.g., Hinshaw, Simmel, & Heller, 1995). Such in situ observers have greater opportunity to observe the phenomena of interest; it may not be possible or practical for trained observers to be present at key times to record behaviors of interest. In situ observers also have the advantage of being unobtrusive, reducing participant reactivity.

Despite these advantages, in situ observers present several problems. A major concern involves the quality of the data. If in situ observers have little training in the observational system, they may interpret key constructs in unknown ways. Related to this, interrater reliability is more difficult to obtain between in situ observers. In addition, in situ observers' frames of reference may be influenced by different amounts of experience with children, or by gender, race, socioeconomic status, or culture, which may shape judgments about what is normative (Seifer, 2006). Finally, in situ observers may have systematic biases that influence how they record or rate the behaviors of interest. These are especially likely when the observers have relationships with the children being observed. For example, when mothers and trained observers rated children's temperament based on brief video clips (Seifer, Sameroff, Dickstein, Schiller, & Hayden, 2004), trained observers and parents showed good agreement when children were strangers to the parents (average $r = .83$), but very poor agreement when parents' own children were rated (average $r = .11$). Parents rated their own children more positively than did observers; they also rated their own children more positively than the standard children. This systematic bias argues against the use of parent report alone to measure child behavior (Seifer, 2006). Training and supervision can improve observer-parent agreement (e.g., Teti & McGourty, 1996; Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992), but the extra effort can be substantial and costly.

Trained Observers

Trained observers offer a number of advantages, including understanding the importance of objectivity and adherence to standard definitions of the phenomena of interest. Cultural, gender, and other biases can be minimized by careful training. Despite these considerable advantages, data collected by trained observers can be costly due to the time needed for training and data collection. However, when the research question concerns children's actual behavior, trained observers are considered optimal (Seifer, 2006; Yoder & Symons, 2010).

Some research suggests that nonexpert raters who capitalize on their intuitive expertise may sometimes be able to deliver valid and reliable data (Baker, Messinger, Ekas, Lindahl, & Brewster, 2010; Waldinger, Schulz, Hauser, Allen, & Crowell, 2004). Note, however, that this depends on which aspects of behavior are being coded and who the participants are. For example, Baker, Messinger, et al. (2010) compared ratings by trained observers with those by untrained undergraduates without research experience

who had been given brief descriptions of each construct. Videotaped parent-child interactions were coded for the amount of family conflict and the degree of maternal sensitivity. For conflict, the concordance between expert and nonexpert raters was quite high ($r = .81$). However, when children with behavior problems or autism were excluded, concordance fell noticeably ($r = .69$). Concordance for maternal sensitivity was lower as well ($r = .65$). Non-experts were especially poor at detecting the “emotional supportiveness” component of maternal sensitivity. Note also that the nonexperts rated only a few global behaviors, unlike trained coders who can code a multitude of both molar and molecular aspects of behavior. This research shows that nonexperts can be good observers for familiar, relatively straightforward, intuitively accessible constructs, particularly when the sample includes extreme instances of the behavior. However, they cannot replace trained, expert observers for capturing multiple, simultaneous, complex, and nuanced features of behavior. Nevertheless, studies examining in greater detail which aspects of behavior nonexperts can (and cannot) reliably code and under what circumstances their observations equal those of expert coders in accuracy and nuance (e.g., with brief training, over different time intervals) would be valuable. Finally, some have argued that using nonexpert raters can not only improve efficiency in collecting observational measures, but may also contribute to our understanding of the face validity of particular constructs (Baker, Haltigan, Brewster, Jaccard, & Messinger, 2010).

Reactivity in Observational Research

The clear advantage of trained observers is the reliability of measurement (see “Measurement Quality of Observations” below). However, in a natural setting, trained observers can be more obtrusive than in situ observers. The presence of unfamiliar people might influence participants to behave in ways they would not normally behave, including refraining from noxious behavior or increasing more socially desirable behavior (Kazdin, 1982). Depending on participant age, awareness of being observed may exacerbate reactivity, even when video or audio equipment is used in place of an observer. Although numerous sources discuss reactivity and countermeasures, the extent to which reactivity is a problem in observational research is an empirical question that has received only limited attention (F. Gardner, 2000; Yoder & Symons, 2010). As a result, relatively little is known about the extent to which reactivity occurs, under what conditions, and whether some participants are more or less prone to reactivity than others due to age, personality,

gender, or cultural factors. Even less is known about the effectiveness of countermeasures to reduce reactivity.

Most studies of reactivity to naturalistic observation have been conducted with audiotaped family interaction at home (F. Gardner, 2000). Reactivity is tested by varying the level of obtrusiveness (e.g., live versus unmanned recording; observer present versus not) and by comparing early and later sessions, or parts of sessions, for habituation effects. Obtrusiveness and habituation have shown few effects on coded behaviors (F. Gardner, 2000; Yoder & Symons, 2010). However, study conditions can maintain participant awareness of being observed, obscuring reactivity effects. For example, Johnson and Bolstad (1975) varied obtrusiveness by having an observer present or absent for alternate sessions and using audio recording to capture family interaction. Analyses showed no obtrusiveness or habituation effects. But given the brevity of the sessions (45 minutes each) and the fact that when the observer was not present the parent had to turn on the recorder, it is reasonable to assume that parents were well aware of being observed. In a study where parents were interviewed post-observation (Russell, Russell, & Midwinter, 1992), fathers reported being more influenced by being observed than did mothers, and reported wishing to enhance their image as parents by inhibiting some behaviors. The lack of evidence for habituation is hard to interpret. It could mean there was no reactivity, but it could also mean that whatever the level of reactivity was, *it did not diminish over time*. Given that parents (more than children) possess the self-regulation abilities to control their behavior, failure to find habituation is perhaps not surprising. Note that in the one study that did find evidence for habituation, participants were preschool-age children with considerably less mature self-regulation (Kier, 1996).

The observation context may exacerbate or mitigate reactivity, but there are few systematic studies comparing reactivity across contexts. As one example, Craig, Pepler, and Atlas (2000) examined bullying in elementary school children when behavior was recorded in the classroom using a manned video camera versus on the playground with a video camera located inside the school using a telephoto lens. Observed bullying was nearly twice as frequent on the playground. Given the contrasting conditions (large versus small space, nonobvious versus obvious camera) and the fact that participants were children (less awareness, poorer behavior regulation than adults), it seems possible that the less obtrusive playground recording minimized reactivity. It should be noted that teachers were equally unlikely to intervene in bullying episodes in both contexts,

so the context difference was not related to differences in teacher reactions. Behavior may also be affected by whether participants are asked to “act naturally” or are given a task. For example, in one of the few studies examining reactivity to in-home videotaping of mother–child interaction, the observation context (dinner time versus a structured task) influenced mothers’ controlling and supportive behaviors, but there were also interactions with time (Session 1 or 2), context (dinner or task), and marital status (married or divorced) on mothers’ supportive behaviors (Pett, Wampold, Vaughn-Cole, & East, 1992). Thus, reactivity might not be present uniformly across participants and contexts. Systematic studies of the effects of participants’ gender, age, personality, or other factors such as context have yet to be done, and there is little clear evidence about the effectiveness of particular countermeasures.

Structured Observations and Laboratory Tasks

Observations of behavior in everyday environments are costly with respect to training and data collection. Further, they may not be useful for addressing behaviors that are infrequent but have high impact in the natural environment; behavior that is difficult to observe because it occurs out of the purview of adults; behavior that changes when observers are present; behavior that can bias observers who cannot be kept blind; or behavior that must be observed under similar conditions across contexts or over time. Observing under more structured conditions or using laboratory-based tasks to assess children’s socioemotional competence can circumvent many of these issues.

Why Structure Observations?

Structured observations and tasks offer more efficient measurement by creating analogs of everyday settings that increase the frequency, intensity, or duration of specific behaviors of interest and permit control over some of the extraneous features of naturalistic settings. For example, to heighten the probability that aggression, negative affect, or their correlates will be observed, settings and stimuli have been structured to intensify children’s self-interest and proneness to conflict by limiting the availability of attractive resources or promoting competition during peer interaction (e.g., Charlesworth & LaFreniere, 1983). The likelihood of parent–child conflict has been increased by creating analogs of particular family interaction contexts such as toy cleanup or prohibitions of children’s behavior (e.g., Laible & Thompson, 2002), or by pairing parents

with difficult children who are not their own (Anderson, Lytton, & Romney, 1986). To assess emotion expression, emotion regulation, or emotion dissemblance, children are led to believe they will receive an attractive prize, but are given something undesirable (e.g., Kieras, Tobin, Graziano, & Rothbart, 2005). Or children may be provoked by a peer confederate who cheats or taunts them during a rigged game to elicit negative affect and corresponding regulatory strategies (e.g., Hessler & Katz, 2007).

Structured observations and tasks can facilitate empirical investigation of age-related social and emotional behavior because children’s behavior is elicited and measured in similar ways over time and contexts (McDermott & Fox, 2007). Unlike in natural settings, every child has the same opportunity to exhibit the target behavior(s). Thus, standardization permits valid within- and between-child comparisons over time. Nevertheless, measures derived from structured situations and tasks are subject to the same validity and reliability considerations as other measurement approaches (Hughes & Haynes, 1978).

From a conceptual standpoint, structured laboratory situations and tasks facilitate hypothesis testing by providing a more telescoped view of specific granular processes that represent the child’s broader socioemotional functioning. Because structured methods are typically used to evoke particular behaviors under standardized conditions, the measures generated can contribute to causal inferences, which demand manipulation and control to rule out alternatives. Indeed, laboratory studies of social processes such as social learning, aggression, and prosocial behavior were dominant in the 1960s and 1970s for these reasons (Grusec & Lytton, 1988). Although unpopular for a period, structured observations and tasks are now part of the regular repertoire of methodologies and measurement approaches used to study socioemotional development from infancy through early adulthood.

What Is Structured?

Structured observations and tasks can vary in the amount of structure and standardization and in the kinds of measures collected, including unobservable responses such as physiological or neural responses. The specific nature of the structured assessment varies depending on the intended target behavior, from adult–child or child–child interaction to children’s individual behavior, social skills, or emotional responses (Haynes & Wilson, 1979). Decisions about what to structure depend on the research question and theoretical framework. Aspects of structured observations that are manipulated or constrained generally include one or more

of the following: the social setting, the partner's behavior, the specific task, or the child's response.

The social setting. Structuring the social setting includes the child's partner(s) or the physical features or stimulus qualities of the situation. Analogs of social contexts such as peer or parent-child interaction permit precise analysis of quantitative and qualitative features of children's social skill and style; their ability to organize effective social and emotional responses under specific conditions; their role in influencing others' behavior; and the quality of their relationships. For example, playing, conversing, or competing with familiar, same-age, or same-gender peers produces different demands than doing so with unfamiliar peers, adults, older or younger peers, and/or with opposite-gender peers (McDermott & Fox, 2007). Similarly, key dimensions of parent-child interaction may differ between mothers and fathers (Cabrera, Linver, & Brooks-Gunn, 2007).

Because social and emotional processes are influenced by features of social context (Dirks, De Los Reyes, Briggs-Gowan, Cella, & Wakschlag, 2012), the social setting should be structured to mirror the complexity of real-life interactive contexts as much as possible. However, children might exhibit different skills in different contexts, and those who are competent in one context may be less so in another. Moreover, developmental changes in socioemotional abilities, and differences in cultural norms for behavioral and emotional expression, can produce different profiles of competence across social interactive contexts. It remains a challenge for the study of socioemotional development to capture the specific aspects of functioning that vary in response to contextual variation (Zeman, Klimes-Dougan, Cassano, & Adrian, 2007).

A review by Bierman and Welsh (2000) of laboratory-based analog social settings from preschool to adolescence illustrates the broader issues. In the "group interaction method," children are observed in small peer groups during cooperative or competitive activity, with partner characteristics or skills, group size, group task, or the amount of adult-imposed structure manipulated. In the "friendship dyad method," children are observed with a known friend, and the interaction task is manipulated, varying from discussing the friendship, to cooperatively planning something pleasant (e.g., birthday party), to negotiating a limited resource or resolving moral dilemmas, to engaging in competitive games. In the "social challenge method," individual children are confronted with a specific social task such as entering an ongoing peer group activity or solving a social or communicative

problem. Across these methods, settings and tasks change with age to remain developmentally appropriate, from predominantly play-oriented in same-gender dyads or groups at the youngest ages to predominantly conversation- and discussion-oriented in mixed-gender dyads or groups at the oldest. Thus, the social setting can be structured in a variety of ways to investigate dynamic social interaction and children's socioemotional competencies and deficits across development.

The partner's behavior. Structuring the partner's behavior permits investigators to isolate experimentally specific aspects of parent or child behavior hypothesized to influence children's social functioning, or to generate selected social or emotional processes thought to function causally. An adult partner is typically provided with specific instructions or asked to engage in particular kinds of behavior with the child. For example, to assess socialization styles or strategies, parents are sometimes asked to try to teach children difficult tasks or to get the children to help the parents with chores or other tasks. To examine the effects of parent anger or marital conflict on children's social behavior, emotions, and regulatory coping, parents or other adults may stage interactions featuring verbal or physical conflict with manipulations of critical factors such as content, intensity, aggressiveness, how affect is expressed, and whether and how conflict is resolved (e.g., Cummings, 1995). In a classic study, Parpal and Maccoby (1985) determined the causal role of parent-child reciprocity in socialization by training mothers to respond positively and contingently to children's social bids during play and then contrasting children's later compliance with trained versus untrained mothers.

Although more challenging procedurally, peer partners' behavior may also be structured and manipulated. For example, in a study of children's responses to peer provocation, children played a video game with an unfamiliar peer (confederate) to win valued prizes (Underwood, Hurley, Johanson, & Mosley, 1999). The game was rigged to the confederate peer's advantage, and confederates were trained to make standard provocative remarks during the game about their own and the other child's prowess or lack thereof while children's emotional responses and coping strategies were assessed. Subsequent studies have added other manipulations of partner or condition, compared children with different risk profiles, and have assessed physiological correlates of behavior during or after the game (e.g., Hessler & Katz, 2007; Hubbard, 2001; Smith et al., 2011), yielding rich, detailed data at multiple levels

of analysis. When children are too young to serve as confederates, one child may be taught something about a task or situation and then grouped with one or more naïve peers to assess communicative skills, peer influence, or other social-exchange processes (e.g., Ashley & Tomasello, 1998; Hanna & Meltzoff, 1993). Thus, structuring the partner's behavior makes it possible to isolate specific, nuanced dimensions of social processes that affect children's socioemotional functioning or that are reflected in it.

The specific task and child's response options. When the individual child's behavior or competence is of interest and the child is studied alone rather than during social engagement, structuring the task and the child's response is typical. Tasks and stimuli are created to elicit social or emotional responses under standard, controlled conditions outside of interactive contexts, but which are meant to provide similar demands. Such measures are sometimes referred to as performance measures (Bierman & Welsh, 2000). Unlike structured observations in which partners and their behavior may be standardized but children's behavior is free to vary, more structured tasks tend to restrict the children's responses. For example, children may be asked to watch social or emotional displays while looking-time to particular display features is recorded (e.g., Serbin, Poulin-Dubois, Colburne, Sen, & Eichstedt, 2001). There are few standard tasks and procedures for measuring social and emotional development (McDermott & Fox, 2007; Morris, Robinson, & Eisenberg, 2006). Instead, such tasks tend to be specific to the particular construct under investigation. As a result, the measurement issues are often unique to those constructs as well (Adrian, Zeman, & Veits, 2011).

Nevertheless, a number of such tasks have become used quite extensively with demonstrated validity, a few of which are noted here for illustrative purposes. During early infancy, the "still-face" procedure, in which an adult briefly stops interacting during face-to-face interaction, has become very widely used to assess infants' social responsiveness, emotion regulation, and communicative skill in both typically and atypically developing populations (Adamson & Frick, 2003). A commonly used measure of emotion understanding in later infancy is the "social referencing" task in which an adult displays positive or negative affect toward an ambiguous object, and the infant's approach or avoidance is measured (e.g., Walden & Baxter, 1989). In toddlers, the "rouge" task (Amsterdam, 1972) is the standard means to assess objective self-awareness, a major milestone in early socioemotional development. A spot of rouge or lipstick is placed surreptitiously on the

infant's face and the infant is shown his or her reflection in a mirror. Self-awareness is indicated when the child touches the spot on his or her own face rather than touching the baby in the mirror. The "delay of gratification" task is frequently used with preschool-age children to index their ability to regulate affect and behavior, a formative individual difference with remarkable predictive ability into adolescence and adulthood (e.g., Casey et al., 2011). It requires the child to wait without touching an attractive toy or food while the experimenter is out of the room; duration of the wait is assessed, with the waiting period adjusted for the child's age. In middle childhood, structured tasks are often used to assess individual differences in achievement motivation (Dweck, 2002). Typically, the child works on a problem-solving task such as a puzzle or arithmetic or memory problems. The task is either especially easy, resulting in a high rate of success, or especially difficult, resulting in a high rate of failure. Children are then given the opportunity to work on the same or another set of tasks, and their persistence and willingness to continue problem-solving is assessed. Before the second set of tasks, children's performance is sometimes explicitly evaluated by an adult (e.g., "you're really good at this"; "you tried really hard at this") to determine the effects of different kinds of praise or feedback on achievement motivation. In adolescence, structured tasks are often used to assess risk-taking, especially emotional risk-taking (e.g., M. Gardner & Steinberg, 2005).

This somewhat arbitrary selection of structured tasks spanning infancy through adolescence makes it clear that there can be as many tasks as there are constructs. Although these particular tasks have become well-established, most such tasks and procedures are designed for a given study and seldom test or report key psychometric data. It is equally clear that each task comes with its own unique measurement issues, including how ecologically valid and representative children's restricted responses are and how best to interpret them.

The advantages of structured observations and tasks include simple, straightforward procedures; substantially reduced coding burden; standardization and control of both task administration and performance assessment, including computerized presentation and response options for some tasks; manipulation of the social and emotional conditions under which children are observed; the availability of more refined, process-specific indices; and the potential for linking task-related behavior and associated socioemotional processes to physiological correlates or neural underpinnings. The primary disadvantages are the

relatively narrow range of functioning typically assessed on a given task, and thus inflexibility in capturing diverse behaviors and processes; situation-specific or task-specific demands that may vary by age or culture, making it difficult to study stability and continuity in the target behaviors or processes; issues surrounding the ecological validity of the laboratory setting, restricted stimuli, and constrained response options; and the noninteractional nature of many such procedures. Furthermore, in situations that expose children to or elicit anger, frustration, or other negative emotions or problematic behaviors, ethical considerations dictate that only brief or low-intensity responses be evoked (Cummings, 1995; Hubbard, 2005), possibly limiting the inferences that can be drawn and the generalizability of the findings.

Measurement Quality of Observations

The reliability, validity, and utility of observational measures are conditioned on the theoretical paradigm, on whose behavior is observed and for what purpose, and on the measurement context. Observational measures feature unique sources of error that can affect validity and reliability. Construction of an observation system must take these into account in determining which behaviors to observe, under what conditions, and in operationally defining the relevant behaviors. Issues of representativeness and generalizability are fundamental to all measurement procedures; observation of children's actual behavior, even under natural conditions, does not solve the problem of external validity, rather it raises unique issues.

Reliability

Interobserver agreement and observer reliability are related, but not identical, standards for determining consistency across observers. As noted earlier, interobserver agreement refers to the agreement between observers about what they have seen and recorded (Bakeman & Gottman, 1986; Yoder & Symons, 2010). It can be examined as point-by-point agreement on the occurrence and nonoccurrence of behaviors, or whether a given behavior occurs within a specified time window. Historically, percent agreement has been used to index interobserver agreement, but this can be inflated by chance agreement, especially when there are few coding categories and when the expected distributions are much higher for one category than for others. When categories are mutually exclusive and exhaustive, correction for chance agreement (e.g., coefficient kappa) is recommended (Bakeman & Gottman, 1986; but see Yoder

& Symons, 2010, for cautions). Interobserver agreement can also be indexed by concordance on rank ordering of behaviors using intraclass correlations (Yoder & Symons, 2010). As opposed to interobserver agreement, observer reliability refers to the accuracy of measurement, typically with respect to agreement with a "gold standard" observer or observers. Using such a benchmark can increase confidence in the accuracy of live coding systems. It can also enhance interobserver agreement across laboratories and is standard practice for published observational coding systems like the Classroom Assessment Scoring System (CLASS; La Paro & Pianta, 2003) or the Strange Situation (Ainsworth, Blehar, Waters, & Wall, 1978).

Because reliability can be adversely affected by small behavior samples (Bakeman & Gottman, 1986; Yoder & Symons, 2010), as a rule of thumb at least 20% of the data are checked for interobserver agreement; the frequency of checks is dictated by the occurrence of the least frequent codes. Additional random, unannounced checks of interobserver agreement are essential to prevent drift and reliability decay. Because reliability estimates are inflated when coders are aware of being checked, coders should be blind to which observations are checked. One disadvantage of live coding is that it is difficult to keep observers blind to reliability checks.

Observer Inference and Bias

It is often assumed that inferring competence from direct observation of behavior requires less inference than from laboratory tasks or standardized tests. However, most observational methods require some degree of inference or interpretation by observers, with more molecular codes generally requiring less than more molar codes. For example, judging which facial muscles are activated during a facial expression as in the molecular facial action coding system (e.g., Cohn, Ambadar, & Ekman, 2007) requires less interpretation than does judging whether a child has exhibited a "sad" or a "fear" face, which are more molar codes; and the latter, in turn, requires less inference than judging whether a child has exhibited "distress" or "avoidance," which are still more molar. Furthermore, observers can be biased by their own idiosyncratic perceptions or by the individuals being observed. When ratings are used, some raters may consistently rate the same behavior or quality higher or lower than others. Observers may also have common biases based on shared norms and attitudes about the observed behavior such as what represents "typical" or "average" behavior and what indicates an extreme (Hoyt, 2000).

These issues are illustrated by studies of bias in observations of aggression. Observers are more likely to attribute aggressive intent and judge behavior as aggressive if it is performed by a boy or if the observer is told the child is a boy (e.g., Pellegrini et al., 2011). This appears to be truer of male than female observers, even when observers are highly trained (Pellegrini, 2011). Presumably, shared norms about gender differences in aggression, combined with observers' own gender schemas, produce such biases. Indeed, when observers were given instructions that activated gender schemas about aggression, they were more gender-biased in their judgments than with gender-neutral instructions (Lyons & Serbin, 1986). Similarly, interactions between observer race and target-child race have been found during observations of children's social behavior (Lethermon, Williamson, Moody, & Wozniak, 1986).

Issues of bias in observational research are especially difficult when observers and observation systems are from a different culture than the child being observed. These extend beyond adequately observing differences in the structure or organization of children's activities and social encounters. Similar practices or experiences may have different meanings in different cultures. Consider, for example, constructs like maternal sensitivity, warmth, and intrusiveness, or child interest, sociability, or hostility. Cultural groups differ in norms, attitudes, and assumptions underlying such constructs, and when they do it can be difficult and even misleading to apply observation systems developed in one culture to another (Knight & Zerr, 2010). Measures so derived include information about the observer or the rating scale in addition to the children or adults being observed. Moreover, socioeconomic, caste, or national origin differences within cultures create intracultural differences in norms and practices. Thus, even within cultures, observations can produce unreliable, invalid, or contaminated measures of children's social experiences or competencies. The importance of minimizing both observation system bias and observer bias is paramount, and can be achieved by acquiring substantial knowledge about the behavioral norms of the observed population; careful, precise behavioral criteria, preferably paired with culture-neutral instructions; multiple, independent raters; and thorough training (see Yoder & Symons, 2010, for a discussion of defining behavior in coding systems and training observers).

Validity

For the legions of papers published with 5, 10, or 15 minutes of observation of children's behavior, there are few

data available to ascertain the psychometric properties of the measures, including construct validity or even ecological validity. Indeed, some evidence suggests only low to moderate correlations across different observations within a single setting like the home (e.g., free play versus toy cleanup; Seifer, Sameroff, Anagnostopolou, & Elias, 1992), and poor correspondence between behavior at home and in the lab on similar tasks (see F. Gardner, 2000, for a review). Leyendecker, Lamb, and Scholmerich (1997) found that brief observations yielded unstable measures of mother–infant interaction quality, but that stability increased with more extended observation periods.

The measurement of temperament illustrates many of the issues. There has been a move to supplement parent-report measures of children's temperament with behavioral observations of children's behavior during standard laboratory tasks (e.g., Gagne, Van Hulle, Aksan, Essex, & Goldsmith, 2011), or at home (see Stifter, Willoughby, Towe-Goodman, & the Family Life Project Key Investigators, 2008) or school (e.g., Bishop, Spence, & McDonald, 2003). However, agreement among these methods can be quite poor. Observers differ from other reporters in their training and frames of reference. Moreover, observers' reports are confined to the period observed, whereas parents' ratings represent the whole of their experiences with the children. However, parents can be biased in their perception or reporting of their own children's behavior whereas observers presumably are less so (Seifer et al., 2004).

Stifter et al. (2008) used structural equation modeling to examine the contributions of method and trait factors to ratings and observations (methods) of temperament (trait). Parents reported on their infants' temperament; observers rated global temperament following extended home observations; and different observers coded videotapes of children's behavior during challenge tasks in the home. A model based on both method and trait factors fit the data best. Parents and observers converged on ratings of positive but not negative aspects of temperament. Home observers and observers coding videotaped challenge tasks converged on both positive and negative aspects of temperament although agreement was modest.

More encouraging results emerged when a single, more circumscribed temperament trait, behavioral inhibition (BI), was examined (Bishop et al., 2003). Observers coded videotapes of children's interactions with an adult stranger at their preschool or kindergarten, and agreement with mother, father, and teacher reports was examined. Correlations between observers' BI ratings and parents'

and teachers' ratings ranged from .25 to .46, with higher agreement when only the children rated high and low in BI were considered (from .35 to .60). Agreement between specific observer-coded behaviors (e.g., gaze, speech) and parents' or teachers' BI ratings varied depending on the behavior and the rater. Such results suggest that there is better correspondence between observations of temperament and parent or teacher report when one aspect of temperament is assessed *and* the observational context is designed to elicit that aspect of temperament.

These studies show that whether observational measures of behavior converge with measures from parents and teachers depends on the nature of the construct in question and the context, with better agreement within than across contexts. More than modest convergence may be difficult to achieve. Longitudinal data provide the opportunity to test the predictive validity of observational measures. For example, in the case of antisocial behavior, observational measures may have greater predictive validity than parent report (e.g., Patterson & Forgatch, 1995).

Although variability in behavior across measurement contexts may be considered problematic for validity, some investigators have argued that theoretical models should be revised to incorporate such variability as a meaningful indicator of functional differences in children's socioemotional behavior and to begin to understand why such variability occurs (Dirks et al., 2012). For example, children's performance on laboratory-based emotion regulation tasks does not always cohere across tasks. Yet this variability can be informative in differentiating among subtypes of regulation such as effortful, voluntary control (shifting attention or activating behavior) versus more reactive, less voluntary control (behavioral inhibition or impulsive approach behavior) (Spinrad, Eisenberg, & Gaertner, 2007). Similarly, the frequency of parents' negative or positive comments during a laboratory-based parent-child discussion of a conflict may not correspond to rates at home. Yet it may still provide valid estimates of functional relations such as emotional tone, mutual responsiveness, acceptance, and joint problem-solving (Haynes & O'Brien, 2000).

External validity. Among the primary dimensions of external validity for observational measures are whether the behavior being observed is the most appropriate for the question, an important component of the larger behavioral repertoire, and relevant to the psychological processes under investigation (Schmuckler, 2001). A central issue is whether the behavior sample is representative of the child's typical behavior in everyday settings. Whether the

behavior sample is both representative and sufficiently captures events of primary interest is especially crucial when the behavior occurs infrequently or variably (Stoolmiller, Eddy, & Reid, 2000; Yoder & Symons, 2010). Low rates of behavior or high day-to-day variability can undermine both the reliability and validity of observational data (Lakes & Hoyt, 2008). Note, however, that the frequency of a behavior does not necessarily correspond to its weight in defining or shaping children's socioemotional functioning. For example, both aggression and prosocial behavior, which occur infrequently in natural contexts (Pellegrini, 2011), are particularly influential in determining children's acceptance or rejection by peers (see Furman & Rose, Chapter 22, this *Handbook*, this volume). Acquiring an adequate sample of such behavior from observations in children's everyday environments requires lengthy sampling periods over multiple sessions. When this is not possible, statistical corrections can be applied to account for differences in rate and/or variability (Stoolmiller et al., 2000). Alternatively, a structured observation or introducing a standard elicitor increases opportunities for participants to display the behavior of interest. Ainsworth's Strange Situation, a structured, lab-based observational procedure for assessing infant-caregiver attachment, was devised to solve the problem of low rates of attachment behaviors in unstructured home observations (Ainsworth et al., 1978). Less than 30 minutes in length, its reliability and validity have been well-established in hundreds of studies, attesting to its representativeness and utility (see Lamb, Thompson, Gardner, Charnov, & Estes, 1984, for further discussion). Notably, children's attachment behavior in the Strange Situation differs from their behavior at home, yet their behavior in the lab predicts many other aspects of socioemotional development, even into adulthood (Sroufe, Egeland, Carlson, & Collins, 2005).

A core assumption of structured observations and tasks is that the child's behavior is representative of, or at least correlates with, the corresponding behavior in natural, unstructured settings. However, concerns arise about how closely the analog situation approximates the everyday world (F. Gardner, 2000; McCall, 1977), how characteristic the families are who agree to come into the laboratory (Bronfenbrenner, 1979; Henrich et al., 2010), and how accurately the measures represent children's social competence and relationships (Bierman & Welsh, 2000). For example, some studies have found that family decision-making interactions are more positive at home than in the lab, but parents are more engaged with their children in the lab and more restrictive and less helpful

at home (Cone, 1999). Still, it should not be assumed that observations of behavior in analog settings are necessarily less representative than observations in the natural environment (Schmuckler, 2001). Indeed, the number of uncontrolled influences on behavior in natural settings far exceeds those in structured contexts, producing greater error and instability in the measures, with accompanying concerns about reliability and validity.

Finally, all settings constrain behavior and the constraints may vary across settings. For example, playground observations of children from different schools may include varying playground physical characteristics, amount of recess time or teacher supervision, or number of children, all of which can influence the behavior(s) of interest. Similar issues arise when comparing across home observations (Leyendecker et al., 1997; Seifer et al., 1992). In structured observations and tasks, instrument effects are a related and important source of influence (Messick, 1983). Instrument effects refer to response variability arising from interactions between child characteristics (e.g., temperament, mood, fatigue) and the format or conditions of measurement, including the structure of the setting (e.g., who participates, for how long, the physical layout) and experimenter behavior. The significance of setting influences has long been recognized (e.g., Barker & Wright, 1954; Bronfenbrenner, 1979; Elder, Modell, & Parke, 1993; Lewin, 1954), but there is no consensus on the criteria for evaluating what is appropriately representative and for whom (see Schmuckler, 2001, for a fuller discussion). Fundamentally, decisions must be based both on the theoretical framework and on judgments about whether critical aspects of the behavior of interest have been captured.

Observational Methods: Summary and Conclusions

Observational methods are the only way to capture real-time behavior, including dyadic and group interactions as well as individual social and emotional behavior. They are especially useful in research with nonverbal children, when behavior is not under conscious control or available to self-reflection and report, and when automated measurement is not feasible. They are thus extensively used to study socioemotional processes throughout the life span.

Many decisions enter into the construction of observation systems and collecting observational data, including what to observe, how, when, where, and who should observe. Behavior can be counted, timed, or rated; behavior

as specific as individual facial muscle movements or as general as dyadic harmony can be coded. Unique issues surround the stability and generalizability of molecular versus molar behavior records and must be considered when designing coding systems. How to sample the temporal dimension of behavior, breaking up the continuous behavioral stream, poses another set of issues. Events or sequences of events, time intervals, or individuals can be sampled, as can qualitative features of behavior such as valence or intensity. Whether behavior is brief or sustained, frequent or infrequent, continuous and predictable, or irregular and unpredictable, affects sampling decisions. Who observes depends in part on decisions about what and how to record, as well as the context in which observations are made. Access to the behaviors of interest and participant reactivity; bias, accuracy, and sensitivity of observers; and costs of training must all be considered as they can affect data quality.

Observations may occur in everyday environments or in structured analogs of natural settings. Features of the setting, the partner(s), or the child's response options may be designed to evoke aspects of behavior that are difficult to observe or occur infrequently. Structured observations and tasks also offer a degree of manipulation and control that is unavailable in unstructured, naturalistic observation, giving every child the same opportunity to exhibit the behaviors of interest, and permitting a sharper, more detailed focus on particular aspects of socioemotional competence. However, structured observations come with their own issues, from setting or task demands to possible ethical issues in attempting to elicit negative emotions or behavior.

Because observational measures depend on human judgment, they are prone to bias and error. Being observed can also produce reactivity in those observed, often altering their behavior in unknown ways. Common reliability procedures and careful training ensure agreement and accuracy across observers, but observers can nevertheless be biased by shared norms and frames of reference such as their own culture or gender. In particular, "best practices" for observations of children from diverse cultures and socioeconomic strata have not been established (Whitcomb & Merrell, 2013), so caution is required when interpreting such data.

Questions of validity are raised by relatively modest agreement between observational measures and parent report measures of the same construct, and between observational measures of the same construct across contexts. However, there may be advantages to modeling such variability more formally to understand why it occurs,

including the possibility that such measurement error actually reflects multiple constructs. Observational measures are also subject to external validity concerns arising from decisions about which aspects of behavior to sample, when, and in what contexts, particularly when the frequency of behavior does not reflect its importance in children's socioemotional functioning.

Observational methods remain among the most routinely and widely used measurement approaches in the study of socioemotional development because of their versatility and their ability to capture complex behavior and interaction in many different settings. For investigators who cannot themselves collect observational measures, or who wish to expand their access to observational data, an important initiative to share video-based observations among developmental scientists has recently been introduced (<http://databrary.org>). This federally funded resource will collect and permanently archive video data from hundreds of researchers while protecting the privacy and confidentiality of the research participants. Readers are encouraged to consult, use, and participate in this scholarly community and its pioneering efforts to advance the understanding of behavior and development via observational methods and measures.

VERBAL REPORT: INTERVIEWS AND QUESTIONNAIRES

Verbal report methods provide a window into mental processes and representations, allowing the measurement of constructs that are difficult or impossible to capture with observations. Researchers can assess children's and adults' knowledge, opinions, and beliefs, as well as judgments about their own and others' current and past behavior. Verbal reports include a range of procedures, from puppet-assisted interviews for preschoolers and young children to web-based questionnaires with young adults. Participants can report on themselves, on others, or on key developmental contexts, such as parents reporting on their children's school or judging influences on academic performance (e.g., Stevenson, Chen, & Shin-Ying, 1993). Participants might report what they or others would do in hypothetical situations or what might happen if they behaved in various hypothetical ways (e.g., social information processing and moral judgment interviews). Verbal reports are especially valuable in measuring unobservable influences on behavior when perceptions, beliefs, or attitudes do not correspond to reality. For example, adolescents' beliefs about the

prevalence of drinking among peers predict their own future alcohol consumption even when their beliefs do not correspond with peers' actual behavior (e.g., "false consensus effect," Neighbors, Dillard, Lewis, Bergstrom, & Neil, 2006).

A number of issues are common to all verbal report methods. Researchers need a well-conceptualized research question with well-defined variables and clear operational definitions. In cross-cultural research, the conceptual and measurement equivalence of the operational definitions must be demonstrated (Church, 2010). Decisions must also be made about the extent to which the instrument will be structured. When all participants receive the same questions (most structured), comparisons among participants are facilitated. However, follow-up questions for some answers (less structured) can provide more detailed information. Item construction and selection are subject to theoretical biases; when new measures are constructed, best practice involves careful psychometric evaluation and publication of the items and other instrument characteristics. The validity of verbal report measures can be affected by social desirability biases and the burden on participants' time or effort. This is especially important for young children whose attention span places limits on interview length, and for teachers who may be asked to complete multiple reports on many students.

Culture or socioeconomic status may be associated with communication differences between researchers and participants, influencing how participants interpret questions or how researchers interpret responses, creating systematic measurement error (Callaghan et al., 2005; Church, 2010). Particularly in face-to-face interviews, such differences may color participants' views of the relative power or status between themselves and the interviewer, affecting responses in various, sometimes unknown, ways. Authority and power differences are also important considerations when adults interview children (D. Eder & Fingerson, 2003). Interviewers need training in building rapport with participants, and for studies with culturally diverse participants, interviewers from similar backgrounds can be helpful.

A key consideration in the construction and use of verbal report instruments is their developmental appropriateness. Language comprehension, literacy, and cognitive and attentional maturity of the participants influence the age-appropriateness of the instrument. Young children often need training and visual aids to use scaled responses (e.g., "like a lot" to "don't like"). Interviews may be preferred with young children or when literacy is in doubt. With retrospective reporting, there are likely to be

developmental differences in memory for past events as well as distortions of memory (e.g., Roisman, Padrón, Sroufe, & Egeland, 2002). Developmental and individual differences in the suggestibility of participants also exist (e.g., Bruck & Melnyk, 2004; Ceci, Papierno, & Kulkofsky, 2007), making interviewer training critical (see below). Finally, as is true of verbal report measures at any age, but perhaps especially so with children, the response format (e.g., positive versus negative responses; forced choice versus scaled responses; number and wording of anchors on a Likert scale) can influence responding as much as the content of the items (e.g., Lamb & Fauchier, 2001). Hence, when participants range widely in age, literacy, or cognitive development, issues of interpretability of measures and response equivalence across participants are crucial considerations.

Verbal Report: Interviews

Because of their flexibility, interviews are used to assess a wide range of constructs from self-concept and self-esteem (e.g., R. A. Eder, 1989; Harter & Pike, 1984), emotion knowledge (Denham & Couchoud, 1990; Morgan, Izard, & King, 2010), and moral cognition (e.g., Turiel, 2006), to parental meta-emotion philosophy (Katz, Maliken, & Stettler, 2012). Interviews are used with parents, teachers, and children. Because they are often used with younger children whose abilities to complete paper-and-pencil or web-based instruments are limited, we focus on this age group. We distinguish between children as informants about themselves and their experiences, knowledge, or beliefs, and their peers as informants about them.

A number of special considerations apply to interviewing children. For preschool age children, whose verbal comprehension lags behind that of older children and adolescents, developmentally appropriate language is needed to permit them to understand the interview questions. Further, because developments in verbal production lag behind comprehension, the extent to which children can verbalize what they know or understand is another concern. Interviews that require free response answers are likely to underestimate younger children's knowledge and understanding. For this reason, researchers have created interview formats permitting children to point to alternatives or to simple visually depicted scales. Although such strategies can circumvent some language production concerns, they do not solve the problem of how to elicit meaningful explanations for forced-choice responses. Young children's verbal limits remain a significant barrier

to interview-based inferences about some aspects of early social understanding and to age-related comparisons in the growth of socioemotional competence.

Other concerns include children's attention span, conceptions of time, memory, and other cognitive demands. With preschool or early elementary school-age children, longer interviews may yield diminishing returns as children become fatigued or bored and their attention wanders. Programmed breaks or multiple short sessions may be necessary. Interview formats that are engaging and child friendly can also help (see "Child Informants" section). Because young children's conceptions of time develop slowly (Friedman & Lyon, 2005), they may be unable to report some kinds of information reliably. For example, research on the use of structured diagnostic interviews has found that children younger than 10 years cannot reliably report the timing and duration of symptoms (Edelbrock & Bohnert, 2002). The cognitive load of the task is also relevant; interview questions that require children to hold information in working memory can underestimate younger children's competence (Case, 1992). Common remedies for interviews that ask questions about story characters in a sequence of events are to accompany the story with illustrations, to retell the story after a series of questions, or to ask the child to retell it.

The interview method has been characterized as time- and cost-effective due to reduced training demands and data collection time relative to other methods (Edelbrock & Bohnert, 2002). However, appropriate training is essential to minimize measurement error. In many laboratories, interviews are conducted by undergraduate and graduate students who must be trained to establish rapport with children (and their parents, teachers, or school officials), be sensitive to the children's perspectives and developmental level, and to understand ethical considerations related to questioning children. The need for standard procedures is also paramount. For example, naïve interviewers sometimes inadvertently point to a particular value on a response scale or hold the response scale with the correct end closer to the child. Given children's suggestibility (e.g., Bruck & Melnyk, 2004), it is crucial that interviewers be trained to avoid such nonverbal slips and to monitor and control other nonverbal behaviors. Below we review common interview formats used with children.

Child Informants

Puppet-assisted interviews. Puppets are often used to make interviews more engaging and to facilitate responding. For example, R. A. Eder (1989) measured young children's

self-concepts with two puppets who presented alternatives based on Harter and Pike's (1984) self-report instrument. Puppet 1 might say, "I keep my room neat and clean" whereas Puppet 2 would counter, "My room is really messy." Children were asked to pick the puppet who was more like them. Eder found that children as young as 3.5 years provided internally consistent responses that exhibited test-retest reliability. The Berkeley Puppet Interview, adapted by Ablow and Measelle (1993) from this technique, has been used to measure domains of self-knowledge, including academic competence, achievement motivation, social competence, peer acceptance, depression/anxiety, and aggression/hostility (Measelle, Ablow, Cowan, & Cowan, 1998), conduct problems (Arseneau, Kim-Cohen, Taylor, Caspi, & Moffitt, 2005), and children's reports of the parenting they experience (Sessa, Avenevoli, Steinberg, & Morris, 2001). Children's reports of their own behavior showed convergent validity with other reporters and their reports of the parenting they received converged with those of observers, but less well with their mothers' reports.

Puppet-based interviews have also been used to measure children's emotion discrimination and emotion situation knowledge (e.g., Denham & Couchoud, 1990). Blank-faced puppets act out emotion-eliciting vignettes, and children select the emotion face that reflects how the puppet is feeling. Children's responses have been shown to relate concurrently and longitudinally to their social and emotional competence (e.g., Denham et al., 2003). In other studies, children have used puppets or dolls to represent themselves and to act out what they would do or say in hypothetical situations (Murphy & Eisenberg, 1997), or in emotion- or attachment-based story endings (MacArthur Story Stem Battery; Bretherton, Ridgeway, & Cassidy, 1990). Because such procedures reduce the demand for verbal responses and create a familiar play-like format, they are especially valuable with preschool and early elementary school-age children.

Hypothetical situation interviews. Because storytelling is natural, engaging, and enjoyable, interviews with young children often involve telling the child a story and then asking questions about the story. Stories involve hypothetical, easily imaginable situations; they may have either hypothetical characters or characters known to the child, including the child him/herself, and can be illustrated with line drawings (e.g., Harper, Lemerise & Caverly, 2010) or presented as video clips (e.g., Lemerise, Fredstrom, Kelley, Bowersox, & Waford, 2006). Questions following the stories include evaluating characters' motives or the

appropriateness of their actions; predicting what characters might do and why; asking children how they feel about the characters' actions or what they themselves would do; what their own goals would be in that situation; or what the consequences might be of various responses to the situation. Responses can be forced choice, choosing a response on a scale, or free response. Because of its flexibility, this general approach is widely used in studies of moral and prosocial reasoning (e.g., Eisenberg, 1986; Killen, Lee-Kim, McGlothlin, & Stangor, 2002; Turiel, 2006), social information processing (see Lemerise & Maulden, 2010, for a review), theory of mind (see Wellman, Cross, & Watson, 2001, for a meta-analysis), and other aspects of social cognition (e.g., conceptions of friendship; Selman, 1980).

Interpretation of children's responses to hypothetical situations rests on the assumption that children's answers reflect their understanding and that their responses are associated with their behavior. However, these assumptions may not always be valid, and the nature and strength of relations between children's interview responses and their knowledge and behavior is an empirical question. The "happy victimizer" phenomenon illustrates the first assumption (e.g., Arsenio & Kramer, 1992). In these studies, children were told stories in which one child victimized another child and then received a material gain or achieved a personal goal. Children were asked to attribute emotions to both the victim and the victimizer. Children had no trouble attributing negative emotions to victims, but children younger than 6 or 7 years attributed positive emotions to victimizers (the "happy victimizer"), whereas older children attributed mixed or negative emotions to victimizers. This finding has been interpreted as reflecting an important milestone in moral development (e.g., Malti & Keller, 2010). However, the developmental difference may lie not in moral reasoning, *per se*, but in children's ability to reason about hypothetical characters. When children were asked to imagine themselves as the victimizer (rather than imagine a hypothetical victimizer), they attributed negative emotions to the self-as-victimizer at earlier ages (Keller, Lourenco, Malti, & Saalbach, 2003), suggesting that reasoning about hypothetical characters may involve greater cognitive load than reasoning about the self (see also Callaghan et al., 2005; DeLoache, 2011). Thus, researchers must be cautious in making inferences about what reasoning about hypothetical characters reveals about young children's social understanding.

Social information processing research, which focuses more on individual differences than developmental change,

also utilizes hypothetical situations accompanied by line drawings or videotaped vignettes. Children are often asked to imagine they are one of the story characters, usually the victim of a provocation or the child who is excluded by a group of other children. The other child (or children) in the stories is/are hypothetical peers, often described as “a kid you know called X.” After telling (or viewing) the story, questions are asked to assess one or more steps of social information processing. A large body of research using this paradigm has demonstrated individual differences in how children perceive and evaluate story characters, with the strongest individual differences demonstrated when the provocateur’s intent is ambiguous (see de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002, for a meta-analysis). These findings are commonly interpreted as reflecting individually stable patterns of reasoning. However, another body of research using stories featuring the child’s own peers calls this interpretation into question (see Lemerise & Maulden, 2010, for a review). These known peers varied in the nature of the affective ties they had with the participants (e.g., good friends, enemies, or neutral peers; or liked/disliked). Results showed that children gave the benefit of the doubt to friends and liked peers as provocateurs, but judged disliked peers and enemies more harshly even when they were portrayed similarly. Thus, children’s responses varied depending on the nature of their relationship with the peer whose actions they were reasoning about. These results, along with those above, demonstrate that the degree to which children’s responses reflect their actual understanding or behavior is an empirical question and should not be assumed.

Peer Informants

Peers are in a unique position to observe and report on the behavior and relationships of children they know. They have access to interactions and events that adults are not likely to witness or that may cease *because* an adult is present. Peers, teachers, and observers exhibit good convergence on a number of aspects of social behavior (Cillessen & Mayeux, 2004). Among the most common peer informant measures are those derived from sociometric methods.

With a long history in psychology (Cillessen, 2009), sociometric methods are widely used to study social and emotional development, especially peer relations. Children are asked to nominate, rate, or rank their classmates or other peers (e.g., at summer camp) according to how much they are liked or disliked; the ensuing scores are then combined to derive measures of social preference

and social impact in the peer group (see Gifford-Smith & Brownell, 2003, for a review). Children can also make behavioral reputation nominations, as in Class Play-type measures where they indicate which children are the most aggressive, prosocial, popular, and so on for roles in a play (Masten, Morison, & Pellegrini, 1985). Researchers then identify specific types of peer relationships such as friendships (defined as mutual like-best or best friend nominations) or enemy relationships (defined as mutual like-least nominations) (Hartup & Abecassis, 2002). Peer likeability, status (popularity, rejection), or behavioral reputation can also be measured (e.g., Asher & Hymel, 1981). Subgroups of children can be compared in studies of social behavior and reasoning. For example, children who are rejected by their peers and receive many nominations for aggressive behavior can be compared to children who have average, rejected, or popular status and are nonaggressive (e.g., Lemerise, Gregory, & Fredstrom, 2005; Lemerise et al., 2006). These subgroups have been shown to differ significantly in social and academic competence (Coie, Dodge, & Kupersmidt, 1990; Lemerise et al., 2005). Peer reports can also be used to study the properties of children’s social networks (e.g., Farmer & Xie, 2013; Neal & Neal, 2013; Rodkin & Hanish, 2007).

When used with older children and adolescents, sociometric measures are usually collected as either paper-and-pencil or computer-assisted questionnaires (see van den Berg & Cillessen, 2013, for a comparison). With preschool and younger elementary school children, interviews are used. In one widely used, reliable, and valid procedure (Asher, Singleton, Tinsley, & Hymel, 1979), children are first trained to use a simple 3-point scale. They are then presented with photographs of their classmates and asked to rate how much they like each one or to nominate the peers they like most and least by pointing to the relevant photos. Note that this procedure is game-like and the child makes active responses. Also, the 5-point scale used with older children is modified to a less cognitively demanding 3 points. This procedure can also be used for younger elementary school children with a few modifications (e.g., Lemerise, 1997).

A number of factors affect the quality of sociometric measures (Bukowski & Hoza, 1989). The timing of data collection matters because children need to get to know their peers well enough to report on them. Reliability is affected by participation rates, with higher participation rates associated with higher reliability (e.g., Marks, Babcock, Cillessen, & Crick, 2012). Behavioral reputation nominations, which are based on observable

behaviors or peer consensus, exhibit better reliability at lower participation rates than do nominations for liking or friendship, which reflect children's individual reactions to peers (Marks et al., 2012). Data collection in middle or high schools where children have classes with a variety of different peers across the school day creates additional challenges (Poulin & Dishion, 2008) because the peer group is much larger and children may not know all of their peers equally well. Unlimited nominations have been suggested to produce more valid data under these circumstances (Marks et al., 2012; Terry, 2000). Moreover, long, alphabetized lists of grade-mates can produce list-position biases in children's nominations, with peers higher on the list nominated more frequently (Poulin & Dishion, 2008). Thus, for middle and high school settings that do not have self-contained classes, shorter, randomly generated lists that sample from the larger peer group are recommended (Bellmore, Juvonen, & Jiang, 2010). These issues notwithstanding, because sociometric methods, unlike parent or teacher reports, combine the judgments of many reporters, the resulting measures, particularly continuous sociometric measures, have been shown to have reasonably high stability and predictive validity (see Jiang & Cillessen, 2005, for a meta-analysis).

Verbal Report: Questionnaires

By late elementary school age, children become able to complete instruments on their own with some guidance, as demonstrated by sociometric methods. By adolescence, interviews begin to be supplanted by questionnaires as the primary form of verbal report. Structured questionnaires have long been the workhorse of individual differences research across the social sciences and many of the strengths and limitations of this method flow from its core characteristics. Specifically, questionnaires require researchers to develop *a priori* conceptualizations of the key axes on which individuals are likely to vary in a given domain, and then to select items (i.e., questions) to capture behavioral, cognitive, or affective indicators of these constructs. Participants then rate each item to characterize aspects of themselves or others (e.g., parents rating their children). Likert-type rating scales are often used to reflect the *degree* (i.e., from "not at all" to "very much") or *frequency* (i.e., how often) of the item. In developing and validating questionnaire measures, data are subjected to exploratory and confirmatory factor analysis to determine whether the putative indicators of the constructs map onto

them as expected, similar to the process for demonstrating convergent and discriminant validity. Once validated, individual items are averaged or summed to provide measures of the constructs of interest (Floyd & Widaman, 1995).

Questionnaires are the most cost-effective and efficient means for collecting large amounts of standardized data and have been used effectively for this purpose since the 19th century. They make it possible to collect parallel information about a construct from a wide range of individuals who may encounter the child in different developmental contexts. For example, to assess children's social competence, a well-validated measure of social skills, such as Gresham and Elliott's (1990) Social Skills Rating System (SSRS), can be administered to mothers and fathers to capture information about the child's social behavior in the home, and also to the child's teachers or childcare providers to assess socially skilled behavior in a peer context. Widely used questionnaires like the SSRS and the Achenbach System of Empirically Based Assessments (ASEBA; e.g., Achenbach, Edelbrock, & Howell, 1987), which primarily assesses psychiatric symptomatology, have been developmentally tailored so that the same measures can be collected from early childhood, as soon as the behaviors of interest emerge, through adulthood, making them especially valuable to studies of developmental continuity and change.

Questionnaires do have notable limitations. First, of necessity they reflect a particular conceptualization of the constructs being measured. The questions are assumed to represent the most appropriate sample from the universe of possible items pertinent to the domain of interest. Thus, there is little opportunity for respondents to inform the researcher's conceptualization of how they may vary in a given domain. Second, even when questionnaires are administered in precisely the same manner to all informants, different groups of individuals may interpret the same questions differently. This issue is one of *measurement equivalence*, necessary for making inferences across groups. Indeed, in addition to careful translation and back-translation of items, establishing measurement invariance (e.g., factorial and intercept) is necessary for valid analyses of cross-cultural and cross-ethnic similarities and differences (e.g., Cheung, Pomerantz, & Dong, 2013; Haltigan et al., 2014). With these considerations in mind, we illustrate some common applications of questionnaires over development to provide a flavor for how they are used in research on children's socioemotional development.

Questionnaires From Infancy to Early Adulthood

Infancy. Questionnaires designed to assess socioemotional functioning in the first 2 to 3 years tend to be administered to primary caregivers, particularly mothers. In addition to probing aspects of parents' own experiences (e.g., parental depression, with the CES-D; Radloff, 1977), parents are frequently asked to report on their children's experiences or characteristics such as temperament. For example, at the 1- and 6-month assessments in the NICHD Study of Early Child Care and Youth Development, mothers completed Carey and McDevitt's (1978) Infant Temperament Questionnaire, rating items on a 6-point scale to assess overall difficulty. This measure was a reliable moderator of the predictive significance of observed sensitive caregiving, with more difficult children either disproportionately negatively affected by low-quality caregiving or differentially susceptible to both lower- and higher-quality caregiving (Roisman, Newman, et al., 2012; see Chen & Schmidt, Chapter 5, this *Handbook*, this volume, for further discussion of temperament measures).

Early childhood. Questionnaire methods become more diversified with older children, increasingly focused on distinct aspects of socioemotional development. Questionnaires such as those contained within the ASEBA, which assesses symptoms of psychopathology, can reliably track both internalizing and externalizing symptomatology as early as 2 or 3 years of age. Similarly, questionnaires such as the SSRS assess multiple aspects of socially skilled behavior from as early as children can sustain interactions with their peers. As children become progressively more engaged with others outside the family in a widening array of contexts, childcare providers and teachers become key informants about the children's behaviors and experiences, using questionnaires that parallel those for parents (e.g., Teacher Report Form, TRF, the teacher-report ASEBA questionnaire).

Middle childhood and adolescence. The reliance on adult informants shifts in middle childhood when self-reports become more routinely used. Versions of the ASEBA, like the Youth Self-Report, and other instruments that require self-reflective reporting, like Kovacs's (1992) Child Depression Inventory (CDI), become age-appropriate as children's ability to reflect objectively on their own physical, psychological, and behavioral qualities becomes more robust and differentiated. As an objective sense of self becomes consolidated, instruments like Harter's Perceived Competence Scales (Harter, 1982) track children's self-concepts in domains such as

academics, peer relationships, and other salient aspects of identity. Similarly, children become able to report on their friendships, including activities and features that index relationship quality; attitudes such as school and achievement attitudes, or gender and race stereotypes; and emotional responses or states such as loneliness or feelings of rejection. They can report on actual behavior like risk-taking, antisocial behavior, or religious and civic engagement. And they can report on others' behavior (peers, friends, or parents).

Although this creates a wealth of possibilities for capturing multiple perspectives from different informants about socioemotional competence in a variety of domains, two limitations must be noted. First, there has been a long discussion in psychological science about the degree to which even adults are able to consciously access the information that questionnaires typically request (Nisbett & Wilson, 1977). Questionnaires often require respondents to summarize information over extended periods of time and to weigh and balance dynamic and variable behaviors, attitudes, or feelings. This is especially demanding for children and poses difficulties for children's self-reports of affective and cognitive experiences which other informants are unlikely to be able to validate. Parents, too, are poor at recalling descriptive information about their own approach to, say, childrearing years earlier (Yarrow, Campbell, & Burton, 1970). Second, the covariation among self-, parent, and other adult (e.g., teacher) reports of the same child's behavior tends to be modest (De Los Reyes, Thomas, Goodman, & Kundey, 2013). Mothers and fathers show more agreement with each other than do parents with teachers, suggesting that context-specific child behaviors may explain part of the difference. However, parents rate their own children more positively than others do (Seifer et al., 2004), also suggesting rater bias or socially desirable responding. Hence, the hopeful view that data from multiple informants might simply be averaged to increase the validity of questionnaire assessments of socioemotional development has proven to be naïve. Although low convergence among measures of the same construct produces significant barriers to interpretation, the fact that it is consistently found and that different informants provide unique predictive information about children's socioemotional functioning (De Los Reyes & Kazdin, 2005), raises the possibility that informant discrepancy can itself be predicted (e.g., as a function of age, child characteristics, or construct) and is worth investigating in its own right (Hourigan, Goodman, & Southam-Gerow, 2011).

Adulthood. A final developmental shift in questionnaire use occurs as adolescents transition to early adulthood (18–25 years). First, teacher and parent reports become less commonly used through the end of high school. Self-reports—and later, romantic partner—reports—fill this gap. Second, the experiences captured by questionnaires also change, with a shift toward romantic and vocational experiences (Roisman, Masten, Coatsworth, & Tellegen, 2004), as well as aspects of antisocial behavior that increase notably across the transition to adulthood (Moffitt, 1993).

Verbal Report: Summary and Conclusions

Flexibility is a clear strength of verbal report methods. Interviews and questionnaires are used to measure a range of constructs, including mental representations and emotional experiences that would not be accessible by other means. Compared to observational methods, verbal report methods are more cost- and time-efficient, with questionnaires more so than interviews. Despite these advantages, there are limitations in the application of verbal report methods. Verbal reports can be constrained by memory distortions and other biases, and some constructs may not be accessible to verbal report, particularly when young children are the respondents. Developmental considerations such as linguistic and cognitive ability and literacy levels restrict the use of both interviews and questionnaires, which makes parents, childcare providers, or teachers necessary informants about very young children.

Interviews begin to be used when children reach preschool age, but the developmental appropriateness of interview demands must be carefully considered to ensure that the procedures are engaging and the results interpretable. Interviewer training ensures standardization and controls for inadvertent nonverbal behavior that might enhance children's suggestibility. Finally, in the absence of converging measures, cautions apply in interpreting interview results as reflecting stable developmental levels or individual characteristics.

As children reach late middle childhood and adolescence, questionnaires largely replace interviews. Children's growing cognitive abilities, vocabularies, reading skills, and capacity to focus attention and follow directions make it possible to capitalize on the more time- and cost-efficient questionnaire method. However, individual differences in the very skills that enable this shift may compromise validity. For these reasons, especially for elementary school children, training children on the response scales

and reading the questions to them can be essential. Given the large numbers of college students who require remedial reading courses (Bettinger & Long, 2009), due diligence seems appropriate beyond elementary school as well. Finally, careful attention to measurement invariance at multiple levels of analysis is required to use questionnaire data validly across culturally diverse groups.

PSYCHOBIOLOGICAL MEASURES: NEUROPHYSIOLOGY, PSYCHOPHYSIOLOGY, AND GENETICS

Extraordinary progress has been made over the past two decades in the development and application of methods to quantify biological correlates of human socio-emotional development. The field can now truly adopt a “molecules-to-mind” approach, studying key phenomena across multiple levels of analysis, from genes, to brain, to behavior, to the broader environmental context (e.g., Somerville, 2013). A driving force has been the development and refinement of neuroimaging methods, especially functional magnetic resonance imaging (fMRI), electroencephalography (EEG), and functional near infrared spectroscopy (fNIRS), to study brain function across the life span (e.g., Nelson & Luciana, 2008). Advances in molecular genetics and the integration of molecular and behavioral genetics have also propelled the field forward, as have advances in epigenetics. Interdisciplinary research teams now combine genetics with neuroimaging and psychophysiological methods to measure constructs across levels of analysis, and, increasingly, across the life span. Each of these measurement approaches is discussed in this section.

As a group, psychobiological methods are powerful, but as with any measurement approach, researchers need a well-conceptualized research question with well-defined constructs and clear operational definitions to maximize the interpretability and validity of inferences. Also like other measurement methods, psychobiological methods require a high level of specific training and expertise to be implemented appropriately. However, unlike the other methods discussed in this chapter, training in psychobiological techniques or the interpretation of measures derived from them is not currently part of routine graduate education in most developmental psychology programs. As such, they are often used in the context of large multidisciplinary research teams, with attendant logistical hurdles.

Psychobiological measures involve several trade-offs. For neuroimaging techniques, there is often a trade-off

between invasiveness and the degree of spatial resolution. Another trade-off exists between temporal and spatial resolution: EEG has excellent temporal but poor spatial resolution whereas fMRI exhibits the opposite qualities. Different psychobiological methods provide complementary but independent measures. It is always best to triangulate on a particular construct utilizing several different methods, each appropriate to the question of interest and the developmental level of the participant.

Psychobiological measures also have notable weaknesses. Threats to data quality are a major issue. Perhaps even more than other techniques, the misapplication of psychobiological measures can generate data that seem informative but are actually misleading. For instance, movement artifacts not only ruin neuroimaging measures, but, when unnoticed, can lead to false, but plausible, conclusions. With these considerations in mind, we review several psychobiological approaches used with children and the measures they generate, their advantages and disadvantages, and the exciting opportunities becoming available.

Neurophysiological Measures

Neurophysiological measurement approaches can significantly enhance the explanatory power of theories of social and emotional perception, regulation, understanding, and reasoning, thereby contributing to our understanding of socioemotional behavior. They can: (a) improve models of social and social-cognitive processes via activation-based *dissociations*, that is, when one brain region or network is activated differently by different tasks, whereas another area shows the opposite pattern of activation; (b) inform understanding of the relative timing or structure of social and cognitive processes; (c) facilitate integration of information from diverse methodologies (e.g., genetics, lesion studies, animal models, and behavioral performance); and (d) help adjudicate between competing psychological theories.

Because a complete account of socioemotional development must include an understanding of brain development, methods for studying *in vivo* brain function have gained positive traction. The brain is highly dynamic and active in its responses to environmental inputs and the activities of the individual, and we are just beginning to acquire the empirical database needed to understand how structural and functional changes in brain size, composition, and organization relate to developments in social and emotional domains. In the sections to follow, we

describe the three functional neuroimaging techniques that are being used most widely to study the development of human social and emotional brain function.

The evaluation of each technique can be informed by two key concepts, *contrast* and *functional resolution* (Huettel, Song, & McCarthy, 2009). Contrast is the intensity difference between quantities being measured by an imaging system, for example oxyhemoglobin levels. Contrast is determined mostly by signal-to-noise ratios, or the magnitude of the intensity difference between quantities divided by the variability in their measurements. Contrast applies to both temporal and spatial properties of neuroimaging methods. Considering the temporal and spatial resolutions of an imaging technique along with the quality of the experimental design and task selection (no technique is useful in the absence of a valid experimental design), the *functional resolution* of a technique can be determined. Functional resolution refers to a measurement technique's ability to identify the relation between underlying neuronal activity and a cognitive or behavioral phenomenon. Functional resolution is limited both by the intrinsic properties of a brain measure and by the researcher's ability to manipulate key features of the experimental design to allow interpretable variation in the phenomenon of interest; this makes the selection of tasks critical, as with any other method in developmental science.

The Social and Emotional Brain

Humans are, at their core, social and affective beings, but these essential characteristics have often been treated as sources of noise to be excluded from controlled experiments. This has changed dramatically in the past 20 years, owing in part to remarkable new discoveries in social and affective neuroscience. Neurophysiological measures not only promise to advance our understanding of basic processes in social and affective development, but they have also opened up an entirely new area of inquiry, brain development itself, including both structural and functional development, particularly as it is shaped by and adapts to experiences, whether biological (e.g., hormonal changes of puberty) or environmental (e.g., social demands and rewards of adolescent peer networks).

Neuroscientists became interested in how the brain processes social information when it was discovered that neurons within the temporal cortices and amygdaloidal complexes of monkeys were sensitive to and selective for social objects (e.g., faces and hands) and complex social stimuli (e.g., actions in a social context; direction of gaze) (e.g., Brothers, Ring, & Kling, 1990;

Desimone, 1991). Brothers et al. (1990) coined the label “social brain” to capture the emerging idea of a network of brain regions dedicated to processing social information. The key assumption is that human beings, in response to the unique computational demands of their highly social environments, have evolved mechanisms and an associated, dedicated neural system supporting abilities such as recognizing other agents and their actions, individuating others, perceiving others’ emotional states, analyzing others’ intentions and dispositions, sharing attention with others, and representing others’ perceptions and beliefs.

A network of neuroanatomical structures and their connections described as the “emotional brain” includes the amygdala as a central component. Emotional experience involves at least three elements: (1) identifying emotionally salient cues, (2) producing affective states and emotional behavior as a response to these cues, and (3) regulating affective states and behavior (Herba & Phillips, 2004). Phillips, Drevets, Rauch, and Lane (2003) proposed two parallel neural systems of emotion processing: (1) a system comprising subcortical and ventral-frontal cortical regions important for identifying emotionally salient cues, and (2) a system comprising dorsal-frontal cortical regions important for regulating subsequent behavior. These brain regions may be activated differentially as a function of the emotion encountered and the process being assessed.

Studies of the social and emotional brain frequently emphasize the unique contributions of specific neuroanatomical structures. This analytic perspective is helpful in providing a framework for organizing emerging understanding of brain development, but it does not fully reflect the complexity of interactions among brain regions. These structures undoubtedly function in parallel and are better understood as components in a network of regions subserving different aspects of social and emotional processing. To date, the functional development of some of the components of this system has been studied, but their developmental integration generally has not. Moreover, the possible role of changes in functional connectivity over development as a process underlying socioemotional development demands more empirical and theoretical attention (e.g., Dosenbach, Petersen, & Schlaggar, 2013). We are now well positioned to remedy this neglect owing to developments in neuroimaging and data analytic techniques.

Functional Magnetic Resonance Imaging (fMRI)

Functional magnetic resonance imaging (fMRI) offers outstanding spatial resolution to visualize networks of

neuroanatomical structures involved in aspects of brain function related to socioemotional processing and development. This technique requires a magnetic resonance imaging (MRI) scanner, a high rate of image acquisition, and specialized pulse sequences to measure localized brain activity. These sequences take advantage of the endogenous blood-oxygen-level-dependent (BOLD) contrast to image brain activity. This technique does not depend on ionizing radiation and does not require invasive procedures, making it suitable for longitudinal investigations of children.

Ogawa, Lee, Kay, and Tank (1990) discovered the BOLD intrinsic contrast mechanism: Because neurons do not store reserves of glucose and oxygen, essential to their proper function, an increase in neuronal activity requires immediate delivery of glucose and oxygen via the bloodstream. Elevated levels of oxyhemoglobin occur in active brain areas, changing the surrounding ratio of oxy- to deoxyhemoglobin, thereby providing a localizable proxy for brain activity detectable by MRI. The change in levels of oxyhemoglobin is typically localized to within 1 or 2 mm of the neural activity. As the neurons in specific brain regions “work harder” to perform a specific task, they require more oxygen. This hemodynamic response peaks around 4–6 seconds following the onset of neuronal activity, setting a limit on the temporal resolution of fMRI. Thus, measures acquired from fMRI are indirect proxies for location, amount, and timing of brain activity in response to specific stimuli or tasks. An accessible exposition of BOLD contrast measurement and outstanding coverage of all aspects of fMRI design, data acquisition, analysis, and interpretation can be found in the first comprehensive textbook of fMRI (Huettel et al., 2009).

Information from fMRI measures about the nature of neural activity is limited in several ways. First, research in rhesus monkeys comparing simultaneous recordings of the BOLD signal via fMRI and local field potentials via electrodes implanted directly into the cortical surface demonstrates that the BOLD contrast reflects mainly the inputs to a neuron and the neuron’s integrative processing within its body, and less the output firing of neurons. It is also important to recognize that the BOLD signal cannot provide information regarding direction of information flow. In particular, because it relies upon a relatively slow vascular response, the overall signal represents the summation of feedback and feed-forward information flow. Similarly, both inhibitory and excitatory inputs to a neuron from other neurons sum and contribute to the BOLD signal such that, within a neuron, the inputs might cancel out, leaving a net zero response; in this case, theoretically important brain

activity is present, but it is not detected by fMRI. An excellent and authoritative discussion of these and many other important issues concerning the BOLD response and its interpretation is provided by Logothetis (2008).

Illustration of fMRI

Theory of mind development in middle childhood. Imaging measures of children's brain activity have revealed heretofore unknown details about the development of some psychological functions such as the ability to think about one's own and others' thoughts, or "theory of mind" (TOM; see Hughes & Devine, Chapter 14, this *Handbook*, this volume; and Carpendale & Lewis, Chapter 10, this *Handbook*, Volume 2). fMRI studies of adult brains have revealed a small and remarkably consistent set of cortical regions associated with thinking about others' thoughts: bilateral temporoparietal junction (TPJ), medial prefrontal cortex (mPFC), and posterior cingulate cortex (PC) (e.g., Ochsner et al., 2005; Saxe & Kanwisher, 2003). In a study by Saxe, Whitfield-Gabrieli, Scholz, and Pelphrey (2009), children's brains also differentiated parts of stories that described the characters' thoughts from parts describing other facts about people and parts describing the physical context. However, in children, unlike in adults, the right TPJ was not significantly more selective than the mPFC for mental-state information relative to other social facts. Indeed, the differential selectivity of the TPJ was positively correlated with age. In contrast to the view that false belief reasoning, one component of TOM, is largely mature before 6 years of age (e.g., Wellman et al., 2001), these findings suggest that the neural organization underlying TOM is still developing as late as Age 9. Although the implications for developmental theory are as yet unclear (Saxe, 2013), one conclusion does seem clear and illustrates the power of imaging measures to contribute to theoretical progress: The existence of late-emerging cortical selectivity undermines the argument that category-selective brain regions in adults constitute evidence for innate and early maturing domain-specific cognitive or perceptual modules, including a domain-specific module for TOM.

The importance of addressing movement artifacts in fMRI. Because of the potential for brain imaging techniques to inform developmental theory, age-specific measurement issues are especially important. Movements of a participant during fMRI lead to blurry images and artifact-ridden measures, a fact that limited the use of this technique to adults for nearly a decade. Historically, the focus on movement artifacts in fMRI has been on large head movements, often defined somewhat arbitrarily as movements greater than

3 mm. fMRI was thought to be relatively impervious to effects generated by smaller movements. More recently, however, it has become evident that even tiny movement artifacts (0.004 mm), though not causing noticeably blurry images, can lead to insidious biases in fMRI analyses, even leading to false conclusions (Power, Barnes, Snyder, Schlaggar, & Petersen, 2012; Van Dijk, Sabuncu, & Buckner, 2012).

The results of a series of papers representing groundbreaking advances illustrate this dilemma. First, via highly innovative, mathematically complex analyses of resting-state functional connectivity data, two papers reported that short-range brain connections start off strong in school-age children and weaken over the course of development into young adulthood, whereas long-range connections begin weak in children and strengthen over time (Dosenbach et al., 2010; Fair et al., 2008). However, two subsequent papers demonstrated that these developmental findings are actually an artifact of uncontrolled age differences in head motion, with younger children moving more than older children, adolescents, and adults (Power et al., 2012; Van Dijk et al., 2012). Notably, these newer results also call into question all previous reports of age-related changes in studies using fMRI. When evaluating developmental changes in fMRI measures, one needs to, at a minimum, determine whether there are also age-related changes in the mean level of movement. Note that in the aforementioned articles, when age-related changes in head movement were controlled, developmental effects generally disappeared, suggesting much more continuity than change in brain function from early childhood to adolescence and early adulthood. Voos and Pelphrey (2013) provide a more extended discussion of these issues and offer suggestions for techniques to eliminate movement artifacts at the source and to correct for observed movement differences.

Electroencephalography/Evoked Response Potentials (EEG/ERP)

In contrast to fMRI, EEG/ERP directly measures the firing of groups of cortical neurons. As one processes information, neuronal activity creates small electrical currents that can be recorded from noninvasive sensors placed on the scalp, providing precise information about the timing of processing and clarifying brain activity at the millisecond pace at which it unfolds. EEG/ERP and fMRI are complementary imaging methods. Both are appropriate for studying brain function and its development from infancy (or, for fMRI, the fetal period; see Thomason et al., 2013) through late adulthood. The high temporal

resolution of ERP complements the high spatial resolution of fMRI, and both have been critical in understanding several aspects of typical and atypical social development. From fMRI measures, we learn what brain regions are involved and whether different regions are activated more or less at different points in development or demonstrate different developmental trajectories. From ERP measures, we learn how specific stages of processing develop insofar as the same brain regions can perform distinct functions at different time points in processing, and we learn about developmental differences in the timing of the stages of social and emotional processing. The classic monograph by Luck (2005) is an outstanding introduction to and tutorial about EEG/ERP.

Illustration of EEG/ERP

Identifying abnormal socioemotional development in infancy. ERP measures have revealed subtle differences in processing of social information at the neural level in children at risk for autism, even in the absence of overt behavioral differences. Autism spectrum disorder (ASD) is an early-onset, neurodevelopmental disorder marked by impairments in reciprocal social interaction and communication and the presence of repetitive or restricted interests and behaviors (American Psychiatric Association, 2000). The lack of reliable indicators of ASD during the first year of life has been a major impediment to diagnosis and treatment: In the absence of a firm diagnosis, treatment is often delayed for 2 or more years until behavioral symptoms emerge. Given its strong social components, Elsabbagh et al. (2012) hypothesized that neural sensitivity to eye gaze in early infancy would predict later development of ASD. Notably, there is little behavioral evidence of disruption in eye-gaze processes in infants later diagnosed with the disorder. The researchers recorded ERP while 6- to 10-month-old high-risk infants (siblings of a child with ASD) viewed faces with dynamic eye gaze directed either toward or away from them. Neural responses to dynamic eye-gaze shifts during the first year predicted clinical outcomes at 36 months, despite similar gaze patterns measured by eye tracking. The authors concluded that neural responses to eye gaze in the first year of life reflect disruptions in basic developmental processes leading to the later emergence of ASD.

This finding illustrates that measures of brain function can index developmental and individual differences in underlying processing mechanisms that are otherwise impervious to study because they do not produce overt behavioral evidence. EEG measures can thus be leveraged

even in very young infants as “neural signatures” of processes that are not available to observation or verbal report. Further, some neural signatures, for example ERP responses indexing face perception, may be remarkably consistent across the life span, allowing researchers to measure certain aspects of socioemotional processing using identical neurophysiological methods even when major developmental changes demand alterations in other measurement strategies (e.g., a shift from behavioral observation to verbal report).

Functional Near-Infrared Spectroscopy (fNIRS)

Because fMRI and EEG/ERP have been used to study the social and emotional brain primarily with 6- to 10-year-olds and adolescents, the organization of these neural systems in the infant and young child remains largely unexamined. In the past two decades, a new neuroimaging technique has emerged that appears to be quite promising for unlocking an understanding of the developing brain in very young humans, as well as in older children and adults (Gervain et al., 2011). The noninvasive, functional near-infrared spectroscopy (fNIRS) uses emitters and detectors attached to the scalp. Because it is less sensitive to motion, fNIRS can be utilized in less-constrained, more ecologically valid social paradigms than fMRI and EEG/ERP.

Like fMRI, fNIRS measures changes in blood oxygenation. However, fNIRS employs light in the near-infrared segment of the spectrum (800–2500 nm) to measure brain activity at and just beneath the cortical surface. Although the scalp and skull are opaque to visible light, they are almost transparent to light in the near-infrared range. Because blood absorbs light photons differently depending upon how much oxygen is present, by shining a near-infrared light into the head and measuring the intensity of the exiting light, fNIRS can reveal the differential absorption of light as a function of blood-oxygenation level. As with fMRI, this provides an indirect measure of brain activity. Furthermore, fNIRS measures both oxygenated and deoxygenated hemoglobin in brain tissue, providing two distinct (but correlated) indicators of neural activity, making fNIRS capable of absolute measures as opposed to only baseline-relative measures, increasing its flexibility (Gervain et al., 2011).

Illustration of fNIRS

Face processing in infants. A number of studies have used fNIRS to examine social and emotional processes in neonates to toddlers. Several have focused on the development of face processing. The ability to localize

neural signatures of face processing in infants who are awake and actively attending to visual displays is unique to fNIRS. Findings show that at 4 months, the temporal cortex of infants activates selectively to faces relative to other objects (Blasi et al., 2007; Csibra et al., 2004). At 6 months, infants exhibit increased activity to upright versus inverted faces in the right temporal cortex (Otsuka et al., 2007). At 8 months, activity in temporal regions is observed independent of viewing angle (Nakato et al., 2009). Researchers investigating responses to dynamic social stimuli such as eye and mouth movements have identified bilateral superior temporal and inferior frontal cortical activations in infants starting as early as 4 months, consistent with activation observed via fMRI in older children, adolescents, and adults in response to the same kinds of stimuli (Grossmann, 2008; Lloyd-Fox, Blasi, & Elwell, 2010). Gervain et al. (2011) provide a comprehensive review of fNIRS studies of infants.

One might wonder why everyone does not use fNIRS all the time given its advantages. From the perspective of head motion, the observation is correct. But there are always critical trade-offs with functional neuroimaging techniques. fNIRS only measures activation at the cortical surface. The light used to image brain function does not return to the optodes from deeper cortical areas and, critically, subcortical areas. Because many of the key social and emotional brain areas are deep within the cortex or are part of the limbic system, they are invisible to fNIRS. Moreover, the more hair on the participant's head, and the thicker the skull, the more difficult it is to use fNIRS, so it works best in infants and young children.

Psychophysiological Measures

Prior to the advent of technologies for directly probing patterns of neural activation, much biologically informed research on socioemotional development focused on indicators of the human stress response, and indeed continues to do so to evaluate how social experiences such as the transition to childcare are reflected in stress-related reactivity as well as children's diurnal cortisol rhythms (Watamura, Donzella, Alwin, & Gunnar, 2003), possibly in lasting ways (Roisman et al., 2009).

The human stress response is subserved by two distinct biological systems. Short-term stress responses are produced via the sympathomedullary pathway (SAM) reflecting the sympathetic branch of the central nervous system, which is opposed by the parasympathetic branch of the autonomic nervous system (ANS). Developmental

studies today use a wide variety of ANS response indicators to assess SAM-mediated activation, including surface measures of electrodermal response as well as assays of enzymes like salivary α -amylase. In contrast to shorter-term SAM-mediated stress responses, longer-term stress responses are regulated by the hypothalamic-pituitary-adrenal (HPA) system, often interrogated using measures of the stress-related hormone cortisol. Below, we discuss in greater detail methods of probing the SAM and the HPA stress systems in the study of socioemotional development.

Sympathomedullary Pathway (SAM)

The ANS is subdivided into two components: the sympathetic nervous system, concerned with mobilizing the body's fight-or-flight response; and the parasympathetic nervous system, involved in freezing and immobilizing behaviors. Activation of the sympathetic nervous system is most often measured via electrodermal response (EDR) or heart rate (HR). EDR measures the electrical conductance of the skin, which varies with its moisture level. The sweat glands of the skin are controlled by the sympathetic nervous system. Thus, increases in moisture, and electrical conductance, indicate arousal in the sympathetic nervous system. Similarly, HR has been used as a measure of sympathetic nervous system reactivity, with HR increases reflecting sympathetic nervous system arousal (although, note that HR is under both sympathetic and parasympathetic regulation).

HR and EDR have been used to examine autonomic nervous system correlates of multiple aspects of social and emotional processes in development. For example, Dozier and Kobak (1992) measured EDR during the Adult Attachment Interview to demonstrate that insecure adults showed evidence of stress-related inhibitory activation while talking about their childhood experiences (see also Roisman, Tsai, & Chiang, 2004). The *Handbook of Psychophysiology* (Cacioppo, Tassinary, & Berntson, 2007) provides a comprehensive treatment of HR and EDR, including recording issues and examples of their use in studying social and emotional development.

Developmental scientists have most often studied the parasympathetic nervous system by measuring HR variability, using electrocardiogram (ECG) data to examine vagal tone (e.g., Porges, 2001). Vagal tone has been used frequently as a physiological correlate of emotion regulation and arousal (e.g., Porges, Doussard-Roosevelt, & Maiti, 1994). It is controlled by the vagus nerve, which is connected to the cranial nerves that help to support and

regulate social behavior via facial expressions. Higher vagal tone is thought to be related to calmer, more regulated, and more positive social behavior (Porges, 2011). Porges (1997) proposed that the mechanism underlying this association is the inhibitory effect of vagal tone on the sympathetic nervous system. The available research paints a mixed picture. Some researchers have reported negative associations between higher vagal tone and measures of sympathy and prosocial behavior (e.g., Zahn-Waxler, Cole, Welsh, & Fox, 1995). Others report positive correlations (e.g., Fabes, Eisenberg, & Eisenbud, 1993). Still others report no correlation (e.g., Eisenberg, Shepard, Fabes, Murphy, & Guthrie, 1998). Sample characteristics must be considered to understand the inconsistency in findings. For instance, the sample in which negative relations were found included children at risk for externalizing problems. Relations between vagal tone and empathy-related responding may also differ by gender (e.g., Eisenberg et al., 1996; Fabes et al., 1993). Despite these caveats, measures of vagal tone have become established as valuable, real-time indices of two key theoretical constructs, emotion arousal and regulation. Notably, these are neither readily observed nor easily accessible to self-report.

Hypothalamic-Pituitary-Adrenal System (HPA)

Functioning of the HPA system in infants and children (see Gunnar, Doorn, & Esposito, Chapter 4, this *Handbook*, this volume) is most often assayed via measures of cortisol from blood, saliva, or urine. Cortisol, a steroid hormone, is released during periods of increased stress. It is important to differentiate between the cortisol awakening response (CAR) and basal cortisol level. The CAR is part of the diurnal cortisol pattern; it is a reactive measure, peaking upon awakening in the morning. Basal levels of cortisol also follow a diurnal pattern but additionally reflect average levels of cortisol over periods of days or even weeks. These two measures can be used to index different constructs. The CAR is more dynamic and indexes changes in context and transient mood states whereas basal levels index more enduring and trait-like stable constructs (Fries, Dettenborn, & Kirschbaum, 2009). For instance, if parents report that their child was emotionally dysregulated and acting out one day, both they and the child will tend to have a dysregulated CAR the following morning. This is because the stresses of the previous day led to an incomplete unbinding of cortisol receptors over the course of the evening. In contrast, the prior day's stresses would not be reflected in basal cortisol levels because these index more chronic stress levels.

Research using HPA-system measures has tended to focus on infancy through middle childhood. For instance, an extensive body of research has examined the effects of poor early caregiving on the development and regulation/dysregulation of the HPA system and its influence on neural systems supporting social and emotional abilities, especially emotion regulation (e.g., Fisher, Van Ryzin, & Gunnar, 2011). More recent research highlights how the HPA system remains "open" to reorganization during adolescence (e.g., van den Bos, de Rooij, Miers, Bokhorst, & Westenberg, 2013). This new emphasis on the reorganization of the HPA system during adolescence is opening exciting venues for research that transcends previous notions of hardwired critical periods for the development of this system and its correlates.

Genetic Variation

An organizing theme in developmental theory concerns the contributions of genetics and environment to variation in behavior and adaptation. Although the nature–nurture dialectic has long generated valuable theoretical discussion, beginning in the second half of the 20th century emphasis shifted toward environmental explanations of social and emotional development, resulting in several decades of research in which genetic influences were relatively neglected. This environmental bias was enshrined in the paradigmatic design in socialization research—the prospective, longitudinal study involving between-family comparisons in which variability between, but not within, families was examined. However, technological advances in human genetics have made it possible to measure genetic variation directly. This has produced both insights and challenges as well as opportunities for understanding how genes and environments work together to influence development. We anchor the discussion of these measurement approaches in the historical context that provided the impetus for embracing them: quantitative behavior genetics.

Quantitative Behavior Genetics

At the close of the 20th century, critics of socialization research (e.g., Rowe, 1994; Scarr, 1992) cogently argued that the ubiquitous correlations repeatedly documented between parenting behaviors and child outcomes might not be due to parenting, *per se*, but instead to the effects of genes shared within families. This is because the between-family research design confounds genetic and shared-environment sources of variability in children's behavior. For a wide variety of outcomes, identical twins are more similar to

one another than are fraternal twins (Turkheimer, 2000), suggesting that genetic variation plays a role in individual differences. Further, the results of biometric modeling, in which the relative effects of genetic, shared environmental, and nonshared environmental variance are estimated, have suggested that the effects of shared environments are often relatively small (Plomin & Daniels, 1987; but see Roisman & Fraley, 2008), leading some writers to speculate that parental influences are minimal and have no long-term effects on development (Harris, 1995).

One positive outcome of two decades of discussion of these issues has been the increased use of behavior-genetic research designs in the study of social development. To be sure, the limitations of behavior-genetic designs should not be minimized (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000). Nonetheless, the use of adoption designs (where biological overlap between caregivers and children does not represent an internal validity threat) and comparisons of identical twins (who share 100% of their genetic variation) and fraternal twins (who share 50% on average) provide a means for beginning to unconfound genetic and environmental contributions to socioemotional development.

The most commonly used approach decomposes individual differences on a variable of interest using the ACE model (Neale & Cardon, 1992). According to this model, variation in an outcome arises from three latent sources. The additive genetic component (A) represents the degree to which genetic variability contributes to variation in the outcome of interest; the common environment component (C) represents the degree to which variation shared by siblings in the same family contributes to the outcome; the nonshared environment component (E) represents the degree to which variation not shared by siblings (e.g., due to differential treatment by parents or different experiences in the peer group) contributes to the outcome. The nonshared environment component also reflects random measurement error.

The ACE model can be extended in ways of particular interest for socialization researchers, including to study the etiology of the *associations among variables*, by decomposing correlations between social developmental “inputs” and “outcomes” into A, C, and E. For example, using the twin subsample of the Early Childhood Longitudinal Study-Birth Cohort, Roisman and Fraley (2012) showed that early parental support was associated with later academic skills ($r = .32$), social competence ($r = .15$), and externalizing behavior ($r = .11$) in kindergarten. Crucially, behavior-genetic modeling demonstrated that the shared

environment accounted for virtually all of the correlation between parenting and academic skills, roughly half of the association between parenting and social competence, and approximately one-fourth of the correlation between parenting and externalizing behavior.

Because the ACE model lumps gene \times shared environment interactions into the estimate of A, it can be construed as biased toward genetic explanations. In part to address such concerns, some investigators have examined whether putative assessments of the environment (e.g., socioeconomic status) moderate the magnitude of the estimates of A, C, and E. For example, Turkheimer, Haley, Waldron, D’Onofrio, and Gottesman (2003) reported that the heritability of IQ (i.e., the magnitude of the A component) was notably smaller among children living in poverty than it was for their high-SES counterparts, suggesting environmental modulation of the degree to which genetic variation contributes to general mental ability (i.e., G \times E interactions). Similar arguments may be possible for socioemotional outcomes. This issue also reminds us that estimates of genetic variation in any characteristic depend on the degree of environment variability (relevant to the outcome) across families within the selected sample. Further, it is important to recall that this approach provides an indirect indicator of genetic effects based on genetic relatedness rather than a direct assessment of relevant genetic polymorphisms.

Molecular Genetics

Quantitative behavior genetics has emphasized genetic and environmental influences at the aggregate level, with the sources of variation inferred on the basis of participants’ genetic relatedness. Given that inferences about genetic mechanisms are distal and therefore relatively imprecise, there is increasing interest in the direct measurement of genetic variation. This typically involves genotyping two distinct kinds of genetic variability: variable number tandem repeats (VNTRs) and single nucleotide polymorphisms (SNPs). VNTRs indicate a location in a genome where a short nucleotide sequence is organized as a tandem repeat, with some children carrying shorter and others longer repeats of the genetic sequence of interest. SNPs, in contrast, are a kind of DNA-sequence variation in which a single nucleotide (A, T, C, or G) differs between individuals. In general, individuals inherit both a maternal and paternal variant of a polymorphism (sex-linked polymorphisms like MAOA being a notable exception), meaning that the latent variability can be operationalized in a number of ways.

Researchers often explore a variety of measurement models, including additive genetic models (i.e., number of “risk” alleles of the polymorphism), dominance models (grouping individuals as carriers of the “risk” allele or not), and models that contrast hetero- versus homozygotes on the SNP or VNTR. For example, individuals inherit short (“risk/plasticity”) or long (“non-risk/plasticity”) forms of the serotonin transporter polymorphism (5-HTT). Investigators may choose to measure how many short forms participants carry (0–2), whether they carry the putative risk variant or not (homozygous long versus homozygous or heterozygous short), and so on. Much molecular-genetic research involves the use of simple genetic association designs, where an SNP or a VNTR is correlated with a psychological phenotype of interest. For example, Lakatos et al. (2000) reported that carriers of the 7-repeat variant of the dopamine D4 receptor (DRD4) are at enhanced risk for disorganized attachment (but see Bakermans-Kranenburg & van IJzendoorn, 2004).

One advantage of measures of molecular genetic variation is the possibility of identifying genetic variants that interact with environmental exposures, in addition to genetic “main effects.” For example, Caspi et al. (2002, 2003) captured the field’s imagination with their suggestion that the effects of environmental exposures (e.g., to life stress and maltreatment) might be amplified by directly measured genetic vulnerabilities. Belsky and Pluess (2009), among others, have further suggested that at least some genetic variants may be more plausibly viewed as *plasticity agents*, making some individuals more susceptible to the effects of both negative *and* positive environmental inputs (see Roisman et al., 2012).

An emerging concern in this area is the replicability of findings. Studies may produce null findings or fail to replicate seminal findings for many trivial reasons, including inadequate measurement of key constructs and low statistical power. Undoubtedly, some of the unevenness in the candidate-gene literature is attributable at least partly to these factors. But it is arguably even more problematic that there are millions of possible genetic markers that could be examined in such studies, combined with what has been termed flexible “investigator degrees of freedom” (Simmons, Nelson, & Simonsohn, 2011); this has made it possible for investigators to report statistically significant associations in underpowered studies while failing to report the effects of other genetic polymorphisms that generate null results.

It is too early to know whether the molecular genetics of behavioral development will blossom into a replicable

science, possibly by examining measured genetic variation at a higher level of abstraction or via Genome Wide Associations Studies. Even so, it is important to remember that measurement factors are inexorably tied up with theory and research design in affecting the strength of the inferences that are possible. In this instance, much molecular-genetic research, paradoxically, is open to the very same critique levied against other between-family studies in that the research design cannot rule out genetic contributions to the environmental variables examined in such studies. For example, if exposures to life stressors in part reflect evocative effects of genetic variation that lead some children to experience more negative life events than others, Caspi et al.’s (2003) seminal finding that the predictive significance of life stress is stronger for individuals containing the short “risk” (versus long) form of the serotonin transporter polymorphism (5-HTT) may reflect evidence of epistasis (i.e., a gene \times gene interaction) as much as gene \times environment interaction.

Epigenetics

The frontier in the genetics of development, epigenetics, concerns the effects of the environment on gene expression (Meaney, 2010). The term “epigenetics” was coined by Waddington (1942) in formulating the concept of the epigenetic landscape. He used the term to describe the developmental differentiation, during interaction with the environment, of embryonic cells from an initial pluripotent state, that is, able to develop into any type of cell, to a specific cell phenotype. Cells with identical DNA differentiate into skin, brain, kidney, or muscle cells, and stay that way across the life span. Accordingly, a brain cell’s daughter cell inherits not just a genetic sequence, but also the epigenetic state of being a brain cell.

The concept of epigenetics has expanded as understanding of the molecular mechanisms has flourished and as measurement techniques for detecting and indexing epigenetic processes have been developed. The term epigenetics is now used to refer to heritable, functionally relevant modifications to the genome caused by mechanisms other than changes in the underlying nucleotide sequence of the individual’s DNA—hence the prefix *epi-* (Greek: *επί*, “on top of”) (Riddihough & Pennisi, 2001). Examples of epigenetics include alterations in DNA methylation and histone modification—structural alterations in DNA that occur in response to environmental conditions without altering the DNA sequence itself (Fraga et al., 2005; Kaminsky & Petronis, 2009). Both mechanisms regulate gene expression, via either enhancement or inhibition.

Epigenetic changes can be produced as a consequence of aging as well as environmental influences. As such, the importance of epigenetics in the development of cancer, neuropsychiatric disorders, and other diseases is increasingly evident.

Developmental scientists are keenly interested in epigenetics because these mechanisms might help to explain how early life experiences can alter brain development and thus influence later social and emotional functioning. To illustrate, the type of mothering a rat receives as a pup calibrates how its brain responds to stress throughout its life (Weaver et al., 2004). Rats raised by less-nurturing mothers are more sensitive to stress when they grow up. This lifetime effect is driven by a reduction in glucocorticoid receptors resulting from alterations in DNA methylation: Rats raised by less-nurturing dams tend to have more methyl groups attached to the promoter region, the “on” switch, of the glucocorticoid receptor gene. These methyl groups block access by the transcription factors that turn the gene on. As a result, fewer receptors are produced. There is preliminary evidence for similar functional mechanisms in humans. For example, McGowan et al. (2009) demonstrated that childhood abuse alters HPA stress responses and increases the risk of suicide later in life. More research is necessary to determine definitively whether these results involve the predicted mechanism, but this is clearly an exciting area for future work.

Environmental factors later in life can also induce epigenetic changes. For example, the brain-derived neurotrophic factor (BDNF) gene was downregulated in the hippocampus of adult mice exposed to social stress in the form of chronic bullying by a bigger mouse (Tsankova, Renthal, Kumar, & Nestler, 2007). This reduction in BDNF activity is linked to epigenetic modifications involving histones, tiny protein spools that keep DNA wrapped up. Chronic stress triggered an increase in a type of histone methylation that suppresses gene activity by keeping the DNA containing the BDNF gene tightly wound. This led to increases in behaviors indicating a depressive state.

Despite extraordinary progress, the study of epigenetics and human behavior is very much in its infancy. If the sorts of findings described above can be extended to humans, epigenetics could be key to understanding the interface between environmental and biological processes in shaping developing social behavior. Although enthusiasm is high about the potential for this field, there are some important caveats. First, there is as yet very little evidence in humans that epigenetics connects early-life experience to behavioral outcomes later in life. Moreover,

one major methodological obstacle will make finding proof exceedingly difficult: There is a limited supply of human brain tissue and it is obviously not possible to obtain brain tissue from living children. Yet, there are some viable options. For instance, investigators have recently pioneered the use of blood-cell lines to study gene expression in humans (Luo et al., 2012). Many of the genes expressed in the brain are also expressed in blood. But it is too soon to know whether this approach will pay off. The correlation between gene expression in brain and blood is unclear, and blood and brain cells do not necessarily undergo the same epigenetic changes in response to a given life experience. Finally, training in the methods and measures of molecular genetics is not yet routine in developmental graduate programs, making research on developmental questions the province of multidisciplinary teams.

Psychobiological Measures: Summary and Conclusions

In this section we reviewed the basic principles of the three most widely used neurophysiological methods for the study of social and emotional development: fMRI, EEG, and fNIRS. Neurophysiological measures can reliably document developmental continuity and change while helping to adjudicate among competing theoretical accounts of key socioemotional phenomena. Each method comes with its own profile of strengths and limitations, and no single method is appropriate for every question. Although the development of techniques to image brain structure and function has added substantially to developmental studies across levels of analysis in infants, children, and adolescents, longitudinal data remain scarce. Measurement over time within participants will be critical to our understanding of how changes in brain structure and function connect up with changing behavioral, cognitive, and social-cognitive capacities in development. Thus, the best science will emerge from longitudinal studies of both brain and behavior using converging measurement approaches.

The earliest biological indices employed in developmental research, psychophysiological measures including heart rate and vagal tone, stress-hormone assays, and electrodermal skin response, remain critical tools today. These measures provide fundamental insights into a level of analysis not available to conscious report, such as stress, arousal, reactivity, and regulation. Measures of the SAM and HPA systems allow examination of how stress and emotion regulation influence brain and behavioral development. Measures of each system provide different

theoretical insights; measures of the SAM reflect the effects of shorter-term stress responses, whereas those of the HPA reflect cumulative effects of long-term stressors. Earlier research focused on the role of early experiences on subsequent organization of the HPA, whereas newer work is exploring adolescence as a second “critical period” for the reorganization of this system. As with other measurement techniques, studies using psychophysiological measures have generated mixed results, highlighting the need to consider potential sources of confounding group and individual differences. Yet these potential confounds also present targets of opportunity for scientists interested in individual differences in socioemotional development.

Supported by technical advances in genotyping and an increasing embrace of biologically informed explanations, the study of genetic contributions to socioemotional development has witnessed a sea change over the last several decades. More complex behavior-genetic research designs are being used to improve causal inferences. Research is also emerging that examines the role of specific genetic variants that directly contribute to and moderate the predictive significance of developmental experiences. We have emphasized the multivariate nature of this work, along with the likelihood that specific genetic variants probably have relatively small individual effects on development. Hence, replicability of work focused on specific SNPs and VNTRs will be crucial, as well as for epigenetics studies. This will necessitate large samples as well as more contained expectations about the magnitude of the expected effects.

LOOKING AHEAD: OPPORTUNITIES AND CHALLENGES FOR MEASUREMENT

As illustrated in the preceding section, technical innovations have provided a number of exciting opportunities in the measurement of social and emotional constructs, but also interesting challenges. We focus on three cases that illustrate both the excitement and challenges that lie ahead: (1) human research that cuts across levels of analysis, from genes, to brain, to social behavior; (2) neuroimaging studies of true social interactions between social partners in real time; (3) triangulation of research methods.

Bidirectional Transactions Among Genes, Brain, and Social Behavior

Discoveries in genetics and epigenetics have shed new light on old debates on the relative contributions of nature and nurture. In part because of advances in measurement

technologies, developmental scientists now recognize not only that developmental changes are driven by complex transactions across multiple levels of organization including the environment, behavior, cognition and emotion, brain, and genes (Gottlieb, 1992), but also that they can investigate these transactions. As a result, in human and animal models there is now clear evidence for the full bidirectionality of these transactions. The now-common use of *in vivo* pediatric brain-imaging techniques together with the revolution in modern molecular genetic and epigenetic techniques offers an unprecedented opportunity to implement a truly developmental perspective, integrating multiple levels of analysis across the full life span.

Nowhere is this clearer than in the area of imaging genetics: applying functional neuroimaging techniques to the identification of genetic effects on brain information processing. At its core, this approach is a form of genetic association analysis (Hariri, Drabant, & Weinberger, 2006; Hariri & Weinberger, 2003). Rather than focusing on a behavioral phenotype, imaging genetics targets the physiologic response of discrete brain circuits during specific forms of information processing, including emotional and social information. Ideally, imaging genetics studies are targeted at genes with clearly defined functional polymorphisms. These polymorphisms are then associated with specific physiologic effects, starting at the cellular level and working up to the level of distinct brain circuits that reflect the underlying cellular mechanisms. Studies must also consider variability in imaging task performance in interpreting potential gene effects because typical imaging signals (e.g., the BOLD response in fMRI) are closely linked to task performance. The experimental tasks employed in imaging genetics studies must maximize sensitivity and inferential value, as the interpretation of gene effects depends on the validity of the paradigm. Measurement issues, therefore, although often seemingly mundane, are at the crux of inference quality, whether measurement is as low-tech as naturalistic observation or as high-tech as imaging genetics.

To illustrate, Hariri and Weinberger (2003) have proposed that the response of brain regions subserving emotional processes in humans (e.g., amygdala and prefrontal cortex) may be more objectively measurable than the subjective experience of these processes. They have also demonstrated that functional polymorphisms in serotonin genetic markers weakly related to behaviors are more strongly related to the integrity of these underlying neural systems. Functional neuroimaging, by rapidly acquiring hundreds of repeated measures of brain function within a

single participant, offers a powerful means for investigating genetic influence on the activity of specific brain circuits during processing of discrete stimuli or performance of distinct behaviors. The power afforded by the statistical advantages of signal oversampling and averaging, and the biological advantages of prebehavioral phenotypes, may allow investigators to identify robust gene effects on brain information processing in considerably fewer participants than typical behavioral studies and with much greater sensitivity. Ideally, associations between gene variants and regional patterns of brain information processing will not only elucidate the biological mechanisms underlying previously shown links with behavior, but also direct attention to new behaviors that are mediated by brain systems influenced by gene variants and vice versa.

Despite the promise of these technological advances, the application of imaging genetics to our understanding of social and emotional development is currently limited by at least three major challenges: (1) although more powerful than conventional genetic association studies, the work still involves individual variables with small effects; (2) imaging genetics remains inherently correlational and suffers from an absence of detailed analysis of mechanisms; (3) all imaging genetic studies to date have focused on cross-sectional samples of adolescents and young adults in racially and culturally homogeneous samples. There is a great need (and opportunity) for longitudinal designs to examine the influence of genetics on developmental trajectories of the social brain and social behavior in varying populations. If these challenges can be addressed, imaging genetics research is poised to dramatically increase our understanding of how genetic variation interacts with the environment to shape developing brain and behavior.

Using Neuroimaging to Study Real Social Interactions

Especially relevant to socioemotional development is exciting work applying neuroimaging techniques, particularly fNIRS, to the study of actual face-to-face social interactions. All three of the neurophysiological methods reviewed earlier have been used to study social interactions. In fMRI, this has been called “hyperscanning” (Montague et al., 2002) and involves connecting two fMRI scanners over the Internet to allow dyads to interact with each other while functional MRI is acquired in synchrony with the behavioral interactions. The first hyperscanning studies involved two players engaged in a simple game of deception (Montague et al., 2002). The chief advantage of this approach is that it allows investigation of brain and behavior in dyadic interaction in a controlled social setting. Brain activity that precedes and follows the actions of another

person can thus be scrutinized. It is even possible to study the degree to which two players become synchronized in generating correlated activity so that the brain activity in one player can be predicted from the brain activity of the other player. With fMRI, this might reveal a regional pattern of activity in one brain that is consistently correlated with similar activity in the other brain. The possibility of observing activity in a large number of voxels (spatial units representing 3-D pixels) in both brains while individuals interact opens up truly novel scientific possibilities for discovering underlying neural relationships and spawning new approaches to understanding the neural basis of social exchange.

Despite this promise, hyperscanning presents particular technical hurdles, especially with children. For example, the challenges associated with preventing excessive motion during the fMRI scan are doubled in child dyads. Moreover, the two scanners must be calibrated with each other to reduce between-scanner variability, a potential source of statistical noise. Such noise, combined with interparticipant variability, has to be accounted for in statistical analyses of the linked imaging data sets. These complexities are probably why hyperscanning studies of children have not yet appeared.

With EEG (silent and less invasive than fMRI), one can move a step past hyperscanning to conduct “two-person neuroscience” or “2PN” (Hari & Kujala, 2009; Konvalinka & Roepstorff, 2012). With 2PN, the unit of analysis becomes the dyad, and the members of the dyad, unconstrained by the enclosed MRI system, can interact face-to-face in naturalistic social interactions, opening a new vista of social and affective neuroscience research. This approach has not yet been applied to studies of development, although the possibilities are enticing. One could imagine, for example, face-to-face interactions between an infant and a parent to study the brain dynamics of early social exchanges involving the imitation of mouth movements and facial expressions. ERP/EEG measures are, however, still quite susceptible to small movements, including the eye blinks, facial movements, and hand and arm gesticulations that are part of even the simplest face-to-face interactions. The steady growth in the use of fNIRS, with its greater tolerance for movements including eye blinks and motor actions, is creating perhaps the best opportunity for more realistic, ecologically valid studies of face-to-face social interactions in children and across the life span (e.g., Cui, Bryant, & Reiss, 2012).

Although the 2PN approach can address novel and important questions in socioemotional development, new analysis techniques are needed for quantifying data from

simultaneous recordings to maximize its potential. These include capturing the time-varying, asynchronous properties of dyadic interactions; analyzing properties of the brain network comprising areas from two brains during interaction; and connecting neural measures with behavioral measures.

Triangulation of Research Methods

Psychophysiological, neurophysiological, and genetic measures represent an emerging wave of measurement in developmental psychology, and it is expected that an increasing number of studies will incorporate them. A critical consideration is how they relate to observational and verbal report measures of the same or related constructs. Studies that use these measurement approaches in conjunction with well-understood paradigms and measures are essential to establishing the validity and utility of their empirical findings (e.g., Pfeifer & Peake, 2012).

To illustrate concretely, Hubbard et al. (2002) measured anger in 8-year-old children during a structured laboratory task in which children played a game with a peer confederate who cheated obviously and repeatedly and then won a valuable prize. Measures included autonomic nervous system responses (HR and EDR); observer-coded facial and nonverbal anger expressions from videotapes of the sessions; and children's self-reported level of anger after each turn of the game while watching their videotape after the session was over. The different measures of anger (physiological, observational, self-report) showed distinct associations with one another as well as with teacher reports of children's reactive and proactive aggression. Furthermore, it became evident that each index captured a different aspect of the emotion system and that these operated somewhat independently. Thus, any single measurement approach cannot capture the complexity of children's anger and its associations with other aspects of social functioning that converging measures at multiple levels of analysis can.

In a study of individual differences in attachment-related systems in mothers, Atzil, Hendler, and Feldman (2011) triangulated neural measures (fMRI of social and emotional brain networks in response to vignettes of own and other infants), hormonal measures (plasma oxytocin, a neuropeptide associated with social affiliation), and behavioral measures (gaze, affect, vocalization, and touch during mother–infant interaction). Differences in mothers' behavioral style of interacting with their infants (synchronous versus intrusive) were characterized by different patterns of organization in limbic and social and emotional cortical

systems, and different patterns of association between the neural and hormonal systems. The insights gained point to unique and otherwise undetected differences in the motivational processes underlying healthy versus at-risk parenting styles, with the former more heavily based in the reward system and more organized, and the latter more heavily based in the stress system and more disorganized.

Finally, that opportunities arising from new measurement approaches also create novel challenges is illustrated by the need to develop ecologically valid tasks for indexing adolescent social sensitivity that can be administered in the laboratory in real time while participants undergo fMRI or other neurophysiological techniques. This effort is motivated by the desire to understand major developmental transitions in adolescent social experiences and behavior, such as heightened responsiveness to the peer group (Albert, Chein, & Steinberg, 2013), including emotional reactivity to social evaluation and social standing, often involving real or perceived cues to inclusion and exclusion by peers. Studying developments in the socioaffective neural circuitry underlying responses to social and emotional information can provide important information about the component mechanisms involved (e.g., emotional reactivity, emotion regulation, emotion evaluation, cognitive control) (Somerville, 2013). Several interesting tasks have been designed for this purpose, including a social-feedback task in which adolescents receive positive or negative feedback from several (putative) peers who are evaluating the adolescent's photograph for likeability; a "chat-room" task in which the adolescent is selected or rejected by a (putative) peer to chat online about mutual interests; and a cyberball task in which the adolescent plays a ball-tossing game with two (putative) peers who stop throwing the ball to the participant after they have all been playing together (see Somerville, 2013, for an overview). These have been validated with self-report, behavioral (eye-tracking), and psychophysiological (pupillary response) measures. Moreover, developmentally unique patterns of activation have been discovered when adolescents undergo fMRI while engaging in these tasks. The findings suggest age-specific enhancement of some affective response systems, greater perceptual and cognitive vigilance to positive and negative feedback, and greater emotion regulation effort, little of which is observable behaviorally or accessible to self-report (Albert et al., 2013; Somerville, 2013).

Looking ahead, with rapid progress in the growing understanding of brain development, molecular genetics, and the physiological bases of behavior, developmental scientists are now in a position to study directly, in humans, bidirectional transactions among levels of analysis from

genes, to brain, to behavior and the environmental context. Methodological advances and accompanying measurement techniques are providing insights into long-standing questions about social and emotional development while at the same time opening up a vast array of novel questions. Developmental science now possesses an arsenal of tools that can be deployed synergistically to adopt a true “molecules-to-mind” approach to the study of social and emotional behavior and development.

CLOSING NOTES

With this promise in mind, we conclude by noting several truisms that remain important at all levels of analysis and for all measurement approaches. First, throughout the chapter we have emphasized the need for well-conceptualized constructs and research questions to guide measurement decisions. Poorly conceptualized research questions will not lead to informative results, no matter the quality or sophistication of the methods used. Equally important is the fit between the method and the questions being asked. Good ideas tested with poorly chosen methods also will not yield informative results.

Methods must also fit the developmental characteristics of the participants. Whether children are asked to reason about hypothetical characters, to recall onset of symptoms, or to hold still for EEG/ERP or fMRI measures, if the task demands are not age-appropriate, conclusions about otherwise well-measured constructs may be invalid. Further, because infants and young children may function in qualitatively distinct ways from older children and adults, similar behavior may have different meaning to young children than to older children or adolescents, or may arise from different sources. For example, peer aggression is at its height in toddlerhood and is normative, motivated by instrumental desires or the wish to engage others; it is therefore correlated with sociability and positive social approach. Peer aggression in adolescence, in contrast, has different motivations and functions, is not normative, and is correlated with antisocial behavior. Similarly, the same behavior may have different meanings in different cultures. Converging measurement approaches and careful attention to validity concerns are thus required to be confident that the same construct is being measured across ages, contexts, or cultures.

Additional caution must be exercised when the measures are removed from the constructs of interest, especially when those constructs are theoretically complex

(Baumeister, Vohs, & Funder, 2007). For example, eye movement data or pupillary responses are increasingly used to examine abstract constructs such as morality, false belief, or motivation in preverbal children. Yet these response measures are not in themselves informative about such constructs. This limits the validity of bottom-up inferences and makes interpreting such measures crucially dependent on theory (Aslin, 2007; Oakes, 2012). Similarly, although neuroimaging data are rich and visually compelling, measures of the brain’s behavior are just like other measures of behavior, subject to the same validity constraints, and must be interpreted within a theoretical context.

Finally, as the range and complexity of measures available to developmental scientists grows, vigilance is required to avoid errors of statistical inference that often accompany access to a wide variety of analytic choices and variables. Based in multiple levels of analysis and multi-informant assessments, modern social developmental science is fraught with the peril of producing type I and II errors. For example, the massive amount of data generated in a single neuroimaging session can generate powerful insights, but also presents the real potential to generate type I errors without appropriate controls for multiple comparisons. Indeed, if—as is widely assumed—many effects in social development are modest in magnitude, sample size and power become critical. Investigators must resist the temptation to engage in research practices that can call into question the replicability of findings (Simmons et al., 2011).

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CHAPTER 3

Evolution and Prenatal Development

An Evolutionary Perspective

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INTRODUCTION

Interest in prenatal influences on child development and adult constitution, health, and behavior is ancient, going back at least to Aristotle, and the literature is voluminous; yet before ethological and evolutionary perspectives on

human behavior and development gained prominence, it was a “gray area” of modern science (Stott, 1973, p. 770). As recently as 1982, Chalmers issued the following judgment: “the paucity of theoretical models in this predominantly empirical field is sufficient evidence in itself that the nature of the research is generally uncoordinated and seemingly patternless” (Chalmers, 1982, p. 329).

The situation is now different. In this chapter we examine maternal influences on fetal development, birth outcomes, infant/child health, and behavioral development from the perspective of evolutionary theory. We show how evolutionary theory provides “coordination” and “pattern” to the abundant empirical evidence of prenatal influences. We focus on maternal psychosocial stress and nutrition, environmental toxins, and the crucial role of placental physiology and epigenetic processes in transducing these maternal effects to the fetus, its subsequent postnatal growth, development, and health, and potentially, the well-being of its descendants. Our approach is a multilevel synthesis, utilizing a broad evolutionary perspective to examine how an organism responds to its environment down to specific physiological examples and their epigenetic regulation.

It is beyond the scope of this chapter to examine all of the processes that influence prenatal development. We focus on one process of prenatal development that embodies information about a broad range of maternal environmental factors in the fetus: the hypothalamic-pituitary-adrenal (HPA) axis (see Gunnar, Doorn, & Esposito, Chapter 4, this *Handbook*, this volume, for a review). The HPA axis is highly conserved across vertebrate species and carefully aligns development with environmental stressors in species as distant from humans as the spadefoot toad (Denver, 1997). Stress hormones influence expression of 10% of the genotype across metabolism, growth, repair, and reproduction (Phillips & Matthews, 2011) and are therefore able to adapt whole life cycles to adversity. During pregnancy, the specific mechanism involved is the enzyme 11beta-hydroxysteroid dehydrogenase type 2 (11 β -HSD-2). 11 β -HSD-2 is involved in limiting the amount of maternal cortisol, a stress hormone that crosses the placenta from the mother to the fetus. Cortisol itself is involved in the epigenetic regulation of 11 β -HSD-2. Moreover, during pregnancy the expression of 11 β -HSD-2 is influenced by maternal stress, nutrition, hypoxia, reproductive hormones, and some toxins and pollutants. This mechanism interprets a range of maternal signals in ways that tend to ensure a more appropriate fit between the fetus and the environment into which it will be born than would otherwise be the case.

Because “nothing in biology [the study of life] makes sense except in the light of evolution” (Dobzhansky, 1973), we show in this chapter how an evolutionary perspective on prenatal influences helps to synthesize diverse disciplines and produce new research avenues. Our review begins, in the section titled “History of Development Within Evolutionary Theory,” by examining the interaction between development and evolution culminating in modern epigenetics. The next section, “Life History Theory: Evolution and Development,” provides an overview of life history theory, the branch of evolutionary theory devoted to the interaction of developmental and evolutionary processes, especially the evolutionary consequences of environmental effects on the timing of development or life history stages. In the next two sections, “Prenatal Stress, Endocrine Responses, and Offspring Development” and “Prenatal Nutrition, Fetal Development, and Offspring Phenotype,” we review the impact of maternal stress and nutrition, respectively, during pregnancy on fetal development. “Prenatal Toxins, Teratogens, and Development” extends this to examine the impact of prenatal exposure to toxins on the growing fetus with focus on pollutants of emerging concern. Finally, in “Future Research and Theoretical Perspectives,” we highlight future empirical and theoretical pathways suggested by this unique synthesis.

HISTORY OF DEVELOPMENT WITHIN EVOLUTIONARY THEORY

In this section, we provide a historically grounded discussion of the role of development within evolutionary theory that brings us to modern developments in epigenetics. This section is designed to develop a particular way of thinking about development, from an evolutionary perspective, that then frames our more contemporary discussions of prenatal development. Crucially, this perspective can be applied rigorously to other phases of the human life cycle. Ultimately, this section builds the logic underlying an evolutionary developmental (“evo-devo”) perspective on prenatal development.

Basic Distinctions

It is quite typical for undergraduate behavioral sciences students to encounter the “nature versus nurture” debate early in their studies. How much of each contributes to the final form of focal traits? One common misinterpretation is to assume that nature or nurture are mutually exclusive

causes of a trait. This can be understood as a category error because nurture is something that happens in nature, where nurture can mean anything from parental investment to learning. Parental investment and learning are naturally occurring activities. More typically, the debate is understood as one of *nativism* versus *empiricism*. Here the argument is about whether a trait is innate and fully formed at birth, or requires a period of learning and development in order to reach capacity.

This debate has long historical roots extending to Pythagoras. The conceptual distinction in his time was between *preformation* and *epigenesis*. Various preformation theories were in place. Preformationism is the idea that all traits are fully formed at conception, when male and female gametes meet. Conversely, Aristotle articulated a form of epigenesis, suggesting that all four of his “causes” were in play during the development of an organism. Both parents contribute *material* causes during coition, upon which *efficient* causes act to bring about the *formal* cause with its *final* purpose. Thus epigenesis is the idea that form gradually emerges over time. In this way, a distinction was made between growth (merely an increase) and development (a change in form and function). Modern thinkers understand epigenesis as morphogenesis and differentiation (Haig, 2004). Haig has noted that causal models of epigenesis include roles for a diverse array of variables including hormones, growth factors, and the mechanical effects of loading and gravity, all of which could be included in Aristotle’s set of efficient causes.

Given the vast empirical evidence of developmental change, it would be philosophically difficult to defend pure preformation in these modern times. The only viable version of preformationism is one that proposes innate plans that unfold along prespecified lines with no significant deviation from those lines. Such plans would be regarded as essential contributions (in Pythagorean terms) that predetermine the final form. With the emergence of the Modern Synthesis in evolutionary biology in the 20th century, this position became possible as genetic inheritance and the guiding role of genes came to dominate scientific discourse.

Evolution

Evolution is not a process, but rather a kind of change. Charles Darwin (1859) detailed this change with much empirical evidence and some abstract description, transforming a basic idea of gradual change over time into something very much more specific. As Godfrey-Smith (2010) has noted, many scholars have tried to continue

the abstraction that Darwin began in the later stages of his book. Here is a now-classic example:

1. Different individuals within a population have different morphologies, physiologies, and behaviors (phenotypic variation).
2. Different phenotypes have different rates of survival and reproduction in different environments (differential fitness).¹
3. There is a correlation between parental fitness and offspring fitness (fitness is heritable).

These three principles embody the principle of evolution by natural selection. While they hold, a population will undergo evolutionary change (Lewontin, 1970). Darwin’s own focus was on evolutionary change within biological systems. His principal effort was to explain the apparent design seen in nature, such that phenotypic traits appeared to fit aspects of their environment in the same way that a carpenter’s tools service specific actions (Dawkins, 1986). The canonical example of specialized beaks in the Galapagos finches demonstrated this alignment between phenotypic traits and the environment. At the time, Darwin did not have a theory of inheritance or of how new variations were introduced. Although originally conducted in Darwin’s time, Mendel’s work on particulate inheritance was rediscovered in the early part of the 20th century and seen as incompatible with Darwinian evolution. Mendel had demonstrated that traits could be passed on as discrete units, which we now know as genes, in contrast to some views of blended inheritance proposed by Darwin himself, among others. Moreover, the kind of trait variation that Mendel demonstrated within populations was at odds with the graded variation claims of Darwinians. It was the emergence of population genetics, resulting from the mathematical work of Fisher, Haldane, and Wright (Gould, 2002; Ruse, 2003) that saw the reconciliation of Mendelian and Darwinian views. Huxley (1942) named this marriage of ideas the Modern Synthesis.

¹From this point, the term *inclusive fitness* rather than *differential fitness* is adopted. Inclusive fitness is the sum of direct fitness, achieved through reproduction, and indirect fitness, achieved through the reproduction of genetic relatives. Modern evolutionary theory adopts this mid-level theoretical concept to capture life-history dynamics for individuals. The assumption is that organisms act to maximize their average lifetime inclusive fitness through a series of trade-off decisions across time. These decisions happen at all levels of biological organization and are captured by formal life history theory, which is discussed in the section titled “Life History Theory: Evolution and Development.”

Bateson had introduced the notion of genes and alleles to the analysis of Mendel. The Modern Synthesis saw genes as the fundamental unit of inheritance, and different alleles as contributing to different phenotypic trait variants. These variants could enter into the abstract Darwinian process of natural selection according to the three principles detailed above. Natural selection would sift variants, retaining some and removing others. Over many generations, new phenotypes would arise through the interactions between different phenotypes and the environment. Moreover, Morgan had discovered that genes could spontaneously mutate, thereby introducing new variants, or alleles, into the population and allowing the emergence of novel traits (Ruse, 2003). These changes need not be dramatic; they could be quite subtle changes expressed as small differences at the phenotypic level. Natural selection was the process that gradually changed gene frequencies within a gene pool over long historical time, operating on small differences between variants. In this way, at the population level, there would be a relatively smooth and normal trait distribution, but, at the level of individual inheritance, trait variants would be passed on in the discrete fashion described by Mendel.

Evolution and Development: During the Modern Synthesis

We have already noted the distinction between growth and development—the difference between increase and change in form and function. Because both evolution and development are changes in form and function extended over time, there is the clear potential for analogy and homology (Gould, 1977). Haeckel firmly linked evolution and development, and understood the pattern of development as mechanically caused by evolution. The pure form of recapitulation he proposed has not stood the test of time, but the idea that developmental processes have been subject to natural selection remains. However, the conceptual relationship between development and evolution has become increasingly complicated since the advent of the Modern Synthesis.

Other theories of evolution and inheritance persisted in the immediate post-Darwinian world. One that is pertinent to our subsequent discussion of epigenetics is Lamarck's proposal that acquired characteristics could be inherited. In its simplest form, Larmackianism suggested that the use of a phenotypic trait induced developmental changes over time, such that the trait was increased or amplified. The disuse of a trait saw its diminution and loss. Use, or disuse, was

guided by behavior and environmental context. The "new" used traits were then supposedly passed on to subsequent generations (Richards, 2006).

As the Modern Synthesis consolidated during the first half of the 20th century, scholars began to abandon any residual allegiance to this Lamarckian idea. Indeed, during this time there was some discussion about what, if anything, could be retained from Lamarck (Waddington, 1942). For advocates of the Modern Synthesis, genetic mutation introduced new variants (alleles) to the phenotype, and natural selection sifted those alleles through the interaction between the phenotype and the environment. With the discovery of DNA in 1953, all was chance (mutation) and necessity (selection) for hardline Modern Synthesis biologists (Monod, 1971).

Waddington introduced the notion of the *epigenotype* and *epigenetics* to distinguish the complex set of processes that allow the formation of a phenotype from a genotype (Waddington, 2012). The term epigenetics is derived from epigenesis and Waddington used it to refer directly to developmental processes, as Pythagoras had before him. Waddington understood these processes as being, to some extent, under genetic control. The amount of regulatory control could be referred to as the degree of buffering of an organism's development relative to the perturbations of genetic and environmental variation. More famously, Waddington referred to developmental trajectories as more or less canalized as a consequence of such regulation. The discussion of development within the context of natural selection made Waddington a pioneer of evolutionary developmental biology, or evo-devo as it is more often termed (Haig, 2004).

Waddington took this explanation a step further and proposed a process of genetic assimilation. Genetic assimilation amounts to the production of a mutation that could preemptively trigger a canalized developmental trajectory (pre-DNA). Waddington's (1942) example was of calluses on the feet and legs of ostriches. Such calluses form in response to pressure induced by walking and crouching. Yet, these calluses are seen in ostrich embryos. The evolutionary story, accordingly, is that calluses were a developmental response to environmental stimuli with selection producing skin that formed calluses. This was highly canalized. The "genes for" callus formation would rely upon a specific threshold and duration of exposure to pressure in order to produce the phenotype. However, a mutation that changed the values for this—effectively setting the pressure threshold and duration close to zero—emerged and was selected for. The natural movements in

an egg were sufficient for calluses to emerge in the embryo, and the newly hatched ostrich was prepared for contact with the ground immediately.

Evidence of genetic assimilation under artificial selection also came from Belyaev's remarkable "farm fox experiment" (Belyaev, Plyusnina, & Trut, 1985; Kukekova et al., 2011; Lindberg et al., 2005; Trut, Oskina, & Kharlamova, 2009). With the goal of understanding the role of genetics in the domestication of dogs from wolves, Belyaev began in 1959 a carefully controlled regime of artificial selection for "tameness" (reduced fear and aggression) in the previously undomesticated silver fox, a close relative of the wolf. Three lines of selection were established: tame, aggressive, and unselected. The first sign of tameness, tail-wagging, appeared after just four generations. A few generations later, kits selected for tameness began to demonstrate positive, affiliative behavior (approach, sniff, lick) to humans. By the 15th generation, 18% of the tame fox line received this highest tameness score; by the 20th generation, 35% received this score; and after 35 generations, 75% received it. Since 1959, well over 45,000 foxes have gone through the experiment.

Having selected for tameness and achieved it, the most obvious interpretation would be that the farm fox experimenters had artificially selected the "gene for" tameness. In fact, they appear to have selected for regulatory genes that made a difference in development. As in all birds and mammals, positive, affiliative, or hedonic behavior develops in foxes before negative, fearful, or agonistic behavior (for example, in humans, social smiling appears at about 6–8 weeks and fear of strangers at about 8 months). Kits of the unselected line first showed fearful behavior at about 6 weeks whereas kits of the tame line did not show fear until 9 weeks or later. In other words, selection for nonaggressiveness worked by slowing the rate or prolonging the period of the development of fear/aggression—that is, by delaying the trigger or raising the threshold for activation of the neuroendocrine mechanisms that mediate agonistic behavior. By the 40th generation, tame foxes differed from aggressive foxes in adrenocortical, serotonergic, and limbic functions related to downregulation of the HPA axis. The overall effect of selection for tameness was heterochrony—specifically neoteny, a form of pedomorphism ("child shape") brought about by slowed or prolonged development—such that adult tame foxes look and act more like their ancestral juvenile wild foxes than their ancestral adult wild foxes. The ostrich and fox examples show how genetic assimilation permits the inheritance of acquired characteristics.

Haeckel saw evolution as driving development, with development involving the unfolding of the latest design. Waddington saw selection as controlling development, but also saw development as a process of buffering the organism against the vicissitudes of life. His focus on canalization and genetic assimilation portrayed development as a form of calibration to the life circumstances of an organism. Canalized processes dealt with the day-to-day variations encountered, and genetic assimilation provided a hypothesis about how selection could tailor development over time. This view has been firmly entrenched in the Modern Synthesis and developmental processes are now seen as adaptations for reproduction, moving an organism from a single-celled zygote, which cannot reproduce, to a mature adult capable of reproducing (Bonner, 1993).

The information represented in a zygote's DNA is derived from or is about the environments of its *ancestors*, not its current environment. Because environmental change is more or less constant, this "old" information is not necessarily a good predictor of the zygote's future environment. As Waddington put it, "The main issue in evolution is how populations deal with unknown futures" (Waddington, 1969, p. 122). Development buffers the organism against unknown futures, the vicissitudes of changing environments, by enabling the developing phenotype to be affected by or to embody "new" information about the environment in which it develops. Because selection operates only on phenotypes, not genotypes, environmental effects on phenotypes can create novel phenotypes as targets of selection. Through canalization, genetic assimilation, epigenetic inheritance, and the many kinds of learning, novel phenotypes can become heritable. Indeed, developmental plasticity, the capacity of the phenotype to be affected by the environment in potentially adaptive ways, is an important driver of evolution (West-Eberhard, 2003).

Modern Epigenetics

In the first decade of the 21st century evolutionary developmental biology has reestablished itself within biology and more specifically within behavioral biology (Bateson & Gluckman, 2011; Jablonka & Lamb, 2005; Weber & Depew, 2003; West-Eberhard, 2003). However, over the past 15 years the use of the term epigenetics has markedly increased in the relevant literature (Haig, 2012). This marks a resurgence of an interest in epigenesis, as understood since Pythagoras.

For contemporary scholars, epigenesis is morphogenesis and differentiation; it is development. The epigenetics

of Waddington referred precisely to this, and claimed a conceptual space between the genotype and phenotype in which epigenesis happened as a consequence of epigenetic processes. Epigenesis was under genetic control and epistatic interactions stabilized development in the face of genetic and environmental variation or noise. These factors operated above the gene level, which is captured by the etymology, *epi-* (above). Within Waddington's pre-DNA formulation is the idea that genes require regulation, if only to allow tissue differentiation, and this is also central to modern genetics.

The particulate view of inheritance contributed by Mendel launched genetic thinking, and population genetics produced the Modern Synthesis. However, since the discovery of DNA, genes are no longer regarded as particulate (Keller, 2000). Genes are understood as functionally described portions of DNA, the function of which is to code for particular amino acid sequences or to control the expression of another segment of DNA. Those amino acids sequences, or polypeptide chains, are then folded into proteins.

The structure of DNA, or deoxyribonucleic acid, consists of two strands of sugar and phosphoric acid in a double helix, joined by pairs of four bases: adenine (A), thymine (T), guanine (G), and cytosine (C). The sequence of bases along a single strand of DNA encodes amino acid sequences and is decoded in two steps: (1) *transcription* and (2) *translation*. First, the sequence of base pairs from a single strand of the double helix is copied to a single stranded messenger ribonucleic acid (mRNA) molecule. The formation of mRNA is similar to DNA replication but in this case the base uracil (U) substitutes for thymine and pairs with adenine (A). Thus the code from the DNA strand is *transcribed* (in its complementary form) to a strand of mRNA. Once formed, mRNA exits the cell nucleus, and joins with ribosomes in the cytoplasm of the cell. Ribosomes can be regarded as reading devices that move along the length of the mRNA, exposing triplets of bases, or codons. Transfer RNA (tRNA) molecules deliver specific amino acids to the ribosomes during this reading process. Each tRNA molecule has a codon. As the ribosomes read the mRNA, three bases at a time, tRNA molecules are attracted to their complementary codon and attach to the mRNA, bringing their amino acid with them. These amino acids join to form a polypeptide chain, which is later folded into a specific protein. It is in this way that the complementary form is *translated* to its original sequence, and this sequence codes for a specific amino acid chain and a specific protein.

Transcription is not a free-for-all but is highly regulated by transcription factors, which are proteins that effectively act to repress or activate gene transcription. Transcription factors operate by binding with regulatory portions of the genes themselves (see Pabo & Sauer, 1992, for a useful overview) and are influenced by environmental factors. Modern epigenetics focuses on this regulation.

For transcription factors to operate, they must be able to access DNA. This physical demand is not always met. DNA is organized into clumps that consist of a small number of base pairs. At the center of these clumps are histone proteins to which the DNA is bonded. The DNA and histone complex is termed chromatin. The manner in which chromatin is organized is referred to as the nucleosome. Nucleosomes are generally tightly organized structures and this reduces the opportunity for transcription factor binding. A solution to this is the chemical alteration of the histone proteins through acetylation, phosphorylation, and methylation, in order to change the nature of their bond to the DNA. Histone modification can also decrease the opportunity for transcription factor action.

Histone modification is one mechanism that allows transcription regulation. The direct addition of a methyl group to cytosine on the DNA is another—and this is most closely associated with the modern concept of epigenetics. Methylation of cytosine can prevent the binding of transcription factor and suppress transcription. Ultimately, methylation acts to silence gene expression.

There is increasing evidence of perinatal methylation and a role for this form of regulation in parenting effects and environmental modification of behavioral phenotypes in animal models (Champagne, 2013; Youngson & Whitelaw, 2008). In this way, a form of quasi-Lamarckianism has emerged in which characteristics can be acquired or developmentally induced, and their effects transmitted to the next generation. These effects are the result of proximate epigenetic mechanisms acting to modify gene expression. As they have no impact on DNA code, they do not violate the central dogma of molecular biology. In many ways these mechanisms appear to be adaptations designed to calibrate organisms to their environment (Dickins & Rahman, 2012). Next we present two examples of epigenetic mediated calibration of an organism to its environment.

Epigenetic Effects of Parenting Behavior

Weaver and colleagues (2004) provide a good example of epigenetically mediated parenting effects in rats.

Maternal behavior directed toward pups during lactation can be grouped into distinct behavioral syndromes. These syndromes consist of licking and grooming behavior (henceforth, licking) and arched-back nursing (henceforth, nursing). Individual mothers can exhibit licking and nursing at high or low frequencies and the particular pattern of their maternal behavior influences the adult end-state of their pups. For example, a pup exposed to a high-licking and nursing mother will develop into an adult with relatively lowered fear response and cortisol reactivity compared with the pup of a low-licking and nursing mother. Cross-fostering paradigms have demonstrated that this effect is not genetically mediated (see also Champagne, 2008). The amount of licking and nursing performed by a mother is a consequence of her own stress response and environment such that highly stressed mothers exhibit the low-licking and nursing behavioral pattern.

Weaver and colleagues (2004) presented correlational data suggesting differential methylation of glucocorticoid receptor promoter gene sites among adults raised by different maternal types. This gene directly affects the inhibitory feedback of the HPA, which is the neuroendocrine mechanism responsible for the passive stress response. The less sensitive the HPA axis is to inhibition, the more chronic is the stress response. Using a cross-fostering paradigm, Weaver et al. were able to support the hypothesis that maternal behavior affects methylation on this gene. This methylation occurs during oocyte and spermatocyte maturation, which occurs postpartum, and is transmitted through the germ line. The methylation itself is a consequence of increased serotonin activity and its secondary messengers, which are known to be involved in the regulation of gene expression. The serotonin response is another endocrine activation caused by maternal care. The full details of this methylation process are as yet unknown but it is clear from Weaver et al.'s results that methylation is involved.

It is noteworthy that these methylation effects are reversible (Weaver et al., 2004). One hypothesis is that exposure to stress leads rat mothers to lick and nurse at a lower rate, thereby calibrating their offspring's stress response to a more sensitive mode and one which will more readily produce the behaviors most appropriate in the stressful environment into which they were born. This can last across generations but extinguish if stressful conditions are removed. This clearly has adaptive value and could act to maximize inclusive fitness across a number of generations. As Dickins and Rahman (2012)

note, one would expect such mechanisms to be present in organisms that exist in stochastic ecologies or that adopt generalist strategies.

Epigenetic Effects of Maternal Nutrition

Kuzawa (2005) introduced the concept of "intergenerational phenotypic inertia." On the basis of extensive evidence that a mother's birth weight is among the strongest predictors of her offspring's birth weight (even more so after controlling for mothers' gestational age at birth), Kuzawa revisited the 35-year-old hypothesis that the nutritional experiences of a mother when she was a fetus can affect the intrauterine nutritional environment that she provides her own offspring, especially her daughters (e.g., Ounsted, Scott, & Ounsted, 1986; Wells, Sharp, Steer, & Leon, 2013).

Kuzawa noted that, among survivors of the Dutch Hunger Winter of 1944–1945 (A. D. Stein & Lumey, 2000), daughters who were exposed to their mother's undernutrition were significantly lighter at birth than Dutch girls born between 1944 and 1946 whose mothers were not exposed to the Hunger Winter. Furthermore, individuals who were prenatally exposed to the famine showed—six decades later—less DNA methylation of a gene that regulates growth (IGF2) than their unexposed, same-sex siblings (Heijmans et al., 2008). Kuzawa's intergenerational phenotypic inertia model provided an adaptationist rationale for expecting the effects of prenatal malnutrition or stress to last more than one generation: When environments are stochastic over time scales greater than a generation, 9 months of gestation cannot provide the fetus with enough information upon which to "predict" its own, within-generation optimal growth and development (Nettle, Frankenhuys, & Rickard, 2013). This is referred to as the "predictive adaptive response" (PAR) model, which we discuss separately in "Future Research and Theoretical Perspectives" at the end of this chapter. Therefore, Kuzawa argues, intergenerational phenotypic inertia provides the fetus with information, not only about the environment into which it will be born, but the environment into which its mother was born, and perhaps even its mother's mother, and so on, back an unknown number of generations. Intergenerational phenotypic inertia "has the effect of limiting changes in growth rate in response to short-term ecologic fluctuations, and thus may allow the fetus to cut through the ecologic 'noise' of seasonal or other stochastic influences to read the 'signal' of any longer term nutritional trends in the local ecology" (Kuzawa, 2005, p. 17).

Conclusion

Waddington's view of epigenetics has found new ground in modern epigenetics. Histone modification and methylation allow a complex and varied array of alterations to gene expression, which in turn affect the phenotype. As the maternal behavior example demonstrated, methylation can occur in response to external inputs (in this case the maternal environment), not only affecting the current organism but also future generations. Moreover, the reversible nature of parental effects make them candidates for facultative (e.g., developmental) adaptations. In the following section, we present life history theory and facultative reproductive strategies as developmental trajectories that may help scientists to organize understanding of factors that influence prenatal development.

LIFE HISTORY THEORY: EVOLUTION AND DEVELOPMENT

Evolution and development are intertwined for two reasons. First, selection operates only on phenotypes (the material organism) not genotypes (information represented in the organism's DNA), but phenotypes must develop (from DNA) before they are exposed to selection. Second, the life cycles of all sexually reproducing organisms begin with a single-celled zygote, but zygotes must develop into adults before they can reproduce. Development is thus an adaptation for reproduction (Bonner, 1965, 1993; West-Eberhard, 2003). Life itself is development; phenotypes are life cycles in progress. Life history theory is the branch of evolutionary theory devoted to the study of life cycles. It views life cycles as reproductive strategies—that is, naturally selected patterns of growth and development for maximizing reproductive success under particular ecological conditions. It focuses on the evolution and interaction of life history traits (e.g., number and size of offspring, interbirth interval, length of lactation, age and size at maturity, postreproductive life span, total life span; see Table 3.1).

Fitness

Reproductive success is fitness (direct and/or indirect—i.e., inclusive). By definition, fitness is *measured* in terms of relative reproductive success (selection leads to individuals who bequeath *more* copies of their genes to succeeding generations than others in their breeding population). But it *consists* of work—the work required by the three

TABLE 3.1 The Minimax and Maximin Reproductive Strategies

Reproductive strategy	Minimax: Maximize current reproduction (r-strategy)	Maximin: Maximize future reproduction (K-strategy)
Ecology	More variable and/or unpredictable	More constant and/or predictable
Mortality rates	Often catastrophic, nondirected, density independent	More constant, directed, density dependent
Survivorship	Low in early life	High in early life
Population size	More variable, nonequilibrium	More constant, equilibrium
Intra- and interspecific competition	More variable, lax	More constant, intense
Traits favored by selection	Rapid development Early reproduction High reproductive rate Low parental investment Small body size Semelparity (large litters) Short life span	Slow development Delayed reproduction Low reproductive rate High parental investment Large body size Iteroparity (small litters) Long life span

Source: Adapted from "On r- and K-Selection," by E. R. Pianka, 1970, *American Naturalist*, 104, pp. 592–597, and "r- and K-Selection Revisited: The Role of Population Regulation in Life-History Evolution," by D. Reznick, M. J. Bryant, and F. Bashey, 2002, *Ecology*, 83(6), pp. 1509–1520.

main components of fitness: (1) survival, (2) growth and development, and (3) reproduction (reproductive effort), which includes finding a mate (mating effort) and producing and rearing offspring (parenting effort or parental investment [discussed shortly]). Work requires resources that are sooner or later always limited. These include the raw materials of life, matter (nutrients) and energy, but also nonmaterial time, safety or security, and information. Time is a resource because doing work takes time, and because organisms have finite life spans, time devoted to one kind of work takes away from the time available to do another kind (opportunity costs). Security is a resource because no environment is without some degree of risk or uncertainty in the flow of resources.² Information is a resource because the better an organism knows its environment, the more efficiently it can acquire other resources. Because selection inexorably favors individuals with greater fitness—but greater fitness requires more work and hence more resources—something has to give. Therefore, evolutionary biology's assumption of optimality (Parker & Maynard Smith, 1990) holds that natural selec-

²Risk refers to environmental threats to survival and reproduction. Uncertainty refers to the probability of such threats.

tion favors organisms' capacity to allocate their resources preferentially to their most pressing adaptive problem. This entails trade-offs. Resources allocated to survival, for example, cannot be allocated to growth and development,³ and resources allocated to producing children (increasing their quantity) cannot be allocated to their growth and development (increasing their reproductive value or quality).

The Current–Future Trade-Off

Of all the trade-offs identified (at least 45 among 10 major life history traits [Stearns, 1992]) the most important or all-encompassing is that between current and future reproduction (Charnov, 1993; Stearns, 1992). This trade-off may be intraindividual (within a life cycle) or intergenerational (influencing descendants). At issue in the intraindividual current–future trade-off is whether it would be better for the organism's lifetime reproductive success to reproduce now, in the current breeding season (or as soon as possible), or wait for another opportunity in the more distant future. For example, consider a nursing mother: Would it be better for her lifetime reproductive success to continue nursing her current child or cease nursing and have another (future) child? Continuing to nurse not only consumes maternal resources but has diminishing benefits for the child's fitness as he or she grows. Therefore, at some point the lifetime fitness benefits accruing to the mother from allocating her resources to the current child will be less than those she would receive if she ceased investment in her current child and allocated them instead to a future child.

At issue in the intergenerational current–future trade-off is whether it would be better for the organism's genetic representation in arbitrarily distant future generations to have more offspring in the current generation (i.e., to maximize its own lifetime reproductive success). This trade-off arises from the fact that, just as fitness is inherently a relative measure (never high or low, only higher or lower), so too is the time at which it is measured relative or arbitrary. What counts in evolution is not only lifetime reproductive success but lineage continuation—that is, staying in the “evolutionary game” (Gillespie, 1977; Slobodkin & Rapoport, 1974). The evolutionary success of a reproductive strategy depends not only on the number of children, but also on the number of grandchildren,

³This trade-off may underlie nonorganic failure to thrive: Highly stressed infants may reallocate metabolic resources from growth and development to maximize their chance of sheer survival.

great-grandchildren, great-great-grandchildren, and so on. All organisms that ever lived did so because none of their direct ancestors failed to reproduce. That is, none of them failed to adapt their reproductive strategy to the prevailing environment.

The major determinants of both the optimal intraindividual and intergenerational trade-offs are environmental risk and uncertainty in (a) local age-specific extrinsic mortality rates⁴ and (b) the availability and flow of energy and nutrients. The former determines the probability of death at a given age and the latter determines the capacity of parents to invest in offspring. Theory and observation show that, when environmental conditions are risky or uncertain, with high or unpredictable extrinsic mortality rates and few or uncertain resources, organisms in general, including humans, tend to reproduce early and often (Chisholm, 1999b; Hill & Kaplan, 1999; Promislow & Harvey, 1990, 1991; Schaffer, 1983; Stearns, 1992). Maximizing the number of offspring reduces the chance of lineage extinction because it maximizes the chance that at least one will survive and reproduce, while increasing the number of offspring reduces the resources parents can invest in each, which only further reduces offspring quality. When conditions have been severe enough, long enough, parents have few resources to invest anyway, so downside risk protection against lineage extinction is still the optimal (most efficient) evolutionary strategy. It can be evolutionarily rational to pay the cost of having many low-quality offspring because minimizing investment in offspring quality maximizes the chance of staying in the evolutionary game. This minimax strategy maximizes reproductive output in the short term, within a life span, so is often called the “current” reproductive strategy—as opposed to the “future,” or maximin strategy.⁵

The maximin strategy is to maximize the chance of obtaining the minimum necessary or possible fitness benefit for continuing the lineage. Whereas the minimax strategy is for downside risk protection against lineage extinction, the maximin strategy is for setting the stage

⁴Extrinsic mortality is the risk of death beyond the control of an individual organism. It is the age-specific probability of death imposed by the environment on all members of a population (Stearns, 1992).

⁵The minimax and maximin strategies are idealized end-points of a continuum. Chisholm and Coall (2008) used these terms because they have more intuitive meaning than their technical predecessors, the *r*- and *K*-strategies (Pianka, 1970; Reznick, Bryant, & Bashey, 2002).

for the future, conserving resources to invest in future reproduction. Theory and empirical evidence show that when environmental conditions are relatively secure, with predictably low mortality rates and adequate resources, organisms in general, including humans, tend to reproduce later and less often (Chisholm, 1999b; Hill & Kaplan, 1999; Low, Hazel, Parker, & Welch, 2008; Placek & Quinlan, 2012; Promislow & Harvey, 1990, 1991; Schaffer, 1983; Stearns, 1992). While minimizing offspring number can be evolutionarily risky in high-mortality environments, in relatively secure environments this is not such a problem. And by having fewer offspring, parents can invest more in each, thereby increasing their quality (growth, education, health, job prospects ...) and setting the stage for the production and nurturing of grandchildren, great-grandchildren, and so on, in the future (see Table 3.1).

In sum, there is no a priori “best” reproductive strategy; the optimal, evolutionarily rational strategy in one environment is not likely to be optimal in another. Humans have a long evolutionary history of selection for the capacity to develop the maximin strategy (investing heavily in fewer children). But because of our long history of selection for developmental plasticity, it is painfully obvious that we also have the capacity to develop the minimax strategy (investing fewer resources in more children) in risky and uncertain environments. One question addressed in this chapter is: What does this mean for mothers and the development and health of their unborn children?

Parent–Offspring Conflict in Utero

The most pressing adaptive problem for the unborn child is surviving long enough to grow and develop well enough to reach term. Because the conceptus, embryo, and fetus are so utterly dependent on resources provided by the mother, the uterus is surely the riskiest, most uncertain environment they will ever inhabit, if indeed they survive it. Empirical evidence shows this and parent–offspring conflict theory helps to explain why.

Recent reviews suggest that, among Western women known to be pregnant, 11%–22% miscarry in the first 5–20 weeks of pregnancy (Ammon Avalos, Galindo, & Li, 2012; Katz, 2012), with the incidence increasing dramatically with maternal age (up to 84% in 48-year-old women; A.-M. N. Andersen, Wohlfahrt, Christens, Olsen, & Melbye, 2000). Howell (1979) noted that, among the !Kung, a modern hunter-gatherer society, the incidence of known miscarriage was 9%. French and Bierman (1962) reported a similar incidence of 9.9% on the Hawaiian

island of Kauai, but L. Henry (1976) reanalyzed their data and argued that the actual incidence was much higher, at 23.7%. Wasser and Barash (1983) suggested that as many as 50% of all conceptions do not result in live births; Roberts and Lowe (1975) put the figure higher still, at 78%. The point is that, even today, gestation constitutes a universal selection funnel, a period of intense natural selection on every conceptus, embryo, and fetus to adapt to its ecological niche—the uterus—to maintain or increase the flow of maternal resources across the placenta (Stearns, 2005).

Humans, like all anthropoid primates, have a hemochorial placenta (Mossman, 1987), in which maternal and fetal blood are in especially close contact (Rutherford, 2013). Luckett (1974) even argued that the trophoblast layer of the human placenta is more invasive than the uterine walls of any other primates (see also Power & Schulkin, 2012). Even if the rates of conception loss, fetal wastage, and miscarriage were no higher in our evolutionary past than today, modern rates, multiplied by thousands of generations, would have provided selection ample time to favor fetal adaptations for eliciting parental (maternal) investment throughout pregnancy. At the same time, however, selection would also favor maternal adaptations for investing wisely, in an evolutionarily rational way. The crucial point here is that what is evolutionarily rational for the fetus is not necessarily evolutionarily rational for the mother. In other words, parent–offspring conflict is inevitable; there is an inherent conflict between the fitness interests of mother and fetus.

Because both the trade-off between current and future reproduction and parent–offspring conflict theory focus on the allocation of limited resources among competing interests, the two can be synthesized logically (Coall & Chisholm, 2003). Under safe and predictable conditions, with low and predictable mortality rates and adequate and predictable resources, mother and fetus can resolve this conflict through “cooperation”; each can afford to give a little. This increases the resources available to the fetus and may improve fetal growth and health. But under conditions of risk and uncertainty, where the availability of resources or their allocation is restricted, this conflict can be fatal for mother and/or fetus. If the fetus survives, the reduced investment may be the source of future ill-health.

Parent–offspring conflict (Trivers, 1974) follows from the logic of parental investment theory (Trivers, 1972). Rephrasing Trivers’s definition, parental (maternal) investment is “any investment by the *mother* in an individual *fetus* that increases the *fetus’s* chance of surviving (and hence reproductive success) at the cost of the *mother’s*

ability to invest in other offspring" (Trivers, 1972, p. 139). These "other offspring" may be existing, current children or potential, future fetuses. The conflict is between: (a) what is evolutionarily rational for the fetus: increased maternal investment will increase its chances of survival (its reproductive value or quality or health); and (b) what is evolutionarily rational for the mother: decreased investment in the current fetus allows her to reallocate resources to existing offspring or future fetuses, thereby increasing her reproductive success (future quantity of offspring). Trivers argued that, because mother and fetus are not genetically identical, they do not have the same inclusive fitness interests (Hamilton, 1964) and are therefore expected to "disagree" about the optimal trade-off between offspring quantity and quality. In sum, the issue is that while the mother has a 50% fitness interest in each of her offspring, each offspring has 100% fitness interest in itself, in the sense that it carries copies of its father's genes as well as its mother's.

Haig (1993, 1996, 1999) developed a sophisticated application of parent–offspring conflict theory for modeling maternal–fetal interaction (see Figure 3.1). When maternal resources are limited (e.g., in risky and uncertain environments), any maternal investment in the fetus entails a trade-off; that is, for every benefit (B in Figure 3.1) a fetus gains from maternal resources, there will be a correlated cost (C in Figure 3.1) to its existing or future siblings. Because the mother is equally related to all her offspring, current and future, it is evolutionarily rational for her to invest equally in each according to their capacity to benefit from the resources invested. Therefore, the mother is expected to seek the best possible balance between the benefit to the existing fetus and the cost to its existing or future siblings. In other words, after a point (x_1 in Figure 3.1), the increased benefit to the current fetus of her continuing the same high rate of investment will be outweighed

by detracting from the resources she could invest in existing or future offspring. At that point, therefore, the mother is expected to begin diverting resources from the current fetus to other existing or future children. To reiterate, parent–offspring conflict and the trade-off between offspring quantity and quality mean that developmental adaptations to stressful (risky/uncertain) fetal environments can have *evolutionarily* adaptive consequences for the mother (to reduce investment) that are nonetheless *developmentally* disadvantageous for the fetus's future health affecting their physical and social-emotional development.

PRENATAL STRESS, ENDOCRINE RESPONSES, AND OFFSPRING DEVELOPMENT

The prenatal period is a time of rapid cell multiplication and cell differentiation (i.e., development). As with other periods of rapid growth, environmental insults can disrupt development. The protected uterine environment of mammalian pregnancy is designed to support fetal growth and buffer the fetus against many challenges that affect the mother. In this section, we use the perspective of human evolutionary ecology to examine the impact of a range of stressors on development, including stressors in the maternal psychosocial environment, nutritional stressors, disease pressures, and exposure to toxicants in the local environment. These stressors are generally examined within a biomedical or pathology model of human health. As described above, we focus on these changes as potentially adaptive responses to environmental change or developmental plasticity that in some cases produce the extremes of normal variation in a trait and pathology.

Developmental Plasticity

Plants and animals that develop in heterogeneous environments typically have the ability to alter their phenotypes in response to those environments (Bateson, Chapter 6, this *Handbook*, Volume 1; Via & Lande, 1985). The response of an individual's phenotype to this environmental variability is referred to as phenotypic plasticity (Piersma & Drent, 2003; Stearns, 1982; West-Eberhard, 1989, 2003). Development can be broadly defined as "all of the phenotypic change during the lifetime of an individual" (West-Eberhard, 2003, p. 32). Therefore, developmental plasticity refers to changes in an individual's phenotype in response to environmental change throughout his or her life span. There is a tendency in this literature to refer to phenotypic changes (e.g., physiology, growth,

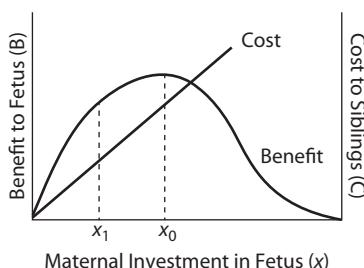


Figure 3.1 Representation of the trade-off between maternal investment in current fetus versus existing or future siblings.

Source: Adapted from "Genetic Conflicts in Human Pregnancy," by D. Haig, 1993, *Quarterly Review of Biology*, 68(4), pp. 495–532.

mental health) induced by the environment as being *programmed* (Whimbey & Denenberg, 1967). We will use such terminology, but it is crucial to remember that these changes are latent potentials, part of the individual's norm of reaction, and are elicited by the environment, not created by it (Bateson, 2007).

The prolonged development of humans provides the opportunity for humans to perceive and evaluate (not necessarily consciously) their environments and respond in ways that maximize their fitness. In the human life cycle, the environment can initiate developmental trajectories that result from the allocation of resources via reproductive strategies and have important consequences for the adult phenotype. The plasticity that is such a striking feature of human development provides the opportunity to make assays of both the biological (Ellison, 1990, 1996) and social (Chisholm, 1999b; Draper & Harpending, 1982) developmental environments. If these assays accurately predict the adult environment, they are likely to provide a fitness advantage (Bateson et al., 2004; Hill & Kaplan, 1999). The range of possible phenotypes that can be expressed is referred to as a reaction norm (Stearns & Koella, 1986) and is limited by phylogenetic constraints (Worthman, 1999). It is this developmental plasticity that enables the individual to respond to the environment and is genetically encoded (Bateson, 1982; Oyama, 1985; Surbey, 1998). Indeed, phenotypic plasticity is one of the most important human evolutionary adaptations (Hrdy, 2000; Stearns, 1982).

Across multicellular species, an organism's developmental environment has consequences not only for its own growth, development, and reproduction, but also for its descendants (Bateson et al., 2004; Coall & Chisholm, 2010; Kuzawa, 2005; Mousseau & Fox, 1998; West-Eberhard, 2003). The influence of early postnatal environments on growth, development, behavior, and health are well established (Bateson & Martin, 1999; Chisholm, 1999b; C. J. K. Henry & Ulijaszek, 1996; Kuh & Ben-Shlomo, 1997). Recently, evolutionists have focused on the intrauterine environment, the broad range of challenges that influence the uterine environment, and their consequences for fetal development and subsequent health.

Reduced fetal growth is associated with higher rates of perinatal morbidity and mortality (Kramer, 1987) and an increased risk of developing coronary heart disease, hypertension, and diabetes in adult life (D. J. P. Barker, 1994, 2004). Experimentally inducing fetal growth restriction in animal models (via the administration of synthetic glucocorticoids, inducing maternal stress, controlling the

maternal diet, or reducing placental function) results in cardiovascular, metabolic, and endocrine changes throughout childhood and even into adulthood (McMillen & Robinson, 2005). Moreover, these same factors are central to fetal programming (Fowden, Giussani, & Forhead, 2006), placental adaptation (Tegethoff, Greene, Olsen, Meyer, & Meinlschmidt, 2010), and epigenetic changes in early development (Vaiserman, 2012). This burgeoning focus on the intrauterine environment has culminated in a new paradigm initially referred to as the Barker Hypothesis, fetal programming, or fetal origins of adult disease (FOAD), and now the developmental origins of health and disease (DOHaD). Within the DOHaD paradigm there has been a particular focus on birth weight, placental weight, and placental weight to fetal weight ratio (hereafter placental ratio) as indicators of the quality of the uterine environment. We examine these further on.

Fetal Growth

It is well known that reduced fetal growth predicts subsequent morbidity and mortality. In a review of the epidemiological literature, Kramer (1987) identified a number of maternal factors associated with intrauterine growth restriction (IUGR), including demographic and psychosocial elements of the mother's environment, obstetric factors, nutritional status, morbidity during pregnancy, toxic exposures, and prenatal care. Placental efficiency plays an integral role in two of the three main causes of reduced fetal growth, which are: (a) abnormal placental structure and/or function; (b) inadequate maternal supply of oxygen and/or nutrients due to either maternal factors or placental factors; and (c) decreased ability of the fetus to use the available supply (Brodsky & Christou, 2004).

Increasingly, the role of maternal constraints on fetal growth—and even that of future generations—are receiving attention (Gluckman & Hanson, 2008; Kuzawa, 2005; Kuzawa & Quinn, 2009; Lewis, Cleal, & Hanson, 2012; Ounsted et al., 1986; Wells, 2003). For example, in a study of 513 low-risk pregnancies, Coall, Charles, and Salafia (2009) found that maternal birth weight was the only factor that consistently predicted children's fetal and placental growth, affecting outcomes including birth weight, placental weight, placental ratio, placental surface area, and placental thickness.

Birth weight is a crude proxy for determining the adequacy or inadequacy of the intrauterine environment (Salafia et al., 2008; Wilcox, 2001). Less commonly used measures of fetal growth that have advantages for research

take into account what the fetus's optimal growth "should" or "could" have been. Constructing fetal growth standards that include only the nonpathological variables is the best way to accurately represent optimal birth weight (Gardosi, 2004). Among other measures, the percentage of optimal birth weight (POBW) was developed from a study of the nonpathological influences on birth weight in Western Australia (Blair, Liu, de Klerk, & Lawrence, 2005). This continuous measure of the appropriateness of fetal growth utilized the whole birth weight range by comparing each individual's birth weight to the birth weight for individuals of same gender, gestational age, and maternal height, age, and parity.

From the perspective of life history theory, fetal growth is a measure of resource flow to the fetus (parental investment). A more direct measure of the resource flow is provided by proportionate birth weight. Proportionate birth weight is the neonate's birth weight as a proportion of the mother's weight and represents the amount of parental investment made during gestation (May & Rubenstein, 1985). This characteristic remains remarkably constant at 5% across all eutherian (placental) mammal species (Land, 1985). Recently, proportionate birth weight has been used as a more direct measure of resource flow to the fetus and, therefore, of parental investment throughout gestation (Coall & Chisholm, 2010). A range of insults have a measurable impact on the uterine environment and health in the next generation. It is important to recognize, however, that insults not producing visible effects on birth weight can still have consequences for fetal programming and adult health (Gluckman & Hanson, 2010). Much of this buffering of the fetus against the maternal environment is achieved by placental adaptation.

Placental Weight and Placental Ratio

Placental growth and development are strongly correlated with the growth trajectory of the fetus and have a major influence on birth weight (Salafia et al., 2005, 2008). The placenta has evolved to provide a protected environment to support fetal growth, buffering the developing organism from environmental insults (Lewis et al., 2012; Wooding & Burton, 2008) and preparing it for the postnatal environment it is likely to inhabit (Gluckman, Hanson, & Spencer, 2005). (Again, we discuss the "predictive adaptive response" [PAR] model separately in "Future Research and Theoretical Perspectives.") The placenta is crucial for regulating the physiological functions that determine fetal growth. The functional efficiency of the placenta may be

challenged by disturbances in the maternal environment, such as poor nutrition, illness, medications, and maternal stress (Tegethoff et al., 2010). The effect of such disturbances may create adverse intrauterine conditions resulting in adaptations (which are often under endocrine control) by the placenta (Coan et al., 2010; Myatt, 2006), and when the placenta is not able to adapt, adverse outcomes for the fetus (Sandman & Davis, 2010).

In epidemiological studies, the role of the placenta is often extrapolated from placental weight. Placental weight is generally associated with placental function (Bell, Wilkening, & Meschia, 1987; Robinson, Owens, de Barro, Lok, & Chidzanga, 1994). Like birth weight (Godfrey, Breier, & Cooper, 1999; Harding, 2001; Wilcox, 2001), placental weight is the end product of a chain of events that include the growth and development of the placenta throughout gestation (D. J. P. Barker & Thornburg, 2013; Coall et al., 2009; Salafia et al., 2005).

As with other aspects of biology, early beneficial adaptations that improve survival can have later costs in morbidity and shortened lives (Kirkwood & Austad, 2000). Research in the field of DOHaD has shown that a high placental ratio is associated with higher blood pressure throughout childhood (V. M. Moore et al., 1996) and into adulthood (V. M. Moore, Cockington, Ryan, & Robinson, 1999) and may predispose individuals to adult illnesses such as hypertension, glucose intolerance, blood coagulation disorders, and coronary heart disease (D. J. P. Barker, 1997; D. J. P. Barker, Bull, Osmond, & Simmonds, 1990; Forsén, Eriksson, Tuomilehto, Osmond, & Barker, 1999; Forsén et al., 1997; Law, Barker, Bull, & Osmond, 1991; Phipps et al., 1993). Some researchers, however, have found a U-shaped association between placental ratio and coronary heart disease in men (Martyn, Barker, & Osmond, 1996). Others have found an association between placental weight, but not placental ratio, and subsequent blood pressure (e.g. Blake et al., 2001; Whincup, Cook, Papacosta, & Walker, 1995; Williams, St George, & Silva, 1992), some have found sex differences (S. J. Taylor, Whincup, Cook, Papacosta, & Walker, 1997), and others have found no effects of gender (Burke et al., 2004; Leon et al., 1996; Martyn et al., 1995; Matthews, Lewis, & Bethel, 1994). It may be that a relatively large placenta does not directly cause adult disease but signals the fetal supply line throughout gestation (Robinson et al., 1995). However, animal and human studies have both shown that placental size and placental ratio play important roles in fetal adaptation to the maternal environment (Faichney & White, 1987; Godfrey, 2002; Kingdom, 1998; Robinson et al., 2001; Steyn et al., 2001).

In remarkable accord with the theoretical predictions from Haig's (1993) application of parent–offspring conflict theory to the uterine environment, the DOHaD perspective proposed that increased placental ratio was an adaptive placental response to intrauterine growth restriction (D. J. P. Barker et al., 1990). Initial studies involving sheep showed that moderate dietary restrictions at various times during pregnancy were associated with increased placental weight (Faichney & White, 1987). This was interpreted as "an attempt by the fetus to compensate for the reduced supply of nutrients in the maternal blood" (Faichney & White, 1987, p. 373). This compensatory placental growth maintained fetal growth in the ewes that had their diets restricted late in pregnancy, and may actually have increased the resource flow to the fetus when the dietary restriction was removed. It must be recognized, however, that although similar responses have been documented in humans, this may be an oversimplified picture. Note that the timing of dietary restriction and the previous nutritional state of the ewes are known to influence placental responses (D. J. P. Barker et al., 1993; Robinson et al., 2001). In a natural experiment, Lumey (1998) reported that women conceiving or in the first trimester of pregnancy during the Dutch Hunger Winter of 1944–1945 had relatively heavy placentae, while birth weights remained static. Lumey interpreted this as compensatory placental growth in response to reduced maternal nutrition. Both animal (Robinson et al., 1994) and human models (Wheeler et al., 1994) supported this interpretation.

Environmentally Appropriate Adaptation, Not Pathology

This application of evolutionary theory challenges the common perception that increased placental weight is pathological (Lao & Wong, 1999, 2001; Naeye, 1987). For example, infants born at high altitudes have reduced birth weights (Mayhew, Jackson, & Haas, 1990), higher placental weights (Kruger & Arias-Stella, 1970), and show structural changes that improve the efficiency of oxygen transfer between mothers and fetuses (Mayhew et al., 1990; see review by Zamudio, 2003). This placental adaptation can improve fetal growth (Mayhew, Jackson, & Boyd, 1993). Moreover, there is evidence that increased placental size can improve fetal survival. In appropriate-for-gestational-age infants of insulin-dependent diabetic mothers, a higher placental ratio was

associated with an increased likelihood of offspring survival (Evers, Nikkels, Sikkema, & Visser, 2003). Increased placental size in insulin-dependent diabetic pregnancies are likely to reflect the larger placenta necessary to maintain a fetus when the placenta is less efficient (Lao & Ho, 2002). More generally, placental adaptation to the uterine environment, which maintains fetal growth, is a normal process of pregnancy (Pardi, Marconi, & Cetin, 2002). Therefore, pregnancies in which the placentae show evidence of compensatory growth resulting in increased placental ratios may actually represent appropriate responses to suboptimal uterine environments of diverse origin in the short term, rather than pathology itself (Adair & Thelander, 1925; Fox, 2000; C. G. Kaplan, 2008).

DOHaD, as the name suggests, is interested in this developmental plasticity because of its impact on health. Here we move away from the biomedical-pathology models and explore these phenotypic changes from an evolutionary perspective (i.e., viewing them as the normal, adaptive responses to challenging maternal environments). The placenta evolved because the closer link between the mother and fetus buffers the developing organism from environmental insults, thereby increasing survival and ultimate reproduction (Wooding & Burton, 2008). Reproductive success is what drives evolution and placental function is crucial for successful reproduction (Lewis et al., 2012). Postnatal pathology arises when the trade-offs with other components of fitness entrain developmental trajectories that increase short-term survival at the cost of ill health and premature mortality in the future. These costs include low birth weight, preterm birth, altered stress reactivity, rapid childhood growth, early reproductive development, and short life spans. If these costs minimize the chance of lineage extinction—that is, if they increase the chance of reproducing at all in the harsh or unpredictable environments that cause them—they may also be evolutionarily rational (Borgerhoff Mulder, 1992; Chisholm, 1999b; Harpending, Draper, & Pennington, 1990; Stearns, 1992). Pathologies may also result when the postnatal environments for which the maternal challenges have prepared the fetus change, creating a mismatch between postnatal physiology and environment (Gluckman & Hanson, 2008, 2010). In sum, life history theory views many of these changes as adaptations to environmental challenges that maximize survival and, ultimately, reproduction.

Consistent with this view, we next examine the impact, first, of maternal stress on early development, second,

the role of maternal nutrition, and last, the increasingly apparent role of toxicants in the environment. We begin by discussing the meaning of *stress*.

Stress, Stressors, and Adaptive and Maladaptive Coping

Environmental stress not only affects development but does so in potentially adaptive ways by entraining alternative reproductive strategies (Belsky, Steinberg, & Draper, 1991; Chisholm, 1993; Worthman, 1999). *Stress* has long been a slippery concept, with considerable disagreement about its meaning (Cohen, Kessler, & Gordon, 1995; McEwen, 1995). We view stress in a general way, as a broad range of environmental stressors or challenges, including social-emotional or psychosocial stress, inadequate nutrition, and toxicants. We focus first on the psychosocial stress entrained by the perception of negative life events, a fairly objective measure of environmental risk and uncertainty (Cohen et al., 1995). We refer to the other stressors as biological stressors. These are factors such as malnutrition, disease, toxicants, and material poverty and include the physiological and energetic stressors associated with them (Ellis, 2004; Ellison, 1990; Thayer & Kuzawa, 2011). Therefore, biological stress represents situations of reduced biological resource availability. It must be stressed that, while we treat psychosocial and biological stressors as independent factors, they should not be seen as mutually exclusive because there is considerable interplay between them and they are often inseparable (Chisholm, 1999b; Coall & Chisholm, 2010). The survival, growth and development, and reproduction of all organisms always depend on biological resources (e.g., nutrition, disease), but because of our species' reliance on cooperation, social exchange, and sharing to gain access to these resources, our life history, as with most other primates, depends on the availability of psychosocial resources.

Any analysis of psychosocial stress must consider individual differences in the ability to cope with or adapt to stressors (e.g., Ellis, 2004). Paramount for our intensely social species is the social-emotional support that can dramatically enhance individual coping styles, life satisfaction, and sense of control (Compas, Slavin, Wagner, & Vannatta, 1986; A. Steptoe & Marmot, 2003; Suldo & Huebner, 2004; Thoits, 1982). These psychosocial resources serve as buffers against the cumulative cost of constantly adapting to environmental challenge (allostatic load; McEwen, 1995) and are known to reduce

the impact of stressful life events on adult health (Compas et al., 1986; Greenberg, Seltzer, Krauss, Chou, & Hong, 2004; B. H. Kaplan, Cassel, & Gore, 1977; Patterson & McCubbin, 1984). Stress has a direct effect on adult outcomes such as mental health and an indirect influence via the impact it has on relationships that constitute these psychosocial resources (McEwen, 2000; Thoits, 1982). Everything else being equal, an increase in the level of psychosocial stress results in a reduced availability of psychosocial resources (Ellis, 2004; S. E. Taylor & Seeman, 1999). Therefore, psychosocial stress not only puts wear and tear on an individual's physiology but also consumes valuable psychosocial resources. From an evolutionary perspective, coping with psychosocial stress is work, and like any other work, it requires resources, in this case, social-emotional resources.

In adulthood, the social support provided by family and friends is important for adjustment to life events (Runtz & Schallow, 1997). Across cultures, social support and social networks are associated with less depressive symptomatology during pregnancy and after childbirth (Byrd-Craven & Massey, 2013; O'Hara, 1986; Surkan, Peterson, Hughes, & Gottlieb, 2006). Furthermore, even for women in low-stress environments, intimate social support during pregnancy is commonly associated with improved birth outcomes (Hoffman & Hatch, 1996; Wakeel, Wisk, Gee, Chao, & Witt, 2013). While the evidence is not conclusive (Bryce & Stanley, 1991), several studies have shown that social support interventions during pregnancy can reduce the rate of low-birth-weight births (Norbeck, DeJoseph, & Smith, 1996). The association between social support and birth weight appears to operate through improved fetal growth rather than longer gestation (Feldman, Dunkel-Schetter, Sandman, & Wadhwa, 2000; Rothberg & Lits, 1991). In a study of 3,073 low-income women receiving general psychosocial services during pregnancy, social support was associated with a reduced risk of delivering low-birth-weight babies (Zimmer-Gembeck & Helfand, 1996). It is clear that people employ both adaptive (e.g., social support) and maladaptive (e.g., alcohol and nicotine) coping mechanisms. The interacting influence of prenatal stress and social support on fetal growth and development is mediated by poor maternal coping mechanisms that include risky health behaviors (Orr et al., 1996; Zuckerman, Amaro, Bauchner, & Cabral, 1989). Evidence suggests that social support and stress are important determinants of smoking (McCormick et al., 1990; Rodriguez, Bohlin, & Lindmark, 2000) and prenatal

weight gain (Hickey, 2000). It is the maladaptive coping strategies that elevate stress hormones, influence nutrition and exposure to toxins during pregnancy, and lead to poor fetal development (Sandman & Davis, 2010).

Maternal Stress During Pregnancy and Early Development

Before Barker advanced the fetal origins of adult disease (FOAD) paradigm in 1986, the question was *whether* stress during pregnancy could affect fetal or child development (Bryce & Stanley, 1991). However, because of his pioneering work and rapid progress in FOAD's successor, DOHaD, the questions now are: *How* does maternal stress affect the developing fetus or child, *what are the processes* whereby these early effects might predispose poor adult health, and *to what extent* do these adult effects constitute evolutionarily adaptive “programming” of the fetus's or child's developing physiology and organ systems by the intrauterine environment (Sandman, Davis, Buss, & Glynn, 2012)?

There is now abundant evidence that maternal psychosocial stress during pregnancy is a risk factor for abnormal pregnancy/delivery, fetal abnormalities, and poor adult health. The effects of stress on the mother include the premature rupture of membranes, preeclampsia, excessive weight gain, and preterm labor and birth (Dole et al., 2003; Newton, Webster, Binus, Maskrey, & Phillips, 1979); those on the fetus include reduced fetal growth and low birth weight (Newton & Hunt, 1984; Wadhwa, Sandman, Porto, Dunkel-Schetter, & Garite, 1993), which in turn are associated with increased infant and child morbidity and mortality, impaired psychological development, and increased morbidity in adulthood (Istvan, 1986; Tegethoff et al., 2010).

Virtually all research into the effects of maternal stress during pregnancy has used either subjective self-ratings of anxiety/depression or more objective measures of stressful life events. Intriguingly, however, because the two measures do not predict the same outcomes, different pathophysiology pathways seem to be involved (Pacak & Palkovits, 2001; Richardson, Zorrilla, Mandyam, & Rivier, 2006; Tegethoff et al., 2010). For this reason alone, research on prenatal influences must be multivariate, incorporating (a) objective indices of stressful life events, (b) individuals' subjective impressions of their stressors and their meaning, (c) their own and others' responses to these stressors, and (d) the biochemical, physiological, neuroendocrine, and immunological processes involved.

Biological Mechanisms of Maternal Stress

The steroid hormone cortisol is a key component of the HPA axis, the “fight-or-flight” response of all vertebrates. It has two evolutionary functions, one short-term, the other long-term. Its short-term function is to maximize the probability of survival in the face of some immediate threat. For example, negative life events typically (but not always, as is commonly thought) activate the HPA axis that stimulates the adrenal cortex to release glucocorticoids (cortisol). This response is adaptive in the short term in that it helps to maintain homeostasis in the face of environmental (including social-emotional) challenges (Cohen et al., 1995; McEwen, 1995; Repetti, Taylor, & Seeman, 2002; Selye, 1957; Tsigos & Chrousos, 2002; Wingfield & Sapolsky, 2003). Its long-term function is developmental: Cortisol is essential for immune function, glucose metabolism, and fetal (e.g., brain) development and the maturation of fetal organs (e.g., lungs; Lupien, McEwen, Gunnar, & Heim, 2009; Reynolds, 2013). Growing up in a chronically risky or uncertain environment entails chronic threats, chronic psychosocial stress, and chronic HPA activation. As we saw above (in “Life History Theory: Evolution and Development”), in chronically risky and uncertain environments the optimal reproductive strategy is the minimax strategy of maximizing current reproduction through accelerated development and early childbearing. Chronic psychosocial stress and high levels of cortisol “predict” risky or uncertain environments and may help to entrain evolutionarily adaptive developmental responses (Finch & Rose, 1995; Worthman, 1999; Worthman & Kuzara, 2005).

The stress response begins with the hypothalamus, which integrates the nervous and endocrine systems. Stress, defined as any challenge to the body's homeostasis (McEwen, 1995; Selye, 1957), activates the HPA axis. In response to a stressor, the hypothalamus releases corticotrophin-releasing hormone (CRH), a peptide hormone that travels through local blood vessels and binds to receptors on the plasma membranes of cells in the anterior pituitary gland. This stimulates the production of adrenocorticotropic hormone (ACTH), which enters the blood and travels around the body, having its primary influence on the cells of the adrenal gland. ACTH acts on the cortex of the adrenal gland to stimulate production of glucocorticoids (GCs), steroid hormones that include cortisol and corticosterone (Nakamura, Sheps, & Arck, 2008; Gunnar, Doorn, & Esposito, Chapter 4, this *Handbook*, this volume).

The hypothalamus also directly influences the adrenal gland medulla via the sympathetic nervous system. Neurons of the sympathetic nervous system from the hypothalamus synapse in the adrenal medulla and release the hormones epinephrine and norepinephrine. These hormones stimulate rapid, organism-wide responses to a stressor in the form of an elevation in heart rate, respiratory rate, and release of energy reserves in preparation for quick responses to environmental threats (Sapolsky, 1994).

Because steroid hormones can cross the plasma membranes of cells, the effects of glucocorticoids are mediated by glucocorticoid receptors (GRs), which have been identified in the cells of almost all tissues within the body. GCs regulate a variety of important functions and are essential for life in adult mammals. Excessive levels of GCs, however, potentially affect many internal systems by dysregulating biological homeostasis (Nakamura et al., 2008).

Fetal exposure to GCs and CRH are essential for fetal growth and development, but excess levels can be detrimental. During pregnancy, due to the elevation of maternal CRH levels, maternal GC production and secretion are increased. High levels of GC hormones are necessary due to their potent and long-term effects on cellular function in almost all organ systems, particularly in regard to cellular differentiation and homeostasis (Burton & Waddell, 1999). Later in pregnancy, exposure to GCs is essential for the maturation of fetal organs and systems (Ellman, Dunkel Schetter, Hobel, Glynn, & Sandman, 2008). Throughout pregnancy, while fetal and maternal neuroendocrine functions are largely independent, because of placental barriers to most maternal hormones, they still interact (Lester, Marsit, Conradt, Bromer, & Padbury, 2012). Approximately 10%–20% of maternal GCs cross the placenta to the fetus (Seckl & Meaney, 2006).

Gitau, Cameron, Fisk, and Glover (1998), examining the relationship between maternal and fetal cortisol levels, showed that, although fetal levels are lower than maternal levels (indicating the metabolism of 80%–90% of maternal cortisol by the placenta), they are correlated, but not with gestational age. Even so, a 10%–20% contribution of maternal cortisol to the fetus could still double fetal concentrations. This study also measured the amount of unmetabolized cortisol crossing the placenta at 15%. Although most cortisol is metabolized by the placenta, high maternal concentrations can affect fetal concentrations because 40%–50% of fetal cortisol is derived from the mother (Gitau et al., 1998). Cortisol also plays a central role in fetal programming of adult

disease (Harris & Seckl, 2011; Reynolds, 2013; Seckl & Holmes, 2007).

Circulating glucocorticoids (GCs) that potentially influence the tissues of the body are regulated by the 11 β -HSD enzymes: 11 β -HSD-2 inactivates cortisol, converting it to the inactive cortisone; conversely, 11 β -HSD-1 activates cortisone back into cortisol, increasing local GC levels in tissues. In the placenta, circulating maternal GCs, including cortisol, are metabolized by 11 β -HSD-2 into the inactive form, cortisone (Benediktsson, Calder, Edwards, & Seckl, 1997; R. W. Brown et al., 1996). These placental enzymes catalyze and modulate ligand access to the glucocorticoid receptor (GR). Therefore, the 11 β -HSD enzymes are referred to as the feto-placental barrier to maternal GCs. Because GCs are potent and have long-lasting effects, changes in the maternal environment that increase GC exposure may persist long after the original insult, thus acting on tissue accretion, differentiation, and programming of the fetal HPA axis (Fowden, Giussani, & Forhead, 2005), changing baseline levels for physiology, metabolism, and behavior (Lester et al., 2012; Seckl & Meaney, 2006).

Twenty years ago, Edwards, Benediktsson, Lindsay, and Seckl (1993) proposed that low levels of 11 β -HSD-2, and concomitant overexposure to maternal cortisol, reduced fetal growth and programmed adult disease risk. Since then, it has been shown that overexposure of GCs to the fetus reduces fetal growth, increases the risk of developing hypertension and metabolic disorders, and inhibits fetal HPA-axis development (Burton & Waddell, 1999; Seckl, 1997). Moreover, Stewart, Rogerson, and Mason (1995) showed a positive association between placental 11 β -HSD-2 activity and birth weight. In humans, 11 β -HSD-2 activity is inhibited by medical disorders involving increased fetal exposure to cortisol such as preeclampsia, maternal asthma, and intrauterine growth restriction (O'Donnell, O'Connor, & Glover, 2009). Moreover, a deficiency in 11 β -HSD-2 is associated with fetal growth restriction and increased risk of hypertension in adulthood (White, 2001). Maternal stress downregulates 11 β -HSD-2 in both animal and human studies (Glover, Bergman, Sarkar, & O'Connor, 2009; Mairesse et al., 2007). Thus, elevated levels of maternal stress can downregulate 11 β -HSD-2 activity, allowing more maternal cortisol to cross the placenta and reduce fetal growth.

Maternal environments that activate the HPA axis, thereby raising cortisol levels, can also affect CRH levels and lead to preterm birth. Questionnaire studies linking measures of perceived stress, stressful life events, racism, and domestic violence with preterm birth suggest that

maternal stress shortens gestation (Hoffman & Hatch, 1996; Istvan, 1986). Increased levels of stress hormones have also been associated with preterm birth (e.g., Wadhwa et al., 1993). Rather than suppressing CRH, as in the hypothalamus of nonpregnant individuals, the relation between GCs and CRH during pregnancy is stimulatory, with levels of both rising throughout gestation leading to parturition (Ellman et al., 2008; Reynolds, 2013; Sandman & Davis, 2010). In response to maternal cortisol, the feto-placental unit activates the placental CRH gene, increasing placental CRH synthesis and secretion to the fetus. This stimulates the maternal pituitary to release ACTH, and thus cortisol from the maternal adrenals. Maternal cortisol again stimulates CRH, creating a positive feedback loop and potentially high fetal exposure to GCs. By the end of pregnancy, cortisol levels are up to 3 times higher than nonpregnant levels.

High levels of CRH are also involved in the cascade of events resulting in myometrial activation and parturition, and thus preterm birth when this cascade is activated earlier in pregnancy. Preterm birth is directly correlated with low birth weight and suboptimal development of the brain and other tissues and organs. Resulting adverse outcomes include structural changes in the brain, negative temperament, impaired cognition, and the developmental programming of adult pathophysiologies such as metabolic and cardiovascular diseases (Mairesse et al., 2007; Reynolds, 2013; Sandman & Davis, 2010).

From an evolutionary perspective, however, maternal stress–induced preterm birth, low birth weight, and their resulting pathophysiologies may not—strictly speaking—represent pathology so much as the normal, evolutionarily adaptive response by mother and fetus to their respective risky or uncertain environments (Ellman et al., 2008). This may be so for three reasons: First, elevated maternal stress hormones, whether due to psychosocial stress, malnutrition, or exposure to environmental toxins (e.g., cadmium), may accelerate maturation of fetal organs and systems in preparation for a “predicted” shorter gestation. Second, in high-risk environments, where the probability of survival for the mother and fetus is reduced, maternal–fetal competition for resources increases and maternal stress hormones may allocate resources away from the fetus to the mother, resulting in fetal growth restriction but increasing the mother’s chance for “predicted” future reproduction (Haig, 1993; Stearns, 2005). A more moderate view of such maternal–fetal competition suggests that mother and fetus can “co-adapt” to each other as a unit, compromising on the allocation of maternal

resources (Kölliker, Royle, & Smiseth, 2012) so that nutrient flow to the fetus simply reflects maternal condition and access to resources (Coall & Chisholm, 2003; Jansson & Powell, 2007). Third, in all of the above, apparently detrimental maternal stress effects on the fetus might, at least sometimes, represent adaptive fetal programming for survival and growth and development (and thus, ultimately, reproduction) in the risky and uncertain environment that caused their mother’s stress in the first place and therefore “predicts” that such risk and uncertainty will continue in the future (Gluckman, Hanson, Spencer, & Bateson, 2005).

Stress During Pregnancy and Developmental Outcomes

The evolved human capacity for developmental plasticity means that maternal prenatal stress can have either, or both, deleterious effects on fetal development and future health as well as evolutionarily adaptive programming effects. The nature and duration of the maternal stress, together with the timing of impact during gestation, determines the severity of fetal developmental outcomes, depending on the stages of development and the number of organs and systems affected (Fowden et al., 2005). We review, below, a number of factors associated with stress during pregnancy to illustrate the diverse impacts prenatal stress can have.

Fetal brain development commences during the third week postconception with structural development of the central nervous system (CNS) extending to Week 20 of pregnancy, providing ample opportunity to incur insults that may result in impaired development (Kurjak, Medic, & Salihagic-Kadic, 2004; K. L. Moore, 1989). There is strong evidence that stress has an impact on fetal development of the brain and CNS, including effects on brain morphology, receptor density and sensitivity, CNS function, and the activity of the autonomic and neuroendocrine systems (Stanton, Lobel, Sears, & DeLuca, 2002). GCs play an important role in the survival and maturation of CNS neurons as different regions of the brain express GRs at different stages of development. This allows for selective effects of stress throughout gestation (Lupien et al., 2009; Nyirenda, 2006; Seckl & Meaney, 2006).

The fetal brain also appears to silence 11β -HSD-2 expression and activity during gestational Weeks 19 to 26, indicating the role of GCs in aspects of brain development (Nyirenda, 2006). Animal studies, including those involving primates, show that excessive GC exposure in utero influences hippocampal and related complex functions,

including cognition, behavior, memory, coordination of autonomic activity, and importantly, the regulation of the endocrine systems (Seckl & Meaney, 2006).

These programming effects on the hippocampus include fetal HPA-axis deregulation. Several studies have demonstrated that the HPA axis is sensitive to excessive GC exposure in utero, with repeated animal studies showing that excessive GC exposure during development permanently alters HPA-axis function, accounting for exaggerated HPA-axis reactivity in adulthood (Nyirenda, 2006). The hippocampus expresses both types of corticosteroid receptors (GRs). There is also evidence that increased levels of GCs are associated with decreased receptor expression in the hippocampus, resulting in hypersensitivity and increased reactivity of the HPA axis (Nyirenda, 2006; Seckl & Meaney, 2006). We turn now to the evidence that the impact of GCs on the CNS and HPA-axis reactivity translates into changes in postnatal behavior, cognition, and mental health.

Behavior, Cognition, and Mental Health

Mounting evidence shows that overexposure to GCs in utero leads to modifications in adult behavior in a number of species (Seckl & Meaney, 2006). In humans, prenatal exposure to elevated maternal stress hormones is associated with behavioral and emotional disturbances during both infancy and childhood (Sandman & Davis, 2010). In one of the first studies of the impact of prenatal stress on the subsequent behavioral adjustment of children, O'Connor, Heron, Golding, Beveridge, and Glover (2002) found, in a longitudinal sample of 7,448 pregnancies, that women who were in the highest 15% of the sample for anxiety at 18 or 32 weeks of pregnancy had children who were 2 to 3 times more likely to be 2 standard deviations above the sample mean for total behavioral and emotional problems at 4 years of age. The association between prenatal maternal anxiety and filial behavioral problems remained after controls for birth weight, potential maternal confounders (age, socioeconomic status), pregnancy-related anxiety, behavioral mediators (smoking and alcohol use), and postnatal (8 weeks) depression and anxiety. Barring the potential influence of maternal weight and postnatal parenting practices, this suggests that the influence of prenatal anxiety was direct (i.e., not through fetal growth, maternal behavioral modifications, or postnatal anxiety and depression). Significantly, prenatal anxiety and postnatal depression both independently predicted childhood behavioral and emotional adjustment problems, and this effect persisted to

7 years of age (O'Connor et al., 2002; O'Connor, Heron, Golding, & Glover, 2003). Unfortunately, the authors did not control for birth length, which has since been shown, in the same sample, to be negatively associated with total behavior difficulties, hyperactivity, and conduct problems at 7 years of age (Wiles et al., 2006). Subsequent to these studies, a veritable feast of investigations have examined these associations in detail and analyzed the physiological processes involved. A likely process is reprogramming of the fetal HPA axis in response to maternal stress.

Maternal prenatal stress and cortisol may reprogram the postnatal HPA axis, influencing adult phenotypes. Maternal cortisol levels, and by association maternal stress and nutrition levels, increase the activation of the HPA axis postnatally. In a sample of 116 mother–term infant dyads, Davis, Glynn, Waffarn, and Sandman (2011) found an increased cortisol reaction to the newborn heel prick test (blood draw) in the neonates of women who had higher cortisol levels during the second half of pregnancy. This association remained evident after adjustment for maternal medical history, socioeconomic status, ethnicity, and sex of the child. Similarly, in 29 mother–child dyads, maternal cortisol and prenatal anxiety levels mid-pregnancy were associated with elevated cortisol levels in response to the first day of a new school year (Gutteling, de Weerth, & Buitelaar, 2005). Such resetting of the HPA axis has consequences for postnatal health and we next examine a specific example: attention-deficit/hyperactivity disorder (ADHD).

A multitude of prenatal and postnatal risk factors, including low birth weight, smoking, alcohol use, stress during pregnancy, and insensitive or abusive parenting increase the risk of ADHD and disruptive behavior disorders (DBDs; Latimer et al., 2012). Some studies have managed to examine the independent impact of maternal stress on ADHD. One of the most striking examples involves a twofold increase in ADHD symptoms in children whose mothers were pregnant during, but not exposed to, the Chernobyl disaster in 1986 (Huizink et al., 2007). Similarly, in the Avon Longitudinal Study of Parents and Children (ALSPAC), prenatal anxiety at 32 weeks gestation was associated with an increased risk of inattention/hyperactivity at 4 years of age (O'Connor et al., 2002). And in a more recent prospective study of 1,247 Finnish children, maternal depression at 10 and 28 weeks of gestation were associated with externalizing problems on the Child Behavior Check List, while maternal postnatal factors (illness, tiredness, and anxiety) were associated with internalizing problems at 12 years of age (Pihlakoski et al.,

2013). As with several other programming effects, there is intriguing evidence of sexual dimorphism in the impact of the maternal environment. For example, Rodriguez and Bohlin (2005) found that maternal stress at 10 weeks of gestation was associated with ADHD symptoms at 7 years, but only in boys. Likewise, examination of a Finnish birth cohort revealed that several measures of placental size were associated with ADHD symptoms in boys, but not girls, at 8 and 16 years (Khalife et al., 2012). These sex differences are intriguing and are consistent with animal and human models and may be underpinned by epigenetic processes.

A consistent finding in the DOHaD literature is that boys are more susceptible to environmental insults during pregnancy than girls (D. Barker, 2003). Male biased effects of prenatal exposures have been found for schizophrenia, autism spectrum disorders, and anxiety (see Bale, 2011). Perhaps, as the faster-growing sex, males are more vulnerable. A possible mechanism underlying the differing impact of maternal stress on the male and female postnatal phenotype is altered sensitivity to GCs. Across several species, females appear to be more resistant and males appear to be more sensitive to GC exposure (Phillips & Matthews, 2011; Seckl & Holmes, 2007). Evidence of differential activation of the HPA axis has been found in animal studies (Liu, Li, & Matthews, 2001). Detailed analyses in mice show that the male vulnerability to prenatal stress, resulting in increased emotionality postnatally, may be attributable to increased placental responsivity with an upregulation of placental gene expression found in the placentae of male but not female mice (Mueller & Bale, 2008). Moreover, the prenatal stress influenced placental epigenetic processes resulting in increased expression of DNA methyl transferases and methyl-binding proteins in the male but not female placentae. Thus, the sex-specific effects of maternal stress on postnatal phenotypes may be transduced via epigenetic processes in the placenta.

What, if anything, do evolutionary models say regarding sex-specific effects? An evolutionary model, sex allocation theory (Charnov, 1982), proposed that, when maternal condition is poor, investment of resources should be allocated to the offspring sex that requires the least investment. As sons grow faster and require more resources to produce, under conditions of prenatal stress the maternal physiology may preferentially allocate resources away from male fetuses and thus increase their sensitivity to environmental insults. Crucially, for this argument, stress hormones appear to provide the link between the maternal condition and the allocation of resources. In a study of European starlings,

Love, Chin, Wynne-Edwards, and Williams (2005) found that elevated maternal corticosterone levels were associated with biasing allocation of resources toward females, with males experiencing higher mortality and being lighter at hatching. This suggests that maternal condition during pregnancy may have sex-specific effects on the postnatal phenotype, including mental and physical health.

PRENATAL NUTRITION, FETAL DEVELOPMENT, AND OFFSPRING PHENOTYPE

No discussion of prenatal development is complete without examining the impact of maternal nutrition on the fetus and its postnatal phenotype. For the vast majority of human history, the primary concern has been malnutrition. Now, with the emergence of the obesity epidemic, overnutrition is of increasing concern (Wells, 2012). Unfortunately for the developing fetus, both maternal under- and overnutrition provide suboptimal environments that can affect early development and lifelong health (Ojha, Robinson, Symonds, & Budge, 2013). Even in well-nourished populations, an imbalanced diet can affect fetal development, and, if not in the form of reduced growth during pregnancy, it can still influence postnatal health (D. Barker, 2003; Kind, Moore, & Davies, 2006). Below, we briefly examine iron, folate, and calcium, important components of the maternal diet, before looking at the consequences of maternal nutrition for postnatal phenotypes.

Iron

Iron deficiency is the most common nutrient deficiency among pregnant women (Guilbert, 2003). The prevalence of anemia among pregnant women worldwide is estimated to be 41.8%, with iron deficiency the leading cause (McLean, Cogswell, Egli, Wojdyla, & Benoit, 2009). Iron demands during pregnancy increase rapidly, especially late in gestation. Peak gastrointestinal iron absorption in pregnant women occurs in the third trimester (Barrett, Whittaker, Williams, & Lind, 1994), concurrent with the increased iron transfer to the fetus. In the absence of adequate maternal iron status, the placenta increases the number of transferrin receptors in order to enhance placental iron absorption in an attempt to maintain adequate iron transfer to the fetus (Cetin, Berti, Mandò, & Parisi, 2011).

Maternal iron deficiency early in pregnancy is associated with an increased risk of low birth weight and preterm delivery (Chang, O'Brien, Nathanson, Mancini, &

Witter, 2003; Scanlon, Yip, Schieve, & Cogswell, 2000). The relationship, however, appears to be U-shaped, with high maternal hemoglobin concentrations in early to midgestation also associated with increased risk of adverse birth outcomes, including preterm birth and low birth weight (Chang et al., 2003; Scanlon et al., 2000).

Iron is required for a number of physiological processes crucial to development, including oxygen transport, energy production, and notably, brain development. Dietary iron deficiency during prenatal development in animal models leads to an alteration in the composition and quantity of neuronal myelin sheaths (Ortiz et al., 2004). Similarly, iron is required for the synthesis of the neurotransmitters serotonin (Martinez, Knappskog, & Haavik, 2001) and dopamine and norepinephrine (Nagatsu, 1995).

Iron deficiency during infancy is associated with long-lasting effects on neurocognitive outcomes, including decreased executive function at the ages of 5, 10, and 19 (Lozoff et al., 2006). While there is a paucity of data regarding the effects of maternal iron deficiency on cognitive function in their offspring, impaired myelination is a potential cause. One study in a rural area of Nepal with a high prevalence of anemia observed improved general intellectual functioning, executive function, and motor skills in 7- to 9-year-old children following maternal supplementation with iron and folic acid compared with a control group (Christian et al., 2010). These findings point to a role for maternal iron deficiency in pre- and postnatal development.

Folate

Folate (folic acid) is an important factor in fetal development because it is involved in a number of biological processes, including acting as a cofactor for many essential cellular reactions, such as amino acid metabolism, DNA synthesis, DNA methylation, and red blood cell production. Fetal development is a time of rapid and sustained cell division and thus the demand for folate increases during this period (McPartlin, Halligan, Scott, Darling, & Weir, 1993). In the absence of adequate dietary folate intake and/or folic acid supplementation, maternal serum and erythrocyte folate concentrations decrease from midpregnancy onward and continue to decline postpartum (Qvist, Abdulla, Jägerstad, & Svensson, 1986).

The implications of maternal folate nutrition on fetal growth have been investigated in a number of studies worldwide which have, however, differed with respect to the baseline levels of maternal folate intake and the inclusion

of supplementation, in the timing of the intervention and dosage used (Baumslag, Edelstein, & Metz, 1970; Blot, Papiernik, Kaltwasser, Werner, & Tchernia, 1981; Czeizel, Dudas, & Metneki, 1994; Fleming, Martin, Hahnel, & Westlake, 1974; Giles, Harcourt, & Whiteside, 1971; Iyengar & Rajalakshmi, 1975; Rolschau et al., 1999). Nonetheless, taken together, these studies support the view that adequate folate intake promotes fetal growth. The clearest finding regarding folate nutrition in pregnancy is that peri-conceptual folic acid supplement use reduces the risk of neural tube defects (e.g., spina bifida) by almost three-quarters (Lumley, Watson, Watson, & Bower, 2001).

Calcium

Maternal calcium intake during pregnancy is inversely associated with the development of hypertension during pregnancy (Ortega, Martinez, Lopez-Sobalar, Andres, & Quintas, 1999; Villar, Belizan, & Fischer, 1983). The benefits of calcium supplementation during pregnancy for hypertensive conditions has been demonstrated in a number of studies, with decreases in the incidence of preeclampsia and hypertension calculated in meta-analyses to be 52%–55% and 25%–35%, respectively (Hofmeyr, Lawrie, Atallah, & Duley, 2010; Imdad & Bhutta, 2012). Maternal calcium supplementation during pregnancy has also been associated with increased birth weight in populations with a low calcium intake, a finding consistent with the reduction in gestational hypertensive disorders (Imdad & Bhutta, 2012). In both of these cases, however, studies conducted in populations with adequate baseline calcium intake (Australia and United States) demonstrated no effect on fetal growth (Crowther et al., 1999; Levine et al., 1997). Furthermore, a decreased incidence of preterm birth has been associated with calcium supplementation and, unlike other birth outcomes, this association was seen in populations with both low and adequate baseline calcium intake (Imdad & Bhutta, 2012).

Nutrition and Fetal Programming

Nutrition is a key determinant of fetal growth and size at term. The initial findings by D. J. P. Barker (1994), linking small size at birth and chronic adult diseases such as hypertension, diabetes, and cardiovascular disease, were thought to result from an imbalance between the maternal supply and fetal demand for nutrients during pregnancy (Phillips, 2004). This hypothesis is now supported by evidence from animal studies (Eriksson, Forsen,

Tuomilehto, Osmond, & Barker, 2003) and longitudinal epidemiological investigations of diet during pregnancy in humans (Ojha et al., 2013; Phillips, 2004).

Prenatal brain development is dependent on adequate nutrition (C. D. Walker, 2005). It is now apparent that the impact of maternal nutrition also extends to mental health outcomes. Prenatal exposure to the Dutch Hunger Winter (1944–1945) in the second or third trimester was associated with an increased risk of affective disorders in both males and females (A. S. Brown, van Os, Driessens, Hoek, & Susser, 2000). In a study of 23,020 Norwegian women, Jacka et al. (2013) found that higher intake of unhealthy foods during pregnancy was associated with increased levels of externalizing problems at 1.5, 3, and 5 years of age. This relation held after adjustment for a range of confounds, including socioeconomic status, depression during pregnancy, and children's postnatal diet. Similarly, in a nonhuman primate model, maternal nutrient restriction during pregnancy was associated with juvenile attentional and behavioral problems (Keenan et al., 2013). Together, these studies highlight a potential role of nutrition during pregnancy for mental health disorders.

The evidence that small size at birth is associated with poorer adult mental and physical health outcomes is substantial. The proximate processes by which these effects could be transmitted throughout a life span, however, are not completely understood. A likely candidate is that maternal undernutrition, like maternal prenatal stress, reprograms the HPA axis and has consequences for postnatal health (Phillips & Matthews, 2011). This makes sense because glucocorticoids are involved in both the stress response and the liberation of glucose for the cells of the body. In a meta-analysis of 11 studies ($N = 2,311$), lower birth weight was associated with higher levels of cortisol during childhood (van Montfoort, Finken, le Cessie, Dekker, & Wit, 2005). Increased stress reactivity to the Stroop Test has also been detected in a study of 721 people who were exposed to the Dutch Hunger Winter prenatally (Painter et al., 2006). In animal models, maternal undernutrition during pregnancy has been associated with the increased expression of glucocorticoid receptor 11β -HSD-1 and the decreased expression of 11β -HSD-2 suggesting programming of gene expression related to the HPA axis (Whorwood, Firth, Budge, & Symonds, 2001). Other areas of interest involve pathways such as the immune process and inflammation during pregnancy, which are also crucial to reproduction, interact with the HPA axis, and contribute to human life history trade-offs (Clancy, 2013; Entringer et al., 2012; McDade, 2005).

Researchers rarely consider that stress hormones may also have a behavioral effect on maternal nutrition. While there is ample evidence in humans that stressful events or administration of CRH increase the eating of comfort food, there has been no study examining the impact of maternal stress on nutritional intake during pregnancy and child outcomes (Entringer et al., 2012). Thus, evidence supports the hypothesis that maternal nutrition influences childhood mental and physical health by reprogramming the HPA axis.

Epigenetics as a Potential Organizing Mechanism

Epidemiological data and evolutionary theory suggest that insults during one generation can have consequences for the growth and development of second- and third-generation descendants (e.g., Bateson et al., 2004; Coall & Chisholm, 2003; Kuzawa, 2005; Ounsted et al., 1986). During development in mammals, there is extensive DNA methylation. Evidence suggests that the majority of methylation occurs during the development of the germ cells (future sperm and ovum) and in the early embryonic cells forming the blastocyst (Reik, Dean, & Walter, 2001; Schaefer, Ooi, Bestor, & Bourc'his, 2007). This methylation follows periods of demethylation in which the epigenetic markers are thought to be "wiped clean" and reset.

The processes responsible for fetal growth and intrauterine programming are regulated by placental nutrient transport. Placental inefficiency is also associated with epigenetic modifications. Jansson and Powell (2007) reported that restriction of protein in the maternal diet of rats induced epigenetic changes in specific genes, the glucocorticoid receptors in the liver of the offspring. Furthermore, genes expressed in the placenta may undergo epigenetic modification in response to disturbances in the maternal compartment due to direct exposure to maternal blood. The methylation of certain genes, such as the trophoblast genes, also results in altered placental structure and function. The effects of methylation due to maternal stressors have direct effects on placental morphology and fetal programming. Nyirenda (2006) suggested that the expression of 11β -HSD-2 is regulated by epigenetic mechanisms (DNA methylation).

PRENATAL TOXINS, TERATOGENS, AND DEVELOPMENT

Research on prenatal development in human evolutionary ecology, life-course epidemiology, and the DoHAD

paradigm predominately focus on maternal stress and nutrition. A stressor often ignored in these analyses, possibly because of the disruptive rather than adaptive nature of exposure, are toxins and pollutants. Just as lower socioeconomic groups are more likely to experience higher levels of prenatal stress and poor nutrition during pregnancy, they are also more likely to be exposed to environmental pollutants (e.g., smoking, workplace, diet). Epigenetic analyses have examined all three of these environmental exposures in relation to health inequalities (Thayer & Kuzawa, 2011). A number of potentially toxic substances are present in the environment as a result of agricultural and industrial practices. Many of these substances persist in the environment and accumulate over time. Human exposure arises through multiple pathways including direct contact with soils, inhalation of particulate matter and household dust, dermal contact, and the consumption of contaminated food or drinking water. In this section we highlight some pollutants and their influence on prenatal development.

Pollutants of Emerging Concern

Unlike many environmental toxicants, metals are naturally occurring, but their concentrations increase as a result of anthropogenic activities. A number of metals have been identified as detrimental to fetal development, if exposure occurs at sufficiently elevated levels. The heavy metals, lead and mercury, have been most widely studied with the adverse effects of these neurotoxicants on developing nervous systems now well established (e.g., Grandjean et al., 1997; Lanphear et al., 2005). However, prenatal exposure to several other metals has also been associated with health effects and, in the case of metals such as cadmium, the effects of low-level exposure are only now being elucidated (e.g., Ciesielski et al., 2012). In addition, there are a number of emerging chemicals of concern, including polybrominated flame retardants, bisphenol A, phthalates, and perfluorinated compounds. These chemicals linger in the human body less than many of the metals, but exposure is widespread, which makes any health effects arising from exposure a significant health concern at the population level. We discuss these pollutants next.

Cadmium

Exposure to cadmium is widespread, with diet and tobacco smoke the major sources. Studies in Japan and China have provided evidence of an inverse relationship between maternal environmental cadmium exposure and fetal

growth (Nishijo et al., 2004; Shirai, Suzuki, Yoshinaga, & Mizumoto, 2010; Zhang et al., 2004). To date, the largest study of the effects of prenatal cadmium exposure on birth outcomes recruited 1,616 mother-infant pairs in rural Bangladesh. Maternal urinary cadmium concentrations, a marker of long-term exposure, were negatively associated with birth weight and head circumference (Kippler et al., 2012). However, stratified analyses revealed that these relationships were exclusively observed with female infants (Kippler et al., 2012). One potential mechanism for this negative effect of cadmium on fetal growth could be that cadmium reduces the expression of 11 β -HSD-2 in human placental trophoblast cells (Yang, Julian, Rubio, Sharma, & Guan, 2006). As detailed above, this placental enzyme protects the fetus from circulating maternal glucocorticoids by converting them to inactive metabolites, and reduced activity of 11 β -HSD-2 has been implicated in intrauterine growth restriction (Shams et al., 1998). Sex-specific effects of 11 β -HSD-2 reduction and impaired fetal growth have been seen following maternal glucocorticoid treatment (Murphy et al., 2003), lending further credence to this possibility.

In terms of neuro-behavioral effects, cord blood cadmium concentrations were negatively associated with both full and performance IQ scores in a study of Chinese children aged 4.5 years (Tian et al., 2009). Furthermore, childhood urinary cadmium concentrations have been associated with the learning disabilities or placement in special education programs in a large representative U.S. cohort of children aged 6–15 years (Ciesielski et al., 2012). However, given the long-term exposure represented by measures of urinary cadmium (biological half-life of 30 years) and the cross-sectional nature of the study, it is unclear whether or not prenatal exposure contributed to this effect.

Tobacco Smoke

Maternal smoking during gestation is known to result in reduced fetal growth, with a decrease of approximately 200 g in infants born to smoking mothers relative to those born to nonsmokers (Rogers, 2009). Tobacco smoke contains more than 4,000 chemicals, one of which is cadmium and hence cadmium may, as discussed previously, play a role in this reduction in birth weight.

Prenatal tobacco exposure was significantly associated with ADHD in a study of 4,704 U.S. children (Braun, Kahn, Froehlich, Auinger, & Lanphear, 2006). Analysis of a nationally representative sample of 8- to 15-year-olds revealed a greater than eightfold increased risk of ADHD

for children who had both prenatal environmental tobacco smoke exposure and postnatal lead exposure (Froehlich et al., 2009), demonstrating the importance of environmental exposures for this prevalent health condition.

A meta-analysis of 14 studies conducted worldwide with a total of over 84,000 children aged 2 years and above revealed that maternal smoking during pregnancy was associated with an elevated risk of the offspring being overweight at the ages of 3–33 years (Oken, Levitan, & Gillman, 2008). Notably, the odd ratios were almost unchanged when adjusted for a range of factors, including parental socio-demographic factors, signifying that social and behavior differences between smokers and nonsmokers were unlikely to account for the increased risk (Oken et al., 2008). Maternal smoking during pregnancy has also been associated with an increased risk of early onset of type 2 diabetes in young adults (Montgomery & Ekbom, 2002) and early onset of puberty in males (Fried, James, & Watkinson, 2001).

Although discussions of prenatal exposures tend to focus on maternal exposures, onset of paternal smoking prior to puberty has been associated with an increase in body mass index (BMI) in male offspring at the age of 9 years, with the effect most pronounced if fathers started smoking when they were aged 10 years or under (Pembrey et al., 2006). This provides compelling evidence of a male-line transgenerational effect.

Polybrominated Diphenyl Ethers

Polybrominated diphenyl ethers (PBDEs) are used as flame retardants in a variety of consumer products including electrical products, computers, upholstery, soft furnishings, polyurethane foams, and children's clothing. There are many PBDE congeners and, due to the differing structures, they are likely to differ in their potential to cause adverse health effects following exposure.

Due to the persistent lipophilic nature of PBDEs, breast milk reflects the body burden of the mother and can therefore be considered an indicator of prenatal exposure. Associations have been observed between PBDE concentrations in breast milk and adverse birth outcomes, with increased PBDE concentrations (BDE-47, -99, -100, and -209) associated with decreased birth weight, birth length, and chest circumference in infants (Chao, Wang, Lee, Wang, & Papke, 2007). Umbilical cord blood PBDE concentrations of BDE-28, -47, -99, -153, -183, and Σ PBDE levels were higher in Chinese infants with adverse birth outcomes (including premature delivery, low birth weight, and stillbirth) than in normal births (Wu et al.,

2010). In addition, higher concentrations of BDE-47, -99, and -100 in maternal serum collected in the second trimester were found to be associated with decreased birth weight in a cohort of low-income Mexican families residing in California (CHAMACOS cohort); with each tenfold increase in maternal concentration of the congeners associated with decreases in birth weight of 115, 114, or 121 grams, respectively (Harley et al., 2011).

A Danish-Finnish study investigated breast milk and placenta PBDE concentrations as two indicators of prenatal exposure, and congenital cryptorchidism in male infants at the age of 3 months (Main et al., 2007). The sum of seven PBDE congeners in breast milk was found to be significantly higher in cryptorchid boys than controls, although this association was not evident in placental PBDE concentrations. In this study, a positive correlation between the sum of PBDE congeners and serum luteinizing hormone in infants was also observed, suggesting a potential ability for prenatal exposure to PBDEs to interact with sex hormones during fetal development.

The ability for prenatal exposure to PBDEs to influence neurodevelopment has been examined. Significant negative associations were observed between higher cord blood PBDEs and neurodevelopmental outcomes in younger children in a New York cohort, with decreases observed in Psychomotor Development Index scores at 12 months (BDE-47), Mental Development Index scores at 24 months (BDE-47, -99, and -100), 48-month Full IQ scores (BDE-47, -100, and -153), Verbal IQ scores (BDE-47 and -100) and Performance IQ scores (BDE-100 and -153). Adverse neurodevelopmental effects associated with increased cord-blood PBDE concentrations were also detected in older children, with decreased Full and Performance IQ scores at 72 months (Herbstman et al., 2010). Furthermore, prenatal exposure to Σ PBDEs was associated with poorer attention and fine motor coordination and decrements in Verbal and Full-Scale IQ in 7-year-olds in the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS) cohort in California (Eskenazi et al., 2013). Environmental exposure to PBDEs in the United States, particularly in California, is considerably higher than in Europe, Asia, or Australia, but similar results were observed in a Dutch cohort with a negative association observed between prenatal PBDE exposure (BDE-47, -99, and -100) and attention in children at the age of 5–6 years (Roze et al., 2009). Differences in coordination, visual perception, and behavior were also reported to be associated with in utero PBDE exposure in this cohort (Roze et al., 2009). Concentrations of BDE-209 in breast

milk have been associated with cognitive impairment in infants in cohorts in Spain (Gascon et al., 2012) and Taiwan (Chao, Tsou, Huang, & Chang-Chien, 2011).

PBDE exposure is associated with thyroid hormone concentrations, with increased serum concentrations of congeners BDE-28, -47, -99, -100, and -153 and Σ PBDEs in pregnant women associated with decreased levels of thyroid-stimulating hormone (TSH) (Chevrier et al., 2010). The odds of subclinical hyperthyroidism were also increased by exposure to BDE-100, BDE-153, and Σ PBDEs, although these relationships were not statistically significant (Chevrier et al., 2010). The effects of maternal subclinical hyperthyroidism on fetal development remain to be shown, although an increased odds ratio of infant hearing dysplasia was reported in a Chinese study (Su et al., 2011).

Bisphenol A

Bisphenol A (BPA) is a ubiquitous chemical used in the manufacture of polycarbonate plastics and epoxy resins. It is found in a number of types of food packaging, including in the lining of tins. Biomonitoring in developed countries has revealed that BPA is present at detectable concentrations in the majority (usually $> 85\%$) of urine samples tested, indicating that exposure is now widespread. BPA has been shown to transfer across the human placenta, mainly in the active unconjugated form (Balakrishnan, Henare, Thorstensen, Ponnampalam, & Mitchell, 2010; Morck et al., 2010). BPA is known to have detrimental effects on placental cells, with low, environmentally relevant, doses of the chemical inducing apoptosis in placental trophoblasts via increased expression of tumor-necrosis factor α (TNF- α) (Benachour & Aris, 2009) as well as altering the microRNA expression in cells derived from the first trimester placenta, with suggestions that this may alter the DNA repair capabilities of these cells (Avissar-Whiting et al., 2010).

Consistent with the effects of BPA on placental cells, prenatal BPA exposure has been associated with adverse birth outcomes. The studies to date, however, have been limited, their results are inconsistent, and differing methodologies preclude direct comparisons. Concentrations of BPA in maternal urine during pregnancy were negatively associated with fetal head circumference and fetal weight in a Dutch study (Snijder et al., 2013). This is in contrast to an earlier French study that identified a positive association between maternal urinary BPA collected between weeks 24 and 30 of gestation and the head circumference of

infants at birth (Philippat et al., 2012). Furthermore, a third study, in which maternal urinary BPA concentrations were sampled in the third trimester, demonstrated no significant associations with birth weight or head circumference in the offspring (Wolff et al., 2008).

Because BPA concentrations in maternal urine are known to vary during pregnancy (Braun, Kalkbrenner, Calafat, Bernert, et al., 2011), exposure misclassification is possible when samples are collected at a single time point. Equally, the specific window of vulnerability to BPA exposure in terms of fetal growth outcomes is unknown. It is important to note that the negative associations between maternal urinary BPA concentrations and fetal weight and head circumference in the Dutch cohort were based on urine samples collected at multiple time points during pregnancy, with restriction of analysis to those participants with three urine samples collected across their pregnancy, increasing the probable reliability of the associations identified (Snijder et al., 2013).

Using blood BPA as a measure of exposure, a birth cohort study in Taiwan identified that higher maternal blood BPA concentrations at delivery were associated with an increased risk of low birth weight ($< 2,500$ g) or small for gestational age (birth weight less than 10th percentile compared with national data matched for gestational age and gender of infant). This relationship was significant for male infants only, and remained so after the odds ratios were adjusted for maternal age, BMI, smoking, socioeconomic status, and the maternal lipid blood profile (Chou et al., 2011).

Although BPA has been shown to exert both estrogenic and antiandrogenic effects in animal models, with morphological changes in the male reproductive organs reported, there is a paucity of data demonstrating endocrine disrupting effects of BPA in humans. Maternal occupational exposure to BPA during pregnancy was associated with a shortened anogenital distance in male offspring in a Chinese study of epoxy resin manufacturers (Miao et al., 2011). Similarly, in Chinese men (with and without occupational exposure) urinary BPA concentrations have been associated with declining male sexual function (Li et al., 2010), decreased semen quality with reduced sperm concentration, sperm vitality and motility, and total sperm count (Li et al., 2011), and alterations in sex hormone concentrations (Zhou et al., 2013). Although these cross-sectional studies measured adult exposure, the observed outcomes suggest that further research into the potential effects of prenatal BPA exposure on male sexual development is warranted.

The first birth cohort study to investigate prenatal BPA exposure and neurodevelopmental effects in humans demonstrated an association between maternal urinary BPA concentrations, collected early in the second trimester of pregnancy (Week 16) and externalizing behavior in girls at 2 years of age (Braun et al., 2009). This cohort from Ohio was followed until the age of 3 years, at which point behavioral and emotional regulation were associated with prenatal BPA exposure, with maternal urinary BPA concentrations associated with anxiety, depression, and hyperactivity, with the effects again restricted to girls (Braun, Kalkbrenner, Calafat, Yolton, et al., 2011). However, a second cohort of African American and Dominican mothers residing in New York City (Columbia Center for Children's Environmental Health, CCCEH cohort) found that prenatal BPA exposure, assessed by maternal urinary concentrations at around Week 34 of gestation, was positively associated with emotionally reactive and aggressive behavior in boys at the ages of 3–5 years (Perera et al., 2012). Among girls in this cohort, high BPA exposure was associated with lower scores for anxious/depressed and aggressive behavior, indicating fewer problems in these areas in girls with higher BPA exposure (Perera et al., 2012). The reasons for the disparities between the two cohorts are unclear, although the timing of exposure assessment and the tools utilized in the assessment of child behavior differed between the two cohorts.

In terms of other health outcomes, early second-trimester maternal urinary BPA concentrations have also been associated with parental reports of childhood wheezing early in life, with the effects seen in children between 6 months and 3 years of age (Spanier et al., 2012). In vitro experiments have revealed the ability of BPA to inhibit adiponectin release from human adipose tissue (Hugo et al., 2008). Consistent with this, urinary BPA concentrations have been associated with risk of overweight and obesity in children in both U.S. and Chinese studies, although the effect has not been consistently found in both males and females (Bhandari, Xiao, & Shankar, 2013; Li et al., 2013). However, the potential for prenatal BPA exposure to promote obesity in humans has not been explored.

Phthalates

Phthalates are used in a wide range of consumer products. For example the high molecular weight di(2-ethylhexyl) phthalate (DEHP) is used as a plasticizer in the manufacture of polyvinyl chloride, whereas low molecular weight phthalates such as diethyl phthalate (DEP) and dibutyl

phthalate (DBP) are used in cosmetics and other personal care products. Animal models have demonstrated that prenatal exposure to DEHP, DBP, or benzyl butyl phthalate (BzBP) has a marked effect on fetal Leydig cells, reducing the production of fetal testosterone and insulin-like growth factor 3 (Insl-3) (Foster, 2006). These effects are responsible for a syndrome of male reproductive abnormalities, including shortened anogenital distance, hypospadias, cryptorchidism, and malformations of the epididymis, vas deferens, seminal vesicles, and prostate (Foster, 2006). In rats, the programming window in which androgen action is required for the normal development and masculinization of the reproductive tract has been identified, and this window is believed to correspond to 8–14 weeks gestation in humans (Welsh et al., 2008), although exposure studies have yet to confirm this.

There is currently limited human data regarding the potential for in utero antiandrogenic activities of phthalates on male reproductive tract development. A multicenter U.S. study found that the concentrations of five urinary phthalate metabolites (MEP, a metabolite of DEP, MBP, a metabolite of DBP, and three metabolites of DEHP, the monoester MEHP and the oxidative metabolites MEOHP and MEHHP) assessed in maternal urine collected during gestation (mean week 28.6) were inversely related to anogenital distance in male offspring (mean age at assessment 12.8 months) (Swan, 2008). DEHP metabolite concentrations in maternal urine were also associated with decreased penile width and impaired testicular descent (Swan, 2008). A study in Taiwan of 65 mother–infant pairs measured phthalate monoesters in amniotic fluid collected during routine amniocentesis and categorized infants as high- or low-phthalate exposure based on the median concentrations of individual phthalate monoesters. This study reported significantly shorter anogenital distances in newborn female infants with high as opposed to low monobutyl phthalate (MBP) exposure (Huang, Kuo, Chou, Lin, & Lee, 2009). The relation remained significant after adjustment of the anogenital distance for birth weight and birth length. In contrast to the work of Swan, no relationship between MBP or MEHP in amniotic fluid and anogenital distance was observed in male newborn infants in the Taiwanese study (Huang et al., 2009), although the biological matrix assessed and the timing of both exposure and outcome assessments differed in these two studies. Anogenital distance has been identified as a strong predictor of multiple semen parameters in adult men, which suggests that this measure is a good indicator of male reproductive function (Mendiola, Stahlhut, Jorgensen, Liu, & Swan, 2011).

This demonstrates the possible effects of prenatal phthalate exposure on male reproductive development at the population level; however, there is little information available regarding influences on female reproductive development.

Studies investigating the potential effects of phthalates on the length of gestation and fetal growth have also obtained mixed results. Cord-blood DEHP/MEHP concentrations were associated with decreased duration of pregnancy in an Italian study of 84 newborns, with no effect of phthalate exposure on birth weight detected in this study population (Latini et al., 2003). Similarly, a case-control study of Mexican women and their infants identified higher concentrations of phthalate metabolites in maternal third-trimester urine samples in those who delivered preterm (<37 weeks), with preterm birth cases having elevated odds for having phthalate metabolite concentrations above the median for each of the metabolites analyzed (Meeker et al., 2009). Although correction of urinary phthalate metabolites for specific gravity or creatinine attenuated the odds ratios somewhat, they did remain elevated for certain metabolites, most notably MBP and the sum of DEHP metabolites (MEHP, MEOHP, MEHHP, and MECPP) (Meeker et al., 2009). Furthermore, an inverse association between third-trimester urinary MEHP concentrations and length of gestation was also identified in a study of 311 African American and Dominican women from the CCCEH cohort, with a ~1-day decrease in the length of gestation with each 1 logarithmic unit increase in MEHP (Whyatt et al., 2009). The results for other DEHP metabolites (MEHHP, MEOHP, and MECPP) and the sum of all DEHP metabolites were similar in this study. Conversely, a multicenter U.S. study of 283 pregnant women found that gestation was increased by ~1 day with each logarithmic unit increase in urinary concentrations of the DEHP metabolites MEHP and MEOHP (Adibi et al., 2009). The authors reported that increased concentrations of these metabolites were also associated with increased odds of delivering at 41 weeks or later and of undergoing caesarean section and reduced odds of preterm delivery (<37 weeks) (Adibi et al., 2009). The reasons for the discrepancy between these studies remain unclear.

While the effect sizes were small, a U.S. study reported a positive association between prenatal exposure to low molecular weight phthalates and increased duration of pregnancy and infant head circumference (Wolff et al., 2008). Similarly, concentrations of MBP in amniotic fluid above the median (85 ng/ml) were associated with higher birth weight and birth length in a Taiwanese study (Huang et al., 2009).

Equally, some studies have reported null findings, with no associations observed between maternal urinary phthalate metabolite concentrations and birth outcomes in a study of 149 Japanese women and their infants (Suzuki et al., 2010). However, the timing of maternal spot urine sample collection was not consistent in this study (ranging between 9th and 40th weeks gestation). A French study also found no evidence of a monotonic association between phthalate metabolites and birth outcomes (Philippat et al., 2012).

Conversely, a Chinese study reported a significant increase in the risk of low birth weight (<2,500 g) with higher DBP in cord-blood samples and higher MBP or MEHP in meconium (Zhang et al., 2009). This study also detected an inverse relation between DEHP/MEHP in cord blood or meconium and infant birth length. Maternal occupational exposure to phthalates (estimated by questionnaire only) was associated with decreased placental weight and also decreased fetal growth in a Dutch cohort (Snijder et al., 2012). Consistent with this indication of impaired placental development, maternal urinary phthalate concentrations were associated with placental gene expression in trophoblast differentiation and steroidogenesis pathways (Adibi et al., 2010). Increased maternal phthalate exposure in the early third trimester was correlated with decreased placental gene expression, with results more pronounced for genes of the trophoblast differentiation pathway (Adibi et al., 2010).

The ability of prenatal exposure to antiandrogenic phthalates to influence sexual differentiation of the brain is also being explored. Concentrations of two metabolites of DBP and two metabolites of DEHP in maternal urine (mean 28.6 weeks gestation) were associated with reduced masculine play in boys aged 3–6 years (Swan et al., 2010). Prenatal phthalate exposure also has other influences on neurobehavior in infants and young children. Exposure to low-molecular-weight phthalates during pregnancy was associated with increased motor performance in male infants assessed at 5 days of age in a multiethnic U.S. cohort of 295 mother-infant pairs (Engel et al., 2009). A contrasting effect was seen in female infants in this study, with exposure to high molecular weight phthalates resulting in lower scores for orientation and quality of alertness (Engel et al., 2009). Assessment of 350 infants at 5 weeks of age revealed that exposure to DEHP and DBP at around week 26 of gestation was associated with several neurobehavioral outcomes, with both favorable and detrimental effects noted (Yolton et al., 2011). Higher urinary concentrations of DBP metabolites were associated with improved behavioral organization in infants, with lower

scores for infant arousal, improved movement quality, less infant handling required during testing, and increased self-regulation. Increased urinary concentrations of DEHP metabolites were associated with increased nonoptimal reflexes in male infants only in this study. A Korean study of 460 mother–infant pairs detected inverse associations between third-trimester maternal urinary phthalate concentrations and infant development at 6 months as assessed by the Korean Bayley Scales of Infant Development (BSID-II) (Kim et al., 2011). Mental Development Index scores were inversely associated with natural log concentrations of the DEHP metabolites MEHHP and MEOHP and Psychomotor Development Index scores were inversely associated negatively with natural log concentrations of MEHHP. When the analysis was stratified by gender, stronger inverse associations were observed between all measured phthalate metabolites (MEHHP, MEOHP, and MBP) and both developmental indices in male infants, with no significant associations detected for female infants (Kim et al., 2011).

In older children, third-trimester maternal MBP and monoisobutyl phthalate (MiBP) metabolite concentrations were associated with decreases in psychomotor development at 3 years of age in the CCCHEH cohort, with increased odds of motor delay per logarithmic unit increase of these metabolites in maternal urine (Whyatt et al., 2012). Prenatal MBP exposure was also associated with decreased mental development at the age of 3 in this study, but this effect was only observed in girls (Whyatt et al., 2012). The odds ratios for clinically withdrawn and internalizing behaviors also increased in these children, with logarithmic increases in urinary MBP, MiBP, and monobenzyl phthalate (MBzP). Furthermore, evidence of low-molecular-weight phthalates in maternal urine have been associated with poorer parent-rated behavior and executive functioning in children aged 4–9 years in a multiethnic urban U.S. cohort, with poorer scores for aggression, attention, conduct, depression, and externalizing behavior reported in children with higher prenatal exposure (Engel et al., 2010). An association between increased maternal urinary low-molecular-weight phthalate concentrations in the third trimester and social impairment was also identified in this cohort when children were assessed at the age of 7–9 years (Miodovnik et al., 2011), which suggested persistent effects of prenatal phthalate exposure.

Perfluorinated Compounds

Perfluorinated compounds (PFCs) are used in an extensive range of commercial and industrial applications.

Perfluorooctanesulfonate (PFOS) and perfluorooctanoate (PFOA) are PFCs that are produced either directly or from the metabolism of other PFCs, with half-lives estimated to be around 5 years and 4 years, respectively (Olsen et al., 2007). These chemicals are used as industrial surfactants and may be present in a number of consumer products including nonstick pans, soft furnishings, clothes, and food packaging. PFCs have been extensively used for several decades and persist for long periods in the environment, but human exposure has only been assessed relatively recently, in part due to our previous inability to detect these chemicals with sufficient sensitivity in biological media. Although the use of PFCs was phased out in most countries in 2000, human exposure to perfluorinated compounds remains widespread. Both PFOS and PFOA are known to cross the placental barrier and are prevalent in cord-blood samples, but few studies have investigated the potential health effects arising from prenatal exposure to PFCs.

The evidence to date regarding prenatal PFC exposure and fetal growth is largely consistent, with decreased fetal growth associated with PFOS, PFOA, or both identified in most studies. A study of 293 pregnant women delivering in Baltimore in the United States, and their infants, observed negative associations between PFOS and PFOA concentrations in cord blood and birth weight, ponderal index, and infant head circumference (Apelberg et al., 2007). However, there were no associations between PFCs in cord blood and birth length or length of gestation (Apelberg et al., 2007). The Danish National Birth Cohort was the first large-scale study to investigate the relationship between exposure to PFCs and birth outcomes, with a random subset of 1,400 participants from the larger national study selected. Maternal plasma PFOA concentrations assessed in samples collected early in pregnancy (week 4–14) were inversely associated with birth weight (Fei, McLaughlin, Tarone, & Olsen, 2007). Despite the higher concentrations of PFCs detected in the plasma of overweight or obese women, the relationship between PFOA and birth weight was only significant for mothers with a normal BMI (18.5–24.9) (Fei et al., 2007). PFOS was not significantly associated with birth weight in this study and neither chemical was associated with the length of gestation. A Japanese study of 428 mother–infant pairs observed a negative association between maternal serum PFOS concentrations collected after the second trimester and birth weight (Washino et al., 2009). In contrast to previous studies, no significant associations between PFOA concentrations and fetal growth were detected in this study.

A Canadian study of 252 mother–infant pairs also concluded that maternal PFC exposure had no significant effect on fetal growth and length of gestation (Hamm, Cherry, Chan, Martin, & Burstyn, 2010). An investigation of prenatal exposure to PFCs was undertaken as part of the ALSPAC in Great Britain using stored maternal serum samples (from 1991–1992) collected during pregnancy (median 15 weeks gestation) (Maisonet et al., 2012). In adjusted models, maternal serum PFOS and PFOA concentrations in the upper tertile were associated with an average birth weight in girls that was 140 grams and 133 grams less, respectively, than those of girls with mothers with PFCs concentrations in the lowest tertile (Maisonet et al., 2012). Similarly, maternal PFOS concentrations in the highest tertile were associated with a small decrease in infant birth length. There were no associations between PFOS and length of gestation or ponderal index, nor between PFOA and birth length. The Norwegian Mother and Child Cohort study (MoBa) included 901 mother–infant pairs and compared maternal plasma samples collected at around week 17 in gestation with infant birth weight (Whitworth et al., 2012). The adjusted birth weight z-scores were lower among infants born to women in the highest quartile of PFOS and PFOA, compared with those in the lowest quartile, but this relation was not statistically significant (Whitworth et al., 2012). Finally, the Taiwan Birth Panel Study investigated the potential adverse effects of PFCs on birth outcomes in 429 mother–infant pairs (Chen et al., 2012). Cord-blood PFOS concentrations were found to be inversely associated with a number of birth outcomes including length of gestation, birth weight, and head circumference, but not significantly associated with ponderal index or birth length. In addition, increased PFOS exposure increased the odds ratio of preterm birth, low birth weight (<2,500 g), and small for gestational age. No adverse effects on birth outcomes were observed with exposure to other PFCs, including PFOA. On balance, the evidence shows a reasonably consistent negative association between exposure to PFOS and PFOA prenatally and in measures of reduced fetal growth.

In addition to noting the decreased fetal growth associated with prenatal PFC exposure, the Danish National Birth Cohort followed 1,010 children and found that prenatal PFOS and PFOA concentrations were inversely related to children's weight in the first year, with more pronounced inverse associations between prenatal PFOS and body weight and BMI observed in boys at 5 and 12 months of age (C. S. Andersen et al., 2010). No clear associations were seen between prenatal PFC exposure and child length, and

when stratified by gender, no significant associations were detected between PFC exposure and body weight for girls.

In contrast, in British girls from the ALSPAC study, weight at 20 months increased with increased prenatal exposure to PFOS, with those in the highest tertile for PFOS on average 580 g heavier than those with prenatal exposure in the lowest tertile (Maisonet et al., 2012). Because most studies find that decreased birth weight is associated with prenatal PFOS exposure, this suggests a rapid early growth catch-up that may have implications for long-term child health. Furthermore, there is evidence that the effects of prenatal PFC exposure on anthropometry persist into adulthood, with positive associations between prenatal exposure to PFOA and the prevalence of overweight and high waist circumference (>88 cm) in females, but not males, at 20 years of age in a Danish cohort (Halldorsson et al., 2012). Maternal PFOA concentrations in the third trimester were also associated with biomarkers of adiposity in female adult offspring, with positive associations with insulin, leptin, and leptin-adiponectin ratio, and negative associations with adiponectin (Halldorsson et al., 2012).

The potential influence of prenatal exposure to PFCs on childhood development was assessed in the Danish National Birth Cohort. There was little evidence of a relation between maternal plasma PFOA and PFOS concentrations early in pregnancy and maternally reported motor or mental developmental milestones in infants at 6 or 18 months of age (Fei, McLaughlin, Lipworth, & Olsen, 2008), but PFOS concentrations were weakly associated with a delayed ability to sit unsupported (Fei et al., 2008). Further follow-up of these Danish children at the age of 7, with screening for hyperactivity and attention problems and developmental coordination disorders using parent-completed questionnaires, revealed that prenatal PFC exposures were not related to behavioral problems or motor coordination problems (Fei & Olsen, 2011). However, both the Danish follow-up studies used rather insensitive milestones, with only parent-reported outcomes; studies using more sensitive indicators of neurobehavioral development may yield differing results. However, neuropsychological tests were conducted on children from the Mid–Ohio Valley community exposed to high PFOA concentrations through contaminated drinking water, and no adverse associations between estimated in utero PFOA exposure and performance on these tests at the ages of 6–12 years were observed (C. R. Stein, Savitz, & Bellinger, 2013), although prenatal exposure was not directly measured.

Only one study to date has considered the potential associations between prenatal PFC exposure and the male human reproductive system. In this Danish study, increased maternal PFOA serum concentrations at week 30 in gestation were associated with lower sperm concentration and reduced total sperm count in male offspring at 19–21 years of age, with higher concentrations of luteinizing hormone and follicle-stimulating hormone detected in the blood samples of those with higher in utero PFOA exposure (Vested et al., 2013). No associations were observed between prenatal PFOS exposure and the outcomes measured. Given the widespread nature of exposure to PFOA, these reported decreases in semen quality in adult men following prenatal exposure could pose a significant population health issue and warrant further investigation. Of equal concern is the suggestion that prenatal exposure to PFOS is associated with reduced humoral responses to childhood immunizations at the age of 5 years and increased odds of diphtheria antibody concentrations below the protective level (Grandjean et al., 2012).

Conclusion and Perspectives for Future Studies

Investigations into the potential health effects of prenatal exposures to environmental toxicants are essential and information is mounting. The main challenge in this field is to deal with a number of methodological issues to improve the accuracy of conclusions that can be made. Below we detail some issues that need to be addressed in future research to move the field forward. Epidemiological, *in vivo*, and *in vitro* studies frequently examine the effects of exposure to a single toxicant while environmental exposure involves chronic simultaneous low-level exposure to multiple toxins, which may act through similar or overlapping mechanisms. A number of factors influence fetal growth, including maternal height and ethnicity, parity, gender, and gestational age, but these variables are not always assessed when measuring fetal growth perturbations arising from prenatal environmental toxin exposure. It would be beneficial to take into account the optimal fetal growth for a given infant by considering these factors, thereby allowing the POBW and birth length to be calculated (Blair et al., 2005). This would provide a more meaningful assessment of how exposure affects fetal growth. Longitudinal birth cohort studies are expensive and need to follow up participants for many years in order to accurately ascertain the health effects of prenatal exposure, some of which may not be manifest until the offspring reach adulthood. Epidemiological studies have varied in the

timing and frequency of collection of samples for prenatal exposure assessment and also in the matrix used to assess prenatal exposure (e.g., maternal urine, blood, or hair, or umbilical-cord blood); these differences preclude direct comparisons between studies and may account for some of the reported discrepancies. More inclusive measures will also aid in comparisons across studies and outcomes. For example, cognitive impairment is frequently assessed using executive function or psychometric intelligence, but children with ADHD, for example, are likely to exhibit cognitive impairment only in assessments of executive function and are unlikely to have low IQs (Schuck & Crinella, 2005). Subtle behavioral outcomes may thus be missed.

FUTURE RESEARCH AND THEORETICAL PERSPECTIVES

In examining prenatal influences on development, this chapter has synthesized theory and evidence from a range of disciplines within a multilevel evolutionary framework. The interdisciplinary nature of this perspective provides a fruitful platform for exploring new and existing issues in development. Issues and challenges crucial to future research and theoretical perspectives on prenatal development are highlighted next.

Resource Flow to the Fetus—Not Maternal Nutrition

Our evolutionary approach to reduced fetal growth suggests that the current emphasis of the DOHaD model on maternal under- or malnutrition as the main cause of reduced fetal growth and subsequent increased risk of adult disease may be misplaced. Adverse prenatal environments definitely contribute to reduced placental function and restricted fetal growth, but the impact of maternal nutrition on fetal and placental growth is clearly complicated (Robinson et al., 1994, 2001). The influence of maternal dietary supplementation on birth weight is small (Harding, 2001) and the outcomes depend heavily on the existing nutritional state of the population (Kind et al., 2006). Investigations of maternal nutrient intake and subsequent fetal and placental weights at birth have yielded mixed results (Godfrey, Robinson, Barker, Osmond, & Cox, 1996; Kuzawa, 2005; Mathews, Yudkin, & Neil, 1999; V. M. Moore, Davies, Willson, Woesley, & Robinson, 2004). The model presented in this chapter suggests that the effect of maternal nutrition on placental ratio is a consequence not only of

maternal nutrient intake, but also that the flow of resources from the uterus to the fetus is “negotiated” by the mother and fetus. This model suggests that it is the long and vulnerable fetal supply line, not measureable maternal nutrition *per se*, that determines the ultimate flow of resources to the fetus (Godfrey et al., 1999; Harding, 2001).

As resources from the maternal diet travel along the fetal supply line, what ultimately becomes fetal nutrition is mediated by the mother’s metabolism and endocrinology, uterine blood flow, placental transport and metabolism, umbilical blood flow, and the fetus’s metabolism and endocrinology (Harding, 2001). Therefore, the allocation of resources between competing demands during pregnancy mean that maternal nutrition and fetal nutrition are not the same thing (Gillman, 2002; Harding, 2001). This may also partly explain the finding that maternal insults that do not necessarily affect fetal growth can still have consequences for subsequent postnatal development and health. Our evolutionary synthesis highlights an interaction between the maternal reproductive strategy and diet as a possible explanation for some of the inconsistencies in the studies of maternal nutrient supplementation and fetal growth and the fetal antecedents of adult disease (Coall & Chisholm, 2010; Kramer, 2000; Kramer & Joseph, 1996).

Assisted Reproductive Technologies

Thus far we have considered maternal adaptations to relatively familiar environmental challenges and their health consequences. Assisted reproductive technologies (ART), however, constitute a novel but increasingly common environmental challenge. Since the first IVF baby, Louise Brown, was born in 1978 (P. C. Steptoe & Edwards, 1978), an estimated 5 million children have been born worldwide through ART (Hansen, Kurinczuk, Milne, de Klerk, & Bower, 2013), some 3% of the world’s population (Joy, Gannon, McClure, & Cooke, 2012). The most common ART treatment involves in vitro fertilization (IVF). In industrialized societies, people who plan to have children often delay reproduction in order to accumulate savings (Hammarberg & Clarke, 2005). Unfortunately, delayed reproduction is associated with decreased fertility, leading to greater demand for ART (Oakley, Doyle, & Maconochie, 2008), to a level that most industrialized countries cannot meet (Hoorens, Gallo, Cave, & Grant, 2007).

While the benefits of ART treatments to couples who are unable to conceive are patent, there are also increased risks of poorer outcomes for children conceived via ART (Fisher, Hammarberg, & Baker, 2005; Kalra & Molinaro, 2008).

The higher rate of multiple births in ART pregnancies was thought to account for these differences, but studies examining singleton births confirm that babies conceived by ART are more likely to be born preterm or have low birth weight than children from unassisted conceptions (Squires & Kaplan, 2007). Placentae from ART pregnancies have not been studied extensively (Joy et al., 2012), but, perhaps in response to reduced fetal growth, placentae from ART pregnancies are heavier and have higher placental ratios (Daniel et al., 1999; Haavaldsen, Tanbo, & Eskild, 2012). Other placental pathologies, including low-lying placenta, placenta previa, placental abruption, and poor implantation, are more common in ART pregnancies (Jauniaux, Englert, Vanesse, Hiden, & Wilkin, 1990). Confirming these concerns, the British Scientific Advisory Committee of the Royal College of Obstetricians and Gynaecologists (2012) stated that the babies who emerge from IVF pregnancies are at an increased risk of adverse outcomes such as low birth weight, small for gestational age, and premature birth. Multiple studies have also confirmed increases in the incidence of major and multiple birth defects among babies conceived by ART, with a twofold increase in major birth defects (Bower & Hansen, 2005; Hansen, Kurinczuk, Bower, & Webb, 2002).

Maternal prenatal stress is another factor that may be associated with poorer pregnancy outcomes in ART. During successful IVF pregnancies, couples report higher levels of stress than in successful nonassisted pregnancies (Eugster & Vingerhoets, 1999). Moreover, this is likely to be an underestimation as there is some, albeit mixed, evidence that preexisting stress is associated with the increased risk of unsuccessful IVF pregnancies (Matthiesen, Frederiksen, Ingerslev, & Zachariae, 2011; Sanders & Bruce, 1999). In a study of 837 Danish women, higher levels of negative life events in the preceding 12 months were associated with a reduced chance of becoming pregnant in the first IVF cycle, independent of current perceived stress and depressive symptoms (Ebbesen et al., 2009).

The associations between ART and fetal and placental growth suggest the possibility of fetal programming in these pregnancies. However, the range of factors influencing babies conceived via ART are extensive (inheritance of infertility, ART procedures, stress during pregnancy, nutrition, multiple births, preterm birth, fetal growth restriction) and must be carefully considered before the consequences of ART for child and adult health become clear (Hediger Bell, Druschel, & Louis, 2013). There is increasing evidence that programming effects, associated particularly with adult cardiac and metabolic health, occur in children

born from ART pregnancies (see reviews by Rinaudo & Wang, 2012; Yeung & Druschel, 2013). Importantly, possibly because of the positive parenting practices found in ART families, there is no evidence that children born with ART have poorer cognitive or socioemotional development (see Golombok & Tasker, Chapter 11, this *Handbook*, this volume, for review). Here, postnatal attachment relationships may moderate the impact of prenatal cortisol exposure on postnatal cognitive development (Bergman, Sarkar, Glover, & O'Connor, 2010).

Evidence is mounting that ART procedures produce epigenetic changes in the offspring. Mammals are diploid organisms having two copies of each gene, one from father and one from mother. Generally, the two genes are expressed together. In approximately 40 genes in humans, however, one of these genes is silenced by DNA methylation. Which gene is silenced is determined by whether the gene was from the mother or father. This silencing is referred to as genomic imprinting. Methylation peaks during the development of the germ cells and early embryogenesis (Scott & Moore, 2012), when ART processes are used to manipulate reproduction. Indeed, global gene expression is altered in ART placentae across a range of genes that influence cell differentiation, transmembrane transport, metabolism, and oxidative stress, among other functions (Zhang et al., 2010). These processes (ovarian stimulation, oocyte retrieval, maturation of oocytes, use of immature sperm, injection of single sperm into the cytoplasm [intracytoplasmic sperm injection; ICSI], washing, cryopreservation, and in vitro culture of embryos) could influence genomic imprinting (Manipalviratn, DeCherney, & Segars, 2009), as they do in animal models (Butler, 2009). Although imprinting disorders are rare, epidemiological studies in humans show that an imprinting disorder, Beckwith-Wiedemann Syndrome (BWS), is associated with ART. In a review of ART studies in Europe, the United States, and Australia, involving children who developed BWS, Manipalviratn et al. (2009) reported that approximately 90% of ART-born children showed imprinting defects compared with less than 50% of BWS children born from nonassisted pregnancies. Research in this area is only beginning to explore these associations in humans and (possibly because of the large sample sizes necessary to examine rare disorders) has so far produced mixed results (Vaiserman, 2012).

It is clear that a full understanding of the developmental effects of ARTs cannot be assessed until ART children become parents and grandparents themselves. Perhaps the most important consideration will be the research

designs developed to examine these associations. As for all pregnancies, prenatal maternal stress and nutrition must be considered, but many factors unique to ART pregnancies must be considered as well: the underlying cause of infertility itself, the ART procedures themselves (including delayed fertilization and freezing and thawing of embryos), the medications used to induce ovulation or maintain pregnancy (Hansen, Bower, Milne, de Klerk, & Kurinczuk, 2005), and the couple's emotional reactions to these procedures. In addition, factors known to influence ART outcomes, including the culture media used to store, grow, and protect the eggs and sperm used in some treatments, must all be taken into account (Barnes & Sato, 1980; Trounson & Gardner, 2000). As the number of babies conceived through ART continues to grow, the answers to these questions become increasingly crucial.

Perceived Stress, Objective Stress, and the Biology of Stress

There has been substantial debate about how subjective stress during pregnancy affects maternal physiology such that fetal growth is impaired. The problem is that, although there are many reliable and valid instruments for measuring subjective psychosocial stress, their results do not correlate very well with biological measures of stress during pregnancy (e.g., free cortisol in saliva; Voegtline et al., 2013). In fact, the literature suggests that both pathways—perceived stress and maternal glucocorticoids during pregnancy—can influence maternal physiology and pregnancy outcomes. This review has shown that experiences during pregnancy as diverse as pregnancy-specific anxiety, perceived stress, nutrient restriction, and cadmium exposure can affect maternal and placental stress hormone levels. Because both the mother and fetus are influenced by psychosocial and physiological stressors, the correlation between perceived stress and stress hormones is often low (Sandman et al., 2012). Similarly, the commonly found association between perceived stress and preterm birth is not always reflected in hormonal measures. For example, Kramer and colleagues (2013) found that, while maternal ACTH was associated with cortisol, which in turn enhanced placental CRH, neither maternal cortisol nor CRH were associated with perceived stress, maternal distress, or preterm birth. Research is beginning to establish the independent effects of perceived stress, objective stress, and the biology of stress, suggesting that several at least partially independent pathways might have been operating.

Adaptive Maternal and Fetal Programming

The evidence that prenatal adversity programs fetal physiology and affects subsequent infant, child, and adult phenotypes is well-established. The focus throughout this literature is strongly on the fetus: What impact does adversity in utero have on the fetus and how does this prepare it for a harsher postnatal environment (D. J. P. Barker, 1994)? A new area of research suggests that these events also program *maternal* physiology, potentially creating co-adaptation between maternal and offspring physiology. Another review by Sandman and colleagues (2012) highlighted animal and human evidence that the structure and function of the maternal brain is also programmed in response to stress during pregnancy and that these changes persist over time. They propose that changes in maternal stress reactivity, cognitive function, and the risk of psychopathology in response to endocrine changes throughout pregnancy prepare the mother for pregnancy, childbirth, and postnatal life.

In the general population, CRH levels have been associated with mental health disorders, particularly depression and anxiety (Risbrough & Stein, 2006). Extending this, Yim et al. (2010) examined the relation between placental CRH (pCRH) and postnatal depressive symptoms, finding that women with elevated pCRH levels at 25 weeks of pregnancy were more likely to develop depressive symptoms postnatally. This may be why problems during pregnancy, perceived lack of social support, anxiety, depression, stressful life events, and low levels of social support during pregnancy are closely associated with postnatal depression (Beck, 2001; O'Hara & Swain, 1996; Robertson, Grace, Wallington, & Stewart, 2004). Moreover, mothers suffering from postnatal depression reduce their investment in their new baby (for a review of the evidence, see Hagen, 1999). Thus, maternal stress during pregnancy may signal a risky or uncertain environment to which both the mother's and fetus's physiology respond (Sandman et al., 2012). This dual programming ultimately improves the fit between mother, infant, and environment. Since postnatal depression affects 10%–15% of new mothers (Hagen, 1999), this adaptive interpretation of maternal stress may have clinical significance.

In postnatal development, there is a remarkable synchrony between maternal behavior and neonatal sensory perception (e.g., Brazelton, Koslowski, & Main, 1974; Trevarthen, 2012; Tronick, 2007). During the long period of slow development that is human childhood, this ensures a coordinated mother–infant relationship and transduction

of social environmental cues via attachment relationships, among other systems (Chisholm, 1999a). Ultimately, these “synchronized capabilities” translate to the improved probability of survival and fitness benefits for the mother and infant (Simpson & Belsky, 2008). Therefore, it makes sense that the mother's, not only the fetus's, behavior and physiology are adapted to the environment they share. Future research must examine the interaction between cues in different life stages, as well as transgenerationally, as it is likely the best fit between an organism and its ecology is affected by many environmental cues across different time frames (Nettle et al., 2013).

Childhood Psychosocial Stress: A New Predictor of Maternal Environment

The critical influence of childhood experience on subsequent growth, development, and adult health and behavior is central to many disciplines, including evolutionary ecology (C. J. K. Henry & Ulijaszek, 1996), evolutionary psychology (Belsky et al., 1991), ethology (Bateson & Martin, 1999, 2013), developmental health (Keating & Hertzman, 1999), developmental psychology (Repetti et al., 2002), and epidemiology (Kuh & Ben-Shlomo, 1997). In humans, as with other species (Meaney & Szyf, 2005), the parental environment and parenting behavior have a particularly strong influence on both physical and mental development.

Life history theory predicts that the flow of resources to the fetus (parental investment) during pregnancy will vary according to the mother's developmental environment, her reproductive strategy, her currently available material and social-emotional resources, and those likely to be available in the future (Chisholm, 1993, 1999b; Chisholm & Coall, 2008; Coall & Chisholm, 2003; Ellison, 2005; Gluckman, Hanson, & Beedle, 2007; Jones, 2005; Kuzawa, 2007; R. S. Walker et al., 2006; Wells, 2003; Worthman, 1999; Worthman & Kuzara, 2005). Evidence is beginning to emerge, however, that the developmental trajectories entrained by early stress may reduce the maternal allocation of resources to the fetus during pregnancy, thus limiting fetal development and increasing the risk of poor health outcomes (Coall & Chisholm, 2003, 2010).

Research with the Adverse Childhood Experiences (ACE) Study demonstrates that early stress is associated with higher adult disease and mortality rates (Anda et al., 1999; Felitti et al., 1998). After adjustment for age, race, gender, and education, adverse childhood experiences

(e.g., sexual abuse, domestic violence, imprisonment of a family member) are risk factors for adult diseases such as severe obesity, smoking, physical inactivity, and poor self-rated health. Compared to those with none, individuals who experienced four or more adverse experiences are significantly more likely to develop diseases such as ischemic heart disease, stroke, diabetes, cancer, and chronic bronchitis (Felitti et al., 1998). Moreover, these results have been replicated in four birth cohorts from 1900 to 1978 (Dube, Anda, Felitti, Edwards, & Williamson, 2002) with the risk increasing in a dose-dependent manner in association with the number of childhood stressors experienced (Felitti et al., 1998).

But although there is convincing (albeit retrospective) evidence that the number of adverse childhood experiences predicts increased adult mortality rates, some early stressors seem to matter more than others. This is probably because they reflect or are symptomatic of a child's generally risky or uncertain family environment. In particular, childhood sexual, emotional, or physical abuse and witnessing physical violence between parents tend to be associated with other adverse experiences during childhood (Dube et al., 2002; Gladstone, Parker, Wilhelm, Mitchell, & Austen, 1999). For example, although witnessing parental violence is associated with higher levels of psychological distress and lower levels of social adjustment in adulthood, this association is mediated by the amount of parental care and warmth experienced (Henning, Leitenberg, Coffey, Bennett, & Jankowski, 1997; Henning, Leitenberg, Coffey, Turner, & Bennett, 1996). Moreover, individuals who experience adverse childhood events appear to have more negative life events and experience more anxiety and depression during pregnancy (Benedict, Paine, Paine, Brandt, & Stallings, 1999; Grimstad & Schei, 1999). Efforts to explore the association between early stress, stress during pregnancy, and pregnancy outcomes might thus benefit from better measures of the overall tone or quality of the family environment.

The early psychosocial environment may also affect fetal development via maternal body composition. Psychosocial stressors such as neglect, abuse, and unsupportive home environments have been associated with childhood obesity (Strauss, 1999) and rapid weight gain during childhood. In a study of 5,399 Swedish schoolchildren (2,661 girls), girls with the most rapid weight gain between 7 and 10 years of age also had the highest prevalence of social, behavioral, and learning problems (Mellbin & Vuille, 1989). In a study of 756 Danish school

children, those who were perceived by their teachers to receive little parental support had higher rates of obesity and were 7 times more likely to be obese at 20 years of age (Lissau & Sorensen, 1994). Thus, early stress may ultimately influence fetal growth through its impact on childhood weight gain and subsequently, maternal body composition during pregnancy.

Whether the process is via chronic stress or increased weight gain, it is likely that these childhood experiences are embodied (Chisholm, Burbank, Coall, & Gemmatti, 2005; Hertzman, 1999; Hertzman, Power, Matthews, & Manor, 2001; Krieger, 2001) in the form of altered stress reactivity (Bremner et al., 2003). Consistent with this evolutionary synthesis, increased stress reactivity is associated with lower birth weight (Clark et al., 1996; Ward et al., 2004), lower parental responsiveness (Haley & Stansbury, 2003; Repetti et al., 2002), earlier menarche (Boyce & Ellis, 2005; Ellis, 2004), and earlier first sexual intercourse (Brody, 2002). The resultant increased levels of glucocorticoids can reduce insulin sensitivity and increase fat deposition (Brindley & Rolland, 1989; Tsigos & Chrousos, 2002). Furthermore, studies have identified psychosocial stress as a risk factor for developing the metabolic syndrome in childhood, adolescence, and adulthood (Eisenmann, 2003; Hjemsdal, 2002; Rosmond, 2005). Therefore, via the actions of stress hormones, childhood psychosocial stress may be associated with weight gain throughout the life span and an increased risk of adult diseases, which in turn are associated with reduced fetal growth in the next generation (Lawlor, Smith, & Ebrahim, 2003).

Predictive Adaptive Responses

Above, we referred only in passing to the concept of predictive adaptive responses (PARs) because it deserves its own special discussion. The concept needs clarification and analysis because it has different names in different fields, its meaning is not always made clear, and there are different ways of interpreting the concept. These are significant issues because PARs could have critical implications for understanding and reducing the prenatal origins of health and disease. As commonly understood, a PAR (in the context of this chapter) is a developmental response by the fetus to a uterine environmental cue such that—if it uses this cue to correctly anticipate or “predict” the future environment—the developmental response will

be evolutionarily adaptive in its postnatal environment. Otherwise, if the fetal response does not correctly predict the postnatal environment, whether because the signal was not reliable or the environment changed, there will be a maladaptive mismatch between the developmental calibration and postnatal environment (Gluckman, Hanson, & Spencer, 2005; Godfrey, Lillycrop, Burdge, Gluckman, & Hanson, 2007).

PARs have stimulated extensive discussion and analysis about what information from its prenatal environment the fetus extracts and responds to. This discussion has provided great stimulus to the field, but is currently unresolved. As we have emphasized throughout this chapter, the fetal environment does not purely comprise information from the current environment but from the mother's current and developmental environments, her mother's and her grandmothers' developmental environments, and so on. Therefore, the question arises: How well can we expect 9 months of pregnancy to predict the child and adult environments of the future (e.g., Jones, 2005; Kuzawa, 2005; Worthman & Kuzara, 2005)?

Alternative (although not mutually exclusive) models of how adverse prenatal environments affect development and postnatal health have emerged. In their original form, PARs supposedly prepare organisms for future environments and provide "weather forecasts" via "fetal programming." However, as was discussed in the context of life history theory above, under harsh environments the first priority is to survive. In light of this, various models portray physiological changes during pregnancy as "making the best of a bad start" (e.g., Jones, 2005). This is a form of downside risk protection. An individual born into an adverse environment must change his or her physiology to ensure survival and avoid lineage extinction rather than to "predict" a future environment that may never exist (Chisholm & Coall, 2008). Still other models see early adversity as a detrimental disruption no matter what its environment is like. These models are often referred to as "silver spoon" (the converse as "leaden/wooden spoon") models (Grafen, 1988) and suggest that there is a lifelong fitness advantage or disadvantage associated with the early environments that individuals embody. Throughout this chapter, these different PAR models have been discussed in specific examples. At present, attempts to test the different predictions are underway, with some support for the silver versus leaden spoon model reported (Hayward & Lummaa, 2013). It is important to recognize that these models currently ignore the competing demands of the

mother and fetus. Thus the application of parent–offspring conflict theory to understanding the adaptive functions of prenatal environment may also be a fruitful area of research (Del Giudice, 2012; Gangestad, Caldwell Hooper, & Eaton, 2012).

Attempts to rationalize the PAR models into manageable categories are underway (Monaghan, 2008; Nettle et al., 2013; Wells, 2012) but consensus is some way off. Some useful results have come from comparing the "weather forecasting" and "leaden spoon" PAR models. Nettle et al. (2013) concluded that their model predicted that (a) developmental plasticity would evolve to receive information from the maximum number of environmental cues available (especially if the cues were not highly reliable) and (b) the reliability of cues from year to year would need to be exceptionally reliable to have adaptive value across an individual's reproductive life span or even shorter durations. More empirical and theoretical work is needed to turn the promising field of PARs into strategies for interventions to reduce the prenatal origins of health and disease. We are currently at the threshold of an exciting area of research.

CONCLUSION

In this chapter, we have tried to make two overarching points: (1) The study of prenatal influences is no longer a "gray area" of modern science because (2) evolutionary theory—our only scientific theory of life (and development)—provides the "bio-logical" basis for coordinating the multidisciplinary evidence for prenatal influences and making sense of the patterns that emerge. We have endeavored to present a truly interdisciplinary perspective within an evolutionary, life history theory framework. Maternal stress, nutrition, and exposure to toxins all provide crucial information to the fetus regarding characteristics of the maternal environment about the harshness of their environment, the abundance of resources, contamination of the environment, and the disease load. This provides the developing organism with a guide to the behavioral and physiological strategy it must pursue to increase its chances of survival and reproduction in the new postnatal environment. When this adjustment is made during sensitive periods of development, such as prenatally, the short-term benefit of changes that ensure continued survival may be traded-off against the longer-term costs of lifelong and intergenerational health.

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CHAPTER 4

Psychoneuroendocrinology of Stress

Normative Development and Individual Differences

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CHAPTER OVERVIEW

Developmental psychology is rapidly becoming a neuropsychobiological field. No longer are we satisfied with documenting developmental trajectories of cognitions,

emotions, and social behaviors, nor are we satisfied with describing and theorizing about how children's transactions in the world influence development. To all of these still critical foci of developmental science, we have added goals of understanding how the genes we are born with, the experiences we have that overlay those genes with chemical marks that control their expression (epigenome), and the physiological responses in our brains and bodies all come together to write the story of our lives. Nowhere is the importance of a multilevel, multidisciplinary, genes-to-society perspective more apparent than in the study of stress and its role in development.

To be fair, the study of stress has always been a psychobiological field from the time Selye first used the term to refer to the body's response to threats to its viability (Selye, 1946). While Selye was focused on physical threats, it quickly became apparent that psychological threats were as potent and often more potent than physical damage to the body in activating stress responses (e.g., Dickerson & Kemeny, 2004). Nonetheless, in developmental psychology the study of the effects of stressful life conditions on children continued for many years as a purely psychological endeavor. An interest in biology and neurobiology entered this part of our field first from biological psychiatry and then in the then-emerging field of developmental psychopathology (see review, Gunnar & Vazquez, 2006). Temperament researchers also brought an interest in stress biology into the field somewhat indirectly through their interest in how mildly threatening events sorted children along a dimension of fearfulness or behavioral inhibition that was reflected in their autonomic and neuroendocrine reactions (e.g. Kagan, Reznick, & Snidman, 1987). However, it was the advent of noninvasive salivary assays for the key stress hormone cortisol that broadly opened the field to questions about the development and regulation of stress biology and how the biology of stress interacts with the child's genetic makeup and experiences to affect the development of our physical and psychological well-being (see review, Gunnar & Vazquez, 2006).

This chapter is about the state of the art in our understanding of the multilevel processes that are involved in how we deal with stressors, how these processes change with development, and how the activity of stress-mediating systems during childhood and adolescence affects our health and functioning. As discussed herein, there are multiple systems that mediate the impact of stress on development; however, the key system from a developmental perspective is the hypothalamic-pituitary-adrenocortical (HPA) system. The sympathetic-adrenomedullary (SAM)

system undergirds the fight-or-flight response to threats, but its catecholamine products, epinephrine and norepinephrine (NE) do not cross the blood brain barrier. In contrast, cortisol, the HPA's product, is a steroid hormone that acts in all parts of the body, with the brain being a primary target for its actions. Cortisol is a gene transcription factor, meaning that it changes the expression of numerous genes. It plays a major role in early development, and the genes it regulates are critical to neural plasticity. Thus, this neuroendocrine system is a developmentalist's dream: not so much a window on what a person is thinking and feeling but a door through which experiences get under the skin and affect development. It is for this reason that, although we discuss both the sympathetic and parasympathetic nervous systems, this chapter is focused on the HPA system. Sadly, readers will find that although it is a developmentalist's dream, it is also a researcher's nightmare because like any neuroendocrine system, the system rapidly adjusts to conditions that provoke its activation. Therefore, as is explained herein, stress is associated with both high and low levels of cortisol production.

In addition, although stress is often construed as something bad, stress is a ubiquitous part of life. Thankfully, not all children experience unpredictable, uncontrollable, chronic stress, which can be toxic to development, but many do and we need to understand individual differences in the impact of this type of stress in order to promote greater resilience and recovery for its victims. All children, however, experience stress as part of their everyday existence. From the impact of infections or cuts and abrasions, which trigger immune reactions that activate the HPA axis, to the threat of social exclusion, failing a test, or flubbing one's lines in a play, there are numerous opportunities in every child's life for stressors to affect development and the effects are often positive. Learning to cope with mild threats to our physical and social selves is an aspect of development that is critical for resilient functioning. As we have known for a long time, it is not so much the actual event as an individual's construal of the event that determines how stressors affect that individual (Lazarus & Folkman, 1984). As we learn to cope with mild to moderate threats, both our bodies and our psyches perceive threats as more manageable and thus we become more resilient to life's hassles and roadblocks. What the field is beginning to show is that multiple neurobiological systems interact with the stress system at different points to mediate the effect of stressors on stress vulnerability and resilience. Understanding how these systems interact is critical to appreciating the role of stress in human development.

The complexity of the neurobiology and psychobiology of stress dictated the choice of topics and construction of this chapter. Nearly 20% of the chapter is devoted to anatomy and physiology, including genetics. Although much of the description is not developmental, our emphasis reflects the critical importance of understanding the physiology of stress in order to use its study to decipher the effects of stress on development. After this we take up a very brief discussion of normative development. Understanding normative processes as they are revealed in relatively low-stress developmental contexts is critical to interpretation of effects of stress in high-stress developmental contexts. We then turn to a discussion of theory. Until recently, there has been no theory devoted to a developmental analysis of stress, although nondevelopmental theories have been applied to children and adolescents. We consider what is currently available and argue that what we have is not yet adequate. The bulk of the chapter is devoted to a key issue in the study of stress and human development. Specifically, what evidence do we have that adversity during children's development affects the neurobiology of stress and stress-induced mental and physical health outcomes through stress-mediating systems? As our discussion of temperament reveals, an equally important question is whether individual differences in temperament are critical moderators of the effects of stress on developmental trajectories. The discussions of both adversity and individual differences lead to the final section on whether vulnerability to mental disorders is reflected in and/or created by aberrant activity in stress-mediating systems.

Throughout this review we were challenged by the fact that the field of stress and development has burgeoned in the past decade. Furthermore, our review crosses multiple fields: genetics, neurobiology, developmental psychology, biological psychiatry, and developmental psychopathology. Given limited room for references, we were forced to only provide examples of relevant research, relying on reviews whenever we could. We have tried, whenever possible, to acknowledge at least one paper from each of the active laboratories in hopes that readers can then track down other important work from these laboratories. It is a sign of the robustness of this research area, however, that in the past decade publications on stress biology and development have moved from specialty journals into journals that rarely used to publish papers with biological measures other than perhaps heart rate. As more readers encounter work on the biology of stress, it is essential that they have a reasonably sophisticated understanding of that

biology. Thus, it is to the anatomy and physiology of stress that we now turn.

HYPOTHALAMIC-PITUITARY-ADRENAL ANATOMY AND PHYSIOLOGY

There are a number of reviews of HPA anatomy and physiology (e.g., Gunnar & Vazquez, 2006; Joëls & Baram, 2009; Levy & Tasker, 2012). Here, we briefly summarize.

The Hypothalamic-Pituitary-Adrenal Axis

Cortisol (CORT), a glucocorticoid hormone, is produced by the adrenal cortex following a signaling cascade initiated in the paraventricular nucleus (PVN) of the hypothalamus (see Figure 4.1). These cells release the neuropeptides corticotropin-releasing hormone (CRH) and arginine vasopressin. These releasing hormones travel to the anterior pituitary where they bind to corticotropin cells signaling the cleavage of a large pro-hormone into adrenocorticotrophic hormone (ACTH) and several endorphins and melanin-stimulating hormones. ACTH is then released into circulation and binds to receptors in the cortex of the adrenal gland, stimulating CORT production. Finally, CORT is secreted into the circulation, acting on its receptors throughout the body. The mature adrenal cortex consists of three regions: one producing aldosterone, a salt-water regulating hormone, one producing dehydroepiandrosterone (DHEA), an androgen with anabolic effects that increases in advance of puberty and also responds to ACTH, and the zone that produces CORT.

Mineralocorticoid Receptor and Glucocorticoid Receptor

Two receptor types, mineralo- and glucocorticoid receptors (MRs and GRs), bind CORT. CORT will bind first to MRs, unless, as is the case outside the brain, the MRs are protected from CORT by an enzyme barrier (11 β -HSD2) that converts CORT into an inert substance (Wyrwoll, Homes, & Seckl, 2011). GRs are occupied as MRs become less available or where they are not present to compete with GR. Throughout the brain, GRs become involved at the peak of the circadian cycle or during stress responses. GRs mediate the genomic stress actions of CORT, while MRs in the brain mediate basal genomic actions (see for review, Gunnar & Vazquez, 2006).

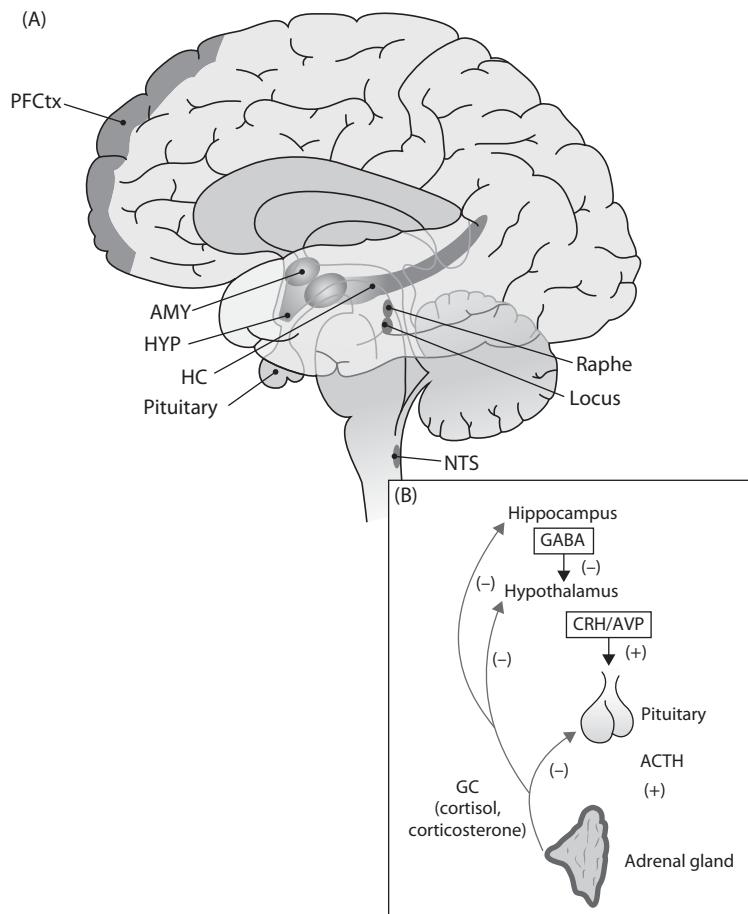


Figure 4.1 The HPA System. Panel A depicts the anatomy of the HPA system and structures important in its regulation. Panel B depicts the activation (+) and negative feedback inhibition (−) pathways of the HPA system.

Panel A: PFCtx = prefrontal cortex, AMY = amygdala, HYP = hypothalamus, HC = hippocampus, NTS = nucleus of the tractus solitarius.

Panel B: GCs = glucocorticoids (cortisol and corticosterone), GABA = gamma aminobutyric acid, CRH = corticotropin-releasing hormone, AVP = arginine vasopressin, ACTH = adrenocorticotrophic hormone.

Source: From “Stress Neurobiology and Developmental Psychopathology,” by M. R. Gunnar and D. M. Vazquez, 2006, in D. Cicchetti and D. J. Cohen (Eds.), *Developmental Psychopathology: Developmental Neuroscience* (2nd ed., pp. 533–577), Hoboken, NJ: Wiley. Reprinted with permission.

Once released into circulation 80%–90% of CORT becomes bound to cortisol-binding globulin, which prevents it from interacting with its receptors. The unbound CORT, being lipid soluble, enters freely into all cells of the body. In the cell’s cytoplasm, CORT binds to its receptors. Receptor binding is mediated by chaperones. Heat shock protein 90 (Hsp₉₀) facilitates CORT binding to its receptors, while a co-chaperone, FK506 binding protein 5 (FKBP5), decreases this affinity (Heim & Binder, 2012). As will be discussed, FKBP5 plays an important role in stress vulnerability and resilience. Once the hormone-receptor complex has been formed, it translocates to the nucleus where it interacts with glucocorticoid responsive elements to regulate gene transcription and protein synthesis.

The time from PVN-CRH stimulation to peak CORT levels in plasma is about 20–25 minutes and about 2 minutes longer for the transition to saliva. Genomic effects take minutes to hours and may last days. Thus, these genomic actions cannot be part of the fight-or-flight response. Indeed, a stress response of the HPA axis is generally considered to be essential to the later phases of coping with stress, rather than fight-or-flight, because it helps to increase energy for the long haul, reverse the effects of other stress mediators, and, through effects on neural systems, alter the organism’s responses to similar threats when they are next encountered (Sapolsky, Romero, & Munck, 2000).

The idea that CORT is not a part of fight-or-flight is now being qualified. It appears that CORT can produce

effects through rapid, nongenomic processes that take about 7 minutes to operate (Tasker & Herman, 2011). Nongenomic effects involve CORT receptors that with stress relocate to the cell membrane. These nongenomic mechanisms help explain fast negative feedback, which we have known for a while occurs before gene-mediated CORT effects could take effect. Nongenomic effects have so far have been noted in the PVN, pituitary, hippocampus, and amygdala. Several nongenomic mechanisms have been identified. One GR-mediated mechanism acts via the endocannabinoid system, and there is increasing evidence that this system plays a role in PVN-located negative feedback. In the amygdala, rapid CORT action operating through this system may contribute to the dampening of responses to repeated stressors (Hill & McEwen, 2010). It appears that many of CORT's nongenomic actions are permissive. That is, operating through these mechanisms, CORT supports and enhances the metabolic, cognitive, and/or emotional processes being used to manage threat.

Corticotropin-Releasing Hormone

CRH is not produced only in the PVN, but also in other brain regions, most prominently the central nucleus of the amygdala (Kovács, 2013). CRH operates by binding to two G-protein coupled receptors (CRHR1 and CHRR2) that are located in different brain regions and have opposing functions. CRHR1 mediates many of the behavioral, hormonal, and autonomic effects of stress. Outside the HPA axis, receptors for CRH (e.g., CRHR1) are located in the basolateral and medial nuclei of the amygdala, prefrontal cortex, hippocampus, cerebellum, and in the reticular formation. CRHR1 antagonists markedly reduce fear and thus are targets for drug treatment. Critically, while CORT acting in the PVN downregulates CRH, in the amygdala chronic elevations in CORT upregulates CRH, increasing fear behavior.

Diurnal Rhythm

CORT is released once per hour in pulses throughout the day. In diurnal animals, the largest pulses are in the early morning hours and smallest at the onset of nighttime sleep. Thus, CORT is high at awakening and near zero 30 minutes after nighttime sleep onset. Imposed on this rhythm is a surge in CORT 30–40 minutes after awakening, the CORT awakening response (CAR) (Fries, Dettenborn, & Kirschbaum, 2009). A robust rhythm of the HPA axis requires near zero levels of CORT around the nadir of

the rhythm. Thus, a common stress signature is slightly elevated late afternoon and evening CORT levels with suppressed early morning levels. The normal CORT diurnal rhythm is regulated by the circadian CLOCK system, (e.g., Kino & Chrousos, 2011), while circadian CORT variation also serves as a peripheral clock that synchronizes other systems including the hepatic, circulatory, and respiratory systems. Consequently, a dysregulated CORT rhythm impairs the functioning of other critical systems.

Stress Response

In the face of threat we mount stress responses to cope and survive. Stress responses are stressor specific (Joëls & Baram, 2009); however, stressors can be grouped into two broad classes. Systemic stressors (e.g., blood volume loss, infection, heat and cold stress) can activate the HPA axis even in a comatose organism. Psychogenic stressors require forebrain processing and elaboration. Activation to psychogenic stressors involves the central nucleus of the amygdala. From the central nucleus of the amygdala, the pathway to HPA activation crosses several synapses and involves the bed nucleus of the stria terminalis. Signals then converge on the PVN to release CRH (Ulrich-Lai & Herman, 2009). Fear of bodily harm and death are highly potent triggers of the HPA response; however, in humans, threats to the social self, particularly if combined with lack of predictability and control, are also powerful activators of the HPA axis and other stress-mediating systems (Dickerson & Kemeny, 2004). The field's most reliable laboratory stressor task is the Trier Social Stress Test (TSST), which threatens the social self through combining public speaking and mental arithmetic while being filmed and judged by a panel (Kirschbaum, Pirke, & Hellhammer, 1993). There is a version for children and now several versions that do not require the large cast of experimenters (e.g., Yim, Quas, Cahill, & Hayakawa, 2010). The TSST can be used with children as young as 7, but becomes more reliable as children get older. Stressor tasks for younger children are more challenging to find and are affected by the child's relationship with the parent who accompanies them to the laboratory (Gunnar, Talge, & Herrera, 2009).

Feedback Mechanisms

CORT controls its own levels through negative feedback via GRs in the pituitary, hypothalamus, hippocampus, and medial PFC (mPFC) (Tasker & Herman, 2011). Mediated by GABA_A receptors, GABA-producing cells surround the

PVN and provide tonic inhibition of the HPA axis. Chronic stress leads to significant downregulation of GABA-ergic synaptic input to the PVN, thus reducing the tonic brake on the system. Regulation of CORT by its own production (i.e., negative feedback) operates on several time scales (Joëls & Baram, 2009). Fast negative feedback occurs within minutes, and in the PVN involves the endocannabinoid system. In the CA1 region of the hippocampus, negative feedback involves cell-membrane MR. Negative feedback that involves genomic mechanisms is slower but critical to HPA regulation. This type of negative feedback involves the hippocampus and mPFC and is mediated by GR. Negative feedback is itself subject to regulation. In response to chronic stress, GR expression is reduced in the hippocampus and mPFC, which reduces negative feedback regulation, but also prevents GR-mediated effects on these brain regions, which can be damaging if prolonged.

Current Methods and Methodological Issues

In this section we focus on the two methods that are the most relevant for research on children and adolescents: salivary and hair cortisol. There are a number of recommended methodological reviews for salivary cortisol (Granger et al., 2007; Gunnar & Talge, 2007; Kudielka, Gierens, Hellhammer, Wüst, & Schlotz, 2012). Numerous substances need to be controlled or avoided in assessing the HPA axis, some general to any mode of sampling, others specific to saliva. Milk in the mouth is a problem somewhat particular to child studies. Milk contains cortisol so samples contaminated by milk tend to have elevated scores (Gunnar & Talge, 2007). Avoiding dairy products within 30 minutes of sampling, rinsing the mouth, and waiting 5 minutes is advised. Medication use is another problem for researchers, especially those studying children at risk for psychopathology. If possible, drug washout periods are advised, but this is not always possible or even advisable for children with serious emotional and behavioral problems. There are various pathways through which drugs affect the HPA system and at least one paper describes a template for using this information and statistical controls to minimize impact on the data (Granger, Hibel, Fortunato, & Kapelewski, 2009). There are challenges with the collection matrix, with passive drool being preferred but not always possible with infants and young children. When swabs are used, those made of synthetic substances are preferred. These have recently become available and are marketed for use in collection. For children, motivating them to mouth these swabs can be challenging.

Several laboratories have found that using small amounts of sweetened drink mix crystals with the swab to get the sweet taste works well. However, depending on what is in the crystals this can lower the pH of the saliva and affect assay dynamics. The solution is to use only a few grains, which have no measurable effects (Gunnar & Talge, 2007).

While cortisol is a stable molecule, it does break down over months and years even in very cold storage and does so more in some samples than others (Kudielka et al., 2012). In a longitudinal study, one would want to avoid shifting levels as assays shift antibody lots, but it is best to assay about every 6 to 12 months.

Timing is critical to any study of the HPA axis. Laboratory tests should take place at the same time for all participants. While late afternoon and evening times are preferred because the axis is more quiescent and elevations are easier to detect, this is unrealistic in studies of infants and young children. Testing all at the same time of day or in time blocks that can be used in the analysis is essential, however. Making sure that time since napping and/or morning awakening is entered into the analysis protocol is also important. A different problem, compliance to protocol, arises when parents take samples at home. Significant numbers of parents misreport when they sample, a problem that is worse for early morning sampling relative to when children are awake (V. C. Smith & Dougherty, 2014). Errors in timing in the early morning result in reports of absent or blunted CARs, which are inaccurate. Use of objective “track cap” monitoring where sampling materials are stored in a device that tracks the time the cap is opened is strongly advised. Recently, despite numerous studies showing that infants and young children lack a CAR, we now know from a study using actigraphy and track caps that the CAR is robust from as early as 2 weeks postnatal (Stalder et al., 2013).

Many times we are less interested in the momentary activity and regulation of the axis than in an overall cortisol production. In these instances, what is needed is a reliable integrated measure of cortisol production. Sometimes what we need is information on cortisol production prior to the onset of our study. We may need a measure of how the axis responded to an unpredictable stressful event that was the reason for the study, but happened before any data were collected. In the last decade, researchers have begun to examine cortisol levels in hair to obtain this type of integrated measure that can serve as a calendar of cortisol production over the past months and is free from problems of protocol adherence (Stalder & Kirschbaum, 2012).

While it is still not clear how cortisol gets into hair, hair serves as a reservoir of cortisol and other chemicals and

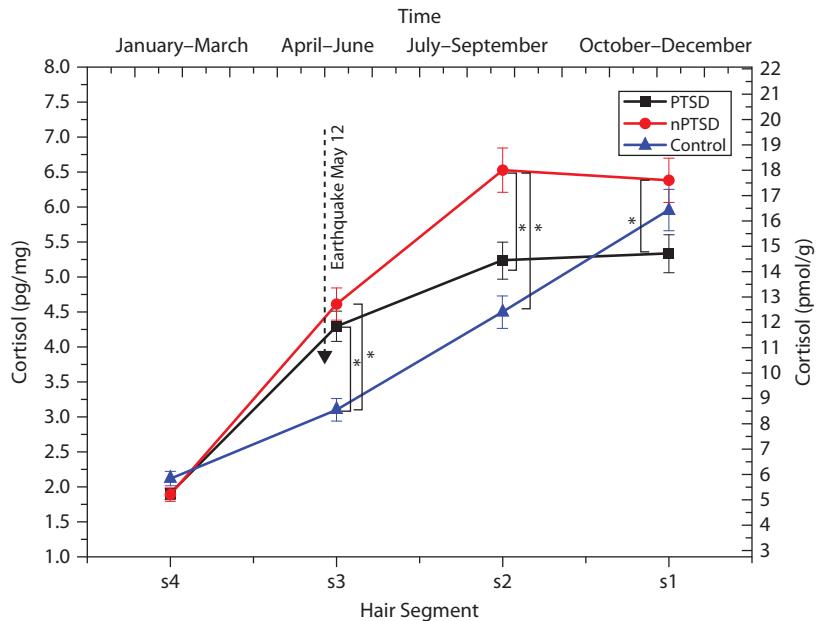


Figure 4.2 Hair cortisol levels in 64 adolescent girls following the Wenchuan earthquake on May 12, 2008.

Cortisol levels in 3-cm hair segments reflect time after and before the earthquake: S1 = 5 to 7 months, S2 = 2 to 4 months, S3 = 2 months before to 1 month after, and S4 = 3 months before the earthquake. The girls were divided into those who developed PTSD ($n = 32$), those who did not (nPTSD, $n = 320$), and nontraumatized controls ($n = 20$). These data show the utility of hair cortisol as a calendar for analyzing the effects of a traumatic event as well as the “washout” effect.

Source: From “Hair Cortisol Level as a Biomarker for Altered Hypothalamic-Pituitary-Adrenal Activity in Female Adolescents With Posttraumatic Stress Disorder After the 2008 Wenchuan Earthquake,” by H. Luo et al., 2012, *Biological Psychiatry*, 72, pp. 65–69.

hormones. Hair grows at roughly 1 cm/month, although there may be age and race differences in rates of hair growth. Counting back 1 cm from the scalp, hair provides a calendar. There are challenges to hair sampling, especially washout, or the decrease in cortisol from scalp to ends of the hair, which is possibly due to hair near the tips being washed more times than hair near the scalp. Both washout and the utility of hair sampling can be seen in Figure 4.2, which shows levels of hair cortisol in female adolescents from two towns who experienced the Wenchuan earthquake in 2008 (Luo et al., 2012). The far right side represents cortisol levels in the past month while the far left side represents levels 1 year before.

Examining cortisol levels in the controls, a washout effect is apparent. However, even with the washout, a strong effect of the earthquake is apparent as is the blunting of cortisol production among girls who developed PTSD. There is evidence that the washout effect may be avoided by changing the way the hair sample is processed (i.e., avoiding isopropanol) as washout may not be due to hair washing as much as to more damaged, older hair being open to the cortisol-leeching effects of isopropanol (Stalder & Kirschbaum, 2012). However, control groups are advised.

NEURO-SYMPHONY OF STRESS— HYPOTHALAMIC-PITUITARY-ADRENAL INTERACTIONS WITH OTHER STRESS MEDIATORS

CORT and CRH do not act alone. There are a number of stress mediators. These mediators all interact in what has been appropriately described as a “neuro-symphony of stress” (Joëls & Baram, 2009). Their interactions vary as a function of the type, duration, and characteristics of the stressor, the developmental stage of the organism, and characteristics unique to the individual, such as genetic background. These stress mediators execute essential functions in their own spatial and temporal niches. Overlap in these niches allows for interactions between them and studies describe direct interactions among individual mediators. We consider some of these other stress mediators next.

Sympathetic-Adrenomedullary and Parasympathetic Nervous System

The sympathetic adrenomedullary (SAM) system is the peripheral effector of the fight-or-flight response and is

critical to our ability to cope with threat. Milliseconds after the perception of threat, preganglionic sympathetic nerves in the spinal cord leading to end-organs are activated; the most important of these for the fight-or-flight response is the adrenal medulla with its production of epinephrine (Ulrich-Lai & Herman, 2009). Epinephrine (E) from the adrenal medulla travels throughout the body to have widespread effects on cardiovascular activity, blood pressure, and energy metabolism. These effects are enhanced by norepinephrine (NE) released from nerve terminals. E and NE effects are fast and short-lived. The half-life of E is 2 minutes. E and NE produced in the periphery do not enter the brain, but NE is produced in the central nervous system, often in coordination with increases in the periphery.

The SAM system is the hormonal component of the sympathetic nervous system (SNS), which, in turn, is one arm of the autonomic nervous system that serves many functions beyond fight-or-flight (ANS; McCorry, 2007). It supports arousal and attention in the central nervous system; thus we see increases in activity mediated by the ANS (i.e., heart rate, blood pressure) on effortful tasks, even if they do not threaten our social or physical selves. For example, effortful tasks like the Stroop or Mirror Drawing increase ANS activity but typically do not increase activity of the HPA axis, nor do they usually increase the production of E from the adrenal medulla. Rather they increase arousal through the release of NE from sympathetic nerve terminals and the production of NE in the brain from the locus coeruleus. These and other effortful cognitive tasks are *not* good tasks if the goal is to produce a fight-or-flight response of the SAM system and activation of the HPA axis.

There are numerous ways to measure activity in the SAM system. Galvanic skin response assesses peripheral NE activity. Salivary alpha amylase measures an enzyme regulated by NE and parasympathetic regulation of saliva flow. Finally, pre-ejection period (PEP), measured by impedance cardiography, is a relatively pure index of E produced from the adrenal gland.

The parasympathetic nervous system (PNS) plays a critical role in stress by helping to restore the conditions under which the body can rest and repair (Porges, 2009). The SAM system is organized for mass action, while the PNS is more targeted. The existence of both afferent and efferent projections from the brain also means that the PNS provides important information about the state of the body. Information travels to the brain along the nucleus tractus solitarius (NTS), which has inputs into the amygdala and

neural systems involved in threat perception and response. Much of the focus on PNS innervation in relation to stress and emotion has focused on the activity of the 10th cranial, or vagus, nerve. The myelinated vagus provides tonic inhibitory input to the heart over the sinoatrial node (the heart's main pacemaker). Decreases in vagal input increase heart rate by *lifting the vagal brake*. Vagal tone is measured as respiratory sinus arrhythmia (RSA) or the variation in heart rate surrounding respiration. Changes in heart rate in response to negative emotional tasks in children are primarily due to changes in vagal tone rather than changes in sympathetic activity.

Central Norepinephrine

Because the enzyme that converts NE to E is present primarily in the adrenal medulla, there is little E in the brain. E and NE produced by the periphery do not enter the brain, although they affect the brain via the NTS (Porges, 2009). Instead, NE in the brain is produced principally by the locus coeruleus (LC) in the brainstem (Benarroch, 2009). Like the peripheral SAM system, the central NE system has many functions in arousal, attention, learning, and emotions. Like CRH, NE also mediates fear behaviors. Another critical role of the central NE system during stress is the formation of emotional memories that can alter future behavior (Roozendaal & McGaugh, 2011). NE acting in the basolateral amygdala (BLA) is essential for the consolidation of emotional memories, and these NE effects require the presence of CORT. Increasing CORT in the BLA during stress through both rapid nongenomic and slower genomic mechanisms enhances the effects of NE. In addition, CORT acting via GR located in the NTS increases NTS NE signals to the BLA, further enhancing the consolidation of emotional memories. These effects have been shown in children, adolescents, and adults where individuals who showed both a large CORT and PEP (adrenal E) response to the TSST had better free-recall of the experience during a pop quiz 2 weeks later than did those who showed less of a CORT response and/or no PEP response (Quas, Yim, Rush, & Sumaroka, 2012). It should be noted that, in contrast to memory consolidation, elevated CORT impairs memory retrieval.

Dopamine

Dopamine (DA) is a major catecholamine neurotransmitter produced in several brain regions, including the ventral tegmental area, which projects to the nucleus accumbens

and PFC. Increases in CORT stimulate production of dopamine through GR receptors. During stress, activation of the ventral tegmental area by CORT results in excessive DA release into the PFC, leading to overstimulation of D1 receptors and impairments in working memory and other executive functions (Shansky & Lipps, 2013). Via GR in the PFC, CORT blocks catecholamine transporters located on glia, impairing their maintenance of DA and NE needed to support PFC-mediated learning, reasoning, and working memory. Via GRs in the PFC, CORT also alters DA cell firing rates. These mechanisms help explain the effect that stress has on self-regulation.

In addition, via interactions with DA, CORT affects activity of the nucleus accumbens allowing stress to modulate the circuits involved in reward (Mora, Segovia, Del Arco, de Blas, & Garrido, 2012). Through GR-mediated genomic mechanisms and membrane nongenomic pathways, rising levels of CORT during the initial phases of the stress response enhance dopamine activity in the accumbens. The behavioral effects of these increasing DA levels are dependent on interaction of the nucleus accumbens with the PFC. There is also evidence that the strengthening of glutamate synapses within the ventral tegmental area is dependent on CORT acting through GRs (Mora et al., 2012). Finally, chronic stress remodels and can impair the reward system, increasing susceptibility to addiction, and these changes involve CORT actions operating through GR.

Serotonin

Serotonin, a biogenic monoamine, plays a critical role in HPA activity. Serotonin is produced in the midbrain raphe nucleus, and one site for its terminals is the PVN, where it induces CRH expression (Chen & Miller, 2012). During development, serotonin is part of the biological pathway that decreases methylation of the GR gene in the hippocampus (Zhang, Labonté, Wen, Turecki, & Meaney, 2013). In turn, during stress, CRH and CORT modulate the synthesis and turnover of serotonin in the raphe (Chen & Miller, 2012).

Oxytocin

Oxytocin (OT) has been identified as a potential mediator of the ability of social support to buffer HPA reactivity. During stress, OT is released from cells in the PVN and from the central nucleus of the amygdala (A. S. Smith & Wang, 2012). Animal studies involving intraventric-

ular administration of OT or human studies involving intranasal administration show reduced anxiety and HPA responses, as well as decreased heart rate and blood pressure responses to stressors. In children, having direct or even phone contact with mothers after the TSST elevated OT and lowered CORT (Seltzer, Ziegler, & Pollak, 2010). Early deprivation of parental care in monkeys impairs the development of the OT system and may reduce the animals' ability to use social support to regulate stress (Winslow, 2005).

Brain-Derived Neurotrophic Factor

Stress remodels the brain and one way this happens is the complex cross-talk between CORT and brain-derived neurotrophic factor (BDNF; Gray, Milner, & McEwen, 2013). BDNF is a neurotrophin that helps regulate nerve cell proliferation, differentiation, survival, and synaptic plasticity. Basal levels of CORT have neurotrophic/neuroprotective effects, enhancing BDNF activity through increasing levels of its receptor, TrkB. During stress, the relation between CORT and BDNF is dependent on timing, levels, and duration of CORT elevations and differs by brain region. In the hippocampus, there is some suggestion that increasing levels of CORT may facilitate BDNF expression until, at some point, excessive levels or levels that are elevated for too long suppress BDNF. Importantly, in the hippocampus, chronic stress produces hippocampal atrophy (which is reversible). Effects of stress in the basolateral amygdala are the opposite of those in the hippocampus and do not appear to reverse during recovery. In the basolateral amygdala, CORT induces increases in BDNF that, in turn, increase dendritic branching and spine density. Some of these effects on amygdalar BDNF are mediated by rapid, nongenomic mechanisms.

Immune System

There is a growing literature on the interaction between the HPA axis and the immune system, particularly with regard to explanations of early life stress and later life health (G. E. Miller, Chen, & Parker, 2011). These interactions are multiple and change across time following an acute stressor. Inflammatory immune cytokines activate the HPA axis, induce fever, and act in the brain to induce withdrawal and depression-like symptoms (e.g., sickness behavior). Elevated CORT and E/NE increase cytokines that have anti-inflammatory effects. Indeed, anti-inflammatory actions are a critical function of CORT.

However, both hyperactivity and hypoactivity of the HPA axis, through different mechanisms, are associated with chronic increases in inflammation and impairments in wound healing. Chronic elevations in CORT may down-regulate GR and produce glucocorticoid resistance, while chronic suppression of CORT levels may fail to restrain inflammatory responses. Stress effects on inflammatory cytokines are believed to be one pathway through which adversity increases the risk of affective disorders.

HERITABILITY AND GENETICS

There are marked individual differences in reactions to stressors. This has led to an interest in heritability of stress reactivity and a search for the polymorphisms that, in interaction with experience, contribute to individual differences in stress reactivity and regulation.

Heritability

Although early heritability studies of the HPA axis were marked by considerable methodological limitations (Barthels, van den Berg, Sluyter, Boomsma, & de Geus, 2003), studies with appropriate sample sizes have begun to reveal the genetic underpinnings of both basal and stress regulation of the HPA axis. In adults, CORT levels shortly after waking show heritability estimates ranging from .34 to .69, whereas later in the day heritability estimates are lower to negligible. One interpretation of these findings is that reactions to experiences during each day mask the trait component of CORT production. This is consistent with evidence that heritability appears high in adults at all points in the cycle when CORT is assessed under laboratory conditions, but are much lower when samples are collected at home (Franz et al., 2010). Using statistical techniques that allow isolation of the trait component should reveal heritability as was shown in a large twin study of children (Van Hulle, Shirtcliff, Lemery-Chalfant, & Goldsmith, 2012). However, even using these techniques, the highest heritability estimates were found for samples taken 30 minutes after waking, and the diurnal rhythm itself showed heritability. For practical purposes, these findings suggest that the CAR may be a particularly useful tool for researchers interested in probing the HPA axis with candidate gene studies.

All studies mentioned above used individuals from low-risk backgrounds. Recently, researchers have examined the effects of adversity on heritability. For example,

among 19-month-old twins, the heritability of HPA reactivity to novel stressors was lower among children reared under high-risk conditions for whom shared environment accounted for considerable variance, while heritability was relatively high among children reared under low-risk conditions (Ouellet-Morin et al., 2008). The utility of heritability studies is limited by their treatment of genetic and environmental factors as independent forces. In order to explore actions of particular genes or sets of genes within an environmental context, molecular genetics studies are necessary.

Molecular Genetics

Multiple genes regulate the HPA axis and its effects. Information about polymorphisms in these genes not only allows for examination of their effect on the axis, but also provides information about behavioral and health characteristics that are mediated by activity of CORT and CRH. Following is a discussion of some genes that appear promising. In some instances, researchers have focused on associations or interactions with individual single nucleotide polymorphisms (SNPs), but other research is considering the influence of haplotypes, or several variants in linkage disequilibrium that are inherited simultaneously.

Corticotropin-Releasing Hormone Receptor 1 (CRHR1)

There are a number of SNPs in the CRHR1 gene. Male carriers of GG genotype of rs110402 and rs242924 SNPs with a history of moderate to severe maltreatment demonstrated significantly higher plasma CORT in response to a DEX/CRH test while A-allele carrier females were the ones to produce larger CORT responses (Heim et al., 2009). (Note that the DEX/CRH test is considered a more sensitive and reliable pharmacological measure of the reactivity of the HPA axis than is obtained by simply administering CRH.) Sex differences in the type of abuse experienced make it difficult to interpret these findings. Measured during childhood, maltreated children homozygous for the TAT haplotype demonstrated significant flattening of the diurnal slope (which appeared to be driven by lower morning CORT levels) compared with children carrying at least one other allele (Cicchetti, Rogosch, & Oshri, 2011). Finally, several CRHR1 haplotypes were found to moderate CORT reactivity in preschoolers and more critically, these haplotypes interacted with other genes in the CRH system, highlighting the complex polygenic underpinnings of HPA reactivity (Sheikh, Kryski, Smith, Hayden, & Singh, 2013).

Given CRHR1 moderation of maltreatment effects on the HPA axis, researchers have also examined whether similar moderation is observed for depression. Particularly pertinent to this review, the CRHR1 TAT haplotype, consisting of SNPs rs7209436, rs110402, and rs242924, has been shown to significantly moderate the effect of childhood maltreatment on the development of depression in adulthood. Findings with the TAT haplotype, maltreatment, and depression, however, have been variable (e.g., Ressler et al., 2010).

Glucocorticoid Receptor (NR3C1)

Multiple polymorphisms in the GR gene have been investigated; only two are discussed here (for review, see Spijker & van Rossum, 2009). The ER22/23EK variant refers to G to A nucleotide changes in two SNPs (rs6189 and rs6190) in codons 22 and 23. This allele is associated with glucocorticoid resistance in response to dexamethasone, a synthetic CORT, but it has not been consistently demonstrated that this allele affects CORT secretion in response to a psychosocial stressor. The minor allele of the BclI variant (rs41423247) represents a C to G transformation that is associated with increased sensitivity to CORT (Spijker & van Rossum, 2009). Minor allele carriers show increased suppression of plasma CORT following administration of DEX and males show decreased HPA-axis responsivity following the TSST. The minor BclI allele may also increase children's susceptibility to maternal psychopathology as assessed using prenatal measures of psychopathology and child behavior at 14 and 36 months of age (Velders et al., 2012). The relatively high frequency of the minor allele (roughly 30%) makes this polymorphism of particular interest.

FKBP5

As noted, as part of the chaperone complex, FKBP5 acts to reduce the affinity of CORT for GR. Increases in CORT stimulate increases in FKBP5, which then decrease the ease with which CORT binds to GR, allowing a short-loop negative feedback mechanism. SNPs in this gene appear to confer differences in induction of FKBP5 in response to elevated CORT and GR activation, and subsequent GR resistance or sensitivity (as reviewed in Heim & Binder, 2012). In healthy adults, individuals homozygous for the T allele of rs1360780 exhibit significantly lower peripheral FKBP5 expression, and several SNPs (rs3800373, rs1360780, and rs4713916) have yielded evidence of exaggerated CORT response even in infants for individuals with at least one copy of the minor allele (Heim & Binder, 2012).

Associated Neurotransmitter Polymorphisms

As described above, the DA, central NE, and serotonin systems all interact bidirectionally with the HPA axis and CRH; thus, not surprisingly, genetic polymorphisms in genes that regulate these systems interact with the axis and CRH as well. For example, a meta-analysis reveals that homozygosity for the gene variant that produces the short version of the serotonin transporter gene (5-HTTLPR) reduces transcriptional efficiency of that gene and increases the CORT response to psychosocial stress (R. Miller, Wankerl, Stalder, Kirschbaum, & Alexander, 2012). Functional variants of the monoamine oxidase (MAOA) and catechol-o-methyltransferase (COMT) genes also affect CORT reactivity via their effects on NE and dopamine. The low-activity alleles of the MAOA gene, a 30-bp VNTR, and COMT gene (val1158met SNP rs4680; met/met), in combination with each other, are associated with increased plasma ACTH and salivary CORT following a psychosocial stressor (e.g., Bouma, Riese, Doornbos, Ormel, & Oldehinkel, 2012). Variation in these systems, as well as others, may affect the HPA axis drive, produce elevated CRH and CORT effects on neural functioning, and influence the efficiency of social support as a stress buffer.

Epigenetics

The structural genome is overlaid by chemical marks, or epigenome, that regulate how the genetic material in each cell interacts with its transcription factors (Szyf, 2012). Epigenetic marks are passed on when the cell divides and, in some instances, from one generation to the next. The epigenome is tissue- and cell-specific, which allows for the tremendous variation in cell types throughout the body. Although much of the epigenome is determined before birth during morphogenesis, postnatal experiences driven by hormones, social experiences, nutrition, toxins, and stress continue to alter the epigenome throughout life.

Methylation is a principal, but not sole, mechanism of epigenesis. DNA methylation refers to the addition of a methyl group to the DNA, which then affects its interaction with transcription factors. DNA methylation occurs in regions where a cytosine is directly followed by a guanine (CpG, cytosine-phosphate-guanine sites or "islands"). Methylation is a bidirectional process, and genes can exist in a range of degrees of openness to transcriptional activity. This range reflects both methylation and histone acetylation and deacetylation (which relaxes or condenses chromatin). Epigenetics provides a powerful means whereby experience can alter developmental trajectories. Although the

epigenome does not alter the structural genome, relations between them are expected. That is, some gene by experience interactions may reflect mechanisms through which the structural genome influences experiential shaping of the epigenome.

As discussed in the section on childhood adversity, during sensitive periods of development, parental care programs the ease with which the GR gene in the hippocampus is transcribed (Szyf, 2012). In rodents, this period is during the first postnatal week when regulatory regions of the GR gene containing the NGF1-A binding, which are completely methylated after birth, are then demethylated as a function of maternal licking and grooming of the pups. Rodents who receive higher levels of maternal care exhibit less methylation at this site and are better able to regulate the HPA axis. It is unknown if there is an equivalent period in humans, but there is evidence that adversity in childhood is associated with differential methylation (see Childhood Adversity section).

There is a growing body of work examining the association between early life adversity and whole genome methylation patterns using either cheek cells or white blood cells, (e.g., Essex et al., 2013). Patterns on these cells will not necessarily correspond to methylation patterns in the brain, and methylation in one type of cell in one region of the brain will not necessarily reflect methylation in other types of cells in other brain regions. It is important to find evidence, using animal models, that stress affects methylation of genes regulating processes important in stress vulnerability and resilience. It appears to do so. For example, in addition to the GR gene, it is clear that early adverse care causes increased methylation of the BDNF gene in the PFC, reducing BDNF expression and contributing to stress-induced impairments in PFC functioning (Roth & Sweatt, 2011). Furthermore, during fetal development elevated CORT programs neural stem cells, upregulating cell cycle-related genes in a GR-dependent manner, and making resulting nerve cells more susceptible to oxidative stress and aging (Bose et al., 2010).

Summary and Future Directions

Several promising research trajectories should guide the study of HPA physiology and human development in the coming years. First, although much has been discovered about PFC regulation of HPA activity, further research is needed to address the development of this top-down regulation together with other stress-mediating systems, interacting in the “neuro-symphony of stress” (Joëls & Baram,

2009). Second, understanding monoamine, neuropeptide, and steroid hormone receptor systems will be vital to interpreting individual differences in responses to stressors. Physiological regulation is strongly influenced by the location, concentration, sensitivity, and function of receptors across tissues and organ systems. Research into how receptor systems develop and their subsequent effects on homeostatic regulation will be essential to understanding stress physiology, neural activity, and behavior. Finally, true developmental research must measure psychological and biological processes at multiple time points to understand the mechanisms involved at each stage of development and the factors contributing to maintenance or change in stress and emotion systems.

NORMATIVE DEVELOPMENT OF THE HPA SYSTEM

Using the HPA system to understand the effects of stress on development requires understanding normative changes in the system’s activation and regulation. These have been described extensively (e.g., Hostinar & Gunnar, 2012) and are summarized here.

Prenatal Period

The HPA axis becomes stress-responsive by the 20th week of gestation. This is the case even though the fetal adrenal gland contains a large fetal zone that helps produce estrogens and involutes over the first 6 postnatal months. Not only does the fetus produce CORT, but maternal CORT can reach the fetus. This raises the question of whether and how CORT influences fetal development. CORT plays critical roles in advancing tissue development, which likely explains why CORT levels in mother and fetus rise toward the end of gestation. However, as in later development, CORT needs to be tightly regulated. Because the fetal liver is immature, its production of binding globulins is low; therefore, even small increases in CORT produce large increases unbound, biologically active CORT. Both MR and GR are present from early in gestation; thus, CORT likely has effects across much of fetal development.

There are numerous checks and balances, however. The enzyme 11 β -HSD2, which converts CORT to an inert substance, is present at the blood-brain barrier, in the placenta, and in fetal tissues. It is highly expressed in the fetal brain between prenatal Weeks 19 through 26, when it is often seen colocalized with GR. As term approaches,

levels decrease. Thus, 11 β -HSD2 likely serves the function of temporarily protecting rapidly developing brain regions from overexposure to CORT (Wyrwoll et al., 2011).

Infancy

Full-term healthy newborns elevate CORT to a variety of even mild stressors. This degree of reactivity remains during the first months of life, but by 3 to 4 months, the axis has become less responsive, perhaps reflecting the development of fast feedback mechanisms.

Events that provoke distress typically also activate the HPA axis; nevertheless, behavioral distress and HPA systems are differentially regulated. Thus, soothing techniques that reduce crying might have no effect on CORT levels, and CORT reactivity may be uncorrelated or only very slightly correlated with crying in many instances (Gunnar & Donzella, 1999).

Three months is an important turning point in development when the infant becomes better regulated and is able to socially engage for longer periods. The diurnal CORT rhythm becomes more stable around this time, although it is only the morning peak and evening nadir that are readily observable. Not until the child gives up the afternoon nap in the preschool years (approximately 3 to 5 years of age) are midafternoon levels predictably lower than mid-morning levels.

In the neonatal period, a variety of stimuli embedded in the caregiver–infant relationship begin to regulate the infant’s HPA system. As reviewed in Hostinar and Gunnar (2012), there is some evidence that the more time the parent and infant spend in physical contact the shorter the bouts of crying and the smaller the CORT elevations to everyday stressors, like being removed from the bath. During these first months when the HPA axis is still highly reactive to stimulation, there is evidence that sensitive responses to infant distress regulate the axis, returning CORT levels more promptly to baseline (Albers, Riksen-Walraven, Sweep, & de Weerth, 2008). The regulatory roles of caregiving activities allow the caregiver to serve as a powerful stress buffer.

However, during these early months, different components of caregiving likely regulate different stress-mediating systems. Thus, facets of caregiving that reduce crying (e.g., feeding, nonnutritive sucking) are less capable of buffering heart-rate responses to painful stimulation, and have no apparent effects on CORT responses to stress (Hostinar & Gunnar, 2012).

The emergence of social relationships as powerful stress buffers is one of the most remarkable phenomena during the

first year of life (Hostinar, Sullivan, & Gunnar, 2014). This appears to occur around the onset of independent locomotion, which corresponds roughly to when the child begins to actively organize security-seeking behavior around attachment figures. At this point it is not just what the attachment figure does but who the person is and his or her relationship with the child that is important. We can see this clearly in studies that have used childhood inoculations as the stressors. Children show marked increases in CORT despite the parent’s presence at 2, 4, and 6 months. Then from as early as 12 to at least as late as 18 months, these elevations are no longer seen and CORT responses remain low in the parent’s presence.

The attachment figure needs to be present to provide buffering during infancy and early childhood. This has been demonstrated in studies of children in childcare. When the parent is present, securely attached children do not show elevations in CORT whereas insecurely attached children do; but in the first days when the parent leaves the child, CORT levels are equally elevated for securely and insecurely attached children. For children who have adapted to their daycares, a secure relationship with their parent may make the HPA axis more sensitive to variations in childcare quality. Thus, securely attached children both produce the largest increases in CORT in poorer quality daycares and the smallest elevations in higher quality ones (Badanes, Dmitrieva, & Watamura, 2012).

We still do not know how the attachment figure’s presence works to provide such a potent stress buffer, although oxytocin and other antistress hormones that are fostered by his or her presence may play a role (Hostinar, Sullivan, et al., 2014). In addition, the presence of the attachment figure may activate brain regions associated with safety signals, thus reducing fear and anxiety even to noxious stimuli. This has been demonstrated in adults for whom viewing an image of the romantic partner while experiencing a pain stimulus activated a safety signal–related neural region in the ventromedial PFC (vmPFC) and reduced the experience of pain (Eisenberger et al., 2011). We do not know how long in development the parent is able to play this stress-buffering role. It may be that parental stress-buffering potency declines in adolescence.

Preschool and Middle Childhood

According to current knowledge, the HPA axis is quite mature by the preschool period. Two psychosocial changes, however, begin to affect its activation and regulation during this period and become increasingly important during

middle childhood: the development of emotion regulatory competencies and the increasing focus on peers and peer relationships.

There are marked increases in the child's ability to regulate behavior and emotions during early childhood. Neurodevelopment of regions in the prefrontal cortex involved in the effortful regulation of behavior (dIPFC) and emotions (vmPFC) may play a role (Belsky & de Haan, 2011). The development of self-regulatory competence should allow the child to modulate activity of the HPA axis more independently. However, there is a complex relation between stress and the PFC and the relations between measures of effortful control and activity of the HPA axis are positive under some circumstances and negative under others (Shansky & Lipps, 2013). CORT is necessary for PFC functions because it supports the central production of DA and NE (Mizoguchi, Ishige, Takeda, Aburada, & Tabira, 2004). Thus higher levels of CORT within basal ranges might support functioning on effortful control tasks if the higher levels occur in anticipation of the task and prepare the child for task demands. This has been demonstrated in several studies. Stress levels of CORT, however, impair prefrontal functioning, in part through the overenhancement of DA production (Shansky & Lipps, 2013). Thus among children experiencing high lifetime stress, the opposite pattern of associations may be found, as was noted among preschoolers in a homeless shelter (Cutuli, Wiik, Herbers, Gunnar, & Masten, 2010). If we measure effortful control in relation to basal or ambulatory CORT levels, negative associations would be expected because children with better self-regulatory abilities should be better able to regulate their emotions and avoid stressful conflicts with others. This has generally been found (Turner-Cobb, Rixon, & Jessop, 2008).

Effortful control also mediates relations between children's emotional dispositions and the quality of their relations with peers. Children who tend to be easily angered when frustrated and those who are exceedingly exuberant have problems with aggression unless they also have good self-regulatory competencies. Although simply inhibiting expressions of anger when provoked might increase adrenocortical and sympathetic activity (Spinrad et al., 2009), because unregulated anger and aggression increase the risk of rejection and ostracism, children with better self-regulatory abilities should, overall, experience fewer stressful social interactions, (e.g., Gunnar, Sebanc, Tout, Donzella, & van Dulmen, 2003).

As noted, threats to the social self are powerful stressors. Rejection and ostracism are powerful social threats that

activate neural pain circuits (Cacioppo & Cacioppo, 2012). Social isolation increases attention to threatening aspects of the environment and in animal studies activates the HPA axis. Peer-rejected preschoolers and older children exhibit elevated CORT at school, although having even one friend reduces this effect (e.g., Peters, Riksen-Walraven, Cillessen, & de Weerth, 2011). It may not so much be peer rejection but loneliness that is stressful for children and youth, particularly if loneliness is chronic (Doane & Adam, 2010).

While some rejected children are simply ignored, others are targets of bullying. Bullying can be highly stressful for children and is associated with significant psychopathology. Only a few studies have examined the relation between peer victimization and CORT and the results have been mixed. There are two reasons for this. First, some victims are also bullies. Bully-victims may be comorbid for conduct disorder and have low CORT levels (van Goozen, Fairchild, Snoek, & Harold, 2007). Second, the duration and intensity of victimization may be critical. When victimizing begins or if it is only occasional it should increase CORT, but after a long period of intense bullying the HPA axis is likely to downregulate (G. E. Miller, Chen, & Zhou, 2007). Intermittent victimization has been associated with elevated CORT, while chronic victimization has been correlated with low CORT in boys (Vaillancourt et al., 2008). Likewise, children experiencing more cumulative stress may exhibit blunted CORT in response to peer victimization (Ouellet-Morin et al., 2011). As children move into preschool and middle childhood, peer relations become increasingly important and problems in relations with peers are important stressors affecting activity of the HPA axis.

Puberty and Adolescence

Adolescence, a period of rapid development and marked changes in social relationships, is also a period when emotion systems and their neural substrates mature and become more sexually differentiated (Dahl, 2004). Sex steroids have regulatory effects on the amygdala and mPFC in adults and although less studied, there is evidence that puberty and increasing levels of gonadal steroids affect the developing brain in a sexually dimorphic fashion (Neufang et al., 2009). Consistent with these findings, activity of the HPA axis becomes sexually differentiated with advancing sexual maturity. For example, in a large sample of youth aged 16 years, CORT levels were higher and ACTH levels were lower in fasting morning plasma samples for girls

than boys (Reynolds et al., 2013). Sex differences in response to social stressor tasks are observed among adults with men responding more strongly than women (Kudielka & Kirschbaum, 2005). Sex differences in responses are not reliably seen in childhood, but emerge around the pubertal transition and are clearly present by mid-adolescence (Gunnar, Wewerka, Fenn, Long, & Griggs, 2009). CORT levels also increase with puberty. The increase is clearly seen in basal levels; whether it is present for reactivity is less clear. CORT reactivity has been reported to increase with pubertal stage/age in some studies (e.g., Gunnar, Wewerka, et al., 2009).

It has been argued that the pubertal increase in HPA activity, along with the increased sexual dimorphism, contributes to girls' vulnerability to depression and to increases in psychopathology for both sexes during adolescence (Dahl & Gunnar, 2009). In animal studies there is evidence that the peripubertal period is a second sensitive period of vulnerability for the HPA system (Eiland & Romeo, 2012). However, at least one study indicates greater invulnerability during this period; specifically, the researchers found that chronic unpredictable stress in the adolescent period in the rat enhanced avoidance learning, whereas it impaired it among adults (Ricon, Toth, Leshem, Braun, & Richter-Levin, 2012). However, as noted by Eiland and Romeo (2012), when similar studies are conducted with adolescent female rats, impairments are noted. Thus sex may influence whether stress increases vulnerability or resilience during puberty.

If stress vulnerability increases during adolescence, it could partly be due to a decrease in the power of parental buffering of the stress system. Just prior to puberty, even being able to phone the mother blocked increases in CORT and increased oxytocin (Seltzer et al., 2010). In children of roughly the same age, allowing the mother to be present and supportive during the speech preparation period of the TSST also blocked elevations in CORT, while providing the child with a supportive but unfamiliar adult did not (Hostinar, Johnson, & Gunnar, 2014). In the same study, parental presence among 15-year-olds had no buffering effect on CORT. Whether this developmental shift is mediated by puberty or psychological changes in the parent-child relationship remains to be determined. In addition, it seems likely that when parent-as-buffer decreases in potency, other social relationships may take over the stress-buffering role. The role of friends and romantic partners as stress buffers in adolescence remains to be explored. Finally, it seems unlikely that parents completely lose their stress-buffering potency for adolescents.

It might depend on the type of stressor facing the youth. This too remains to be examined.

Summary and Future Directions

As the HPA axis develops, both reactivity and regulation shift from infancy to adolescence. From the emergence of attachment figures as stress buffers in infancy to the potential role of romantic partners as regulatory forces in adulthood, social relationships play a crucial role in stress regulation across the life span. Further, as peer structures become more complex during middle childhood and adolescence, social standing may play a critical role in HPA functioning. As research accumulates on the development of self-regulatory skills that emerge in early childhood, care should be taken to examine its relation to stress reactivity and regulation in the context of both children's lifetime stress as well as task demands. At the pubertal transition, future research is needed to understand the potentially differential effects of sex hormones on vulnerability to stress during adolescence. Exploring shifts in stress-buffering social systems during this period is a promising avenue for better understanding these processes.

THEORETICAL PERSPECTIVES

Child development research on the psychobiology of stress has largely been conducted from a developmental systems perspective. Adult work on the psychology of coping has been guided by Lazarus and Folkman's (1984) transactional model, emphasizing individual differences in appraisal and response to events. Both of these perspectives have influenced current thinking. Evolutionary perspectives have also challenged our dominant models.

Allostasis and Allostatic Load

The allostatic load model (ALM) is the most influential psychobiological stress theory (McEwen & Wingfield, 2010). In developing ALM, the starting point was the concept of allostasis, which describes the body's ability to up- and downregulate vital functions to achieve new steady states in reaction to challenge. As a shorthand, allostasis is often defined as "achieving stability through change." There are a number of allostasis-mediating systems; however, CRH and the HPA system, the immune system, and the central and peripheral catecholamine systems have received the greatest attention.

As Selye noted decades ago, activation of these allostasis- or stress-mediating systems allows us to cope (Selye, 1946). In the face of chronic adversity, the mobilization of these systems can allow us to look like we are coping exceptionally well for prolonged periods, and then somehow, we are overcome by disease. Selye thought the disease states were due to exhaustion of these systems. He was wrong. In place of exhaustion, ALM inserts allostatic load (McEwen & Wingfield, 2010). Allostatic adjustments, if frequent or chronic, can take a toll on the body. Allostatic load or overload refers to the wear and tear produced by either too much stress or from inefficient regulation of stress mediators. Inefficient regulation can mean a failure to turn off or return to baseline once the threat has passed and/or a failure to appropriately activate the response. Both under- and overactivation of allostasis-mediating systems can develop through prolonged overuse. The cumulative wear and tear of allostasis and/or dysregulation of allostasis-mediating systems defines allostatic load, which leads to many diseases of aging as well as undergirds cognitive deficits and stress-related mental disorders in some individuals.

Allostasis-mediating systems influence one another, but their relations are expected to be nonlinear and stressor specific (Joëls & Baram, 2009). Different patterns of responses are provoked by different classes of stressors (e.g., infectious agents, social threat) and the time courses differ across systems in their activation and the time it takes for them to affect function. Catecholamines produce their effects quickly and dissipate rapidly, which is why epinephrine and norepinephrine undergird the fight-or-flight system whereas CORT takes 25 minutes to reach peak reactions and its gene-mediated effects can play out over hours and days.

Hypothalamic-Pituitary-Adrenal and Autonomic Nervous System Asymmetry

No one attempts to measure all stress-mediating systems; however, there are increased calls to measure more than one system at a time, especially combining HPA and SAM measurement (Bauer, Quas, & Boyce, 2002). Bauer and colleagues argue that the HPA and SAM systems evolved to work together and moderate levels of co-activation should be related to healthier functioning, while SAM and HPA asymmetries may reflect allostatic load. Because chronic stress tends to downregulate the production of CORT (G. E. Miller et al., 2007) and increase catecholamine production, high sympathetic and low HPA activity may be the product of chronic stress. Some studies (Gordis, Granger,

Susman, & Trickett, 2006) have supported this argument, whereas others have found the opposite results (El-Sheikh, Erath, Buckhalt, Granger, & Mize, 2008).

One challenge in testing the asymmetry hypothesis is that the HPA system habituates to repetition of the same stressor after as little as one trial, whereas the type of chronic stress that downregulates the axis requires presentations of changing and unpredictable stressors. The HPA axis often habituates whereas the sympathetic system keeps responding, particularly if the stressor demands an effortful response (Ursin, Baade, & Levine, 1978). Thus, it is unlikely that symmetry or asymmetry between the HPA and SAM systems will consistently be associated with health or disorder. Rather, the meaning of these patterns will be context and stressor specific, reflecting situational demands, stressor appraisal, and prior experience.

Allostatic Load Model Indices in Children and Adolescents

Allostatic load is measured through systems affected by chronic activation of allostasis-mediating systems. Its indices include high systolic and diastolic blood pressure; high waist-hip ratio; elevated cholesterol (HDL and total); high glycosylated hemoglobin; and high overnight urinary CORT, norepinephrine, and epinephrine. Typically one counts up the number of these indicators. These measures of allostatic load were developed for work with adults and it is an open question whether they are predictive in children whose systems are still developing. Other indices may be sensitive in childhood. We have proposed that a slowing of linear growth may be an index of allostatic load in children (A. E. Johnson, Bruce, Tarullo, & Gunnar, 2011). Evidence is accumulating that the standard allostatic load indicators are useful by later childhood or early adolescence (Evans & Kim, 2012). There is also evidence that individuals who are highly resilient psychologically and behaviorally may exhibit higher indices of allostatic load by late adolescence (Brody et al., 2013). Although this might seem surprising, resilience in the face of heavy odds should require frequent activation of allostasis-mediating systems, producing an accumulating allostatic load.

Although ALM may help explain the development of children exposed to harsh conditions, it is not a developmental model. Because there is increasing evidence that there are sensitive periods in the organization of stress reactivity and regulation, a developmental framework is needed. Similarly, although ALM acknowledges individual differences related to temperament and sex/gender, it does not provide an explanation for these differences or

build predictions based on them. We now turn to a model that does.

Adaptive Calibration Model

The adaptive calibration model (ACM; Del Giudice, Ellis, & Shirtcliff, 2011) is an evolutionary-developmental model based in life-history theory (Coall, Callan, Dickins, & Chisholm, Chapter 3, this *Handbook*, this volume). Its proponents argue that it is an extension of ALM, specifically addressing what they see as its shortcomings. According to ACM, both positive and threatening environments have been part of our evolutionary heritage, and we have evolved to maintain reproductive fitness across a range of environmental harshness. What might be thought of as dysfunction, if reliably produced by harsh experiences, should better be thought of as choice of a different life-history strategy. For example, when early harsh conditions result in earlier-onset puberty, earlier and more frequent reproduction, and greater risk taking, this is viewed as a fast life-history strategy (Belsky, Steinberg, Houts, & Halpern-Felsher, 2010). ACM argues that the stress response system, in interaction with brain neurochemistry, acts as a filter and amplifier of life-history relevant experiences to mediate their effects on life-history traits: growth/learning, maturation/fertility, competition/risk-taking, and pair-bonding/caregiving. Beginning before birth, experiences are sampled by the stress response system, which leads to the selection of different life-history strategies that get modified during each developmental period. In some instances, response patterns may adversely affect the health and happiness of the individual and those around him or her, but they have been selected because they increase reproductive fitness, or did so in the environment in which we evolved.

Perhaps because this model was developed precisely to apply to human development, when measures of the stress response system are discussed, they only include those that can be noninvasively measured in children (i.e., CORT, ANS measures, and perhaps immune). The many other systems discussed in ALM are not a focus, though presumably are not excluded.

There are two aspects of ACM that are of particular note with regards to developmental stress research. First, the model has incorporated the biological sensitivity to context hypothesis (Boyce & Ellis, 2005; see also differential susceptibility hypothesis, Pluess & Belsky, 2010). Accordingly, some individuals are shaped more by their developmental history than are others and, consistent with adaptive calibration, it is reactivity of the stress systems

that determines sensitivity to context. Individuals with relatively nonreactive stress systems tend to have similar life-history strategies across a wide range of life-history relevant environmental inputs. In contrast, those with more responsive stress systems will be more sensitive to context. These individuals will exhibit the socially positive characteristics of a slow life-history strategy (low aggression, high agreeableness, focus on long-term goals, low reproductive rate, high investment in each offspring) if reared in supportive environments, but the socially negative characteristics of the fast strategy (high aggression, early puberty, risky behavior, early pregnancy, low rate of investment in individual offspring) if reared in harsh environments.

On a behavioral level, there is clear evidence that some phenotypes are more sensitive to context, perhaps based on their genetic endowment. What is unclear is whether stress reactivity determines this sensitivity, and whether the relationship is stressor specific or general. As noted by Obradović (2012), reactivity of the PNS has been shown to increase sensitivity to context, but in studies of marital conflict and domestic violence, PNS reactivity reduces sensitivity to context (i.e., tends to buffer children). Thus, simple models that are not context, stressor, and system specific may fail to capture the complexity of the stress-development landscape.

As another outgrowth of the biological sensitivity to context theory, ACM also argues that the stress response system is toned or tuned by the harshness or supportiveness of the early environment. From an evolutionary perspective, this is a form of conditional or predictive adaptation that has evolved to help preadapt the child. ACM argues for a U-shaped function between early care conditions and stress reactivity. Specifically, both highly supportive and very harsh conditions will produce a highly responsive stress response system, which supports sensitivity to the environment, better learning, and good outcomes in supportive contexts, but high vigilance and anxiety in harsh contexts. Moderately supportive, slightly harsh developmental contexts result in a buffered stress response system. ACM also describes a fourth grouping that results in traumatic rearing contexts that is differentiated by sex, with girls remaining vigilant and highly stress reactive and boys becoming unemotional with blunted stress reactivity. These four patterns are expected to be accompanied by differential activity of the ANS and HPA systems as follows: (1) Sensitive (high PNS basal and response activity; high to moderate SNS reactivity and moderate basal SNS activity; high HPA reactivity and moderate basal HPA levels), (2) Buffered (moderate PNS and HPA basal and response

activity, low to moderate SNS basal and response activity), (3) Vigilant (low to moderate PNS reactivity, low basal PNS activity; high SNS basal and response activity, high HPA reactivity, and high to moderate basal HPA levels), and (4) Unemotional (low basal and response activity of PNS, SNS, and HPA systems).

This is a complex theory with many moving parts. Currently, there are only a few studies testing parts of the theory. Critical to the theory is the existence of the four phenotypes and their correspondence to the patterns of stress responding. There is some support for these four groupings. Using finite mixed modeling, these theorists have recovered four patterns that roughly fit the predicted ones, although they only used measures of PNS and SNS activity (Del Giudice, Hinnant, Ellis, & El-Sheikh, 2012). Examination of the results showed that the four groups differed most in baseline skin conductance (a measure of SNS activity), with the Buffered being low and the Vigilant high as predicted; but the Unemotional were moderate rather than low in skin conductance baseline. Counter to expectations, males were not overrepresented in the Unemotional Group, but girls were overrepresented, as predicted, in the Vigilant group.

It is critical in the model that the relation between childhood adversity and the stress response system is *not* linear. There is more evidence of nonlinearity, but not always in the predicted direction. For example, in a study of kindergarteners (4–6 years old), measures of socioeconomic class and measures of adverse family events bore different relations with CORT when assessed at two different times of the school year. In the fall, the expected U-shaped function was found; while in the spring, the relationship was an inverted-U. Measures of adversity were linearly, not curvilinearly related to CORT and many of the associations were moderated by race (Bush, Obradović, Adler, & Boyce, 2011). In a study of 9–16-year-olds, another inverted-U rather than U-shaped function was found, with moderate levels of recent adversity associated with the highest CAR, whereas both the lowest and highest levels of accumulated adversity were associated with smaller CARs (Gustafsson, Anckarsäter, Lichtenstein, Nelson, & Gustafsson, 2010). As in HPA and SNS asymmetry, relations between experience and physiology seem to be contextualized and nuanced, challenging attempts to contain them in simple phenotypes.

The four patterns (Sensitive, Buffered, Vigilant, and Unemotional) are conditional or predictive adaptations, which presumably increase reproductive fitness. This is a difficult concept to prove in human research, but also not a concept peculiar to ACM. A number of researchers

have discussed the possibility that early programming of the HPA axis is a form of predictive adaptation. Predictive adaptation provides a framework in which to understand the “developmental origin of adult health and disease” model (DOAHaD; Gluckman, Hanson, & Beedle, 2007). The idea is that harsh fetal or early postnatal conditions shape an organism with a thrifty phenotype (i.e., a smaller body, lower metabolic rate, reduced behavioral activity, avoidance of novelty and exploration), which reduces the need for food and promotes survival under harsh conditions. If conditions continue to be harsh, a thrifty phenotype fosters longevity and reproductive fitness. However, if there is a mismatch in conditions, poor health ensues. This idea can readily be combined with the ALM to produce predictions of heightened reactivity of allostasis-mediating systems as a function of early adversity leading to obesity and even more rapid acceleration of allostatic load in an overly rich environment (McEwen & Wingfield, 2010).

The ACM, however, does not require a mismatch between programming cues and the encountered environment to result in behavioral and health disorders. In this regard, it should also be noted that Pluess and Belsky (2011) suggested that the heightened stress reactivity and timidity that is reported among offspring of stressed pregnancies (see “Prenatal Stress”) are a different form of programming—specifically, prenatal programming of postnatal plasticity or sensitivity to context.

Finally, predictive adaptation models, although assuming an increase in reproductive fitness, do allow for trade-offs, particularly with regard to longevity. In one example, the type of maternal separation in rats shown to increase reactivity of the HPA axis has also been shown to enhance hippocampal-dependent learning in the juvenile and young adult period followed by rapid cognitive decline in aging rats (Suri et al., 2013). In long-lived animals, such as humans, there may be life-history stages when the stress system is reprogrammed. The ACM describes multiple recalibrating periods from infancy to adulthood. Other models describe fewer. Among these periods, in addition to the fetal/early postnatal period, puberty stands out as potentially important for recalibration prior to the onset of reproductive maturity (Romeo, 2010).

OTHER THEORETICAL PERSPECTIVES OF POTENTIAL RELEVANCE TO DEVELOPMENTAL RESEARCH

While the ALM and ACM are the two most prominent theories guiding studies of stress and development in children,

there are several theories applied only to adults and/or in animal studies that may be useful to include in our developmental models.

Tend and Befriend

As we will note later, there is little evidence of sex differences in HPA-axis activity until puberty. However, that does not mean that boys and girls perceive the world similarly with regards to threats to their physical and/or social selves or that the sexes have evolved and/or have been socialized to cope in the same way. The ACM begins to address this problem, but a much more elaborate theory was proposed for adults. Over a decade ago, Taylor and colleagues (2000) proposed that there are marked sex differences in the organization of stress responses and in the consequences of exposure to stressors. Because the roles of males and females differ with regards to the bearing and rearing of the young, especially in species like ours where males have not been the primary caregivers until recently, the female stress system evolved to manage protection of both the female and her offspring. Thus, unlike males who “fight or flee” under threat, threat activates “tend and befriend” tendencies in women that foster seeking and banding together with others in the protection of the young. With regard to the neurobiology of these stress responses, they argue that the attachment system, supported by oxytocin and endogenous opioid peptide mechanisms, works to keep HPA and sympathetic responses in check during periods of stress. To be effective, nurturing relationships need to be present. Lack of nurturing relationships should be a particularly acute source of stress for women. Female reproductive hormones should play a role in modifying patterns of stress responding or producing patterns that differ from men, and these tendencies should increase with puberty, pregnancy, and childbirth.

There are clear differences in the types of stressors that activate the HPA axis in adulthood, with men being more responsive to stressors involving threats to how others perceive their intelligence and performance and women to situations involving threats of social rejection and exclusion (e.g., Stroud, Salovey, & Epel, 2002). However, some studies show that both men and women increase the type of prosocial behavior that supports social networks in reaction to stress (von Dawans, Fischbacher, Kirschbaum, Fehr, & Heinrichs, 2012). In addition, women do not differ from men in HPA responses to performance stressors at certain points in their menstrual cycle (Kudielka & Kirschbaum, 2005). Thus, as is typical of sex differences, there are more

overlaps in behavior than prototype models would suggest. In addition, as discussed in “Normative Development of the HPA System,” it is not clear when these differences develop; however, this could be an important avenue for developmental research.

Hawks and Doves

As discussed in the section called “Temperament and Stress Vulnerability and Resilience,” shy/inhibited children appear to be particularly sensitive to social stress, yet we do not have stress theories that really address temperamental differences. The one that comes closest is the Hawk and Dove theory (Korte, Koolhaas, WingWeld, & McEwen, 2005). This is an evolutionary theory based on the expectation that populations should include individuals who vary in their typical responses to threats and challenges. The theory describes two phenotypes: Hawks and Doves. Those with Hawk phenotypes are aggressive and bold. They fight or flee when threat is encountered. They are proactive rather than reactive, and take risks. They are at a fitness advantage when energy resources are high but at a disadvantage when energy resources are low because their phenotype requires a good deal of energy to sustain. They are also at an advantage when population density is high because their aggressiveness allows them to compete successfully. Doves, in contrast, prefer to freeze or blend into the background when conditions become threatening. They are risk averse, inhibited, and cautious. They are at a survival advantage when energy resources are low because their strategies tend to conserve energy. They do better when population density is low because they are poorer competitors. These phenotypes are theorized to differ in their underlying stress physiology. Hawks are expected to have low-responsive HPA systems and low basal HPA tone, whereas Doves are predicted to have highly reactive HPA systems and higher basal HPA tone. Hawks are supposed to be more SNS reactive than Doves, whereas Doves are supposed to be more PNS reactive than Hawks. Theoretically, the effects of chronic stress differ for these phenotypes, being associated with problems of impulse control, violence, hypertension, and autoimmune disorders for Hawks and metabolic syndrome, internalizing disorders, and infections for Doves. There has only been one child study to apply the Hawk/Dove model explicitly. In this study, researchers used the Hawk and Dove prototypes to effectively identify factors moderating the effects of harsh parental discipline (Sturge-Apple, Davies, Martin, Cicchetti, & Hentges, 2012). Among the Hawks, harsh

discipline did not affect levels of basal cortisol or vagal tone, but did increase sympathetic tone over time, and this mediated a rise in externalizing problems. Among the Doves, harsh discipline increased vagal tone and basal cortisol levels, while lowering sympathetic tone, and this mediated a rise in internalizing problems. Although it is unclear whether the Hawk/Dove prototypes are the best to use in developmental research, these results suggest that temperamental differences among children will be important to incorporate into our theories.

Summary and Future Directions

None of our models of stress and development are completely satisfactory. The ALM is biologically based and consistent with the complexity of the systems involved in stress responding, but it was never intended to be a developmental theory. The ACM is explicitly developmental, which is a benefit for developmental researchers. However, it elaborates ultimate arguments and does not adequately deal with proximal processes. The patterns it proposes are likely elusive as they suppose much less stressor and context specificity than has been richly demonstrated in the literature. While neither theory is completely adequate, both theories have, in the case of ALM and likely will in the case of ACM, stimulated research. Furthermore, the many concepts derived from or that have been absorbed into these theories and brought into the human developmental literature (e.g., sensitivity to context, differential susceptibility, predictive adaptation) are enriching the study of stress and development. Finally, neither of the main theoretical models deals adequately with sex/gender differences or temperamental differences; thus we might be wise to consider “tend and befriend” and “hawk/dove” models or other similar theoretical arguments as we enrich our models of stress and human development.

CHILDHOOD ADVERSITY: STRESS AND BIOLOGICAL EMBEDDING

Increasingly, we are called to attend to early adversity in order to improve lifelong health. Several research areas converge to fuel this focus. First, there is evidence that the socioeconomic gradient in health may have its roots in childhood social class (Ziol-Guest, Duncan, Kalil, & Boyce, 2012). Second, the evidence that birth weight, as a reflection of prenatal adversity, predicts cardiovascular disease in adulthood established a field termed the fetal

origins of adult disease (Gluckman et al., 2007). Finally, over a half century of research on early adversity in animals provides invaluable insights into the processes through which adversity gets under the skin to affect health and disease (Zhang et al., 2013). Less than a decade prior to the time of this writing, the concept of biological embedding was introduced to provide an umbrella term for a variety of processes through which experience becomes part of our biological makeup during development. The concept of biological embedding has since entered the mainstream of scientific discourse (Shonkoff, Boyce, & McEwen, 2009). Because animal models have been critical to providing hypotheses about biologically plausible pathways through which embedding can occur, key points from this work are highlighted before reviewing the human literature.

Animal Models and Early Life Stress

Nearly all early adversity paradigms manipulate the mother–offspring relationship in some way, either through deprivation, separations, or other manipulations that disturb maternal behavior. Those that do not manipulate the mother–offspring relationship use naturally occurring variations in maternal care to index early adversity (Schmidt, Wang, & Meijer, 2011). Thus, one of the earliest and most productive hypotheses about how adversity gets transmitted is that it alters maternal behavior, which in turn affects the offspring (Smotherman & Bell, 1980). Animal studies, however, have shown that although many early adversity effects are transmitted through maternal care, some are not (Tang, Akers, Reeb, Romeo, & McEwen, 2006). The question of which effects do and do not depend on caregiving has not been addressed in human studies.

The HPA axis has been a prime focus of rodent early experience research. The axis is immature in the rat pup at birth and matures during the first two weeks postnatal when early experiences program GR via regulating methylation of the GR gene (Zhang et al., 2013).

However, it is now apparent that the programming effects of early maternal care extend far beyond epigenetic modification of the GR gene to include (a) the estrogen receptor alpha gene, which influences maternal behavior into the next generation (Champagne, 2012), (b) neurotrophic genes (e.g., BDNF; Roth & Sweatt, 2011), and (c) genes involved in inflammation (G. E. Miller et al., 2011). Studies are now documenting similar programming effects in other species, as well as our own (reviewed in Champagne, 2012, and G. E. Miller et al., 2011).

What is often missed when this literature is translated to the human case is that there is little evidence that these effects in the rodent depend on elevated CORT. Rather, with regard to the GR gene, its epigenetic modification involves stimulation of thyroid hormone, increases in serotonin turnover and greater expression of nerve-growth factor-inducible factor-A transcription factor in the hippocampus (Zhang et al., 2013). Many of the destructive effects on the hippocampus in the rodent are due to CRH, not CORT (Faturi et al., 2010). Thus, we need to be aware that there may be pathways from early adversity to later effects on the HPA system and other stress-mediating systems that are not produced by activity of the axis during the period of early adversity. Because the HPA axis is more mature in humans than in rodents at birth, early adversity effects in humans may involve CORT even when this is not the case in some rodent models.

Finally, the animal literature makes it clear that exposure to stressors early in life is not always associated with poor outcomes. First, the changes produced by early life adversity may actually support survival in harsh and unpredictable environments. Second, in some instances it is the animals that were exposed to stressors who score higher on tests of cognitive performance, exhibit more robust neurodevelopment, and produce lower levels of stress hormone in response to provocation in adulthood (Lyons & Parker, 2007). In these latter instances, it appears that early life stress has served a stress-inoculation function. We are far from understanding what makes some experiences *stress inoculations* whereas others increase the risk of disease and disorder. The possibility that inoculation effects were obtained because the stressor was *challenging but not overwhelming* has been suggested (Lyons & Parker, 2007). However, so far, this is a post hoc explanation. Nonetheless, if we understood what differentiates stressors that inoculate versus those that increase vulnerability, we would have a much better understanding of resilience.

Other Pathways to Early Adversity Effects

In this chapter we focus on the role of early experiences in programming the neurobiology of stress with an emphasis on the HPA axis and the genes regulating it. However, there are other pathways to early adversity effects that should be acknowledged and that may overlap with those examined here. First, early adversity may affect the development of neural circuits through experience-expectant and experience-dependent processes that influence cell death and synapse pruning (Fox, Levitt, & Nelson, 2010).

When these experiences affect the development of neural systems that process threat and orchestrate coping, they may contribute to individual differences in allostatic load across development. Indeed, there is increasing evidence that the amygdala is particularly sensitive to early adversity (Pechtel & Pizzagalli, 2011). There is also increasing evidence that oxidative stress in response to extreme stressors results in damage to DNA, RNA, and lipids (Schiavone, Jaquet, Trabace, & Krause, 2013).

CORT bears a complex, U-shaped relationship with oxidative stress. At low to moderate levels, CORT helps reverse oxidative stress and thus is neuroprotective, whereas at high levels CORT decreases mitochondrial functioning and increases cell death (Aschbacher et al., 2013). These processes may explain why children exposed to longer periods of early deprivation in Romanian orphanages have greater evidence of cellular aging (i.e., shorter telomeres) by middle childhood (Drury et al., 2012). Indeed, in typically developing kindergarten children it has been shown that those who show larger CORT and sympathetic reactions to a stressor protocol have shorter telomere lengths in buccal cells by the end of kindergarten (Kroenke et al., 2011).

Finally, there is increasing evidence that the immune system is programmed by early adversity (G. E. Miller et al., 2011). Early adversity is believed to program heightened reactivity in inflammatory pathways and down-regulate the GR gene that mediates anti-inflammatory effects of CORT. Programmed thus, the immune system interacts with ongoing life stress and the hormonal signals generated by reaction to these stressors in ways that contribute to the onset of cardiovascular disease, tumors, and bone and muscle loss leading to frailty. The programming mechanisms may involve CORT and CRH.

With this as background, we now turn to a review of the major types of early adversity studied in humans: poverty, parental loss, prenatal stress, risky families, and maltreatment. The categories overlap, but each literature has its unique aspects, justifying their separate treatment.

Childhood Poverty and Lower Socioeconomic Position

Socioeconomic position is a contextual factor associated with a host of adverse early conditions. There is increasing evidence that socioeconomic position during childhood predicts health outcomes in childhood and later in life (Shonkoff et al., 2009). A number of studies have found that a lower economic position in childhood is associated with higher CORT levels. Some of these studies have used

income-to-needs ratios in generally low income samples (Blair, Raver, Granger, Mills-Koonce, & Hibel, 2011), others have used parental reports of financial strain (Essex, Klein, Cho, & Kalin, 2002), and still others have used cumulative risk indices composed of adversities common in low income families (Evans & Kim, 2012). Basal CORT has typically been the focus, either as measured in saliva, overnight urine, or in hair (Vaghri et al., 2013). The ages studied have ranged from infancy to adolescence. Not all studies, however, have found evidence of higher CORT with low socioeconomic position. Some have found the opposite (Badanes, Watamura, & Hankin, 2011). It has been argued that one reason sometimes high and sometimes low CORT is found is that the relationship is actually U-shaped (Boyce & Ellis, 2005; Bush et al., 2011; Marsmana et al., 2012). This might be an attractive solution, except that both U-shaped and inverted U-shaped functions have been found, sometimes in the same study at different time points, (e.g., Bush et al., 2011).

Whereas the above studies are all correlational, one study has manipulated family economic circumstances and then assessed the HPA axis (Fernald & Gunnar, 2009). This study used a quasi-randomized design to examine the effects of a conditional cash transfer program on children living in extremely poor communities in rural Mexico. The children were 2 to 6 years old when assessed after the family had been in the intervention for at least 3 years. The sample was large (over 500 intervention and 700 comparison children). The intervention lowered CORT levels but not reactivity and the effect was larger for children of depressed mothers. Low income and financial strain increases maternal depression. Later we will cover the role of maternal depression in the development of stress reactivity and regulation, but here we note that consistent with the Fernald and Gunnar (2009) study, maternal depression appears to mediate the effect of financial strain on children's HPA axis functioning (Hostinar & Gunnar, 2012).

None of the studies cited above provide evidence that early socioeconomic position programs the HPA axis. Evidence of programming has been examined in adult studies that have contrasted current with childhood socioeconomic status. There are very few studies of this sort and the results are mixed. Using a subsample of the 1958 British Birth Cohort, home basal CORT levels assessed at middle age were found to be associated with lifetime socioeconomic position. Low childhood economic position added to the effect but was not sufficient to program a higher basal set point in the HPA axis in adults who improved in socioeconomic status after childhood (Li, Chiou, & Shen, 2007).

On the other hand, using a sample of adults in their 30s who were specifically selected to represent low or high socioeconomic status prior to the age of 5, higher CORT levels were found across the day as evidence that the immune system had been programmed for larger inflammatory responses and poorer containment by CORT (G. E. Miller et al., 2009). These findings were not dependent on current income or position. Of course, even if childhood economic and social circumstances predict adult CORT levels, this would not prove that early socioeconomic adversity programmed the HPA axis. Childhood socioeconomic position may have affected other aspects of the individual's functioning that helped carry its effects forward. This appears to be the case in a study of middle-aged adults for whom childhood disadvantage predicted higher diurnal CORT at middle age (Franz et al., 2013). This effect was mediated by intellectual functioning in early adulthood, which in turn influenced adult socioeconomic position, which then predicted adult CORT. Such findings strongly argue for the need to develop and test cascade models to understand how early adversity ultimately affects stress reactivity and regulation in adulthood. Also, given the variability in results, it is likely that it is not poverty but factors associated with poverty, such as maternal depression leading to lower quality care, that affect the development of stress reactivity and regulation.

Parental Separation and Loss

Loss of a parent in childhood is a risk factor for poorer mental and physical health throughout development (Wilcox et al., 2010). A number of studies have examined CORT in adults who lost or were separated from their parents during childhood. The strongest evidence that such experiences produce long-term effects on the HPA axis comes from studies conducted on adults who were children during World War II and who, for their protection, were sent away from their families. Studying the responses of elderly men and women, one research group (Pesonen et al., 2010) found larger CORT responses to the TSST for those who were separated from their mothers or both parents, but not for those separated only from their fathers.

Interestingly, adults who were separated as preschoolers differed more from the control group than those separated as infants or school-aged children. There are more studies examining adults with childhood bereavement or separation, but none of them differentiated early from later loss. One study of middle-aged men found higher early morning and late afternoon but not bedtime home CORT (Nicolson,

2004). Another study of young adults probed the HPA axis using the DEX/CRH test and found that adults who had experienced loss of a parent or close friend prior to age 19 exhibited larger CORT responses. The largest responses were from those who reported a warmer and more supportive relationship with the parent prior to the parent's death (Tyrka et al., 2008). In sum, studies examining CORT years after childhood bereavement find HPA hyperactivity.

At least two studies have examined HPA-axis activity closer in time to bereavement. For example, children 7 to 13 years old were studied every 6 months for 2 years beginning an average of 19 months after losing a parent in the terrorist attacks on the United States on September 11, 2001. A number developed anxiety, depression, and attention-deficit/hyperactivity disorder (ADHD). Compared with children from the same communities who did not have family members who were killed that day, the bereaved children had higher diurnal CORT levels early in the morning and at 4 p.m. but not at bedtime and they also showed less suppression of CORT to dexamethasone (Pfeffer, Altemus, Heo, & Jiang, 2007).

In sum, there appears to be growing evidence that losing a parent during childhood is associated with anxiety, depression, and a more hyperactive HPA axis. Increased activity of the axis appears to emerge with bereavement and to remain for years, well into adult life. As is discussed in the sections that follow, this contrasts with the effects of maltreatment and trauma, which appear to shift from a hyper- to a hypoactive pattern with time, unless the person develops depressive illness. Parental loss increases the risk of depression, but depression was not necessary to observe increases in HPA-axis set points in the above studies. Clearly the HPA axis can be reset to a higher baseline and response level and stay there for years without becoming downregulated. There must, then, be something different about the neurobiological response to separation and bereavement from the response to other kinds of chronic threats and stressors. Understanding this difference would seem critical in understanding the sequelae of early adversity. One possibility that has not been explored is that the emotions accompanying the initial elevations in CORT (i.e., sorrow versus fear) may set different neuroendocrine and epigenetic processes into motion.

Although studies of childhood loss and bereavement are taken as evidence that early experiences may program the HPA axis, caution is warranted. First, the wide ages over which long-term effects take place raise questions about whether a programming or sensitive period interpretation really is appropriate. If it is a sensitive period effect, it

would appear that the HPA axis is sensitive to programming by loss of an attachment figure from birth until at least Age 19, the oldest age used in these studies. Second, no adult comparison group is included. It is not known whether loss of an attachment figure as a child has a greater long-term effects on the HPA axis than loss that produces grief at any other point. Third, while many of these studies also measured psychopathology, none examined whether the HPA axis mediated associations between bereavement and symptoms of emotional problems. Future studies must address these questions.

Prenatal Stress

Some of the strongest evidence that stress has developmental programming effects comes from research on the prenatal period. We have reviewed the work on prenatal stress and rely heavily on that review here (Gunnar & Davis, 2013). The concept of fetal programming arose with evidence that birth weight and/or preterm delivery predicts adult disorders, including heart disease, diabetes, and obesity. Two major hypotheses have been proposed to explain the processes of fetal programming: malnutrition and chronic exposure to CORT. These may be two related hypotheses because the effect of maternal malnutrition on the fetus has been shown in animal studies to depend on elevated CORT (Monk, Georgieff, & Osterholm, 2013).

Although poor maternal nutrition, exposure to toxins, and infections are all stressors reflecting a harsh environment, researchers have focused more narrowly on the role of maternal psychosocial stress. There is evidence that above nutrition and other risk factors, the mother's mental and emotional state has effects on her fetus. Minority status and discrimination may also conspire to produce prenatal stress and poor birth outcomes. Among immigrants, acculturation, rather than reducing poor pregnancy outcomes, increases low birth weight and premature birth (Callister & Birkhead, 2002). Greater acculturation among immigrant Hispanic women has been associated with a flatter diurnal CORT rhythm during pregnancy, which mediated the association between acculturation and birth weight (D'Anna-Hernandez et al., 2012). In another study of Hispanic women, acculturation predicted higher maternal stress, higher plasma CRH levels at 22 to 25 weeks gestation, and earlier delivery (Ruiz, Dolbier, & Fleschler, 2006).

Individual differences in maternal anxiety and perceived stress predict birth outcomes and child psychological functioning, even after controlling for other confounding factors. These studies, however, could simply mean that

women who are anxious and who report high perceived stress transmit these proclivities to their offspring genetically. This cannot be the case for babies conceived through in vitro fertilizations (IVF) in which the birth mother is not genetically related to the fetus. Studying a large number of twins representing both IVF pregnancies of related and unrelated mothers and fetuses, birth weight, duration of gestation, and conduct problems were all shown to be associated with the birthing mother's stress during pregnancy, regardless of genetic relatedness (Rice et al., 2010). Although more studies of this sort are needed, when combined with the animal studies and the work on natural disasters, it seems that there is clearly a phenomenon to understand. The following questions are relevant to this chapter: (a) are the HPA axis or its hormones and peptides involved in mediating these effects, and (b) do programming effects of prenatal stress include programming of the HPA axis? The answers to these questions are still uncertain, but considerable progress has been made since 2005.

Before discussing these issues, it is necessary to describe the physiology of stress during fetal development more completely (Gunnar & Davis, 2013; Sandman & Davis, 2012). During pregnancy there is an integration of the maternal HPA axis, the placenta, and the fetus's HPA axis (see Figure 4.3). During pregnancy, elevations in maternal

CORT stimulate increases in CRH gene activity in the placenta, resulting in increases in CRH and ACTH. CRH produced by the placenta stimulates increases in both fetal and maternal CORT production.

As the total production of CORT by the mother increases across her pregnancy, so do her levels of binding globulin. Therefore, for part of pregnancy, levels of unbound CORT are within or close to the levels of nonpregnant women. Also, during this time 11β -HSD2 in the placenta increases and serves the function of converting CORT to an inert substance, thus reducing and regulating the ability of maternal CORT to affect the fetus. All of these effects change as the baby approaches term. In the last trimester, levels of unbound, biologically active CORT in the mother increase precipitously as her cortisol binding globulin levels drop. Further opening the fetus to maternal CORT efflux, levels of 11β -HSD2 in the placenta decrease and there is a marked reduction in the fetus of co-localized 11β -HSD2 in GR-expressing cells. Thus under low-stress conditions, the fetus is protected from normal pregnancy levels of maternal CORT during roughly the first two-thirds of gestation, and then open to maternal CORT levels after that. Why? It seems likely that this reflects the dual roles of CORT during gestation; specifically, as a stress hormone and as a maturational hormone. During the last trimester

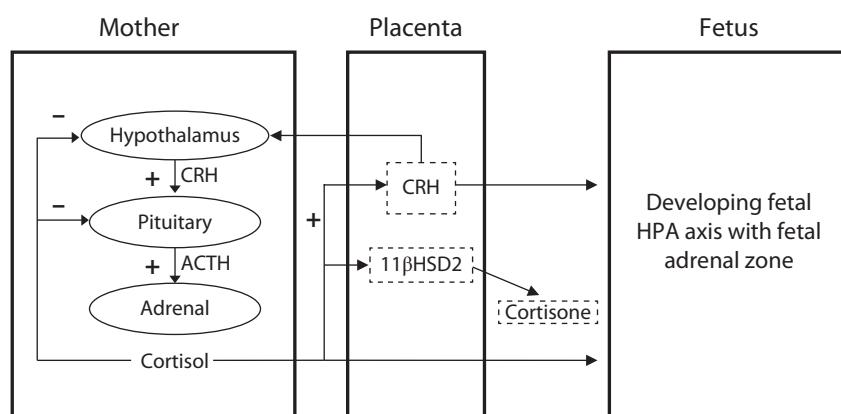


Figure 4.3 Schematic of the maternal, placental, and fetal HPA axis during gestation. During pregnancy, CRH is released from the placenta into both the maternal and fetal compartments. Cortisol *increases* the production of CRH from the placenta. Placental CRH (pCRH) concentrations rise exponentially over the course of gestation; however, the effects of maternal cortisol on the fetus are modulated by the presence of a placental enzyme, 11β -HSD2, which oxidizes cortisol into an inactive form, cortisone. Activity of this enzyme increases as pregnancy advances and then drops precipitously near term, allowing cortisol to promote maturation of the fetal lungs, central nervous system, as well as other organ systems. The fetal HPA axis begins its development early in gestation and becomes increasingly functional with the progression toward term. See text for description.

Source: From "The Effects of Stress on Early Brain and Behavioral Development," by M. R. Gunnar and E. P. Davis, 2013, in J. Rubenstein and P. Rakic (Eds.), *Neural Circuit Development and Function in the Brain* (pp. 447–465), New York, NY: Elsevier. Reprinted with permission.

of pregnancy, CORT serves to mature the infant, preparing it for delivery. For example, CORT stimulates the lungs to produce surfactant, which is necessary to allow the baby to breathe air.

Because the baby needs to experience elevated CORT levels for its tissues to mature, it would seem reasonable to assume that nature has equipped the fetus with the ability to cope with higher CORT levels during the last trimester, although not perhaps the supraphysiologic levels used therapeutically to rapidly mature the infant's lungs when there is the risk of premature labor. In contrast, given the multiple mechanisms present during early pregnancy to protect the fetus from maternal CORT, we might expect that elevated levels in the mother that are high enough to overwhelm these mechanisms will have significant long-term effects. Indeed, when the mother is chronically stressed and producing elevated CORT levels, this serves to downregulate 11 β -HSD2. This has been observed as a function of maternal anxiety and depression during pregnancy (Gunnar & Davis, 2013).

In animal studies, there is strong evidence that the effects of maternal stress on the fetus are mediated by the mother's production of CORT (Meaney, Szyf, & Seckl, 2007). What evidence exists of HPA-axis mediation of prenatal stress effects in humans? The answer to this question is a bit complex. Although there is evidence that maternal CORT affects fetal CORT (as measured in amniotic fluid), associations between maternal reports of stress, anxiety, and/or depressive symptoms do not always correspond to either maternal or fetal CORT levels (Baibazarova et al., 2013). Furthermore, maternal psychological state in pregnancy and maternal CORT levels independently predict child outcomes (Sandman & Davis, 2012). Thus, it is not clear that the HPA axis is the primary pathway through which maternal emotions produce effects on the fetus. What does seem fairly clear, however, is that activity of the mother's HPA axis affects fetal development. Furthermore, there is evidence that the timing of elevated maternal CORT levels matter in determining the nature of the effects.

Given the changes in mother–infant HPA physiology over the course of pregnancy, it has been argued that elevated CORT earlier in pregnancy, before the third trimester, will have more negative effects on fetal development than elevated CORT later in pregnancy (Sandman & Davis, 2012). A number of the results point in this direction. For example, placental CRH (pCRH) levels at 25 weeks gestation predicted increased risk of preterm delivery and increased fearfulness at 2 months postnatal, while

pCRH levels at 31 weeks did not. Likewise, high levels of maternal CORT in the second trimester predicted lower mental development scores at one year, whereas higher levels of maternal CORT in the third trimester predicted the opposite (for review, see Sandman & Davis, 2012). Finally, higher maternal CORT earlier but not later in gestation has also been associated with larger amygdala volume and more emotional problems in 7-year-olds, mediated in part by amygdala size (C. Buss et al., 2012).

In a few of the above studies, effects were observed only in girls (Gunnar & Davis, 2013). There is also evidence in animal studies that prenatal stress differentially affects male and female fetuses with more emotional effects seen in girls and more learning problems observed in boys (Sandman & Davis, 2012). The question of sex differences in the effects of prenatal stress in humans has not been sufficiently examined to allow for conclusions at this point.

There are an increasing number of studies examining whether prenatal stress has programming effects on the HPA axis, although the issue is far from settled. Thus, both pregnancy-specific anxiety and maternal CORT levels during the first trimester have been shown to independently predict higher CORT levels in the child at 4 years during an inoculation stressor and at 5 years in response to starting school (Sandman & Davis, 2012). High levels of CORT in amniotic fluid at 17 weeks gestation, but notably not in maternal saliva, predicted atypical patterns of CORT response to the Strange Situation, compared with moderate to low amniotic fluid levels (O'Connor, Bergman, Sarkar, & Glover, 2013). Controlling for prenatal and postnatal factors, maternal but not paternal prenatal anxiety predicted a blunted CAR and flatter diurnal rhythm in 14-year-old boys and girls (O'Donnell et al., 2013). Finally, in a study of women and their fetuses exposed to anxiety about radiation from Chernobyl, higher CORT levels at 14 years of age were noted for both boys and girls relative to levels for adolescents close in age who were not in utero during this anxious period (Huizink et al., 2008).

The strongest evidence that CORT affects fetal development comes from studies in which the fetus has been exposed to high levels of CORT for therapeutic reasons (Reynolds, 2013). In women at risk for preterm labor, CORT in some form (e.g., betamethasone) is administered. If preterm delivery does not follow, children carried to term provide a model of prenatal CORT effects. The results show reduced birth length, weight, and head circumference, and increases in CORT responses in the neonatal period. Effects are larger when CORT is administered earlier in gestation (i.e., closer to 24 weeks than to 34 weeks, the age range

when the drug is given). Finally, CORT exposure is associated with bilateral cortical thinning, most clearly in the rostral anterior cingulate cortex (Sandman & Davis, 2012).

There is growing evidence that even if prenatal stress affects fetal development, many outcomes are moderated by the care the infant receives after delivery. In the study of prenatal stress, similar findings have been reported for emotional and cognitive outcomes (Bergman, Sarkar, Glover, & O'Connor, 2010). However, there have been few studies examining whether prenatal stress interacts with postnatal caregiving to predict activity of the HPA axis. In one of the few studies available, prenatal maternal anxiety and postnatal caregiving had independent effects on infant CORT responses to the still-face procedure (Grant et al., 2009); however, in another study, postnatal CORT levels were moderated by maternal sensitivity, but only for infants whose mothers had a mental health diagnosis (Kaplan, Evans, & Monk, 2008). Studies are needed to determine whether prenatal stress effects can be eliminated by postnatal caregiving.

To summarize, there is a growing body of evidence indicating that prenatal stress has long-term or programming effects on the fetus, that CORT is involved in at least some of the effects, and that the programming effects may include the HPA axis, increasing basal levels and stress reactivity. There are arguments, however, over how to interpret these effects. Are they impairments or shifts in developmental strategies? There are also arguments over whether the effects are comparable across all levels of prenatal stress or at all points in development. Taking the second issue first, some have argued that the effects of prenatal stress are overstated and that in some populations they enhance development (Dipietro, 2012) or that if mild, they may have positive effects (Sandman & Davis, 2012). The question of whether the effects of prenatal stress should be viewed as impairments or as a reflection of adaptive developmental plasticity are more complex. The programming argument typically has been framed from an evolutionary perspective; specifically, the effects of stress prenatally serve to increase survival of the fetus and the reproductive success of the genes the mother and fetus share. However, the models differ in the importance of the match between pre- and postnatal environment in predicting whether healthy or unhealthy outcomes are predicted. Typically health is predicted in these models when there is a mismatch between the harshness of pre- and postnatal environments (Gluckman et al., 2007). Pluess and Belsky (2011), in contrast, argue that prenatal stress increases fear and stress reactivity but that the effect is to make the

child more sensitive to context; thus the prenatally stressed offspring will do poorly in harsh contexts (environments that match prenatal conditions) but extremely well in supportive ones (environments that mismatch prenatal conditions). There is support for both types of predictions. For example, in a study of maternal depressive symptoms, infants did better in terms of health and IQ in their first year of life if the mother's symptoms were stable from the pre- to the postnatal period and worse if she either developed symptoms postnatally that were not there earlier or the reverse (Sandman & Davis, 2012). In contrast, postnatal experiences may moderate associations between prenatal CORT levels and postnatal outcomes, with some evidence that more reactive infants were more sensitive to postnatal experiences (Bergman et al., 2010). Thus far, there are too few studies that have examined, rather than statistically controlled for, postnatal experiences to differentiate between these perspectives.

Parenting and Risky Family Environments

Repetti, Taylor, and Seeman (2002) coined the term *risky families* to refer to family environments that were chronically stressful and/or deficient in warmth and support. While such families can be found at all income levels, they tend to concentrate more among those lower in income, and thus may mediate some of the effects of socioeconomic position on the HPA axis and lifelong health (Repetti et al., 2002). As already described "Normative Development of the HPA System," the presence and availability of a supportive adult with whom the child has a secure attachment relationship provides a powerful buffer that reduces activation of the HPA axis to a range of potentially threatening events. In the following section we examine evidence that variations in care shape children's stress responses and their ability to regulate those responses. We examine this question first in relation to parental warmth and support and then with regard to harsh discipline and interparental conflict and violence. Finally, we examine the few parenting intervention studies that have examined effects on the HPA axis.

Regarding warmth and support, or rather the lack thereof, despite the ranges of ages studied and the different types of measures used, most studies provide evidence that less supportive care is associated with higher CORT levels and greater CORT reactivity. The largest study was conducted in the Netherlands (Marsman et al., 2012) and included over 1,500 11-year-olds. Children who described less parental support and more parental rejection had

higher basal levels of CORT and higher CARs. Results were obtained controlling for family income. In another large sample of younger children, direct observations of mother–infant interaction at 7 months showed that lower maternal support was associated with less CORT responsiveness at 7 months but overall higher CORT levels by the time the babies were toddlers (Blair et al., 2008). The 7-month measures were obtained in response to a combination of one fear and two frustration tasks. Distress responses to frustration are greater for infants with higher expectations of agency, which might explain the direction of effects at their 7-month age point (Lewis, Hitchcock, & Sullivan, 2004). In another study of 7-month-olds (Grant et al., 2009), using the still-face paradigm that mimics maternal withdrawal of affection, lower maternal sensitivity predicted larger CORT responses. More negative interaction with fathers has also been related to CORT activity in infants at 7 months and in a longitudinal study with toddlers at 24 months (Mills-Koonce et al., 2011). In several studies, mothers who were more withdrawn had children who either showed larger CORT responses to the Strange Situation or exhibited initially elevated and then declining levels of CORT in response to this task (Sturge-Apple et al., 2012).

Nonetheless, higher CORT activity has not always been associated with lower warmth and support. In one of several examples, preschoolers whose mothers were more negative and lower in warmth exhibited a flatter diurnal slope in CORT (Zalewski, Lengua, Kiff, & Fisher, 2012). In this study maternal negativity and low warmth mediated the relations between family income and children's CORT. Notably, in this and another study that also found lower cortisol with lower maternal warmth, the children were drawn from populations for whom low warmth was compounded by poverty and, thus, other adversities. Thus, cumulative stress may have resulted in a downregulation of the HPA axis in these studies.

Hostile, threatening forms of discipline such as yelling and spanking can be frightening to children. While there tends to be a negative association between discipline and parental warmth and support, these dimensions can be disentangled. A small study revealed that mothers who used physical punishment had infants who showed larger CORT responses to maternal separation and interaction with a stranger at 12 months (Bugental, Martorell, & Barraza, 2003).

In a larger study, children on a Caribbean island were sampled for CORT in the morning and evening daily for months. Using each participant as his or her own

control, CORT levels were significantly elevated following bouts of harsh discipline and these elevations were larger than responses to other common stressors (Flinn & England, 1995). Finally, combining three samples of 2- to 6-year-olds that used similar methods, mothers who reported using more shouting with their children had children who exhibited higher CORT levels 20 and 65 minutes after strangers arrived at the homes to assess both mothers and children (Hastings et al., 2011). Other studies have also found positive associations between CORT and harsh discipline, but for only some of their participants. Thus, for example, this association was found among children whose mothers were high on depressive symptoms, but not for the other children who experienced harsh discipline (Essex et al., 2011).

Finally, there is at least one publication reporting an association between blunted CORT and greater conflict. This was a study of preschoolers in which the child wore a voice-activated recorder for one weekend day and CORT was assessed across the day on both weekend days (Slatcher & Robles, 2012). Children who were involved in more conflicts had a lower CORT at wakeup and a flatter diurnal slope. It is unclear whether the conflicts were with parents and there was no measure of parental harsh discipline. These findings might reflect associations with conduct problems rather than with parenting (see “Developmental Psychopathology” later in this chapter).

Poor marital quality and aggressive conflict tactics among parents are important contributors to risky family environments (Repetti et al., 2002). Violent arguments between parents should be a significant stressor for children, but not all children show adverse effects. Indeed, there is evidence that emotional insecurity in response to parental fighting determines long-term effects (Davies, Sturge-Apple, & Cicchetti, 2011). Few studies have examined whether CORT responses in children reflect their insecurity in response to parental conflict. In one that did (Koss et al., 2013), children who were more distressed, more dysregulated, and more involved in parental fights were more likely to show a rising pattern of CORT in response to a simulated parental argument. The other studies by this research group all showed that greater exposure to parental fighting was associated with a smaller CORT response to the simulated fight paradigm (Sturge-Apple et al., 2012). This might be because children accustomed to their parents fighting judged the simulated fight to be of low intensity relative to fights they experienced at home. Indeed, overall, CORT levels decreased from pre- to post-testing in this paradigm. In contrast to children's

responses to a simulated fight, infants exposed to more violence in the home showed larger CORT responses to fear- and frustration-eliciting tasks (Towe-Goodman, Stifter, Mills-Koonce, & Granger, 2012). Likewise, in both kindergarteners (5–7 years) and adolescents, poor marital quality has been associated with higher morning and evening CORT levels (Pendry & Adam, 2007). Although more studies are needed to clarify the effects of marital conflict on children's stress responding, it seems likely that the effects may be twofold: increasing HPA reactivity among children who become emotionally insecure as a result of exposure, and habituating the system to mild examples of parental conflict.

Interventions provide the best proof that parenting affects children's CORT activity. To date, there have been seven randomized clinical trials of parenting interventions in which basal and/or diurnal CORT has been measured. All of these studies have been with infants or preschoolers (e.g., Bakermans-Kranenburg, Van IJzendoorn, Mesman, Alink, & Juffer, 2008; Cicchetti, Rogosch, Toth, & Sturge-Apple, 2011; Fisher, Stoolmiller, Gunnar, & Burraston, 2007). This work has shown that interventions that improve parenting lower CORT or, in studies of maltreated children, bring patterns of CORT production in line with those of children in the nonmaltreated comparison group. In one study, the intervention effects were observed only for the children with the 7-repeat DRD4 polymorphism; however, they were the ones expected to be in greater need of the intervention (Bakermans-Kranenburg et al., 2008).

Finally, so far we know of only one study that has examined the effect of a parenting intervention on CORT reactivity. This study was done with the preschool siblings of adjudicated youth who were themselves at high risk of developing conduct problems and antisocial behavior. As discussed earlier, low arousal and the failure to mount physiological reactions to interpersonal threats is believed to play a role in antisocial behavior problems (van Goozen et al., 2007). Thus this intervention was designed to improve parenting, children's social competence, and to *increase* CORT levels in anticipation of entering a new peer group (O'Neal et al., 2010). The results revealed that, over time, the preschoolers in the intervention group showed increasing levels of CORT just prior to entering new peer groups and the increase in CORT predicted reductions in aggressive behavior during peer entry. There was evidence that this anticipatory CORT was correlated with improvements in parenting, but a mediational analysis was not reported. It would be useful to have more studies examining CORT reactivity.

Overall, studies of the relations between parenting and activity of the HPA system provide good support for the hypothesis that the parent–child relationship is important in regulating activity of the system. Furthermore, intervention studies clearly show that parenting plays a causal and not just correlative role in stress hormone activity during childhood. Most studies indicate that adverse parenting is associated with greater activity of the HPA axis. What is unclear in these studies is whether set points have been programmed. The fact that interventions can alter HPA-axis activity in children suggests that results do not reflect stable epigenetic changes in the axis. More long-term studies that include interventions at different ages are needed to determine whether there are sensitive periods for parenting effects on the axis.

Of course, even if the axis is not programmed by normative variations in parental care, brain systems that are developing during periods of poorer parental regulation of the axis might be affected. Thus the importance of parenting effects on the HPA activity does not solely lie in whether long-term effects on CORT are observed. Studies are needed to analyze whether parenting effects on other outcomes, including brain structure and function, are mediated in part through effects on activity of the HPA axis. In addition, there is the possibility that individual differences among children may influence the openness of the axis to programming by parent–child relationship. Finally, it also may be that when poor parenting becomes abusive and traumatic there will be longer-term effects on the HPA axis and on other neurobiological systems involved in defensive responding. We now turn to that area of research.

Maltreatment

Neglect and abuse are potentially traumatic experiences that threaten a child's viability. Experiences of physical and sexual abuse can co-occur with adequate or even good parenting, while neglect is typically more chronic and may even threaten healthy development more severely (De Bellis, 2005). Maltreated children typically experience multiple forms of maltreatment along with other types of adversity during childhood (see also Cicchetti & Toth, Chapter 13, this *Handbook*, this volume). These experiences increase the risk of a range of pathological conditions, although many and perhaps even most maltreated children display remarkable resilience (Cicchetti & Rogosch, 2007).

Much of the neurobiological work in this area has been guided either by adult research on posttraumatic stress disorder (PTSD) or by work on depression. In adults,

these disorders display markedly different neuroendocrine signatures. PTSD is associated with upregulation of the sympathetic nervous systems in conjunction with a downregulation of the HPA axis and increased negative feedback regulation (Yehuda, 2009), while depression is associated with hyperactivity of the axis and reduced negative feedback regulation (Heim, Newport, Mletzko, Miller, & Nemeroff, 2008). One of the major challenges is determining how different signatures could emerge and what effect childhood maltreatment has for those who are resilient and do not develop disorders. We cover issues of depression, maltreatment, and the HPA axis later in the section called “Developmental Psychopathology.” In this section we first focus on adult survivors of childhood maltreatment with and without PTSD. After dealing with the adult literature, we examine the effects of childhood maltreatment on the HPA axis in childhood.

Studies of adult maltreatment survivors provide a fairly consistent picture of the long-term consequences of childhood maltreatment. Across abuse subtypes, adults who were maltreated as children exhibit lower basal levels of CORT later in the day and stronger suppression to dexamethasone (Morris, Compas, & Garber, 2012), as well as blunted responses to psychosocial challenges such as the TSST (Heim & Binder, 2012). Notably, meta-analyses have shown that suppressed afternoon and evening basal levels and enhanced response to DEX do not differ for adult survivors of maltreatment as a function of whether they have developed PTSD or not (Morris, Compas, et al., 2012). In addition, trauma in childhood appears to reduce methylation of the FKBP5 gene in regions of the gene that are responsive to CORT (Klengel et al., 2013). Recall that FKBP5 is the co-chaperone that reduces the ability of CORT to bind to GR. CORT regulates this gene, with increases in CORT increasing gene transcription as one mechanism that protects the organism from being overly affected by stress-stimulated increases in CORT. Thus, demethylation of the FKBP5 gene amplifies the protective mechanism, but protection from some insults can increase risk of others. There is evidence that in conjunction with childhood trauma, individuals who already carry the version of the FKBP5 gene that is hyperresponsive are at risk for developing PTSD, perhaps because stimulation by elevated CORT post-trauma is actually important for normal processing of the traumatic event (Heim & Binder, 2012). Another factor that might increase the risk of PTSD given childhood maltreatment is upregulation of the sympathetic system. Hyperresponsiveness of the sympathoadrenal system is noted among adults with PTSD and adolescents

who will show increasing emotional problems following trauma, but not among trauma-exposed but psychiatrically healthy adults (Lovallo, Farag, Sorocco, Cohoon, & Vincent, 2012).

One reason that the adult work is informative is that pharmacological probes can be used to determine whether changes in CORT production are due to physical changes in the axis as opposed to changes in psychological processing of negative events in higher brain regions. Here the evidence strongly suggests that epigenetic changes within the axis are responsible for the blunting of the CORT response. Indeed, in addition to evidence of upregulation of the GR gene as suggested by enhanced suppression to DEX, blunted ACTH and CORT responses to stimulation by the DEX/CRH test have also been observed in psychiatrically normal adult survivors (Klaassens et al., 2009).

Thus, setting aside adult depression, exposure to maltreatment in childhood appears to downregulate the HPA axis. The processes are complex and interactive, with evidence of upregulated GR but also upregulation of mechanisms that prevent CORT from binding to GR. The complexity within the HPA system should alert us to the general systems nature of adaptation to maltreatment. There are likely many adaptive systems that show this type of reaction and counterregulatory responses. The complexity is nearly overwhelming, so it should not be surprising to find that when the dynamics of development are added, the picture will be unclear, at least until much more is understood about these neurobiological processes.

Indeed, studying children exposed to abuse and neglect has yielded elevated, suppressed, and nonaltered patterns of CORT activity, and there have been a number of good reviews (e.g., Carrion & Wong, 2012; De Bellis, 2005). There are likely a number of reasons for this inconsistency, but the most salient is that this is not only a developing system, but one that may be changing over time in relation to time-since-trauma. This is notable in studies of children with PTSD. Unlike adults with PTSD, children with PTSD tend to exhibit higher than normal levels of CORT (Morris, Compas, et al., 2012). One of the major questions has been whether there is a shift from elevated to suppressed activity as these children mature and, if so, is this shift a function of age or time since the trauma?

At this point the answer is still unclear. Adolescents who were in a relocation camp 2 months after Hurricane Katrina exhibited lower basal CORT levels but not salivary alpha-amylase levels than did age, sex, race, and economically matched comparison teens (Vigil, Geary, Granger, & Flinn, 2010). Thus CORT appeared to already

be downregulated 2 months after a trauma in these youth. In another sample of adolescents, exposure to violence over the previous year was associated with blunted CORT responses to the TSST (Peckins, Dockray, Eckenrode, Heaton, & Susman, 2012). In contrast, in children, those experiencing more traumatic events in the previous year were found to have higher diurnal CORT (Bevans, Cernone, & Overstreet, 2008). In none of these studies were children with PTSD examined separately from other children and many of the children did not carry any psychiatric diagnosis. When children with varying degrees of PTSD were followed from childhood through adolescence and into early adulthood, a shift in basal CORT levels from elevated to blunted occurred approximately 6–8 years posttrauma (Trickett, Noll, Susman, Shenk, & Putnam, 2010). Trickett and colleagues (2010) reported that this shift was more closely associated with time since identification of the trauma than child age; however, this was only one study and the information it contains pertained only to girls who were sexually abused. Notably, however, a similar conclusion was obtained in the meta-analysis described earlier that included adult-onset trauma exposure as well (Morris, Compas, et al., 2012). More longitudinal studies are needed examining different types of trauma exposure for children at different ages to distinguish between time-related and development-related effects.

A second very critical issue is whether the child is experiencing ongoing adversity. Even if the child is no longer being maltreated, his or her ongoing family situation may be difficult and parenting might still be poor. Often, ongoing family stress is not reported or examined. However, as demonstrated by Kaufman and colleagues (1997), maltreated and depressed children show larger responses to a CRH challenge test, but only if they are experiencing ongoing adversity at home. Likewise, for children in foster care, morning CORT concentrations become more dysregulated with each major care transition (Fisher, Van Ryzin, & Gunnar, 2011). Thus current stressors and protective processes may introduce tremendous heterogeneity making it difficult to discern how maltreatment has affected children's stress reactivity and regulation. Another potential problem in the child literature is that there are very few studies of stress responses to challenging tasks. Nearly all of the data pertain to ambulatory levels. This adds additional complications when researchers have taken samples at different times of the day and in different contexts (i.e., coming to the laboratory, in the home, at a summer camp).

Because of the heterogeneity of findings, much of the attention in the child literature has been focused on trying

to understand how individual differences in children might help to explicate inconsistent findings. Thus, Cicchetti, Rogosch, Gunnar, and Toth (2010) examined whether internalizing problems in maltreated school-age children moderated effects on CORT levels assessed during a summer camp. Only children with high internalizing symptoms exhibited altered CORT levels and then only if they had been abused (not just neglected) before Age 5. In a subset of this sample, the same effect was noted for children with the TAT haplotype of the CRHR2 gene, but for this subset it did not matter whether abuse began before or after Age 5 (Cicchetti, Rogosch, & Oshri, 2011). Finally, children with PTSD exhibit higher CORT levels over the day; elevated late afternoon and evening levels in these children predicted decreasing volume of the hippocampus and left ventral PFC (Carrion & Wong, 2012).

We and others have examined children adopted from conditions of deprivation and institutional neglect as a way of examining neglect relatively independently from abuse in children who are not suffering ongoing maltreatment. The results of these studies have also been mixed (Hostinar & Gunnar, 2012). One factor that appears to be significant is whether the child suffered a pattern of growth delay consistent with psychosocially induced short stature (D. E. Johnson & Gunnar, 2011). Children who are stunted at adoption but then exhibit catch-up growth and are no longer stunted at assessment tend to display a flatter pattern of CORT production over the day due to slightly lower morning and higher evening levels (A. E. Johnson et al., 2011).

Importantly, among postinstitutionalized children, late afternoon and evening levels correlate positively with the frequency and severity of the types of problems, specifically indiscriminate friendliness, attention problems, and emotion regulatory problems, that characterize these children (A. E. Johnson et al., 2011; Kroupina et al., 2012).

In all of this work on maltreated children, it is not clear whether the lowered morning levels are characteristic of the children or responses to events on the previous day and evening. There is evidence in animal models that it is critical to bring CORT levels down to near zero in order to reset the diurnal cycle (Akana et al., 1992). In foster care children, CORT levels are suppressed at wake-up on days after the foster parents reported that they were stressed by the child's problem behavior, but not if the foster parents reported child behavior problems that did not create much parenting stress (Fisher & Stoolmiller, 2008). Because, in this intervention study, the intervention lowered parent reports of stress in response to child problem behaviors, one interpretation of the CORT findings is

that stressed parents communicate their irritation with the children, which produces elevated child CORT into the evening hours, which in turn suppresses morning levels. The possibility that morning levels are being driven down by higher levels into the evening is consistent with data on overnight urinary CORT collected from preschoolers adopted from Russian and Eastern European orphanages who were at least 3 years postadoption (Wismer Fries, Shirtcliff, & Pollak, 2008). Although these children's first void CORT concentrations did not differ from those of comparison children, concentrations were higher for those who had suffered severe neglect. Because urinary concentrations reflect activity of the axis many hours earlier, these data suggest increased activity in the late evening and early period after sleep onset. Similar studies combined with salivary measures over the day would be helpful. CORT and sleep are intimately related and thus including sleep measures would be informative (Tininenko, Fisher, Bruce, & Pears, 2010).

Finally, as noted above, there are very few studies examining CORT reactivity among maltreated children, even though most theories involve effects on reactivity rather than basal levels. Here again the results are mixed. Studying 12-year-olds who had been abused by parents, peers, or both, one study reported blunted responses to the TSST with lower CORT responses being associated with more behavioral and emotional problems for the abused children (Ouellet-Morin et al., 2011). Studying postinstitutionalized children of about the same age, we found no difference in response as a function of early institutional care (Gunnar, Frenn, Wewerka, & Van Ryzin, 2009). We did find, however, that the postinstitutionalized children exhibited higher sympathetic tone (Gunnar, Frenn, et al., 2009). Both types of social engagement raised CORT levels in postinstitutionalized preschoolers interacting with strangers (rather than mothers), whereas among children in the nonadopted comparison group, interacting with mothers lowered CORT (Wismer Fries et al., 2008). Despite the ethical challenge of conducting stress tests on emotionally vulnerable children, a much better understanding of how neglect and abuse affect stress reactivity is still needed.

In summary, there is increasing evidence that childhood maltreatment affects the developing HPA axis. The evidence is clearest in studies of adults where there has been enough work to determine that trauma exposure alone is sufficient over time to result in a downregulated HPA system. It is unclear whether age at exposure matters; although, the passage of time does appear to be relevant. Numerous factors moderate these findings, the most

critical of which appears to be the development of affective pathology. PTSD is associated with asymmetrical effects on the HPA (blunted) and autonomic (heightened) systems, whereas depression produces the signature of heightened adrenal production of CORT and often a reduced capacity for negative feedback (e.g., Heim et al., 2008). Longitudinal studies are needed to focus on understanding the relations among maltreatment, stress biology (both HPA and autonomic), and the development of neural systems involved in stress and emotion regulation. These studies, however, will have to examine ongoing as well as prior adversity along with the quality of children's relationships and their ability to use relationships to regulate stress.

General Summary of Research on Early Adversity

As this section has shown, studies of early adversity have burgeoned in the decade prior to the time of this writing, from work on poverty to bereavement, prenatal stress to maltreatment. A wealth of evidence shows that adversity in childhood affects the HPA axis and CRH and a small but growing body of evidence that this serves as a pathway through which early adversity affects neurobehavioral development and health. There is still a good deal that is not understood. Poverty, in and of itself, seems to be unreliably related to stress reactivity and regulation. Other types of adversity discussed here are likely mediators. Prenatal stress, but not necessarily maternal emotional state, seems to upregulate the HPA axis, decrease birth weight, and increase fearfulness. Parental loss and risky family environments also seem to upregulate the system, but in contrast, maltreatment, perhaps particularly physical and sexual abuse, downregulate the HPA axis, except possibly in those individuals who develop depression (see Depression section). Why different types of stressors have different effects, whether it is type or severity, whether there are sensitive periods and, if so, whether they are the same for different facets of the stress system are questions that must be answered to move the field forward.

TEMPERAMENT AND STRESS VULNERABILITY AND RESILIENCE

Temperamentally shy, behaviorally inhibited children are at risk for developing social anxiety disorders by adolescence, and thus much of the research on stress vulnerability and resilience has focused on this temperament dimension (see review, Fox et al., 2010; Hostinar & Gunnar,

2012). We argue that temperamental shyness increases vulnerability to both adverse childhood experiences and the normative challenges of childhood. It is associated with the affective neurobiology of fear and social phobia that, when activated, stimulates increased HPA axis activity. Furthermore, elevations in CORT can act on these systems to enhance fear memories, increase vigilance to threat, and lower thresholds for subsequent anxious reactions to socially challenging situations (Rosen & Schulkin, 1998). However, low shyness and high extroversion are not necessarily protective. The protective value of a socially outgoing temperament depends on whether extroverted children have sufficient self-regulation to manage their exuberance in appropriate ways. If not, these children are vulnerable to the stress of peer conflict and rejection, and this vulnerability may foster the development of externalizing problems (Oldehinkel, Hartman, De Winter, Veenstra, & Ormel, 2004).

As we discuss in this section, shy/inhibited children do not always activate the HPA axis in response to social challenge. Whether or not they do depends, in part, on whether they embrace or avoid the challenge. If they successfully avoid, the very behavior (i.e., inhibition of approach) that defines behavioral inhibition reduces HPA axis reactivity. If they cannot avoid or choose to approach situations they find threatening, increased HPA axis activity may be observed (Tarullo, Mliner, & Gunnar, 2011). Because of these dynamics, it is helpful to have a cumulative measure of HPA-axis activity that reveals responding over time to multiple instances of challenge, some of which can be avoided and some cannot. In monkeys, behaviorally inhibited temperament is associated with higher CORT levels assessed using hair CORT (Laudenslager, Jorgensen, Grzywa, & Fairbanks, 2011). No studies with children have examined hair CORT in relation to shyness/inhibition, but such work would be helpful. Instead, there are studies examining children's reactions to different social situations.

Shy/inhibited children tend to exhibit relatively low levels of CORT in anticipation of entering a new social group, but higher late afternoon and evening CORT levels following the social challenge (for review, see Hostinar & Gunnar, 2012; Russ et al., 2012). Thus, unlike exuberant children who mount a preparatory response and then return to baseline levels, many shy/inhibited children do not prepare physiologically for the challenge of being with peers and then fail to bring levels to baseline for hours after the encounters are over. Once in the peer group, whether or how fast CORT increases depends on the shy/inhibited

child's coping strategies. Shy/inhibited children who spend more time in solitary play show lower CORT responses to group entry (Davis & Buss, 2012). Similarly, over the course of a preschool year, shy/inhibited children who avoid social contact show stable or declining CORT levels (Tarullo et al., 2011). Of course, avoiding social contact, while it may reduce acute experiences of stress, sets children up for developing poorer social skills and experiencing continuing problems in negotiating the social landscape of childhood. This may be why mothering that is overprotective and controlling is associated with sustained inhibition throughout childhood and increased likelihood of developing anxiety disorders (Lewis-Morrarty et al., 2012).

Approaching what frightens you should activate the stress system. There is now evidence that this is what happens when shy children attempt social engagement. For example, in one study shy children who spent more time hovering and attempting to enter into peer interaction produced a more prolonged CORT response to group entry than did shy children who spent more time playing alone (Davis & Buss, 2012). Studying shy/inhibited children across a year of preschool, those who showed increases in CORT levels as the year progressed surprisingly were more socially competent, had more friends, and were better integrated socially into the classroom (Tarullo et al., 2011).

The fact that social approach and peer engagement are both stressful for shy children and essential for developing social competence points to the possibility that activation of the HPA system may, at times, be a component of resilience. What is not known is whether social competence developed at this cost will result in increases in allostatic load for these children. The allostatic load associated with social engagement for shy/inhibited children may depend on whether or not the social competence gained is sufficient to result, over time, in a reduction of anxiety about social interaction.

In addition to these data about peer interaction, stress, and shyness, there is increasing evidence that shy/inhibited children are especially vulnerable to increases in HPA-axis activity in response to adverse childhood experiences. This has been shown for interparental violence, harsh and/or less sensitive maternal care, and poorer quality childcare (Hostinar & Gunnar, 2012).

There is also increasing evidence that for shy/inhibited children, higher allostatic load and/or higher levels of CORT late in the day predicts the development of anxiety disorders and internalizing problems, perhaps most predictably for girls (K. A. Buss, Davis, & Kiel, 2011). Thus, in studying children in full-day childcare, the combination of shy/inhibited behavior and rising levels of

CORT over the childcare day predicted increasing levels of inhibition at childcare and higher internalizing problems (Gunnar, Kryzer, Van Ryzin, & Phillips, 2011). Notably, when CORT followed the normal diurnal decrease over the day in childcare, shy/inhibited children became less fearful over time and showed fewer internalizing problems relative to non-shy children. This last finding is reminiscent of the differential susceptibility and sensitivity to context hypotheses. Indeed, regarding internalizing problem scores, children lower in inhibited behavior were unaffected by whether they experienced increasing or decreasing CORT levels over the childcare day.

In work by Rothbart (Derryberry & Rothbart, 1997), shyness loads negatively on a higher-order temperament factor labeled surgency or extraversion. Children who score high on this factor seek stimulation, are impulsive, enjoy novelty, are not shy, and are high in activity. As noted earlier, such children are at risk for developing externalizing problems (Oldenhinkel et al., 2004). Although they tend to be the opposite of shy/inhibited children, highly surgent children are not necessarily stress resilient. Surgent children do tend to show habituation of the CORT response to parental fighting over time (Sturge-Apple et al., 2012). They are also less sensitive to whether they are in a childcare that produces increases or decreases in CORT over the day (Gunnar et al., 2011). However, while they do not tend to develop altered patterns of CORT or vagal tone reactions in response to harsher maternal care, they do show changes in sympathetic activity that, in turn, mediates externalizing behavior problems (Sturge-Apple et al., 2012).

Indeed, whether the surgent child experiences chronic or frequent elevations in CORT depends on whether they have the self-regulatory competencies to manage their exuberance in ways that do not create conflicts with others. For example, in a study of preschool children, surgency plus poor effortful control was associated with aggressive peer interactions that then resulted in more peer rejection and elevated CORT (Gunnar et al., 2003). For children who are social and outgoing, being isolated or ignored is emotionally distressing. Indeed, there is now evidence that social rejection activates the same circuits that process physical pain (Eisenberger, 2012). Although most surgent children show decreases in CORT over the school year, highly surgent preschoolers who were not well integrated into the social network and who had no close friendships did not show these declining CORT values (Tarullo et al., 2011).

These findings suggest that the relations between emotional temperament and stress vulnerability and resilience

depend to large measure on self-regulation. This has been shown in a large sample of 10- to 12-year-olds in the Netherlands. Among these youth, poor self-regulation increased the risk of behavior disorders later in adolescence, with temperament mediating the type of disorder: surgent temperament with externalizing, shy/inhibited temperament with internalizing (Oldenhinkel et al., 2004). In that study, self-regulation was assessed as effortful control, a construct that reflects regulation of reactive emotional dimensions of temperament (i.e., approach/impulsivity and fear/withdrawal) by corticolimbic attentional circuits (Derryberry & Rothbart, 1997). In work with Posner, Rothbart identified executive attention involving the anterior cingulate cortex (ACC) and the dlPFC, as fundamental to effortful control (Posner, Rothbart, Sheese, & Tang, 2007). Executive attention and other executive functions influence circuits in the vmPFC that can put the brake on the amygdala and hypothalamic autonomic and neuroendocrine systems. Under resting conditions, one would expect that children scoring higher on measures of effortful control would have lower basal HPA activity (Watamura, Donzella, Kertes, & Gunnar, 2004). Under conditions of cognitive challenge that require recruitment of effort, modest increases in HPA and autonomic activity should support better performance (Blair, Granger, & Razza, 2006). Finally, under conditions of emotional threat that require modulation of amygdala reactivity, higher levels of effortful control should result in reduced HPA reactivity (Slattery, Grieve, Ames, Armstrong, & Essex, 2013). Interestingly, in response to the TSST, better executive functions (in the form of working memory) predicted a smaller CORT response in nondisordered adolescents, but the opposite was found in adolescents with internalizing disorders (Slattery et al., 2013). It is not only cognitive skills but likely the uses to which they are put (adaptive coping versus ruminating) that influences stress responding. Also, as discussed earlier, elevations in CORT can impair executive functions and effortful control. Thus, there is a dynamic relationship between the cognitive abilities that support self-regulation and the activity of stress-sensitive systems.

Inputs from the vmPFC to the amygdala appear to be critical in extinction of fear responses, and perhaps as these inputs develop they may be critical in regulating the responses of temperamentally shy/inhibited children. Experience also affects the development and functioning of the vmPFC and the strength of its control over amygdalar threat processing.

In studies of adult humans and animals, those with prior experiences of control over potent stressors cope better

with subsequent threats, responding with less activation of the HPA axis and with stronger apparent expectations of being able to protect themselves from harm. There is increasing evidence that this facet of resilience reflects control-induced activation of the vmPFC (Maier & Watkins, 2010). These data add to an understanding of why overprotective parenting sustains shy/inhibited temperament as such parenting may neither allow nor promote children's experiences with manageable threat (Lewis-Morrarty et al., 2012). In addition to experiences of controllable threat, there is evidence that children's ability to regulate emotions and reduce stress is promoted by parental scaffolding, which reflects responsiveness to the child's needs and respect for the child's autonomy (Eisenberg et al., 2010).

Summary and Future Directions

Children's emotional dispositions and their ability to regulate those dispositions contribute to their stress vulnerability and resilience. Experiences affect how temperamental differences among children influence development and how self-regulatory capacities develop and modify stress vulnerability and resilience. The two reactive dimensions of temperament that were discussed, shyness/inhibition and surgency, affect the odds that children will develop internalizing and externalizing disorders. We now turn to what is known about relations between stress and psychopathology in childhood and adolescence.

DEVELOPMENTAL PSYCHOPATHOLOGY

Activity of the HPA axis has been implicated in several mental disorders. We already discussed its potential role in PTSD in the section on maltreatment. Here we focus on two disorders that emerge in childhood and adolescence: major depressive disorder and disruptive behavior disorders (DBDs). Two major questions guide our discussion of this work: (1) What is the evidence that dysregulation of the HPA axis is involved and (2) is stress experienced during development critical to the role that CORT and/or CRH play in these disorders?

Depression

Dysregulation of the HPA axis in depression is one of the most robust findings in biological psychiatry. Depression is often accompanied by a flat diurnal rhythm due to failure to

bring CORT down to low levels in the late afternoon and evening (Heim & Binder, 2012).

Depressed individuals exhibit a larger CORT elevation in response to stressors and they remain elevated for a longer period of time before returning to baseline post-stressor. In addition, they often show failure to suppress to the dexamethasone challenge test, indicating poor negative feedback regulation of the HPA axis. Both the remitted and current major depression groups exhibit a higher CAR than never-depressed individuals (Vreeburg et al., 2009). Adults with depression consistently show a blunted ACTH response to CRH challenge, possibly due to a chronic CRH drive and subsequent downregulation of pituitary responsiveness to CRH (Heim & Binder, 2012). This adult literature on depression and the HPA axis has been challenged by work on adults with depression who do and do not have histories of child abuse (Heim & Binder, 2012). Many of the findings described above appear to be characteristics of depressed adult survivors of child abuse rather than depressed adults without maltreatment histories.

Consistent with this argument, suicide victims with a history of child abuse compared with those without were found to exhibit increased methylation of the same gene in the hippocampus (i.e., NR3C1 promoter region of the GR gene) shown to be methylated in rodent studies of poor maternal care (McGowan et al., 2009). Because of the frequent comorbidity of PTSD and major depression, the association of major depression with hyperactivity of the HPA axis and PTSD with hypoactivity has long been very puzzling. If, however, trauma is associated with hyperactivity of the axis followed by downregulation in most individuals but not in those who develop major depression, then this provides a way of focusing the research question.

Specifically, why, in adult survivors with major depression, has the HPA axis up- rather than downregulated in response to frequent or chronic elevations in CORT experienced in response to maltreatment?

Treatment studies provide the most compelling evidence that the HPA system and CRH play causal roles in the induction and maintenance of major depression. For example, antidepressants reduce CRH in the cerebral spinal fluid (CSF) of healthy controls as well as in patients with major depression, indicating that antidepressants directly manipulate CRH levels rather than the reduction of CRH being a side effect of improved depressive symptoms (Wilkinson & Goodyer, 2011). Treating depression with SSRIs reduces CORT levels of depressed adults to those of nondepressed adults, and this decline is correlated with lower levels of depressive symptoms. Rodent studies

support the causal role of the axis by showing that depressive behaviors and HPA hyperactivity induced by low maternal care can be reversed in adulthood by pharmacological and dietary interventions that reverse methylation of hippocampal GR (Heim & Binder, 2012). Individuals with high CRH have the greatest risk of relapse following antidepressant treatment (Wilkinson & Goodyer, 2011). In addition, greater CORT reactivity predicts increases in depressive symptoms (Morris, Rao, & Garber, 2012) and a smaller CAR, or blunted HPA axis activity and low morning CORT predict an unfavorable psychiatric course and/or greater risk of relapse (Morris, Rao, et al., 2012; Vreeburg et al., 2009).

The role of the HPA axis in child and adolescent depression is less clear (Wilkinson & Goodyer, 2011). Although high CORT levels are often reported for depressed youth studied in outpatient settings, it has been more difficult to identify endogenous dysregulation assessed by acclimating children and adolescents to a sleep laboratory for several days, providing them with warm and supportive adult attention, and then testing them for both sleep and HPA-axis impairments (Dahl et al., 1991). It is hypothesized that children may be more resilient than adults to endogenous dysregulation and that the period of late adolescence or more chronic depression may shift individuals to greater endogenous vulnerability. The experience of depression may also have different effects on children and adults. For example, in adolescents, those studied soon after symptom onset showed elevated CORT levels, whereas those studied following more chronic symptoms showed blunted activity of the HPA axis. By contrast, adults with more chronic symptoms are, if anything, hypercortisolimic. In depressed youth, the system may still be resilient enough to downregulate following periods of prolonged activation.

HPA measures have also shown predictive power in adolescents. A higher CAR in adolescence predicted the onset of a major depressive episode 2.5 years later although it was not predictive beyond that time point (Vrshek-Schallhorn et al., 2013). In another study, higher basal CORT in the morning and afternoon predicted an increase in depressive symptoms over 2 years in boys tested initially between 10 and 14 years (Heim & Binder, 2012). Although HPA dysregulation is less common in children and adolescents with depression, these findings indicate that regulation of the HPA axis likely contributes to the onset and maintenance of depression prior to adulthood.

Some of the most persuasive evidence that abnormalities in the HPA axis precede the onset of depression come

from the study of not-yet-depressed children who are at high risk because of a family history of depression. When the depressed family member is the mother, as is often the case in these studies, alterations in the axis before the children develop depression likely reflects the interaction of both shared genetics and shared environment along with the effects of parents and children on one another. That said, offspring of postnatally depressed mothers had higher and more variable morning CORT levels over 10 days when they were 13 years old, and these levels predicted the development of depressive symptoms over the next few years (Halligan, Herbert, Goodyer, & Murray, 2007). At the transition to adolescence, girls but not boys with depressed parents showed blunted CORT responses to a psychosocial challenge (Bouma, Riese, Ormel, Verhulst, & Oldehinkel, 2011). Children with depressed mothers may also be more likely to develop dysregulated patterns of HPA axis activity when exposed to other family risk factors such as harsh parenting (Dougherty, Klein, Rose, & Laptook, 2011), high expressions of anger in the family (Essex et al., 2011), or insecure attachment (Heim & Binder, 2012). The timing of maternal depression may also matter, which suggests that more than shared genetics are involved (Dawson & Ashman, 2000).

Of course, it is not just the HPA axis that may be altered prior to symptom onset in the offspring of depressed mothers. There is at least one report that low levels of vagal tone and poor vagal regulation are observed in children of depressed mothers (Gentzler, Rottenberg, Kovacs, George, & Morey, 2012), which is consistent with evidence that low vagal tone and blunted CORT responses may co-occur with higher levels of internalizing symptoms in children (El-Sheikh, Arsikawa, Hinnant, & Erath, 2011). Thus, interactions of HPA axis anomalies with anomalies in other developing stress-mediating systems need to be examined. In addition, given the increase in depressive symptoms and the emergence of the gender bias in depression with puberty, special consideration must be given to interactions between the HPA and hypothalamic-pituitary-gonadal axes.

Researchers are actively pursuing whether genes involved in regulating the HPA system (e.g., CRHR1, GR and MR polymorphisms, FKBP5) affect the risk for depression. We have already discussed FKBP5, which seems to moderate the effect of childhood abuse on adult PTSD (Klengel et al., 2013). For depression, it may be the CRHR1 gene that moderates the effects of child maltreatment (Heim & Binder, 2012). This pattern would suggest that genes that increase the potency with which

threats can affect the pituitary-adrenal system and other fear-stress orchestrating targets of CRH increase the risk of depression, while genes that downregulate CORT effects may increase the risk of PTSD. This is highly speculative, but it does suggest the relevance of a systems neuroscience approach to understanding genes, stress, and developmental psychopathology.

Disruptive Behavior Disorders

Disruptive behavior disorders (DBDs), including conduct disorder and oppositional defiant disorder, have been associated with low basal and reactivity measures of both the HPA and ANS systems. There have been a number of reviews on this topic, which we draw on in this section (Hawes, Brennan, & Dadds, 2009; Shirtcliff et al., 2009; van Goozen et al., 2007). One study by van Goozen and colleagues (2007) proposed a neurobiological model of childhood antisocial behavior according to which genetic factors interact with childhood adversity to produce neurobiological and self-regulatory deficits, which then enhance the development of antisocial behavior. Diminished activity of the HPA axis plays an important role in this model based on evidence that, in animals, CORT interacts with serotonin receptors in the amygdala to support typical aggressive responses to threat provocations and insufficient CORT then fails to provide this input. This then leads to abnormal, hyperaggressive behavior. Studies supporting the association between CORT and DBD in children include evidence that (a) when exposed to a stressor that involves taunting and disparaging remarks made by another child, typical children respond with elevations in CORT and autonomic activity, whereas DBD children do not but do engage in more hostile retributive actions, (b) youth with lower CORT levels and reactivity respond less to interventions designed to reduce antisocial behavior, and (c) even subclinical levels of externalizing problems have been associated with lower baseline levels of CORT. Despite these arguments, a meta-analysis revealed that the association between CORT and externalizing behavior is less strong than once thought. This led Hawes and colleagues (2009) to posit two pathways to adult antisocial behavior distinguishable by whether the children display callous-unemotional traits. These traits are viewed as developmental precursors of psychopathy. One pathway to adult antisocial behavior runs through this disposition, which is associated with blunted activity of the HPA axis, whereas another runs through adverse childhood experiences, poor emotion and behavior regulation, and more

reactive stress responding. The Hawes et al. (2009) analysis is complemented by another (Shirtcliff et al., 2009) that reviewed the neuroscience research on psychopathy, callousness, and empathy and provided a rationale for why low levels of CORT and reduced HPA axis reactivity should be associated with the observed patterns of brain impairments in callous-unemotional antisocial individuals. Despite this, the empirical evidence for a relation between callous-unemotional traits and low levels of CORT activity is weak. Among boys with ADHD and DBD, blunted CORT reactivity to the TSST has been associated with callous-unemotional traits (Stadler et al., 2011). However, two other studies failed to find any association with basal CORT levels, although aggression was negatively associated with basal levels in these studies (e.g., Poustka et al., 2010). Because the relation between antisocial behavior and low sympathetic tone and reactivity is better established, it may be that a combination of low CORT and low sympathetic activity will be more consistently associated with DBDs (van Goozen et al., 2007).

Treatment studies are particularly telling. Thus, boys with DBD were found to have lower CORT levels than healthy controls before treatment and a larger increase in CORT over time, suggesting that interventions may reduce disruptive behaviors through normalization of basal CORT levels (Dorn, Kolko, Shenk, Susman, & Bukstein, 2011). Studies have also shown that DBD interventions increase HPA axis responses to a frustration stressor (van Goozen et al., 2007) and CORT levels in anticipation of peer entry in boys at risk for DBD, as discussed earlier (O'Neal et al., 2010).

Comorbidity is a problem for researchers studying DBD, as anxiety and attention disorders are often present simultaneously with DBD. Furthermore, there is evidence that, when comorbid with an anxiety disorder, the relations of DBD with CORT may invert. That is, in the absence of an anxiety disorder, children with DBD may have lower than normal levels of CORT or CORT reactivity, but when combined with an anxiety disorder, CORT levels and reactivity may be higher than in nondisordered children (van Goozen et al., 2007). Thus, variability in findings may have to do with other comorbid problems present in children with DBD.

It may also be that activity of the HPA axis is associated with an endophenotype that contributes to the development of DBD but may do so to different degrees for different children or for different subtypes of DBD. As we have discussed, callous-unemotional traits might be one such endophenotype. Another may be low sensitivity to

punishment. Low punishment sensitivity has been associated with amygdala hyporeactivity to negative events, lower CORT reactivity, altered fear conditioning, and changes in serotonin and noradrenaline regulation (Matthys, Vanderschuren, & Schutter, 2012). There is evidence that disrupted serotonergic regulation is related to low CORT levels or CORT downregulation following chronic stress, but more research is needed to understand the nature of this association. Impaired sensitivity to punishment and its accompanying physiological characteristics may disrupt children's and adolescents' abilities to pair inappropriate actions and negative consequences. Disruptions have been related to hyposensitivity to reward, which encourages adolescents to engage in sensation seeking as a compensatory behavior, and to problems with executive functioning, which impair the ability to overcome emotion-driven behaviors (Matthys et al., 2012).

Sex differences are essential to consider in research on DBD. There is evidence that boys with DBD and healthy control girls have lower basal CORT than girls with DBD and healthy control boys (Dorn et al., 2009). The timing of puberty and activity of specific systems are also important moderators of disruptive behaviors. In boys, high CORT responses to stress were related to antisocial behavior in adolescents with later onset puberty. However, in boys with earlier puberty, lower salivary alpha-amylase activity—an index of autonomic activity—was related to more antisocial behavior (Susman et al., 2010). Future research needs to consider the effects of testosterone, SNS mediators, and hormones with antiglucocorticoid properties (e.g., DHEA) in order to understand the complexities of DBD in relation to the HPA axis.

Summary and Future Directions

One of the most perplexing questions confronting neuroendocrine researchers is whether HPA-axis dysregulation precedes psychopathology or if the onset of psychopathology produces alterations in HPA functioning. Although there is growing evidence of HPA abnormalities preceding the onset of psychiatric disorders, future research must track children before any sign of disorder to determine how early alterations can be detected and whether this information can be used in preventative interventions. The role of genes in mediating HPA-axis contributions to the development of psychopathology, as well as the effects of stress in epigenetic changes contributing to psychopathology are critically important and growing areas of research.

Future models of HPA axis development must explain how the system acts to mediate the effects of experience on physical, cognitive, and socioemotional domains across time and in concert with other stress-mediating systems. These models must also describe how individual characteristics affect HPA regulation and predict who goes on to develop psychopathology. As knowledge of HPA correlates of psychological functioning accumulates, translational efforts should be made to aid the treatment of disorders. For example, should practitioners manipulate CORT levels or GR levels and sensitivity in order to prevent or treat depression? Can altering stress hormone levels affect individuals' ability to cope following a major stressor to prevent PTSD? Any such efforts should be made with the understanding that the HPA axis does not operate in isolation and that manipulation of the system may also affect susceptibility to other disorders closely related to stress system activity.

GENERAL CONCLUSIONS AND FUTURE DIRECTIONS

There is little doubt that stress plays a critical role in development and that activity of the HPA axis and CRH, in interaction with other stress mediators, is involved in many of the effects of childhood adversity on physical and mental development. Despite the broad evidence for this conclusion organized in this review, there are a number of issues that remain to be resolved.

First, are there sensitive periods for the development of stress reactivity and regulation, and if so, when are they and how are they characterized? Although there are clear sensitive periods in the rodent models that spawned this field, rodents are born with less mature neuroendocrine systems than humans are and translating the timing of sensitive periods from rats to humans is problematic. Yet there is increasing evidence that the homologous GR gene is methylated by postnatal experiences in rats and humans (McGowan et al., 2009). Nature appears to be able to accomplish similar outcomes in the infant rat and young human, though it is unknown whether they occur through the same molecular processes. Still, the issue of sensitive periods for shaping the stress system persists and is one of the more critical ones in the field.

Second, how can we move beyond analyzing each stress-mediating system separately? The dynamics of the HPA axis defy many of our attempts to do so. For example, while elevated sympathetic and suppressed HPA activity

might reflect the effects of chronic stress, it depends on the type of stressor, the context, the individual's prior history with similar stressors, and likely, the stage of development. To be useful, theoretical models of multisystem patterning need to be as nuanced and contextualized as the neurobiology and neuroendocrinology of stress.

Third, theories and research plans in the study of development have paid relatively little attention to temperament, sex differences, or gender socialization. Nonetheless, temperament has been shown repeatedly to moderate stress responses and the effects of stress on development. With regards to sex and gender, although we see few sex differences in physiological reactivity until puberty, it seems quite possible that gendered worlds of childhood will begin to affect how children weigh the threats they encounter and influence their best strategies for managing threat. No theories of stress adequately address sex differences, although the Tend-and-Befriend hypothesis (Taylor et al., 2000) might provide inspiration for how to begin examining and thinking about how gendered stress and coping emerges during development.

Fourth, we need to understand how development, and particularly puberty, affects stress physiology for children exposed to early life stressors and trauma. Time-since-trauma may explain changes in the direction and activity of stress-mediating system during adolescence, but it seems highly unlikely that this is the whole story. Puberty may open windows for reorganizing the neurobiology of stress and emotion shaped in particular ways by earlier experiences, and pubertal hormones and processes may have differential effects on this neurobiology depending on the way earlier experiences have shaped the system. Given the importance of adolescence in psychopathology, this is a critical avenue for future research.

Finally, we need to figure out how best to incorporate work on genes and epigenetics into our theories and research on stress and development. We now know of a number of polymorphisms for stress-relevant genes. Studies are beginning which, generally, ask the same question: Does this genetic polymorphism moderate the stress response? These studies are likely to yield conflicting findings. Until the field of developmental science can move beyond the simple directional hypothesis (increase or decrease the stress response), it will not reap the benefits of molecular genes. What is needed are hypotheses that take into account the nature of the stressor, the level of the system the gene should affect, the potential counterregulatory activity that may have developed to negate the effects of

the "faulty" gene and the time during the stress response that effects should be most apparent. In all of this, the developmental stage is also likely to be relevant. The same applies to epigenetics. It is necessary to move beyond asking whether the epigenome is affected by childhood experiences, although this was an important first issue, and move on to asking about specific epigenetic effects. Again, it may also be necessary to adjust predictions to the specific tissue under analysis. And again, are there sensitive periods for epigenetic programming of stress-relevant genes, and the same sensitive periods for brain, buccal, and white blood cells? These are challenging questions, but ones that will be at the forefront of research on stress and development in the coming years.

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CHAPTER 5

Temperament and Personality

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Human development is a complex phenomenon involving the joint influence of individual dispositional characteristics and socioecological conditions. Children come to the world with initial temperamental biases, which provide a basis for them to interact with their environments in specific ways. Through the interaction, children increasingly develop socioemotional, behavioral, and cognitive qualities that distinguish them from one another.

This chapter is concerned with children's temperament and personality and their roles in socioemotional development. We begin by providing a brief background to the exploration of temperament and personality. We then discuss major theoretical perspectives and some assessment issues in the field. Next, we focus on the biological foundation for the development of temperament and personality. After reviewing research on links between temperament and personality and their developmental outcomes, we discuss the roles of social contexts, including the family and peers, in facilitating and undermining the development of temperament and personality characteristics and their relations with adjustment. We go on to consider how culture affects the display and the developmental significance of temperament and personality. The chapter concludes with a discussion of practical implications and future directions.

As a general framework for the chapter, we emphasize the role of social interaction in shaping children's temperament and personality from a contextual-developmental perspective (Chen & French, 2008). According to this perspective, temperament and personality need to be understood in terms of their developmental processes, and the development of temperament and personality needs to be understood in the social context. How adults and peers perceive, evaluate, and respond to specific characteristics of children in social interaction, which is guided by cultural norms and values, is a main mechanism for the development of those characteristics. Whereas biologically rooted individual biases in early disposition may be a major source of variations in temperament, personality, and socioemotional development, social interaction gives meaning to individual characteristics and determines, to a large extent, their developmental patterns and their relations with adjustment.

TEMPERAMENT AND PERSONALITY: SOME CONCEPTUAL ISSUES

Temperament and personality represent individual behavioral, emotional, and attentional characteristics that are relatively stable across situations and over time and have a pervasive impact on wide ranges of social and cognitive functions. Whereas temperament is often considered the core of personality, personality taps more specific individual traits as indicated by the patterns of behaviors, emotions, cognitions, and implicit and explicit aspects of the self that are associated with adaptive and maladaptive performance in particular domains (e.g., Rothbart, 2011). Some investigators have argued that temperament and personality have much in common (Shiner & Caspi, 2012). For example, temperament and personality both (a) are concerned with the uniqueness of individual characteristics that show consistency across situations and over time and with interpersonal differences in these characteristics, (b) involve the processes of reactivity and regulation, (c) are influenced by biological factors and experiences, and (d) interact with the environment in contributing to adjustment.

Despite their commonalities, temperament and personality may differ to varying degrees in several aspects. First, temperament has traditionally been viewed as constitutionally based emotional and behavioral characteristics of feelings, thinking, and reacting (e.g., Allport, 1937; Rothbart & Bates, 2006), and thus it is presumed to be more biologically rooted and is determined to a greater extent by heredity and maturation than personality. Second, many temperamental characteristics, such as irritability, distress proneness, soothability, and activity level, appear very early in life, as indicated by individual differences in these characteristics in newborns and infants (e.g., Rothbart, 2011). Researchers have examined the development of personality in childhood and adolescence (e.g., John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; Lamb, Chuang, Wessels, Broberg, & Hwang, 2002). Whereas major personality traits, such as extraversion, agreeableness, and neuroticism, may emerge within the first 2–3 years of life and become increasingly salient with time, many of them are not well defined in early childhood. As indicated by Lamb et al. (2002), some aspects of personality may not become apparent until children experience various social situations

that allow their tendencies to be consolidated. Personality traits that are based on sophisticated social and cognitive skills, coping styles, and values are likely to appear in the later years. Third, relative to most personality traits, temperamental characteristics are concerned with more general affective and behavioral processes. Temperamental characteristics become increasingly differentiated with age and gradually integrated or merged into personality, which, as argued by Rutter (1987), may be considered the projection of temperamental tendencies into the world. Finally, according to Chess and Thomas (1986), temperament is mainly about the style of behavior (the “how,” e.g., rhythmicity, adaptability, intensity of reaction), whereas personality may include the content of thought, habits, motives, coping styles, goals, values, and beliefs (the “what”). Nevertheless, as pointed out by Rothbart and Bates (2006), the style versus content distinction makes sense at the theoretical level but is less useful in research because it is often difficult to differentiate between them in the assessment of children’s temperament.

A salient issue in the study of temperament and personality is temporal stability. Two types of stability are interesting from a developmental perspective: mean-level stability (i.e., whether the average level of a trait remains the same or changes with age) and rank-order stability (i.e., whether children maintain their relative positions on traits over time). Research has shown that levels of traits related to regulatory abilities such as effortful control and conscientiousness tend to increase from childhood to adulthood, which may reflect psychological maturity (Caspi & Shiner, 2006; Chuang, Lamb, & Hwang, 2006). Research has also revealed that the rank-order stabilities of many temperamental and personality characteristics are moderate over years, with the magnitude increasing with age (higher from middle childhood), and decline as the time interval increases, although researchers have reported long-term stabilities of some characteristics such as inhibition and undercontrolled behavior (e.g., Asendorpf, Denissen, & van Aken, 2008; Caspi et al., 2003).

Despite evidence that temperament and personality are generally stable, research projects on similar characteristics often provide inconsistent results perhaps in part because of the age-specific pattern of genetic influence and the impact of changing socializing environments. That is, it is unclear when and in what circumstances temperament and personality characteristics maintain their temporal stabilities and when and in what circumstances developmental changes in these characteristics occur. A related issue, which is important for empirical research, is how the

same characteristic is manifested in observable behaviors in different developmental periods. It is plausible that the “latent” construct of a characteristic is manifested in different behaviors over time. In order to meaningfully examine the stabilities of temperament and personality, researchers need to analyze how personal, developmental, and contextual factors are involved in the exhibition of specific characteristics and establish their observed “indicators” at different ages, although this may be a difficult task (see Thompson & Goodvin, 2005, for a review).

BRIEF HISTORY

The phenomena of temperament and personality were observed and mulled over profoundly in ancient times. However, it was not until the last century that these phenomena were explored systematically from a scientific perspective. Research on temperament and personality burgeoned exponentially from the 1980s, yielding a comprehensive understanding of their nature, structure, and developmental significance.

Ancient Times

The notion of temperament and personality in human beings appeared in early civilizations. In Chinese society, for example, Mencius (372–289 BC), one of the most famous Confucian thinkers, identified four social–moral attributes of the ideal personality: *ren* (benevolence, humanity), *yi* (righteousness), *li* (propriety, proper conduct), and *zhi* (wisdom and knowledge). He believed that these four attributes originated from four predispositions or inborn qualities of human beings that he described as “sprouts”: a feeling of commiseration, a sense of shame, a reverential attitude toward others, and a sense of right and wrong. Mencius emphasized human predispositions because he believed that external control was unlikely to improve the organization of the society without considering innate human tendencies. Nevertheless, he asserted that education and socialization in childhood and adolescence were critical to cultivating the innate goodness of the individual and preventing the development of undesirable behaviors.

The idea of temperament also appeared in *Huang Di Nei Jing* (the Emperor Huang’s Manual of Corporeal Medicine), a book written more than 2,500 years ago that had a pervasive impact on traditional Chinese medicine and cultural beliefs. According to the holistic perspective provided in this book, human physical and emotional

well-being was associated with the balance of Yin (the passive and receding aspect of nature) and Yang (the active and advancing aspect of nature). The Five Element Model, as a part of the broad Yin and Yang theory, explained how individual traits might be formed on the basis of interactions among the states of human functioning that represented the fundamental “five elements” in nature (wood, fire, earth, metal, and water). The model particularly stressed the connections among factors at the psychological and physical/biological levels. For example, five basic emotions—irritability/anger, joy, worry, sadness, and fright/fear—might be directly associated with the condition of the liver, heart, spleen, lung, and kidney, respectively. And at the same time, repeated experiences of a predominant emotion in people with a particular disposition might result in health problems related to the corresponding organ (see Chen & Swartzman, 2001).

The connection between temperament and biological functioning was also recognized in ancient Western societies. The Greek physician Hippocrates (460–370 BC) developed a four-element model that was surprisingly similar to the Chinese Five Element Model. Drawing on the basic elements of nature, earth, air, fire, and water, Hippocrates proposed that human health, emotions, and behaviors were related to body fluids or “humors”: blood, yellow bile, black bile, and phlegm, derived from the heart, liver, spleen, and head, respectively, and that the balance of the fluids determined one’s health status. Based on the combination of hot-cold and dry-wet with the four elements, Galen (AD 131–200) developed the well-known typology of temperament and attempted to link it to physiological processes. The four temperaments he identified, the sanguine (sociable, cheerful), choleric (aggressive, ambitious, full of energy), melancholic (introverted, anxious, sad), and phlegmatic (calm, rational), each represented an excess of one of the humors. Although the typology described distinct behavioral and emotional inclinations, Galen indicated that individuals differed mainly in the strength of the qualities.

The ancient views of temperament in Eastern and Western cultures have influenced the thinking of scholars and the public. For example, the typological approach has been adopted by some contemporary researchers (e.g., Kagan, Snidman, Kahn, & Towsley, 2007). Ideas about the biological origin of temperament have received support from research. In addition, the notion in both the Chinese and the Hippocrates-Galen models that temperament, health, and environmental factors such as socioecological conditions interact with each other is consistent with the

results of empirical studies (Hampson & Vollrath, 2012). Nevertheless, the ancient views have been replaced by more sophisticated and scientifically relevant modern theories and perspectives that have been refined on the basis of research findings.

Modern Temperament and Personality Theories and Research

For the first part of the 20th century, the theoretical and empirical explorations of temperament and personality were conducted mainly within the same broad frameworks of individual traits because temperament was considered the nucleus or a subdomain of personality (Allport, 1937; Gesell, 1928). As a result, the boundaries between temperament and personality were rather blurry in much of the scholarship from this period. Most of the theories and studies focused on adults but tapped developmental origins and socialization processes, which provided the intellectual and methodological foundations for developmental research on children.

Pavlov’s and Jung’s Typologies

Based on his seminal studies of dogs, Pavlov (1935) postulated the central nervous system (CNS) as a framework for different types of temperament, with a focus on excitatory and inhibitory processes. According to his theory, how excitatory and inhibitory processes function in individuals is related to the properties of their CNS including strength (the extent to which an individual endures intense and prolonged stimulation or conditioned inhibition), balance or equilibrium (how the two processes function in the system relative to each other), and mobility (how the CNS adequately responds to continuous changes in the environment). Individual differences in these properties define types of temperament (e.g., the strong, impetuous, and unbalanced; the strong, equilibrated, and lively). Among them, the weak inhibitory type, which is still interesting to temperament researchers today, characterized individuals that were particularly susceptible to stressful and challenging situations. Dogs of weak inhibitory type were easily disturbed by irregular stimuli and were likely to develop what Pavlov called experimental neurosis, which was an indicator of the disturbance of the balance between excitatory and inhibitory processes of the nervous system (Pavlov, 1935). Pavlov found that basic temperamental tendencies were inherited or conditioned since infancy by various environmental influences. Once formed, these tendencies persisted and had a long-lasting impact on behavior.

Many features of Pavlov's model are reflected in other theories, such as Jung's introverted and extroverted personality typology. According to Jung (1928), whereas extroverts were action-oriented and tended to direct their psychic energy (libido) outward toward people, objects, and activities, introverts were thought-oriented and quiet and tended to direct their energy toward internal states such as ideas and feelings. Jung (1928) described four types of individuals based on two rational or judging functions (thinking and feeling) and two irrational or perceiving functions (sensing and intuition), allowing extroverted and introverted tendencies to be expressed in different ways. Extroverted thinking, for example, characterized individuals who understood the world through abstract concepts learned from other people, whereas introverted thinking characterized individuals who interpreted the environment through subjective, internal knowledge. Although multiple extroverted and introverted functions could be present in the same person, one of them was normally more developed and dominant, existed in consciousness, and defined one's personality type, with the others repressed into a part of unconsciousness. A related notion in Jung's theory was that, besides the *personal unconscious*, which represented individual unique and private experience, the *collective unconscious*, a deeper and more fundamental part of the unconscious, influenced our behaviors and emotions. The collective unconscious, with what he called archetypes, was innate and generally universal, derived from the latent memory traces of human beings' ancestral past.

Allport's Personality Traits

According to Allport (1937), the basic unit of personality was the trait, which he defined as a neuropsychic system with motivational properties. An individual's traits guided his or her behavior and made it consistent across situations and over time. An individual might possess traits that were unique to him or her as well as traits that were shared by others to a varying extent in a culture. The existence of common traits such as sociability, submissiveness, and conformity was important because it allowed us to assess individual differences in personality.

In Allport's theory, traits within the person were interconnected to form an internally consistent and coherent system, which constituted a basis for the development of the self and a sense of identity. Thus, Allport advocated the use of the interpretive or idiographic approach to understand the unique and integrated personality profile of the individual; this approach was believed to be useful but is nonetheless rarely used in personality research today.

The Factor-Analytic Approach: Some of the Pioneers

Consistent with Allport's trait approach, psychologists have explored temperament and personality structures using analytic methods. One technique that is commonly used to pursue this task is factor analysis. As noted by Rothbart (2011), European researchers such as Webb (1915) and Burt (1937) were among the first to explore the structures of temperament and personality using early forms of factor analysis at the beginning of the 20th century. Webb (1915), for example, conducted factor analysis of items describing individual emotions and social behaviors, rated by judges on a sample of college students, and found a factor concerning the consistency of action related to deliberate volition or will. The early factor-analytic studies might have contributed to the development of Eysenck's personality model.

In Eysenck's initial two-dimensional model (Eysenck, 1947), the dimension of extraversion–introversion was concerned with the extent to which individuals needed external stimulation and directed their attention outward to other people or the environment or inward to inner experiences. This dimension was related to the balance between excitation and inhibition in the reticulocortical circuit, with introverts typically more aroused than extraverts. The other dimension, neuroticism, was characterized by emotional stability and levels of negative affect and was related to the activation threshold of the limbic system. People who had lower activation thresholds and were more vulnerable to neurotic problems were believed to be more aroused in the limbic circuit by emotion-provoking events or situations. The combination of the two dimensions in Eysenck's model formed different types of personality—the neurotic extravert (choleric in Hippocrates-Galen typology), the neurotic introvert (melancholic), the stable extravert (sanguine), and the stable introvert (phlegmatic).

In his later work, Eysenck identified another factor, psychotism, based on data obtained from individuals in mental institutions (Eysenck & Eysenck, 1976). This dimension represented the tendency to become psychotic or display problems with reality, as reflected in qualities such as recklessness, lack of empathy, and inappropriate emotional expression. Eysenck suggested that this dimension might be related to serotonergic function.

Challenges of Behaviorism

Temperament and personality theories were persistently challenged by behaviorism in the 20th century. A key assumption for the existence of personal traits is the consistency of behaviors across situations and over time. This

assumption is incompatible with the main argument of behaviorists, who emphasized learning processes and the dependence of behavior on specific contexts. In the late 1920s, as Freud elaborated his view that the superego was the moral aspect of personality, Hartshorne and May (1928) conducted a series of experiments assessing school-age children's moral behaviors in various settings with opportunities to lie, cheat, or steal; to help others or not; and to resist or yield to distractions. The results showed virtually no consistency or coherence of behaviors across situations. Although later reanalyses of the Hartshorne and May data suggested that behaviors might be more consistent than Hartshorne and May originally reported (Burton, 1963), cross-setting correlations remained weak.

The dispute over the consistency of behaviors was heightened by Mischel's (1968) argument that broad personality traits were not useful. Based on his review concluding that personality traits failed to show consistency or to predict behavioral outcomes, Mischel argued that behaviors were largely determined by specific situational factors and that it would be more interesting to analyze situation-behavior relations. Interestingly, Mischel's later work examined children's self-control, as indicated by performance on delay of gratification tasks, and its long-term effects on adjustment. Although the debate is unlikely to end as long as research findings continue to show weak to moderate consistency of behaviors, many researchers, including Mischel and his colleagues (e.g., Mischel & Shoda, 2008), now take a broader view that considers the interaction of individual traits and social contexts.

Summary

The ancient views and modern theories of temperament and personality focus largely on the identification of a few fundamental or core characteristics, in the form of either types or traits, to describe individual differences in behavioral and emotional tendencies. Several of these characteristics such as extraversion–introversion and the inhibitory process in the nervous system continue to receive intensive attention from contemporary researchers. The methods used in the early studies, such as factor analysis, continue to be used in the exploration of temperament and personality structures today.

Some major issues raised in the ancient and modern theories are still intriguing and should be examined more systematically in the future. For example, both biological functions and experiences are believed to play significant

roles in the formation of temperament and personality. However, it is still largely unknown how biological and environmental factors work together to affect temperament and personality. It will be an important task for researchers to explore this issue in the future. The Chinese Five Element model and Pavlov's system, along with others, suggest dynamic interactions among different traits or biological processes. The ideas are mostly speculative and sketchy and clearly need to be elaborated. In addition, although the ancient and modern theories tap the origins or antecedents of temperament and personality, the goal is mainly to provide explanations of adulthood characteristics without a deliberate inquiry into distinct characteristics and their changes in childhood and adolescence. To address these issues, it is necessary to use integrative frameworks and multimethod, multidisciplinary approaches. Researchers have attempted to do this over the past half century, which has led to significant progress in the development of temperament and personality theories.

MAJOR CONTEMPORARY THEORETICAL PERSPECTIVES

Researchers have proposed theories of temperament and personality from different perspectives in the past half-century. In this section, we briefly review the major theories, particularly those that address temperament and personality development in childhood and adolescence. In addition, we discuss a contextual-developmental perspective that emphasizes the role of social interactional context in the development of individual characteristics. The contextual-developmental perspective serves to guide our discussions of temperament and personality development and its relations with adjustment outcomes in different societies.

Thomas and Chess's Categories of Infant Temperament and the Concept of Goodness of Fit

Thomas, Chess, Birch, Hertzig, and Korn (1963) proposed the first systematic categorization of young children's temperament based on their New York Longitudinal Study (NYLS). The researchers observed that family environment or parenting practices could not explain children's behavioral and psychological disturbances. For example, high-power parenting might lead to anxious and submissive behaviors in some children, but defiant and antagonistic

behaviors in others. Thus, to understand the developmental origins of behavioral problems, it is necessary to consider individual characteristics in response to external and internal stimuli called *individual reaction patterns* (changed to temperament later). Examples of these characteristics include positive versus negative mood, intensity of reaction, and regularity of body activities. Based mainly on the content analysis of parental reports of infants' behaviors, Thomas and Chess identified nine dimensions of temperament: activity level, rhythmicity (regularity), approach versus withdrawal, adaptation, threshold of responsiveness, intensity of reaction, quality of mood, distractibility, and attention span/persistence. As indicated by Goldsmith et al. (1987) and Rothbart (2011), although Thomas and Chess attempted to focus on the style, not the content or motivation, of behavior, some of these dimensions, such as positive versus negative mood and the tendency to approach or withdraw from new situations, are related to what children do rather than how they do it.

Based on their work on the dimensions of temperament as well as their consideration of clinical relevance, Thomas and Chess further developed the well-known broadband categories or temperamental constellations: easy child or temperament, difficult child or temperament, and slow-to-warm-up child or temperament (Thomas et al., 1963; Thomas & Chess, 1977). Easy and difficult categories are characterized by high and low scores on regularity, approach, adaptability, mild intensity of reactions, and positive mood, and the typical features of the slow-to-warm-up child include negative mood, low intensity, and low adaptability. Despite its popularity in the academic and applied fields as well as among members of the public, this framework, particularly the labeling and the notion of "difficult" children or temperaments, has been criticized by many researchers (e.g., A. H. Buss & Plomin, 1984; Rothbart, 2011; Strelau, 1998). Indeed, whether a specific characteristic or a child with a particular temperamental profile is judged as difficult may depend on many factors including situations, age and gender of the child, and cultural norms. Moreover, the difficultness of a child's characteristics inevitably depends on parental attitudes, an issue related to the concept of goodness of fit.

Thomas and Chess's concept of goodness of fit stemmed from the fact that temperamental categories did not correspond directly to behavioral problems. According to Thomas and Chess (1977), the meanings of temperamental characteristics needed to be considered in relation to family or other environmental factors. It is the extent to which child characteristics fitted the expectations, demands,

and opportunities of the environment that determined the adjustment of the child. A particular characteristic might be regarded as desirable in one family but undesirable in another. Moreover, during development, a characteristic might be viewed as desirable at one time but undesirable at another, depending on parental expectations about their child.

The goodness of fit theory has been widely used by researchers to describe relations between temperament and environmental factors in the family, school, community, and society. However, several issues need to be clarified at the theoretical level for research and applied work. First, as pointed out by Sanson, Hemphill, Yagmurlu, and McClowry (2011), it is difficult to operationalize the concept of goodness of fit because it is unclear what "fit" exactly means. Direct match or similarity of characteristics (e.g., irritability) between the child and the socialization agent may not necessarily constitute a good fit; children and parents or teachers with different temperaments may still engage in positive interactions. Second, researchers often believe that goodness of fit is equivalent to interaction between the child's and caregiver's characteristics in their contribution to developmental outcomes (Strelau, 1998). Although child temperament and socialization undoubtedly both play crucial roles in development and their interaction has been shown in a number of studies, whether the outcomes of their combination can be understood within the goodness of fit framework is unclear. It is unclear, for example, what type of child temperament an unsupportive or rejecting parenting behavior can fit to produce positive outcomes. Similarly, it is difficult to understand why warm, sensitive, and inductive parenting would not fit either easy or difficult child temperaments. The exacerbating effect of unsupportive parenting on relations between the child's irritability and problems or the facilitating effect of supportive parenting on relations between the child's desirable characteristics and adjustment seem to be a more complicated issue than goodness of fit. Third, adult attitudes such as approval and disapproval of a child characteristic are a major criterion for the judgment of goodness of fit in the model, which makes the measurement of fit relatively viable (e.g., using parental reports). However, the value of the framework would be markedly limited if goodness of fit is equivalent to, or determined by, the degree of adult approval. Moreover, how adult attitudes toward the child (e.g., parental indulgence of an impulsive and defiant child), even if they represent a good fit, are related to adaptive or maladaptive developmental outcomes may not be straightforward.

“Big Three” and “Big Five” Models

Researchers have developed different models of child temperament and personality since the 1970s, many of which were influenced by Thomas and Chess’s work (e.g., A. H. Buss & Plomin, 1984; Goldsmith & Campos, 1982; Rothbart & Derryberry, 1981). Among them, “Big Three” and “Big Five” models appear most popular, although they may not be about the same three or five dimensions or factors. Whereas some of the models focus on temperament in childhood, others do not explicitly differentiate between temperament and personality characteristics.

Various “Big Three” Models

Consistent with their definition of temperament as a set of inherited personality traits that appear early in life, A. H. Buss and Plomin (1984) proposed that the structure of temperament consisted of three major traits that are present in early childhood and genetic in origin: sociability (preference for being with others), emotionality (tendency for emotions such as fear and anger to be aroused easily and intensely), and activity (rate and extent of movement). According to A. H. Buss and Plomin (1984), traits that are not present in infancy, such as self-regulation or effortful control, were not considered temperamental. Traits that are present in infancy but do not show continuity or have an apparent enduring impact on later development, such as rhythmicity or regularity of biological functions, were not considered temperamental either. Neither were traits that have low heritability, such as smiling.

The criteria used by A. H. Buss and Plomin to define temperamental traits have been challenged by other researchers (e.g., Goldsmith et al., 1987) or proved to be less useful in research than Buss and Plomin thought. There is little disagreement today, for example, that self-regulation, which may show relatively limited individual differences in early infancy, is one of the most important temperamental characteristics. Hinde (Goldsmith et al., 1987) also argued that genetic origin is not a satisfactory criterion for temperament because, among other reasons, (a) it is unnecessary to maintain the dichotomy of innate versus learned behavior, (b) it is impossible to specify the proportions of variance accounted for by genetic factors, given that most behavioral characteristics are partly heritable, and (c) heritability may change with age and across samples and environments. Perhaps molecular genetics research will help resolve disputes about the defining features of temperament. Despite these disputes, however, most researchers agree that temperament should appear in

the early stage of life, show at least moderate temporal stability or predict relevant developmental outcomes, and be linked to biological or genetic processes (Zentner & Bates, 2008).

Rothbart and colleagues (Rothbart & Derryberry, 1981; Rothbart & Bates, 2006) proposed a theory focusing on individual differences in two dimensions of temperament, reactivity and self-regulation, and three broad components, surgency, negative affectivity, and effortful control. Reactivity referred to the arousability of behavioral, neuroendocrine, and autonomic systems in the face of change in external and internal environments. It was indicated by threshold, latency, duration, and intensity of motor, affective, and attentional reactions, and was expressed in fear, smiling and laughter, and activity level. Self-regulation was concerned with the processes that modulate (enhance, maintain, or inhibit) reactivity such as approach, avoidance, and attentional orienting, indicated by frustration with limitations, soothability, and duration of orienting.

Each of the three temperament components or categories in Rothbart’s model consisted of several lower-level domains. Surgency, like the personality construct of extraversion, represented a dispositional tendency toward positive emotions, rapid approach to potential pleasant activities, and high activity level. Negative affectivity included anger/frustration, fear, sadness, discomfort, and difficulty recovering from distress or excitement. Finally, effortful control included attentional focusing, inhibitory control, low-intensity pleasure, and perceptual sensitivity. In Rothbart’s model, reactivity and self-regulation and the broad categories were believed to be constitutionally based and associated with neurobiological processes. Reactivity might depend on arousal in autonomic and endocrine systems; self-regulation was related to the efficiency of neurobiological networks in frontal regions of the brain that functioned to increase optimal alertness, arousal, and interpretation of information.

From a personality perspective, Block (1971) proposed a “Big Three” model to describe resilient, overcontrolled, and undercontrolled individuals. Resilient people had traits of adaptability, concentration, and self-confidence, allowing them to get along with the world. In contrast, overcontrolled and undercontrolled people had poor abilities to maintain their emotions and behaviors according to social standards and displayed anxious-introverted and impulsive-defiant behaviors, which led them to move away from or against the world. Developmental researchers have found robust evidence using various methods supporting this model in children and adolescents (e.g., Robins,

John, Caspi, Moffitt, & Stouthamer-Loeber, 1996). Links between Block's model and other researchers' temperamental models have also been found in studies of temperamental characteristics of children with resilient, overcontrolled, and undercontrolled personality types (Komsu et al., 2006).

The “Big Five” Model

Since the mid-1980s, the Big Five model, developed based on Cattell's pioneering work (Cattell, Eber, & Tatsuoka, 1970) by a number of researchers (e.g., Goldberg, 1992; Costa & McCrae, 1992), has increasingly guided research on adult personality. The five factors in the current model—Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness—were believed to represent major personality dimensions that were independent of each other. Relative to personality researchers, however, developmental researchers have been more cautious and hesitant about accepting the model in studies with children.

Developmental researchers have been reluctant to adopt the Big Five model for multiple reasons. First, the model was derived mainly from factor analysis of adults' self-report data. It is difficult to obtain meaningful self-report data from children about their own traits, especially complicated ones such as openmindedness and conscientiousness, until at least middle to late childhood. It is unclear whether other methods that are commonly used in studies with children, such as observations, parental reports, teacher ratings, and peer evaluations, are sufficiently effective to detect the personality traits and whether the data from these sources point to the same five factors. Second, developmental researchers are obviously interested in developmental patterns and processes. It is theoretically and empirically more efficient to focus on fewer traits to study their developmental patterns and processes. Thus, models with fewer dimensions are often preferred. Moreover, the Big Five model is largely nondevelopmental, with little consideration of age-specific features of children's characteristics, such as activity level, negative emotions in the forms of whining, crying, and tantrums, and reactivity to novel situations in early childhood. Despite the hesitations, researchers have examined the emergence of Big Five characteristics from early childhood (e.g., Lamb et al., 2002) and have attempted to integrate temperament models such as Rothbart's model with the Big Five model (De Pauw & Mervielde, 2010; Shiner & Caspi, 2012). The initial evidence (e.g., John et al., 1994; Kohnstamm, Halverson, Mervielde, & Havill, 1998; Lamb et al., 2002) suggests that, although some aspects of personality may

not be evident in early childhood, the Big Five model may be a useful framework for a comprehensive assessment of personality structure in children and adolescents and may help connect temperament and personality research on children and adults.

Kagan's Approach

Kagan and colleagues (e.g., García Coll, Kagan, & Reznick, 1984; Kagan et al., 2007) have focused on a single temperamental characteristic: behavioral inhibition. These researchers observed that, in response to novelty, some children tended to be vigilant and anxious, whereas others were relaxed and spontaneous and displayed relatively little distress. When presented with novel visual and auditory stimuli, inhibited infants displayed a high level of motor reactivity and negative emotions such as crying. In toddlerhood, compared with their uninhibited counterparts, inhibited children were typically more anxious and fearful in unfamiliar social and nonsocial situations, as indicated by a hesitation to interact with a stranger, retreat from unfamiliar objects, and lack of play and vocalization.

Believing that behavioral inhibition reflected a lowered threshold for amygdala reactivity, Kagan and colleagues (e.g., Kagan et al., 2007) were interested in autonomic, hormonal, and brain patterns in infants and children who exhibited highly inhibited and uninhibited reactions to novelty. Thus, behavioral observations as well as biological measures were used to assess children's temperament. The combined behavioral and biological approach helped to focus attention on constitutional factors within the child. This approach largely shifted the field from accounts of temperament that were mainly descriptive toward an appreciation of its causal underpinnings. Another feature of Kagan's approach was the identification of inhibited/high-reactive (typically 15%–20% of the sample) and uninhibited/low-reactive (15%–40% of the sample) children believed to be qualitatively different, based on aggregated behavioral and biological data. Kagan's work has considerably shaped the field of temperament over the past two decades. His colleagues and students (Fox, Henderson, Marshall, Nichols, & Ghera, 2005; Schmidt et al., 1997) have expanded the investigation of behavioral inhibition to other biological processes such as resting frontal brain activity and neuroendocrine functioning, although not all of these researchers have followed his methodology, especially with respect to the categorization of children. Moreover, adopting Kagan's conceptualization and research paradigm, researchers have explored interactions between temperament and environmental

factors such as social relationships in human development (e.g., Chen et al., 1998; Rubin, Coplan, & Bowker, 2009).

In the literature, reactivity has been viewed as a broad concept referring to behavioral, emotional, psychological, and physiological responses, positive or negative, to stimuli and their changes in the environment (Fox et al., 2005). Behavioral inhibition is a type of reactivity focusing on fearful and anxious responses to novel situations. Researchers have expanded the notion of inhibition to include anxious responses to other situations. For example, inhibition in preschool and school age children is often indexed by their reluctance to spontaneously interact with unfamiliar peers by watching others playing without joining in, whining, and nail biting (Asendorpf, 1991; Rubin et al., 2009; Stevenson-Hinde, Shouldice, & Chicot, 2011). Research has showed substantial links between early inhibition and shy, wary, and reticent behaviors (e.g., Kagan et al., 2007). Thus, researchers (e.g., Chen & French, 2008) have used the term “shyness-inhibition” to conceptualize children’s vigilant and anxious reactivity to challenging social situations (social novelty and perceived social evaluation) that indicates internal conflict

between approach and avoidance motivations (Asendorpf, 1991).

The Contextual-Developmental Perspective

Researchers have long recognized that environmental factors, particularly socialization experiences, affect temperament and personality characteristics and their significance for development (e.g., Pauli-Pott, Mertesacker, & Beckmann, 2004; Rothbart & Derryberry, 1981). The temperament-environment connection and interaction were reflected in Thomas and Chess’s goodness of fit theory. However, that theory focused on the compatibility of temperament and socialization and on caregivers’ ability to change their childrearing practices depending on children’s temperaments, with little attention paid to the contributions that children’s experiences and social-contextual factors made to temperament and personality development.

Chen and colleagues (e.g., Chen, 2012; Chen & French, 2008) have proposed a contextual-developmental perspective emphasizing social interaction as a context for the development of socioemotional characteristics (see Figure 5.1). According to this perspective, children’s

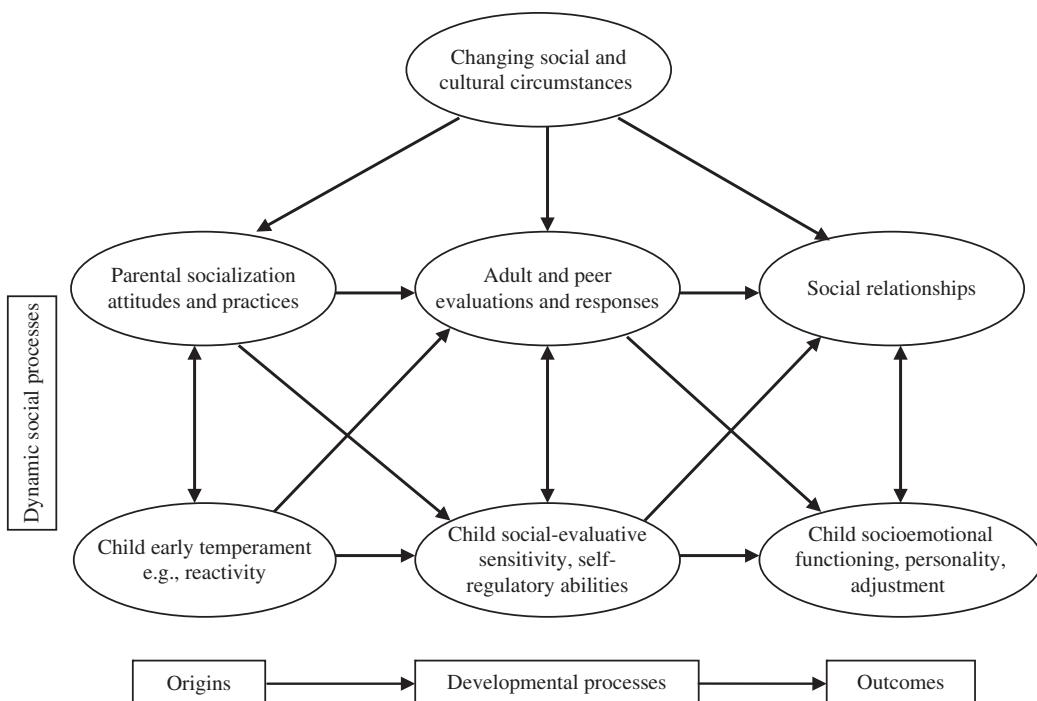


Figure 5.1 A contextual-developmental model concerning the role of social interaction in the development of temperament, personality, and socioemotional functioning.

Source: Adapted from “Peer Interactions, Relationships and Groups from a Cross-Cultural Perspective,” by X. Chen, J. Chung, and C. Hsiao, 2009, in K. H. Rubin, W. Bukowski, and B. Laursen (Eds.), *Handbook of Peer Interactions, Relationships, and Groups* (pp. 432–451), New York, NY: Guilford Press, and “Culture, Temperament, and Development,” by X. Chen, F. Yang, and R. Fu, 2012, in M. Zentner and R. Shiner (Eds.), *The Handbook of Temperament* (pp. 462–478), New York, NY: Guilford Press.

temperament and personality need to be understood from a developmental point of view, and the development of temperament and personality needs to be understood in the dynamic social context. Specifically, individual and group biases in early disposition constitute a major initial source of variations in socioemotional development. Parents and other socialization agents, particularly peers from middle childhood, may evaluate children's characteristics in manners that are consistent with social expectations in the society, community, or group. Moreover, based on their evaluations, adults and peers may respond to these characteristics and express attitudes (e.g., acceptance, rejection) toward children who display the characteristics in interactions. Social evaluations and responses during interactions, guided by changing social-cultural norms and values, in turn serve to regulate the development of the characteristics and determine, to a large extent, the children's adjustment.

The contextual-development perspective highlights the regulatory function of social interaction in temperament and personality development. Social contexts likely direct children's attention to external demands, and continuous feedback from others promotes children's awareness of social expectations and evaluations. Whereas social approval informs children that what they display is regarded as appropriate, negative evaluations from others may place pressure on them to modify their behaviors. The regulatory process of social interaction occurs gradually as children attempt to maintain or alter their behaviors or behavioral styles according to social evaluations. The need for social acceptance, intimate affect within social relationships, and a sense of belonging (Sullivan, 1953) are the main motivational forces that direct children to participate in interaction, to attend to social evaluations, and to adjust their reactions. To obtain social acceptance and affiliation, children need to understand others' attitudes and expectations and change behaviors that provoke negative social responses. For behavioral characteristics that are resistant to change, particularly those strongly influenced by genetic factors, children need to learn how to control them and how to express them in socially acceptable ways. Children with adequate social-cognitive abilities may act as others expect to improve their social relationships and adjustment status, but those who fail to do so may experience frustration, distress, and other psychological problems, which eventually lead to maladaptive outcomes.

The contextual-developmental perspective is particularly concerned with social interaction in the peer group

as a context for development. Support from the peer group, including approval and acceptance, is necessary for children to maintain socially desirable characteristics such as self-control that may be related to readiness for personal sacrifice. Group-level social processes including the establishment and modification of group norms and mutual evaluation and regulation in group activities determine, in part, the display and functional significance of temperamental and personality characteristics, although individual sensitivity to social evaluations may affect the processes by constraining or facilitating group influence. As they develop their social-cognitive abilities, children play an increasingly active role in the social processes through their reactions to social influence (e.g., compliance, resistance) and through their participation in constructing new norms for social evaluations (Chen, 2012). Thus, the social processes are transactional in nature.

Summary

Theorists and researchers have been engaging in intensive and extensive inquiry over the past 50 years about the function, structure, and development of temperament and personality in childhood and adolescence. Theories and models have been proposed from different perspectives and validated using different approaches. Although these theories and models help the field understand the major aspects of temperament and personality, researchers still know relatively little about their developmental processes, particularly the role of socialization experiences in the processes.

From the contextual-developmental perspective, social interactional processes are involved in the formation, maintenance, and change of temperament and personality. An examination of social processes may help to achieve multiple goals such as the delineation of temperament and personality structures. Information about adult and peer interpretations and evaluations of, and responses to, specific characteristics that children display during interaction allows for a better understanding of the distinct functions of the characteristics in social contexts. In addition, children's temperament and personality need to be examined from a developmental perspective. Findings about similar and different developmental origins, patterns, and outcomes of child characteristics, such as reactivity to novelty, frustration, and excitement, may help clarify issues related to the constructs and provide insight into the general and domain-specific nature of temperament and personality characteristics.

ASSESSMENT ISSUES

Over the past several decades, researchers have debated how to assess temperament and personality (e.g., Kagan, 1998; Rothbart & Bates, 2006). Depending on their theoretical considerations (e.g., focus on coherent patterns of behaviors and emotions across contexts versus reactions to specific stimuli or situations) and practical constraints, researchers may choose particular methods to assess individual characteristics. Three types of assessment approaches often used by researchers in the field are subjective reports, direct observations of behavior, and physiological measures. Each of these approaches has particular strengths and limitations.

Subjective Reports

Of the three approaches to assessing temperament and personality, subjective reports have been the most common. Ease of administration is the main factor in the growth of studies using questionnaires. However, the real advantage of subjective measures lies in the richness of the data generated. Parents and caregivers are in a unique position to assess how their children behave in a wide variety of situations and across multiple contexts. Rothbart and colleagues have developed a series of parent- and self-report measures of temperament that tap similar temperamental dimensions from infancy to early adulthood (e.g., Evans & Rothbart, 2007; Putnam, Gartstein, & Rothbart, 2006; Rothbart, Ahadi, Hershey, & Fisher, 2001). For example, the Infant Behavior Questionnaire (IBQ) asks parents to rate how often in the last week their 3- to 12-month-old cooed and vocalized for 5 minutes or longer. The Early Childhood Behavior Questionnaire (ECBQ) asks parents of toddlers between 18 and 36 months of age to indicate their child's activity level, attention-shifting and focusing, and other temperamental characteristics. The Children's Behavior Questionnaire (CBQ), used to measure temperament in children aged 3 to 7 years, produces three factors: negative affectivity, surgency/extraversion, and effortful control (see Rothbart & Bates, 2006). The Colorado Child Temperament Inventory (CCTI; A. H. Buss & Plomin, 1984) measures temperament at ages similar to those in the CBQ and yields temperament dimensions of shyness, sociability, emotionality, soothability, activity level, and attention.

Researchers have also attempted to measure children's personality using self-reports. For example, Corulla (1990) developed a "junior" version of the Eysenck Personality

Questionnaire to assess personality dimensions of extraversion, neuroticism, and psychoticism in children and youth. Others have developed self-report measures to index the Big Five dimensions, which have been demonstrated in adulthood, to see if similar constructs can be reliably identified in childhood (e.g., Kohnstamm et al., 1998).

A major difficulty with the use of subjective reports is that parents and teachers are vulnerable to biases such as contrast effects. For example, behavioral characteristics of a child may be amplified or attenuated in the parent's mind when the child is compared with another child in the family. Teachers are susceptible to similar biases in which they have a tendency to rate bright and well-behaved children more positively than less bright and disruptive children. Other problems affecting informant accuracy include memory biases, inadequate attention to instructions, social desirability considerations, and any interpretations of a behavior. Accordingly, agreement between subjective reports and laboratory observations is typically low. Whether parental responses reflect the child's behavior or characteristics of the parent also remains an important issue to be addressed by researchers. This situation can be improved by aggregating responses from multiple raters (e.g., teachers, caregivers, parents, and the child) to achieve convergence. Subjective questionnaires also tend to avoid asking invasive personal questions and use selected vocabulary that can be understood by a majority of, but not all, respondents. The reasons for these choices are obvious, but they have the unintended effect of limiting what can be measured by the questionnaires. This issue is important because investigators' conclusions are often based on factor analyses of item responses so excluding some items necessarily influences the number and type of factors generated. Finally, many of the temperament and personality questionnaires have not been normed on diverse ethnic and cultural groups, but rather reflect primarily middle-class North American values. This is a concern because particular traits may be more valued in one culture than in another. Investigators are beginning to address this issue by creating and norming measures that can be used across nations and cultures. For example, Rothbart's questionnaires (e.g., IBQ-R and ECBQ) have been translated into multiple European and Asian languages.

Behavioral Observations

One of the most objective measures is information garnered from direct observation of behavior in laboratory or

naturalistic settings. Laboratory assessments allow for relatively high levels of control of the experimental parameters. The data collected are unbiased by parental perceptions or the child's relationship with the parent or teacher. Behavioral measures are then quantified in terms of rate or frequency, duration, and intensity of response. Because laboratory assessments are expensive and time-consuming, their use is often restricted to one or two visits. As a result, such assessments provide only a brief sample of a child's behavior in an unusually controlled environment. As well, laboratory measures are often obtained in contrived settings that may not reflect the child's everyday environment and may constrain some behaviors that would be observed in non-laboratory settings.

Other measures may be derived from observations of the child in naturalistic settings (e.g., playground) or everyday environments (e.g., home) that are familiar to the child. A familiar environment provides high ecological validity. However, one limitation with everyday environments is that the setting and sequence of events are not standardized. This limitation may introduce confounds between the features of child behavior and features of the home or school. Aggregating naturalistic observations across multiple sessions over time may offset this limitation and provide the most reliable information about the child's behavior.

Physiological Measures

The measurement of physiological processes involved in temperament and personality development provides another piece of information that can be used in conjunction with behavioral and subjective assessments. Physiological measures provide additional evidence about the underlying state of a child, which enables researchers to make inferences about motivation and intention. Different noninvasive measures are used with children to assess electrocortical, autonomic, and neuroendocrine functioning.

Electrocortical Measures

One measure that has been used to index functioning of the central nervous system is electroencephalographic (EEG) activity. Researchers can measure patterns of electric activity generated by thousands of synchronously firing brain cells by using electrodes attached to the surface of the scalp. The electrical oscillations produced by these brain cells may be measured as tonic levels of firing in resting conditions or phasic changes in firing during information processing and state-related processing. The magnitude

of spectral power, computed as the amount of electrical energy in specific frequency bandwidths of the signal, reflects underlying brain activation in a given brain region during a particular task/condition. Activity in these EEG frequency bands is presumed to reflect different functions as well as psychological and motivational processes. For example, the pattern of frontal EEG alpha activity at rest has been linked to individual differences in temperamental reactivity (Fox et al., 2005).

Investigators also use electrocortical measures to index event-related brain reactions to sensory stimuli to effectively track real-time brain processing. Event-related potentials (ERPs) are short (typically < 1,000 ms) epochs of EEG activity that are time-locked to discrete stimuli or responses. Although the use of ERPs in temperament studies is relatively limited, researchers have found that the way the brain processes information may reflect temperamental characteristics (McDermott et al., 2009).

There are limitations associated with the use of brain electrical activity measures. One limitation is related to the difficulties involved in recording sensitive electrical signals from children. Another limitation is the fact that information from adult studies is used as a guide to understand children's EEG and ERP components, even though the child's brain may not be fully mature. A third limitation is that the source of the EEG signal measured at the surface of the scalp is unknown. The source may originate at subcortical and cortical levels and their interactions. Thus, investigators should be cautious in drawing inferences from electrocortical measures without support from behavioral observation and/or self-report data. However, if these caveats are addressed, electrocortical measures can provide invaluable and unique information about brain processing and novel insights about brain processes underlying temperament and personality functioning.

Autonomic Measures

Individual differences in autonomic reactivity are of interest to developmental researchers because of links between heart rate control and temperamental inhibition. To assess cardiac autonomic control, researchers collect continuous cardiac electrical signals over a period of minutes while the child is relaxed or attending to a visual and/or auditory stimulus. Measures of heart rate and heart rate variability, such as respiratory sinus arrhythmia (RSA), are then usually calculated offline. At rest, cardiac output is dominated by activity in the parasympathetic division of the autonomic system through the vagus nerve, which is the 10th cranial nerve. When psychological or physical demands

increase, parasympathetic outflow is withdrawn, reducing RSA and allowing heart rate to increase. The ability to successfully disengage and reengage the “vagal brake” at an early age in response to changing psychological and physical stressors is associated with emotional regulation (see Porges, 1995, 2007). High levels of resting RSA and greater RSA reactivity in infants have been found to be associated with social engagement, preschool adjustment, and fewer behavior problems (Porges, Doussard-Roosevelt, Portales, & Greenspan, 1996).

It is important to note that inferences about psychological and motivational states such as behavioral inhibition cannot be made from high RSA alone. As with other psychophysiological indexes, converging evidence from different sources is needed to create a reliable physiological profile that may be related to a given psychological or motivational state.

Neuroendocrine Measures

Cortisol is a stress hormone that is produced by the hypothalamic-pituitary-adrenocortical (HPA) system (see Gunnar, Doorn, & Esposito, Chapter 4, this *Handbook*, this volume). The brain stimulates the adrenal glands to increase cortisol production and secretes cortisol into the blood, increasing blood sugar levels and blood pressure to prepare the body for fight or flight. Cortisol is assayed from samples of saliva, plasma, or urine and measured as the difference between some basal or baseline level and the level obtained in conjunction with a psychological stressor. Temperamentally inhibited children are known to have higher basal levels of cortisol activity as well as higher resting heart rates than uninhibited children (Kagan, Reznick, & Snidman, 1988). However, Schmidt, Santesso, Schuklin, and Segalowitz (2007) found that baseline salivary cortisol levels varied significantly among inhibited children, indicating that a temperament of inhibition is a necessary, but not sufficient, condition for high cortisol production. Gunnar and her colleagues (Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996; see also Gunnar, Doorn, & Esposito, Chapter 4, this *Handbook*, this volume) reported that early caregiving might moderate the relation between inhibition and cortisol reactivity. Inhibited toddlers who were insecurely attached exhibited higher levels of cortisol stress reactivity than inhibited toddlers who were securely attached.

Over time, environmental factors can influence cortisol levels. Under conditions of chronic stress, the HPA system may downregulate its activity. Early chronic stress may lead to low cortisol in which morning cortisol production

is markedly suppressed and cortisol reactivity is dampened as a result of downregulation (e.g., Beaton, Schmidt, Schuklin, & Hall, 2013). One of the main challenges in studying the HPA system lies in the difficulty of activating this system within the context of controlled laboratory settings. Psychological stimuli in the laboratory are often not potent enough to elicit significant cortisol production. As well, cortisol is highly susceptible to time of day, diet, medications, and a range of daily life events. It is difficult to control for all of these factors.

Summary

Three commonly used types of assessment tools for understanding temperament and personality are subjective report, behavioral observation, and physiological measures. Researchers need to weigh the time, cost, and feasibility of these methods in relation to their questions when designing studies. Each of these methods has advantages and disadvantages. For example, although biological measures are often viewed as “objective” and privileged relative to subjective reports, presumably making the science more rigorous, the psychometric qualities of many biological measures have not been assessed. In addition, although biological measures often account for unique variance in predicting temperament, personality, and socioemotional outcomes, effect sizes using these measures are typically smaller than behavioral and self-report measures. The strongest approach is one that combines multiple methods and measures as this enables researchers to investigate the phenomena on multiple levels of analysis. Future research should consider the use of multiassessment tools in longitudinal designs in order to establish convergent evidence over time regarding the developmental phenomena under investigation.

BIOLOGICAL FOUNDATIONS

The search for a physiological basis of temperament in the modern era began with Pavlov (1927). Pavlov theorized that individual variation in nervous system functioning was important for understanding the degree of adaptation to various environmental stimuli. Pavlovian concepts and ideas exerted a considerable influence on subsequent generations of Soviet and Eastern European scientists studying biological aspects of temperament in adults. Investigators such as Teplov, Nebylitsyn, and Strelau made important contributions to the study of individual differences in

temperament by applying Pavlovian ideas of nervous system functioning to humans.

Certain concepts investigated by the Soviet and Eastern European researchers were revisited and elaborated by Eysenck and Gray in the adult personality literature. For example, the balance between neural excitation and inhibition was central to Eysenck's (1947) theory. For Eysenck, extraversion reflected the degree of arousal in the brainstem reticulocortical activating loop, and neuroticism was mainly related to a low threshold for excitability in the limbic lobes of the brain. Along the same lines, Gray's (1994) approach/withdrawal model extended basic notions of threshold sensitivity in the brain as mediating factors in a behavioral activation system (BAS) and a behavioral inhibition system (BIS). Cloninger, Svrakic, and Przybeck (1993) and Zuckerman (2005) extended the "biochemical bases of individuality" proposed by Nebylitsyn many years earlier by relating the activity of diffuse neurotransmitter systems to individual differences in novelty seeking (dopamine) and harm avoidance (serotonin).

In research on individual differences in temperament, specifically temperamental inhibition, Kagan (1998) speculated that infant reactivity to novelty might be linked to sensitivity in forebrain circuits involved in the processing and regulation of emotion. Children who become easily distressed during the presentation of novel stimuli may have a lower threshold for arousal in forebrain areas, particularly the central nucleus of the amygdala. This hypothesis was based largely on findings from studies of species in which the amygdala plays an important role in the regulation and maintenance of conditioned fear (see LeDoux, 1996). The amygdala sensitivity hypothesis in temperamental inhibition was tested and supported in empirical studies (e.g., Schmidt & Fox, 1998; Schwartz, Wright, Shin, Kagan, & Rauch, 2003).

In this section, we review theories and research concerning biological foundations for temperament and personality development. We limit our review to the major biological systems. Although other biological measures have been used to index children's temperament and personality (e.g., skin conductance reactivity, autonomic preejection period, startle EMG, fMRI), given their relatively limited use in the field, we do not review studies using these measures.

Brain Electrical Activity and Temperament and Personality

The link between brain physiology and individual differences in temperament and personality development is

supported by at least two types of evidence: EEG asymmetry and power and ERP studies. In this section, we describe some of the theoretical framework and empirical evidence related to the studies.

Studies of Frontal Brain Asymmetry and Power

One long-standing, and perhaps the most widely used, theoretical framework to understand the biological foundations of temperament and personality development is the model developed by Davidson (2000) and Fox (1991). Davidson and Fox described a frontal activation model of emotion, in which they argued that emotions are organized around approach-withdrawal motivational tendencies, which are differentially lateralized at the level of the cerebral cortex. The left frontal cortical area is involved in approach-related emotions (e.g., happiness, joy, interest). The right frontal cortical area is involved in the withdrawal-related emotions (e.g., fear, sadness, disgust). Using regional measures of brain electrical activity (EEG) to index brain responses during the concurrent presentation of affective stimuli, Davidson and Fox found greater relative right frontal EEG activity during the presentation of visual stimuli used to induce negative emotion, and greater relative left frontal EEG activity during the presentation of visual stimuli used to induce positive emotion. These same basic patterns of frontal EEG responses to affective stimuli have been noted across different sensory modalities and different ages (Schmidt, 1999).

Davidson and Fox also theorized that patterns of resting or "tonic" lateralized alpha activity in the frontal hemispheres were predictive of dispositional mood and affective reactivity (Davidson, 2000; Fox, 1991). Individual differences in the patterns of resting frontal activity are presumed to reflect differences in excitability of forebrain limbic circuitry involved in the regulation of emotion.

The neurocircuitry underlying affective reactivity with respect to approach- and withdrawal-related motivational systems has been intensively investigated. The frontal regions, particularly regions of the prefrontal cortex, are believed to be involved in the regulation of subcortical sites, such as the amygdala, a region known to be intimately involved with withdrawal-related negative affect (LeDoux, 1996). More specifically, left-sided activation of the prefrontal cortex may exert an inhibitory effect on the activation of the amygdala, thereby dampening the duration of negative affect in response to negatively valenced stimuli (Davidson, 2000). Individual differences in patterns of prefrontal activity at rest may mediate the regulation of the time course of emotional responding, such that individuals

showing greater relative left prefrontal activity recover more rapidly from negative affect than those individuals with greater relative right prefrontal activity (Davidson, 2000).

In a series of studies with typically developing infants and children, Fox and colleagues (2005) reported that inhibited infants at 4 months of age exhibited greater relative right frontal EEG activity at 9 months and 4 years of age. As well, children classified at Age 4 as either socially anxious-reticent or solitary-passive during play with same-sex and same-age peers exhibited greater relative right frontal EEG activity at rest than socially outgoing children. Schmidt and colleagues (e.g., Theall-Honey & Schmidt, 2006) reported differences in state-related changes in frontal EEG activity in shy children. For example, shy children displayed greater relative right central EEG activity at rest and during the presentation of a fear-eliciting video clip than non-shy children at Age 4. Shy children also displayed greater increases in right, but not left, frontal EEG activity in anticipation of a self-presentation compared to their non-shy counterparts at Age 7 (Schmidt, Fox, Schukin, & Gold, 1999). Associations between right frontal EEG activity and infants' and children's social withdrawal-related behaviors and temperamental fear were reported in others studies (e.g., K. A. Buss et al., 2003). In addition, the pattern of right frontal EEG asymmetry characterizes some other personality styles in childhood. For example, Santesso, Reker, Schmidt, and Segalowitz (2006) reported a relation between right frontal EEG asymmetry at rest and disinhibited behaviors in 10-year-olds. Accordingly, right frontal asymmetry at rest might reflect emotion regulatory problems underlying inhibited and disinhibited temperaments in childhood.

Although the frontal brain asymmetry model for understanding temperament has garnered considerable traction over the years, it has a number of limitations. The salient limitations include (a) the assumption of localization of emotion and temperament, which is somewhat antiquated as it is now known that they are distributed brain processes, (b) the assumption of emotional experience as static, which is inconsistent with evidence for the blending of emotional experience (Kreibig, Samson, & Gross, 2013), (c) unclear causal relations between frontal asymmetry and behavior, (d) inadequate explanations of the meaning of brain asymmetry function, (e) lack of information about the source of brain activity because the signal's origin gets distorted by the time it reaches the scalp, and (f) failure of many studies to replicate basic right-left differences in relation to temperament and personality.

Some general suggestions may be offered for future research. First, researchers should develop alternative models about the frontal brain asymmetry. For example, the frontal asymmetry may be considered to indicate a static or dynamic *endogenous environmental condition* that varies from the left side (related to tendency of approach in social settings) to the right side (related to avoidance or hesitant behavior) and interacts with some genes to promote particular outcomes (Schmidt & Miskovic, 2013). The argument about gene X environment (e.g., resting brain activity) interaction is consistent with the notion in other biological disciplines that have long emphasized the importance of the internal environment for gene expression and the development of different genotypes. Second, in brain asymmetry models, alpha activity is traditionally considered the dominant frequency band related to temperament and personality characteristics. Nonhuman and human and evolutionary evidence indicates that slow-wave brain activity (e.g., delta) originating in deep cortical/subcortical structures is related to arousal while fast-wave brain activity (e.g., beta) originating in the neocortical mantle is associated with higher cognitive and regulatory functions. Delta-beta EEG spectral power coupling or correlation may reflect cortico-subcortical cross-talk. Thus, it is possible to use continuous EEG power measures to examine the degree of correlated activity in frequency ranges to approximate connectivity and cross-talk among distinct brain levels and distributed neural processes in understanding individual differences in temperament (see Miskovic et al., 2010). It is necessary to move beyond the single frequency band notions that are central to the frontal asymmetry model to more distributed and brain network models. Such an approach allows deeper insights into how the brain communicates among particular brain regions and which circuits underlie temperament and personality variations.

Event-Related Potentials

The interface of the work of Posner and Rothbart (2000, 2009) provides the framework for ERP studies of temperament and personality in children. Rothbart, Ahadi, and Evans (2000) argued that regulation or effortful control and other basic dimensions are biologically based. Posner's work on executive attention and the putative neural substrates and attentional networks that underlie self-regulation provides a basis for ERP studies of broad executive processes (e.g., Posner, Rothbart, Sheese, & Voelker, 2014).

There is an emerging literature on the ERP study of executive attention processes and networks involved in children's emotion regulation. P. J. Marshall, Reeb, and Fox (2009) found that children who were classified as inhibited as infants exhibited increased amplitude of a positive slow wave in the ERP response to deviant tones compared with standard tones at 9 months. Bar-Haim, Marshall, Fox, Schorr, and Gordon-Salant (2003) also found that, at Age 4, shy children had smaller mismatched negative amplitude and longer mismatched negativity (MMN) latencies than non-shy children. In addition, McDermott et al. (2009) reported that adolescents classified as inhibited as children displayed enhanced response monitoring, manifest as large error-related negativities (ERNs), ERP components linked to response monitoring that appear approximately 100 ms after an error. In a study of affect processing in 7-year-olds, Perez-Edgar and Fox (2007) noted that children rated high in soothability and attentional control showed slower behavioral responses to social words with a negative valence. Children low in attentional control displayed enhanced amplitudes in the later, more cognitive ERP components (i.e., a P3 component, which is linked to cognitive and attentional processing) in response to both positive and negative affective words.

Using different ERP components, researchers have examined relations between temperament and personality traits and information processing. Some of these studies have used the N2 response, an ERP component linked to cognitive inhibitory and attentional control. For example, K. A. Buss, Dennis, Brooker, and Sippel (2011) found that increases in the N2 response were associated with less efficient executive attention and lower temperamental effortful control in 6-year-olds. Lamm, Granic, Zelazo, and Lewis (2011) examined the N2 response temporally (200–500 ms) during a go/no-go task in a group of children aged 8 to 12 who were classified as anxious and aggressive. Anxious aggressive children exhibited high ventral prefrontal activation in the early N2 window, and nonanxious aggressive children displayed high ventral prefrontal activation in the late N2 window. Henderson (2010) reported that shyness and the N2 response interacted to predict social adjustment in 9- to 13-year-old children. Shyness was related to poor outcomes among children with relatively large N2 brain responses.

Still other investigators have used the ERN to examine different temperament and personality styles in children and youth. For example, Brooker, Buss, and Dennis (2011) found that enhanced ERN and Pe (error-related positivity response following the ERN) responses were

related to better orienting and greater attentional focusing, respectively, in 4- to 8-year-olds. Greater Pe was also associated with less observed boldness in the children. Santesso, Segalowitz, and Schmidt (2006) found that 10-year-old children who scored high on the CBCL measure of obsessive-compulsive behaviors exhibited greater ERN responses to errors made on a visual flanker task than children scoring low on this CBCL measure. The pattern of ERN response was interpreted to mean that the children with obsessive-compulsive tendencies may have been more concerned with making errors than children scoring low on the CBCL measure. Santesso and Segalowitz (2009) also found that risk propensity (risk taking, sensation seeking, and sensitivity to reward) and empathy were associated with the ERN amplitude, negatively and positively, respectively, in a sample of boys in late adolescence. In another study, Segalowitz et al. (2012) reported an interaction between temperament and context on the feedback-related negativity (FRN) component in response to an impending simulated car crash in a group of typically developing 15-year-olds. The FRN amplitude was reduced as a function of (a) the presence of peers during the driving task stimulus and (b) high trait surgency; these findings suggest that the FRN is sensitive to both context and temperament.

ERP measures suffer from some of the same methodological issues as continuous EEG asymmetry and power measures, including source, volume conduction, as well as the lack of normative data, which is of critical importance as more and more ERP studies are being used to parse and categorize problem temperaments. It should also be noted that, although ERP studies are concerned with dynamic brain processing, the presentation of hundreds of trials in a sterile laboratory environment may not accurately capture how the brain actually processes sensory information in the real world. Researchers need to find ways to assess the activities of the brain that extract meaning from far fewer trials that are usually not repeated with the same temporal course. One approach, for example, would be to examine event-related brain oscillations allowing for the interplay of time and frequency activity and single trial analyses.

Autonomic Activity and Temperament and Personality

The autonomic nervous system and measures that index peripheral physiology have also been used to illustrate the biological foundation of temperament and personality in children. There are at least three measures that have been used at rest and in response to affective stress to assess temperamental reactivity: heart period (inverse of heart rate),

heart period variability (standard deviation of heart period), and cardiac vagal tone, which is a measure of heart rate variability due to respiration (e.g., Porges, 1995). In general, a high and stable heart rate reflects emotion dysregulation, while high vagal tone reflects more optimal emotion regulation abilities than low vagal tone.

Kagan and colleagues (1988) found that inhibited preschoolers exhibited high and stable resting heart rates. Schmidt and colleagues reported a relation between high resting heart rate and shyness in 7-year-olds. State-related changes have also been found in shy children, with increases in heart rate and reductions in heart rate variability during self-presentation (Schmidt et al., 1999).

Fox (1989) found that infants with higher vagal tone were more reactive to positive and negative events at 5 months and more sociable at 14 months than infants with lower vagal tone. By contrast, low resting vagal tone has been related to frustration, fear, and distress in neonates, infants, and toddlers (Gunnar, Porter, Wolf, Rigatuso, & Larson, 1995).

Despite a number of studies using cardiovascular measures to understand stress and anxiety, there is still little consensus about how peripheral measures index central states. Arousal is often the key link to negative emotions, yet hyperarousal characterizes some forms of aggression as well as sociability in children. Future studies should examine a combination of psychophysiological measures that index central and peripheral levels during different affective challenges. Because central-level measures provide more information in distinguishing emotions, this multilevel approach may help delineate the relative contributions of general arousal and emotional valence from arousal to temperament and personality development.

Neuroendocrine Activity and Temperament and Personality

In the study of the neuroendocrine system, cortisol, a stress hormone, has been examined in relation to individual differences in temperament and personality. Overall, high basal and baseline cortisol characterizes fearful, inhibited, and anxious profiles, although some studies have shown that these profiles are also characterized by low levels, a result that has been hypothesized as reflecting a recalibration of the HPA involved in regulating cortisol.

Kagan and his colleagues (1998) reported that inhibited children exhibited higher morning basal cortisol levels than their uninhibited peers. Schmidt and colleagues

(1997) replicated the morning basal cortisol finding in shy preschoolers at Age 4 and reported increased cortisol reactivity in shy children at Age 7 in response to self-presentation (Schmidt et al., 1999). Gunnar, Mangelsdorf, Larson, and Hertsgaard (1989) reported that infants who were identified as temperamentally distressed from 9 to 13 months of age exhibited increases in adrenocortical activity during the presentation of laboratory vignettes. Gunnar's group also noted that inhibited children who were in insecure attachment relationships exhibited greater increases in salivary cortisol in fear-eliciting conditions than uninhibited and securely attached children (Nachmias et al., 1996).

There appears to be a developmental pattern between temperament and personality and cortisol responses. Schmidt et al. (2007) found that, although shy preschoolers had high morning salivary cortisol levels, shyness predicted high and low salivary cortisol levels in middle and late childhood. Other findings indicated that younger and older children diagnosed with clinical anxiety exhibited different patterns of cortisol responses to self-presentation. Across the sample, the direction of cortisol reactivity to a speech task differed by age groups; in younger children (<9.75 years) this task elicited a slight decline between baseline and the speech stressor, whereas in older children (>9.75 years) cortisol increased (Mathewson et al., 2012).

Despite the burgeoning use of cortisol as an index and the HPA axis as a theoretical framework for understanding temperament and personality over the last several decades, the field is still left with many unanswered questions. A major concern surrounds the role of cortisol in the maintenance of temperament. For example, although high cortisol levels are usually characteristic of anxious personality, high cortisol levels occur in bold and exuberant children as well (see Schmidt et al., 1997). This apparent paradox may inform how researchers should view cortisol and behavior. For example, rather than conceptualizing cortisol as a molecule of fear, it may make more sense to view it as an indicator of energy metabolism (that is, energy to be fearful and hypervigilant to the environment as well as to be bold and exuberant). In addition, cortisol levels are highly variable and sensitive to time of day, stress, diet, and other factors. Repeated measurement of cortisol throughout the day is necessary to capture its diurnal pattern within an individual. At the same time, it is important to ensure the reliability of the data by measuring cortisol levels across days and contexts before inferring their psychological significance.

Genetic Basis of Temperament and Personality

The idea that there may be a genetic basis to individual differences in temperament can be traced to evidence produced by three disparate sources: inbred nonhuman animal strains, twin studies, and molecular genetics. The first source of evidence involves studies of domesticated and laboratory animals. Researchers have known for years that nonhuman animals can be bred to produce highly fearful, defensive, aggressive, and subdued temperaments. As well, a long and substantial nonhuman animal literature demonstrates a susceptibility to stress-reactivity among some inbred animal strains. Strain differences in physiological and behavioral reactivity have been found in rodents (Blizard, 1989).

A second body of evidence for a genetic basis of temperament comes from findings of long-standing behavioral genetics studies of human twins (Gagne, Vendlinski, & Goldsmith, 2009). Overall, researchers have shown that identical (i.e., monozygotic) twins appear more similar in temperament and personality than fraternal (i.e., dizygotic) twins and adopted children. For example, Matheny (1989) reported genetic influences on inhibited and timid behavior in 12- to 30-month-old children, with changes and stability in behavior being more concordant in monozygotic twins than in dizygotic twins. Robinson, Kagan, Reznick, and Corley (1992) assessed a longitudinal sample of same-sex twin pairs at 14, 20, and 24 months on observed laboratory behaviors of fear and wariness, and found high internal consistency at all ages, suggesting that these behaviors are heritable. In a later study of 24-month-old twin pairs, DiLalla, Kagan, and Reznick (1994) reported that monozygotic twins showed stronger intraclass correlations of inhibited and fearful behavior to unfamiliar stimuli than dizygotic twins and non-twin siblings.

A third source of evidence for a genetic basis of temperament and personality comes from the rapidly emerging field of molecular genetics in the study of human personality. Researchers who are interested in the molecular genetic basis of temperament and personality have studied, among others, the functional polymorphism in the dopamine D4 receptor gene (DRD4) and the serotonin transporter gene (5-HTT) (e.g., Benjamin, Patterson, Greenberg, Murphy, & Hamer, 1996; Lesch et al., 1996). Dopamine has been implicated as a major neuromodulator of novelty seeking because of the role it plays in inducing euphoria in humans and approach behavior in animals. The longer alleles code for a receptor that is apparently less efficient in binding dopamine than the shorter alleles. Serotonin

has been implicated as a major neurotransmitter of anxiety and withdrawal because of its effects on regulating mood and emotional states. The short allele of 5-HTT reduces efficiency of serotonin promotion and results in reduced serotonin expression.

Two initial studies (LaHoste et al., 1996; Swanson et al., 1998) reported an association between the DRD4 receptor gene and attention deficit hyperactivity disorder (ADHD). The 7-repeat form of the DRD4 appeared more frequently in children with ADHD than in the control group. Another study reported a gene-gene interaction in predicting neonatal temperament (Ebstein et al., 1998). Neonates with a short 5-HTT allele and who lacked a long form of the DRD4 had lower orientation scores on the Brazelton neonatal assessment scale than other neonates. Other studies with children have linked the DRD4 long allele gene to reactivity and regulation and problem behaviors maintained by reactivity and regulation across a range of measures and ages, including attention problems and aggression in children (Schmidt, Fox, Perez-Edgar, Hu, & Hamer, 2001; Schmidt, Fox, Rubin, Hu, & Hamer, 2002).

Lesch et al. (1996) initially found that adults with one or two copies of a short allele in the serotonin transporter gene self-reported higher levels of neuroticism, anxiety, and depression than adults with two copies of a long allele. Auerbach, Faroy, Ebstein, Kahana, and Levine (2001) reported that infants who were homozygotic for the short allele (i.e., s/s) of the 5-HTT gene exhibited less fearful distress to stranger approach and less pleasure in a structured play situation than infants who were homozygotic for the long allele (i.e., l/l) or heterozygotic (i.e., l/s) for this gene. Battaglia et al. (2005) and Hayden et al. (2007) found that children who were homozygotic for the short allele were significantly shyer than children with at least one copy of the long allele of the 5-HTT gene. Others reported that the long form of the 5-HTT gene was associated with shyness in 7-year-olds as measured using questionnaires (Arbelle et al., 2003). However, Schmidt et al. (2002) failed to find an association between the 5-HTT gene (short or long form) and observed shyness in preschoolers.

Other studies have extended prior work on the main effects of genes on behavior to examine the interaction of genes with particular environments. For example, Kochanska, Philibert, and Barry (2009) found that children who carried at least one short 5-HTT allele (i.e., s/s or s/l) and who were in insecurely attached mother-child relationships developed poor regulatory capacities. However, children who were in securely attached relationships developed as good regulatory capacities as children who

were homozygotic for the long allele. Sheese, Voelker, Rothbart, and Posner (2007) found that children who were carriers of the DRD4 7-repeat (long allele) and experienced lower quality parenting had higher levels of sensation seeking. The authors also reported that there were no associations between the DRD4 gene and children's self-regulation as assessed using an effortful control measure.

Schmidt, Fox, Perez-Edgar, and Hamer (2009) reported evidence for a gene-“endoenvironment” interaction in which the environment was conceptualized as dynamic activity within the individual. This interaction predicted children's temperament related to self-regulation and effortful control. Importantly, the internal environment was conceptually and empirically orthogonal to the candidate gene of interest. Children who were carriers of the DRD4 long allele exhibited the highest and lowest levels of soothability at 48 months, depending on whether they also had greater relative left or right frontal EEG activation asymmetry, respectively, at 9 months.

It is important to note that many studies have failed to replicate findings regarding the molecular genetics of complex traits. There is growing evidence that the initial findings of particular candidate genes underlying complex traits are not as informative as they first appeared. As well, the mechanistic approaches of gene \times environment interactions have been questioned. The field now views gene \times environment interactions as probabilistic rather than deterministic. What we have learned is that gene expression is quite dynamic rather than static (Charney, 2012). Today, the science of epigenetics is beginning to inform our understanding of complex traits. Epigenetics involves changes in gene expression, but not the underlying chemical structure of the DNA sequence. These changes are affected by a range of internal and external environmental influences. Epigenetics provides new opportunities for understanding human development (van IJzendoorn, Bakermans-Kranenburg, & Ebstein, 2011).

Summary

Theoretical and methodological advances in the area of neuroscience have spawned much interest in how researchers come to understand complex traits in children. Although much remains to be discovered, there have been significant advances in the understanding of brain-behavior relations, the biological origins of complex traits, and the neural processes that may maintain them. For example, it is now known that brain functions and structures are

not fixed after the early school-age years and that early experience plays a key role in shaping brain-behavior relations. Developmental changes can occur across the life span.

Nevertheless, it is important that methodological advances do not trump theoretical and research questions. Some methods that fuel excitement in the field come and go, but the fundamental questions about what makes people unique transcend time. Among the questions concerning the biological processes of temperament and personality, for example, it is important to examine how biological systems are malleable to environmental input, what environmental conditions influence change, and whether there are sensitive periods for change. Caution is recommended when inferring the psychological significance of biological states and measures. Further theoretically driven developmental research is required to achieve a better understanding of biological data.

THE DEVELOPMENT OF TEMPERAMENT OR PERSONALITY AND ADJUSTMENT

Given the general belief about the significance of dispositional characteristics for development, it makes sense that researchers are interested in links between early temperament and later personality and their contributions to socioemotional and behavioral adjustment. In this section, we review major findings in this area. We also review the literature on trait \times trait interaction in development. Our review and discussion focus mainly on the two dimensions of child reactivity to stressful and provocative situations and self-regulation or self-control.

Temperament Development in Early Childhood

Newborns show clear individual differences in levels of arousal and emotionality, such as alertness, calmness, activity, irritability, and distress proneness (e.g., Korner, 1972). There is also evidence indicating variations among newborns in soothability, an initial indication of regulatory abilities (e.g., Crockenberg & Smith, 1982). Within the first half-year of life, individual patterns of reactivity, such as the expressivity of positive and negative emotions in different situations, become increasingly distinct and stabilized. A temperamental characteristic in infants that has received heightened attention from researchers is reactivity to novel stimuli. Kagan and colleagues (e.g., García Coll et al., 1984) have found that infants at 4 months displayed

different reactions to unfamiliar visual and auditory stimuli. Inhibited infants are anxious and distressed, displaying high levels of physiological arousal, whereas uninhibited infants are spontaneous and exhibit little distress. Findings from different projects, including those based on extremely inhibited and uninhibited groups, indicate that behavioral inhibition is moderately stable in childhood (Fox et al., 2005). However, it is unclear how inhibition changes in form or level among normative or extremely inhibited children, although reactivity to novel situations in early childhood is associated with anxiety in social-evaluative situations from middle childhood (e.g., Rubin et al., 2009).

Compared to reactivity, more evident normative progressive “phases” are observed in self-regulation in early and middle childhood, likely in response to the rapid development of neurocognitive abilities. Initial regulation, largely automatic, in infants’ sleeping, eating, and orienting gradually becomes more sophisticated as reflected in parent–child coordinated daily activities, such as dressing and feeding and in infants’ initiation and control in social interactions (Rothbart, 2011). At 4 to 6 months, some infants show signs of controlling their attention and using the control to help them regulate their emotions, such as looking away from distressing or frightening objects (Crockenberg, Leerkes, & Jó, 2008; White, Helfinstein, Reeb-Sutherland, Degnan, & Fox, 2009). Toward the end of the first year, children start to display some forms of goal-directed, internally driven self-regulation largely due to the maturation of the frontal lobe and associated executive function.

Research has shown that at least from the second year, there are reliable and meaningful individual differences in effortful control, the ability to inhibit dominant responses to perform subdominant ones (Rothbart & Bates, 2006). Kochanska, Murray, and Harlan (2000) have found that children’s performance on effortful control tasks, such as snack delay, latency to look at gift upon request, and slowing down motor activity, considerably improves from 22 months to 33 months. Similar results have been reported in other studies (e.g., Chuang et al., 2006). Girls often outperform boys on control tasks during early childhood (Chen et al., 2003; Kochanska et al., 2000). Self-regulation or control is maintained mainly by external adults’ directions and demands in early childhood, but, with age, becomes increasingly mediated by internal factors such as spontaneous and voluntary pursuit of goals. Voluntary internalized control is indicated by children’s willingness to initiate, maintain, or modify particular actions and to

delay or inhibit certain behaviors without adult intervention (Kochanska et al., 2000).

The development of self-regulation is likely to affect other aspects of temperament and socioemotional functioning in children and adolescents, such as emotional expressivity in social settings. Researchers have found that children’s expressivity of positive and negative emotions and intensity of emotions steadily decline from middle childhood to early adolescence (Sallquist et al., 2009; Weinstein, Mermelstein, Hankin, Hedeker, & Flay, 2007). As children develop more mature regulatory skills, they may become more competent in managing their emotional reactions, particularly of a high intensity, to function more appropriately in social interactions (Sallquist et al., 2009). It remains to be examined to what extent self-regulation serves as a driving force of temperament and personality development.

Links Between Temperament and Later Personality

Because temperament is considered the dispositional core of personality, it is reasonable to expect conceptual and empirical links between temperament in the early years and later personality. Several scholars (De Pauw & Mervielde, 2010; Shiner & Caspi, 2012) have made great efforts to build connections, mostly at the conceptual level, between major temperament and personality traits. For example, based on their analysis of similarities in structure and content of traits in the literature, Shiner and Caspi (2012) proposed that temperament and personality in children and adults might be organized within the Big Five framework, with traits of Positive Emotionality/Extraversion, Negative Emotionality/Neuroticism, Effortful Control/Conscientiousness, Agreeableness, and Openness to Experience/Intellect. The work on the integration of the two fields, however, has drawn some concerns and criticisms including, among others, (a) unclear forms of expression of some traits (e.g., agreeableness and openness to experience in young children) at different developmental periods, (b) weak and inconsistent empirical evidence regarding some of the hypothesized links, and (c) the lack of specification of the developmental processes linking traits in childhood and adulthood (e.g., Wachs & Bates, 2010).

Despite these concerns, researchers have found that major temperamental characteristics in early childhood, such as behavioral inhibition, self-regulation, and positive emotionality, predict personality traits in the later years (Rothbart, Ahadi, & Evans, 2000). In a longitudinal study

with a large sample in Dunedin, New Zealand, Caspi and colleagues (2003) assessed temperament at Age 3 years based on ratings of observed behaviors as well as personality profiles at the ages of 18 and 26 years based on self-reports and reports of other people who knew the participants. The researchers found that undercontrolled children who were rated irritable and impulsive in early childhood became easily upset, antagonistic, and anti-social, with high scores on negative emotionality and neuroticism and lower scores on agreeableness and conscientiousness in adulthood. In contrast, inhibited children who were shy and fearful at 3 years developed an over-controlled and nonassertive personality style, with high scores on harm avoidance and constraint and low scores on extraversion, social potency, and positive emotionality in adulthood. Relative to undercontrolled and inhibited children, the personality profiles of other groups were less clear in adulthood. Some patterns emerged indicating that confident and outgoing children were more extraverted, socially more active, and more open to experience than others in the later years.

Results of other, mostly cross-sectional and short-term longitudinal studies also indicated associations between sociability/approach tendency and extraversion and agreeableness, between negative emotionality/fear and neuroticism, and between self-control/persistence and conscientiousness (Komsu et al., 2006; also see Deal, Halverson, Havill, & Martin, 2005). The magnitudes of the associations varied from weak to moderate, depending on a number of factors such as the length of interval (weaker with a longer interval), the developmental period (e.g., weaker from infancy to toddlerhood than from adolescence to adulthood), the domain of traits (e.g., stronger between irritability/anger and defiance than between approach and agreeableness), and research methods (e.g., stronger when assessments completely relied on self-reports than when observations were used) (Shiner & Caspi, 2012).

Temperament, Personality, and Adjustment Outcomes

Relations between temperament and later personality represent one aspect of trait development. A broader issue is how temperament and personality predict later adjustment in various domains. Researchers have found that temperament and personality characteristics such as positive emotionality, irritability, and extraversion–introversion have implications for individual adaptive and maladaptive social, cognitive, and psychological development. Positive

emotionality, for example, is positively associated with social competence as well as social-behavioral problems (e.g., Eisenberg et al., 2009). Anger or irritability is associated with externalizing problems such as aggression and defiance (Eisenberg et al., 2009; Lengua, 2006; Oldehinkel, Hartman, Ferdinand, Verhulst, & Ormel, 2007). We focus on the two fundamental dimensions, reactivity and self-regulation, in the following section because longitudinal research has demonstrated that they have relatively extensive and enduring effects on individual adjustment in socioemotional areas.

Reactivity/Inhibition and Adjustment

Cumulative evidence indicates that early reactivity or inhibition is associated with, and predictive of, socioemotional difficulties (e.g., Asendorpf, 1991; Fox et al., 2005). Moreover, when reactive or inhibited children realize their difficulties in social situations, they may develop anxiety, depression, negative self-perceptions, and other internalizing problems (Coplan, Prakash, O’Neil, & Armer, 2004; Kagan et al., 2007), although the findings are sometimes inconsistent with each other (Asendorpf & van Aken, 1994). Thus, it has been argued that high reactivity or inhibition is a major risk factor for maladaptive development (Rubin et al., 2009).

Kagan and colleagues (e.g., García Coll et al., 1984; Kagan et al., 2007) conducted one of the most systematic explorations of the later correlates of early reactivity. Based on physiological and behavioral assessments, groups of children were identified at 4 months and 24 months of age as high-reactive and low-reactive. Follow-up studies revealed that, relative to those who were identified as low-reactive, infants who had been high-reactive tended to be less sociable, quieter, and more socially avoidant in interactions with unfamiliar peers and adults from middle childhood to adolescence. Adolescents who were high-reactive in toddlerhood displayed higher levels of social anxiety than those who were low-reactive (Schwartz, Snidman, & Kagan, 1999). In addition, compared with adolescents who were low-reactive in infancy, adolescents who were former high-reactives described themselves as less happy and more morose and nervous, worrying about interpersonal relationships (Kagan et al., 2007).

Gest (1997) examined links between inhibition in middle childhood (Ages 8–12) and adjustment in early adulthood (Ages 17–24). Longitudinal analyses, with the stability effects controlled, revealed that childhood inhibition, rated by interviewers in interview and test sessions, negatively predicted the quality of social life

including peer relationships for both men and women, and positively predicted emotional distress for men. Moreover, inhibited children were less likely than uninhibited children to move out of the family-of-origin home in early adulthood. Similarly, Caspi, Elder, and Bem (1988) found that shyness-inhibition in boys, assessed at 8 to 10 years through clinical interviews, was associated with delays in career establishment, poor occupational performance, and marital instability at 30 and 40 years, although shyness-inhibition in girls was not associated with adulthood problems. Caspi et al. (2003) also found in the Dunedin longitudinal study that inhibited children displayed more internalizing problems, such as low social interest and engagement and lack of pleasure in life, at Ages 18 and 26. In a 19-year longitudinal study in a German sample, Asendorpf et al. (2008) found that both inhibited boys and inhibited girls showed a delayed transition into major social and life roles, such as romantic partnerships and full-time jobs. Moreover, extremely inhibited children displayed internalizing problems such as neuroticism and low self-esteem.

Taken together, several large-scale longitudinal projects have provided convergent evidence that highly reactive and shy-inhibited children are likely to develop internalizing socioemotional problems, such as social anxiety and life dissatisfaction, in adolescence and adulthood. Moreover, these children, particularly boys, tend to experience difficulties in later social relationships and life adjustment. The more salient problems of highly reactive and shy-inhibited boys may be related to gender-stereotypical ideologies. Relative to girls, boys are often expected to be more autonomous and assertive in social situations in most societies (Rubin et al., 2009). As a result, reactive and inhibited behaviors are viewed as more negative and less acceptable in boys, which may create obstacles for highly reactive and inhibited boys to achieve success in social interactions and life adjustment.

Self-Regulation/Control and Adjustment

Self-regulation involves processes in which individuals control behaviors, emotions, and cognitive activities (e.g., attention focusing or shifting) to achieve certain goals. Temperamental regulation, often represented by effortful control in the literature, is concerned with the ability to manage one's responses in order to complete tasks. It is conceivable that the ability to willfully and effectively control one's own behaviors or emotions helps children concentrate on their work, cope with negative experiences such as frustration and distress, and behave appropriately

in social situations (Eisenberg et al., 2009; Kochanska et al., 2000).

Longitudinal research has shown that self-regulation or control in early childhood may have prolonged effects on social-behavioral, academic, and life adjustment (Eisenberg et al., 2009; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005). Crockenberg et al. (2008) found that infants' ineffective regulation, such as attention to frustrating events, positively predicted later aggressive behavior, whereas effective regulation, such as looking away from frustrating events, negatively predicted later aggressive behavior, particularly in girls. Kochanska and Knaack (2003) assessed effortful control in early childhood using behavioral observations on tasks, such as delaying, slowing down motor activities, suppressing or initiating activity to signals ("Go-No Go" tasks), and lowering voice, and conscience and externalizing problems in middle childhood using interview with the child, maternal ratings, and observations. The researchers found that children with higher effortful control at 22 to 45 months developed higher levels of conscience at 56 months and fewer externalizing problems at 73 months.

Hill, Degnan, Calkins, and Keane (2006) identified groups of children with different developmental trajectories of externalizing problems from 2 to 5 years and found that children's emotion regulation on frustration tasks and mother-rated inattention at 2 years differentiated the groups. Specifically, poor attentional control predicted high and stable externalizing problems in both boys and girls. Poor emotion regulation predicted such problems in girls. Eisenberg et al. (2009) found that parent and teacher ratings of low attentional (maintaining or shifting attentional focus according to the task) and low inhibitory (suppressing inappropriate responses) control were associated with externalizing problems in middle childhood. Moreover, low effortful control was associated with an increase in externalizing problems over time. In their longitudinal projects, Caspi and colleagues studied how children with control problems adjusted in adulthood. In the Berkeley study (Caspi, Elder, & Bem, 1987), explosive, irritable, and undercontrolled temperament in childhood was associated with the progressive deterioration of socioeconomic status, work instability, divorce, and ill-tempered parenting at 30 and 40 years. Similarly, in the Dunedin study (Caspi et al., 2003), undercontrolled children displayed social and behavioral problems, such as perceived alienation from the world and aggression, in adulthood.

Researchers have speculated about the processes by which early self-regulation or control contributes to

development (e.g., Wachs & Bates, 2010). However, there is relatively little research on the processes. Zalewski, Lengua, Wilson, Trancik, and Bazinet (2011) assessed children's physiological, behavioral, and self-reported reactions to frustration and social evaluation, and found that, whereas the overall lack of regulation of negative emotions in the frustration situation was a main mediator of the relation between low effortful control and conduct problems, the poor ability to regulate subjective experience of frustration appeared to mediate the relation between low effortful control and depression. According to Zalewski et al. (2011), the contributions of effortful control to adjustment and problems may operate through children's emotional response and regulation in challenging or provocative situations. Moffitt et al. (2011) found in the Dunedin sample that low self-control from 3 to 11 years, based on adult ratings of multiple behaviors such as inattention, hyperactivity, and lack of persistence, positively predicted health problems, depression, substance use, financial struggles, and criminal convictions at 32 years. The longitudinal associations were mediated, in part, by "mistakes" the participants made in adolescence, such as smoking, becoming an unplanned teenaged parent, and dropping out of high school. These mistakes during the critical period of development trapped them in adverse lifestyles.

Self-control is consistently associated with academic achievement (Blair & Diamond, 2008; Ponitz, McClelland, Matthews, & Morrison, 2009). It is understandable that behavioral and emotional control is necessary for children to maintain their motivation for learning, focus on classroom activities, and make sustained efforts to complete assignments. Adequate control helps children organize their actions toward long-term goals and facilitate the execution of problem-solving strategies. In longitudinal studies with middle school students, Duckworth, Quinn, and Tsukayama (2012) found that, whereas IQ predicted changes in standardized achievement test scores over time, self-control, rated by parents, teachers, and students, mainly predicted later report-card grades. More importantly, the effects of self-control on grades were mediated by teacher-rated homework completion and classroom conduct, such as mastery of skills and knowledge taught in class, class participation, school attitudes and effort, and prompt and reliable class attendance.

Valiente et al. (2011) tested whether children's social functioning (social competence and externalizing problems) mediated relations between effortful control and academic achievement. The results indicated that children's

effortful control was positively associated with later academic achievement. The associations were fully mediated by social functioning. Chen, Zhang, Chen, and Li (2012) found in a Chinese sample that children's behavior on delay tasks at 2 years positively predicted school adjustment and negatively predicted learning problems in adolescence and that social competence mediated the predictive relations. Apparently, self-control or regulation helps children attend to others' needs and interests, which is conducive to the engagement of positive social interactions. The favorable experiences that well-controlled children obtain may enhance their positive attitudes about the school milieu and motivate them to display their competencies and to maintain their behaviors according to social standards.

The Moderating Effects of Self-Regulation on Relations Between Reactivity and Socioemotional Functioning: An Example of Trait × Trait Interaction

If self-regulation represents the process that modulates reactivity to events and their changes in the environment, it is reasonable to expect that self-regulation moderates the effects of reactivity. The moderating role of regulation has been explored from both temperamental and personality perspectives (e.g., Muris, 2006). In general, the literature suggests that self-regulation, particularly effortful control, moderates the effects of reactivity to (a) novelty or stressful situations (inhibition, fearfulness) in predicting internalizing problems such as anxiety, depression, and other negative emotions, and (b) frustration or limitation (irritability, anger) in predicting externalizing problems such as aggression, noncompliance, and disruptive behaviors (e.g., Olson et al., 2005). In addition, regulation and reactivity may interact in other ways, such as high negative emotionality and low control exacerbating the effects of each other in predicting poor socioemotional and social-cognitive skills (Belsky, Friedman, & Hsieh, 2001; Eisenberg et al., 1995; Ursache, Blair, Stifter, & Voegtle, 2013).

Several studies have been conducted to examine the moderating effects of attentional and behavioral control on the relations between inhibition and internalizing problems. White, McDermott, Degnan, Henderson, and Fox (2011) examined children's abilities to shift attention and suppress prepotent responses using cognitive regulatory tasks (e.g., Dimensional Change Card Sort, Day-Night Stroop) and maternal reports, and found that observed inhibition positively predicted later parental ratings of anxiety for children with low scores, but not for children with high scores, on attention shifting. Similarly, Sportel,

Nauta, de Hullu, de Jong, and Hartman (2011) found, in a sample of adolescents in the Netherlands, that attentional control moderated the associations between inhibition and a series of internalizing symptoms, such as generalized anxiety disorder, social phobia, and major depressive disorder. High behavioral inhibition was associated with internalizing problems only for adolescents who were low on attentional control. Although inhibited children tend to be highly vigilant in threatening situations, the ability to flexibly shift their attention away from these situations reduces their vulnerability to negative emotions.

Regulation or effortful control seems to moderate the effects of personality traits that are similar to behavioral inhibition on internalizing problems. Muris (2006) analyzed interactions between neuroticism and effortful control in predicting psychopathological symptoms such as depression and anxiety in a sample of adolescents in the Netherlands. The results showed that neuroticism was positively associated with internalizing problems, but the associations were weaker for adolescents with higher effortful control. Similarly, Oldehinkel et al. (2007) found in a sample of Dutch young adolescents that effortful control attenuated the effects of fearfulness on internalizing problems.

Consistent with its moderating effects on internalizing problems, regulation may affect relations between reactivity to frustration and externalizing symptoms. Stifter, Spinrad, and Braungart-Rieker (1999) observed 5- to 18-month-old infants' reactivity to frustration (arm restraint and toy removal) and regulation (orientation to mother, toy, or other objects, avoidance, communicative behaviors, self-comforting) and examined how they jointly predicted compliant and noncompliant behaviors on toy clean-up and other tasks at 30 months. The results showed that reactivity at 5 months predicted high levels of noncompliance and defiance more strongly for infants with lower regulation, although the patterns of interaction were more complex at 10 and 18 months. Degnan, Calkins, Keane, and Hill-Soderlund (2008) found similar frustration reactivity by physiological regulation interactions. These researchers observed children's reactions to frustration tasks and measured their vagal tone activities during the baseline and frustration episodes. The results showed that reactivity to frustration as indexed by vagal tone activities at 2 years was positively associated with maternal reports of disruptive behavior at 4 and 5 years for children with low regulation whereas the pattern was opposite for children with high regulation. Thus, high physiological regulation

was a protective factor that reduced the risk for children who displayed high levels of emotional reactivity, whereas low capacity to regulate emotional reactions to frustration placed these children at higher risk for developing disruptive behavior. Consistent with the findings in early childhood, Oldehinkel et al. (2007) reported that effortful control served to weaken the effects of frustration on externalizing problems in adolescence.

Reactivity and regulation may also interact in predicting children's social competence. Eisenberg and colleagues (1995) found that school-age children who were irritable and anxious as well as weak in regulation were more likely than others to become socially incompetent and experience difficulties in peer interactions. Belsky et al. (2001) found, in a longitudinal study of children of 15 months to 3 years of age, that high levels of negative emotionality displayed in stressful laboratory episodes were associated with low levels of mother-rated social competence, but only for children who had low scores on attentional persistence in a free play session. Finally, regulation may interact with other temperamental characteristics in development. Dollar and Stifter (2012), for example, found in a longitudinal sample (4–5 years to 6–7 years) that self-regulation moderated relations between surgency and later aggression and social wariness. Highly surgent children tended to develop more problems than others when they were low on regulation but fewer problems than others when they were high on regulation.

Summary

Newborns and infants show initial biases in their emotional, attentional, and behavioral responses to the environment, which constitute the dispositional foundations for socioemotional functioning. During the first 2 to 3 years, due to biological maturation, the growth of social-cognitive capacities, and socialization experiences, children display increasingly distinct reactivity to different situations, socially oriented and internally driven regulation, and more generally, individualized and coherent temperament profiles. Early temperamental characteristics predict, often to a modest or moderate extent, relevant personality traits and adjustment outcomes in adolescence and adulthood. Among these characteristics, reactivity or inhibition and effortful control show relatively robust and long-term effects on socioemotional functioning.

The interaction between reactivity and regulation in their contributions to social and psychological adjustment has

received increasing attention in developmental research. Researchers interpret the interaction mainly in terms of how high regulation or control serves to mitigate the development of problems or low regulation or control serves to exacerbate maladaptive development in highly reactive children. Nevertheless, some of the findings do not support this model. For example, in White et al.'s study (2011), inhibition positively predicted later anxiety for children with low scores, not for children with high scores, on attention shifting. However, a closer inspection revealed that, whereas among high-inhibited children, those low on attention shifting were more anxious than those high on attention shifting, among low-inhibited children, those low on attention shifting were less anxious than those high on attention shifting. In Stifter et al.'s study (1999), among highly reactive children at 5 months, those low on regulation were more defiant later than those high on regulation; however, the pattern was virtually opposite for highly reactive children at 18 months—those high on regulation tended to be more noncompliant than those low on regulation. Therefore, the processes of interaction between reactivity and regulation remain to be investigated, perhaps with different models, in future research. Research on trait \times trait interactions has focused on the moderating effects of regulation or control. It will be interesting to explore interactions among other traits such as positive emotionality and irritability in socioemotional development. Moreover, the contributions of temperament and personality characteristics to development take place in social environments. It is essential to consider social factors such as the socialization practices of parents and peers when studying the development of temperament and personality.

PARENTS AND PEERS AND THE DEVELOPMENT OF TEMPERAMENT AND PERSONALITY: THE ROLE OF SOCIALIZATION

Although traditional conceptualizations of temperament and personality tend to emphasize their biologically rooted dispositional features and temporal and cross-setting stabilities, researchers have been aware of the role of the environment in temperament and personality development (Rothbart & Derryberry, 1981). Findings from research programs have indicated that environmental factors are associated with the development of temperament and personality and may modify their relations

with adjustment outcomes (e.g., Eisenberg et al., 2007). Based on a reanalysis of the NYLS data that indicated weak to moderate stabilities of difficult temperament, Partridge and Lerner (2007) argued that temperament was an "emergent property of a dynamic interaction between a child's physiological and behavioral capacities and the constraints and contingencies placed on that child by his or her ecological context" (p. 263). Moreover, researchers believe that child characteristics and the environment may contribute independently as well as interactively to social and psychological adjustment (Lahey et al., 2008).

Nevertheless, a number of issues exist concerning how child characteristics and environments, particularly socialization practices, are associated with each other and how they interact in predicting adjustment outcomes. Researchers disagree, for example, about the causal direction between child characteristics and socialization practices. The main arguments include that (a) the manifestation of temperament and personality elicits particular patterns of social reactions of adults and peers, which in turn form an environment for the child, (b) environmental factors such as parenting trigger the exhibition of temperament and personality characteristics and facilitate or hinder their development, and (c) child characteristics and socialization practices reciprocally affect each other, although the effects may or may not be balanced. Different models of temperament \times environment interaction have also been proposed. In general, the contributions of child characteristics and environments to adjustment may occur in (a) an additive manner in which they make unique and independent contributions to adjustment, and (b) an interactive manner in which the contribution of one depends on the other. Concerning the interaction between child characteristics and environments, it may occur in two major fashions: (1) environmental factors exacerbate or buffer against the adverse effects of undesirable child characteristics, such as difficult temperament, that are considered risk factors, and (2) environmental factors reinforce or "potentiate" the strengths of children with desirable characteristics, such as high self-control, and enhance further adaptive development. Finally, from a different perspective, it has been suggested that child characteristics, such as emotionality and compliance, may represent personal susceptibility to environment influences (e.g., Belsky & Pluess, 2009). Individual differences in susceptibility to adversity and environmental support are likely to predict different development outcomes.

Relations Between Temperament and Personality

Characteristics and Parenting: The Issue of Directionality

As the most important socialization agent in the early years, the family, particularly parents, has received heightened attention in empirical studies of temperament and personality development. Although a lack of relations has been found in some studies (see Wachs & Bates, 2010), evidence from a number of studies indicates that parenting and parent-child relationships are associated with child characteristics (Kiel & Buss, 2011; Pauli-Pott et al., 2004; Schofield et al., 2012). The associations in some of the studies, particularly correlational and cross-sectional, may be contributed partially or completely by the “third” variable, such as genetic similarity between parents and their children, family conditions, and shared method variances if the data are collected from the same source of information. However, the results of more rigorously designed and controlled longitudinal and interventional studies (e.g., Pauli-Pott et al., 2004) suggest that the links are unlikely to be spurious.

Nevertheless, the direction of causality in the links is not clear. Researchers have reported results indicating both parent-to-child (Eisenberg et al., 2007; Pauli-Pott et al., 2004; Schofield et al., 2012) and child-to-parent (Kiel & Buss, 2011; Rubin, Nelson, Hastings, & Asendorpf, 1999) effects. The impact of temperament on parenting and parent-child relationships tends to be more evident in the first several years, although family influence on child characteristics becomes stronger in the later years (Lengua & Kovacs, 2005). It appears that, in general, child temperament or personality and family relationships affect each other in a reciprocal manner. Indeed, results from some longitudinal studies have supported the bidirectional model. Lengua and Kovacs (2005), for example, found that child irritability and parental inconsistent discipline predicted each other. Eisenberg et al. (1999) found that children’s poor regulation at 6 to 8 years of age predicted parental punitive reactions at 8 to 10 years and that parental punitive reactions at 8 to 10 years predicted low regulation at 10 to 12 years. Despite the evidence, further investigation is needed to clarify the causal processes in the relations between specific child characteristics and family socialization practices.

Parenting and Reactivity

Rubin and colleagues (2009) have argued that parental oversolicitousness and overprotection are developmental origins of children’s reactive and shy-inhibited behavior

because directive and overprotective parenting may lead to dependence on parents and a lack of exploration of the environment, which ultimately weakens children’s ability to develop coping strategies to overcome anxious reactions to novelty and challenging social situations. According to this argument, helping children to avoid stressful situations may not help them to develop social competencies. Consistent with the argument, Pauli-Pott et al. (2004) found that maternal sensitivity as observed at home significantly predicted infants’ negative emotionality, such as irritability and fear, that was observed in the laboratory and reported by parents. Hudson, Dodd, Lyneham, and Bovopoulous (2011) also found in a sample of 4-year-old children that maternal high involvement in mother-child interactions was significantly and positively associated with later increased behavioral inhibition in peer interaction settings.

It should be noted that the behavioral manifestations of parental high involvement, overprotection, and solicitousness may be similar to those of parental warmth and support. However, parental warm and supportive behavior may be beneficial for children to acquire feelings of security and confidence in exploring the environment and thus alleviate children’s reactivity and social anxiety (L. Murray, Creswell, & Cooper, 2009). A major issue in these studies is the failure to examine whether parental involvement and warmth are intended to guide children to engage in social activities or to impede their activities. In the future, researchers should consider the goal of parental behaviors in the study of their relations with children’s reactivity or inhibition.

In addition, it is possible that children’s reactive and anxious behavior elicits parental involvement and overprotection. Anticipating or viewing their children’s anxiety and fear in challenging situations is likely to produce feelings of concern and unease. As a result, parents may attempt to provide their support and assistance by displaying overprotective and controlling behaviors such as directly telling the child what to do and how to do it (Rubin et al. 1999). Kiel and Buss (2011) found in a longitudinal study that the association between child fearful temperament and later maternal protective behavior was strengthened by maternal accuracy in predicting children’s distress reactions to novel situations. In other words, child fearfulness appeared to elicit more protective behaviors in mothers when they anticipated correctly their children’s fearful reactions. According to Dadds and Roth (2001) and Rubin et al. (2009), child reactive and fearful temperament and parental protective and involving behavior may form an anxious-coercive cycle, in which anxious children seek attention and protection from the parents in stressful

settings and in turn parental protective responses reinforce children's behavior.

Parenting and Regulation

Relations between parenting and child regulation appear more unidirectional than those between parenting and reactivity. According to Eisenberg et al. (2007), children's regulatory abilities develop in the context of social interactions and relationships, particularly with their parents. Parents may affect children's regulatory abilities in several ways, including (a) serving as models in managing stress and controlling negative emotions and behaviors; (b) approving or disapproving children's expression of emotions and behaviors, which facilitates or undermines children's regulation; and (c) providing warmth and support in parent-child interaction that are beneficial to the development of secure parent-child relationships, compliance to adults' requests, and internalization of adults' goals. In addition, Eisenberg et al. (2007) suggest that parental responsiveness to children's emotions is important for the socialization of effortful control. When parents are sensitive to children's emotions such as distress, children may not become overaroused in distressing situations. In contrast, parental insensitivity and unsupportive reactions may induce aroused and dysregulated emotions in children.

Empirical results have consistently indicated that infants and toddlers of parents who are warm, sensitive, and responsive to child emotions tend to develop competent regulatory skills and express their emotions and behaviors appropriately in various situations (e.g., Kochanska, Aksan, Prisco, & Adams, 2008). Studies of parenting and conscientiousness or self-control in older children and adolescents provided similar results. Schofield and colleagues (2012), for example, reported that supportive parenting (e.g., warmth and respect for the child, as rated by observers during home visits) of both mothers and fathers positively predicted adolescent alpha personality, which was formed by lower-order traits of conscientiousness, agreeableness, and emotional stability, two years later with the stability of personality controlled in the analysis. The effects of parenting of mothers and fathers on adolescent personality were virtually identical and modest.

Parenting and Parent-Child Relationships as a Moderator of Relations Between Child Characteristics and Adjustment

The notion of interaction between temperament and parenting is consistent with the goodness of fit theory (Thomas & Chess, 1977). However, the goodness of fit theory may not

be particularly useful for making predictions in empirical research because of the judgmental nature of fit, which often results in circular reasoning about the appropriateness of parenting and adjustment outcomes. In the study of interactions between child characteristics and parenting or other environmental factors, many researchers use other models, such as the stress-buffering model (Cohen & Wills, 1985). According to the stress-buffering model, undesirable characteristics such as behavioral inhibition or irritability represent risk factors in development. Supportive parenting or favorable family conditions may serve as a protective factor that reduces the risk and protects children with those characteristics from developing maladaptive outcomes, whereas unsupportive parenting or unfavorable family conditions serve as an exacerbating factor that makes temperamentally at-risk children particularly susceptible to adjustment problems. As a result, children with undesirable characteristics in supportive and unsupportive families may have different developmental outcomes.

The stress-buffering model has been supported by findings from a number of studies. Williams et al. (2009), for example, assessed infants' inhibited behavior in laboratory observations and parenting styles and child behavioral problems based on maternal reports. The results showed that, whereas inhibited infants displayed more internalizing problems at Age 4 years than uninhibited infants when their mothers used permissive parenting styles, inhibited infants did not differ from their uninhibited counterparts when they were not exposed to permissive parenting. Similar buffering effects were found in other studies with young children, such as those involving parental positive control and child impulsivity in predicting externalizing problems (e.g., Lahey et al., 2008) and parental sensitivity or control and child difficult temperament in predicting internalizing and externalizing problems (e.g., van Aken et al., 2007).

Researchers have also examined the buffering function of parenting in relations between temperament and personality characteristics and adjustment beyond early childhood. Van Leeuwen, Mervielde, De Clercq, and De Fruyt (2007) studied parenting \times personality interaction in predicting adjustment problems among school-age children, using parent-report data. The results showed that low levels of agreeableness and conscientiousness were associated with externalizing problems for children with high scores on negative parenting (e.g., harsh discipline and punishment) or low scores on positive parenting (e.g., positive parental behavior, teaching rules, and autonomy), but not for children with low scores on negative parenting or high scores on positive parenting. Apparently, warm and

supportive parenting styles served to protect children who had antagonistic tendencies and poor control abilities.

Although researchers have widely used the stress-buffering model, child characteristics may interact with parenting in other ways. A conceptual model that is an alternative to the stress-buffering model is the resource-potentiating model (Kupersmidt, Griesler, DeRosier, Patterson, & Davis, 1995), which focuses on the context of low risk or high resources (e.g., child positive emotionality, self-control). According to this model, supportive parenting or favorable conditions facilitate the strengths of children with desirable characteristics. The potentiating effect ensures that favorable conditions promote positive developmental outcomes whereas unfavorable conditions hinder or constrain positive development. The resource-potentiating model is theoretically interesting and can help achieve a further understanding of the person \times environment interaction processes, given that many temperament and personality characteristics, such as positive emotionality, sociability, and self-regulation, likely contribute to adaptive development in supportive social conditions.

Not all research findings support the moderating or interactive model. Hudson et al. (2011), for example, found that behavioral inhibition and parenting as assessed in observations predicted maternal reports of child anxiety in an additive, rather than an interactive, manner. Lengua and Kovacs (2005) measured child temperament, parenting, and adjustment problems based on maternal and child reports, and found that temperamental characteristics, such as irritability, and maternal parenting, such as acceptance and inconsistent discipline, contributed uniquely and independently to the prediction of children's externalizing and internalizing adjustment problems. In a later 3-year longitudinal study, Lengua (2006) further found that increases in child fear and irritability during development were associated with high levels of internalizing and externalizing problems, over and above the effects of parenting, whereas increases in maternal rejection and inconsistent discipline were associated with high levels of externalizing problems when child temperament was controlled. These results supported the additive model.

The Role of Peer Interactions and Relationships in Temperament and Personality Development

With age, children engage in more social activities outside the home, and peer interactions become an increasingly important socialization context. Researchers who are

interested in peer interactions and relationships often focus on peer acceptance and rejection, dyadic relationships with friends, and peer groups. Experiences of these three aspects of peer relationships all seem to have significant implications for the development of temperament and personality.

As an illustration of the role of peer relationships in temperament and personality development, researchers examined the associations between peer exclusion and anxious withdrawal or solitude, a type of solitary behavior due to internal social anxiety or fear. Using a longitudinal data set from 10 to 13 years of age, Oh and colleagues (2008) and Booth-LaForce and colleagues (2012) identified three trajectories of anxious-withdrawn children (low-stable, increasing, and decreasing), based on peer nominations, and examined self-reported peer experiences associated with these trajectories. The results showed that children who initially had unstable friendships or lacked mutual best friends were likely to be in the increasing group, where anxious withdrawal became higher with time. In contrast, children with low levels of peer exclusion and victimization after the transition from elementary to middle school (11 years of age) were likely to be in the decreasing group, where anxious withdrawal was initially high but gradually decreased over time. Apparently, these children might have an opportunity to reduce their anxious-withdrawn behavior in a new school where they could engage in relatively normal peer interactions without being excluded.

In a longitudinal study with children from 5 to 9 years of age, Gazelle and Ladd (2003) examined children's peer relationships and anxious solitude using teacher reports and peer nominations. Anxious-solitary children who experienced peer exclusion after school entry displayed stable anxious solitude from 5 to 9 years of age. In contrast, anxious-solitary children who did not experience significant peer exclusion early on displayed decreased anxious solitude over time. Gazelle and Ladd (2003) argued that, compared with their counterparts who experienced peer exclusion, anxious-solitary children who did not might find it easier to overcome their social fear because it had not been confirmed by their social experiences. The experience of peer exclusion was likely to confirm and perhaps intensify social fear of anxious-solitary children.

Gazelle and Ladd (2003) also examined in this study how anxious solitude and peer exclusion jointly contributed to the risk for depressive symptoms. The results indicated that anxious solitude in combination with interpersonal adversity predicted elevated depression symptoms over time. Thus, whereas anxious-solitary children who

experienced high levels of early peer exclusion displayed sustained or increased depressive symptoms, anxious-solitary children without the experience of early peer exclusion did not differ from other children on initial depression and, more importantly, displayed a declining trajectory of depressive symptoms during the period of study. According to the authors, peer exclusion might have provoked negative self-schemata and feelings of helplessness that were linked to depression in anxious-solitary children.

The impact of peer relationships on temperament and personality characteristics and on their relations with adjustment is also demonstrated by developmental changes in children who are affiliated with peer groups with distinct group norms. Van Zalk, van Zalk, and Kerr (2011) investigated self-reported affiliation with crowd groups and individual social anxiety in Swedish adolescents. The researchers found that, in radical crowds (punks and goths) comprising adolescents who were shy and socially fearful, members became more anxious through group interactions with time. In these groups, members reinforced one another's anxious behavior by approving of the behavior in situations that elicit social fear. Similarly, Prinstein (2007) assessed group experiences and internalizing symptoms using adolescent and peer reports, and found that experiences in active groups, such as the "Populars" and "Jocks," led to declined shy-anxious behavior whereas experiences in academically oriented groups, such as the "Brains," led to increased social anxiety from childhood to adolescence. Moreover, increases in social anxiety were associated with greater susceptibility to peer influence, particularly among girls. In addition, the effects of peer groups were stronger on peripheral than nuclear members of the group, perhaps because peripheral members faced greater pressure to conform to the group norm (Conway, Rancourt, Adelman, Burk, & Prinstein, 2011).

Dishion and colleagues' work (Boislard, Poulin, Kiesner, & Dishion, 2009; Dishion, McCord, & Poulin, 1999) has shown peer group influences on self-control or control-based behaviors. When adolescents discussed topics such as planning a joint activity and solving a problem, adolescents who displayed deviant, undercontrolled, or delinquent behaviors were more likely than others to engage in talk about rule-breaking and to express contingent positive reactions, such as laughter, to deviant talk. Moreover, interactions among adolescents, including talk about rule-breaking and positive reactions to the talk, led to increased problems including violence, substance use, and high-risk sexual behavior in subsequent years. As argued

by Dishion and Dodge (2005), the grouping or aggregation of adolescents with behavioral problems provided a context that facilitated the development of their undercontrolled and defiant behaviors. Personal and contextual factors may moderate peer group effects. For example, the salience of the group norm, the uniformity of norm-based social evaluations, and affective and attitudinal processes in interactions such as mutual responsiveness may affect peer influences on the development of behavioral characteristics. In addition, group influence seems to be more evident for members who are more discrepant from their peers (Boxer, Guerra, Huesmann, & Morales, 2005).

Child Temperament and Personality as a Sensitivity Factor

Trait \times environment interactions can be understood from different perspectives. Although researchers have traditionally focused on the moderating effects of parent-child and peer relationships on relations between child characteristics and adjustment, it may be equally valid, from both theoretical and analytical perspectives, to view child characteristics as moderators of environmental influences on adjustment.

Several relatively broad frameworks may be useful for exploring the moderating effects of child temperament and personality. In their chapter on socialization and parent-child interaction in the *Handbook of Child Psychology*, Maccoby and Martin (1983) argued that researchers should consider child compliance, receptiveness, or readiness in the study of family socialization, particularly parenting styles. Parental socialization efforts such as guidance may lead to expected developmental outcomes among children who are compliant with parents and "ready" for socialization, but such efforts may be less successful for children who resist parenting attempts. In other words, parental support and guidance may elicit cooperation or reduce problem behavior in children who are responsive but not in children who display disobedient and defiant reactions to parental requests and demands. Maccoby and Martin (1983) and other researchers (e.g., Kochanska et al., 2008) have focused on the mutual contributions of compliance and parenting or the mediating role of compliance in relations between parenting and adjustment. However, the conceptualization of child compliance, or broadly regulation, as an indication of receptiveness to socialization implies the moderating function of this trait and perhaps other related personal traits such as conscientiousness and social sensitivity in the link between social experiences and development.

Another model of the moderating role of personal characteristics, which is commonly used in the field of psychopathology, is the vulnerability or diathesis-stress model (e.g., Rutter, 2006; Zuckerman, 1999). According to this model, children with certain undesirable characteristics such as a difficult temperament may be more vulnerable than others to adverse environmental influence, which leads these children to develop more adjustment problems. In this process, adverse environmental factors or experiences may trigger destructive reactions in vulnerable, but not resilient, children; individual vulnerability and environmental stressors represent a dual-risk for maladaptive development. Thus, relative to children with easy temperaments, children with difficult temperaments are more likely to suffer in adverse environments, although they are not more likely than others to benefit from supportive rearing conditions. The vulnerability or diathesis-stress model, which is virtually equivalent to the stress-buffering model that focuses on environmental factors as a moderator, has been supported by findings from numerous studies (e.g., Lengua & Wachs, 2012). De Haan, Prinzie, and Deković (2010), for example, examined relations among personality, parenting, and behavioral problems in a Flemish sample of 6- to 15-year-olds based on teacher and parent reports. The results indicated that personality moderated the relations between coercive or overreactive parenting (criticism, yelling) and the development of delinquency and aggression; coercive parenting was related to higher and more stable delinquency and aggression for less extraverted, benevolent, and conscientious children.

As an extension of the diathesis-stress model, Belsky, Ellis, and colleagues (Belsky & Pluess, 2009; Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2011) have proposed a differential susceptibility model that treats temperament as susceptibility to the influence of childrearing environments. This model includes the aspect of resource-potentiation in the resource-potentiating (Kupersmidt et al., 1995) and vantage sensitivity (Manuck, 2011) models. All these models recognize that children with certain temperamental characteristics or genes may be particularly sensitive to the influence of environmental conditions. However, the differential susceptibility model explicitly emphasizes that individual susceptibility may be directed toward both positive and negative influences, which can lead to corresponding adaptive and maladaptive outcomes. The same characteristic, such as negative emotionality, fear, or difficult temperament, may predict problems when it is combined with a detrimental

environment but positive outcomes when it is combined with a supportive environment. In other words, children with a high level of susceptibility are vulnerable in stressful settings, but, at the same time, are more likely than others to benefit from supportive environmental conditions (Belsky & Pluess, 2009). Individual sensitivity to environmental influence is rooted in an evolutionary framework. According to Ellis and Boyce (2008), a strategy for survival and reproduction may promote success in some environments but failure in others. "Selection pressures therefore tend to favor *adaptive phenotypic plasticity*, the capacity of a single genotype to support a range of phenotypes in response to particular ecological conditions that recurrently influenced fitness during a species' evolutionary history" (p. 183).

Pluess and Belsky (2010) tested the differential susceptibility theory using a longitudinal data set from a large sample in multiple locations in the United States. In the study, mothers rated children's difficult temperament at 6 months, and maternal parenting and childcare quality were assessed by semistructured play and observation at 6, 15, 24, 36, and 54 months. Children's cognitive-academic competence and socioemotional adjustment outcomes were assessed repeatedly over time from 5 to 11 years of age using standardized tests and teacher reports. The results partially supported the differential susceptibility model. Children with high temperamental negativity had clearly lower scores on later academic performance, including in reading, math, and picture vocabulary, when they experienced insensitive and unsupportive parenting, but children with the same temperament did not display obviously higher academic competence when their parents were sensitive and supportive, a result that supported the diathesis-stress model. On the other hand, consistent with the differential susceptibility model, children with a difficult temperament had lower scores on social skills and higher scores on problems in the context of low-quality parenting or childcare but had higher scores on social skills and lower scores on problems in the context of high-quality parenting or childcare.

Essex, Armstrong, Burk, Goldsmith, and Boyce (2011) tested the differential susceptibility hypothesis in a longitudinal study of children from 7 to 13 years of age. The researchers measured reactivity with biological (e.g., slope of mean arterial pressure across a 20- to 30-minute stress protocol) and behavioral (inhibition/disinhibition) assessments, and teacher-child relationships and externalizing and internalizing problems through teacher, parent, and child reports. The results indicated that, compared with

their counterparts low in biological sensitivity, biologically sensitive children were more susceptible to adverse teacher-child relationships, but were not more susceptible to supportive teacher-child relationships, which supported the diathesis-stress model. The results about behavioral reactivity appeared to be consistent with the differential susceptibility hypothesis. However, the pattern of interactions between temperament and teacher-child relationships were not straightforward in predicting later problems; whereas highly inhibited children were more susceptible to the influence of teacher-child conflict, highly disinhibited children were more susceptible to teacher-child closeness.

Mixed findings were also reported by Lengua and colleagues in a series of studies (e.g., Lengua, 2008) of child characteristics, including fear, anxiety, frustration, and effortful control, as moderators of relations between parenting or neighborhood environment and adjustment in childhood. In general, different child characteristics appeared to operate differently depending on the parenting or neighborhood dimension and the adjustment outcome. For example, Lengua (2008) found that maternal rejection was associated with greater increases in externalizing problems for children high in frustration, relative to children low in frustration, which was consistent with the differential susceptibility hypothesis. However, many other interactions in these studies were complex and did not show a coherent pattern.

Stronger support for the differential susceptibility model came from some other research programs. Boyce, O'Neill-Wagner, Price, Haines, and Suomi (1998) found that high-reactive rhesus monkeys who were exposed to a high-stress living condition had the highest number of injury incidents over a 12-month period, whereas high-reactive monkeys who were exposed to a low-stress living condition had the fewest injury incidents during this time period. The low-reactive monkeys had a mid-level number of injuries during the same time regardless of whether they were exposed to high- or low-stress environments. Bakermans-Kranenburg and van IJzendoorn (2006) found that children with the DRD4 7R allele, which is related to a range of reward-seeking and approach-related behaviors such as sensation seeking, impulsivity, and risk taking, exhibited the least and most externalizing behaviors, depending on whether they experienced high or low quality caregiving. Thus, the DRD4 7R allele may not be a risk allele per se, but may confer heightened sensitivity to environmental influences, regardless of whether these influences are positive or negative.

In several longitudinal studies using various observational laboratory paradigms, Kochanska and colleagues (e.g., Kim & Kochanska, 2012) showed that parenting, particularly by mothers, had significant effects on developmental outcomes for children high in fearfulness or negative emotionality, but not for children low in fearfulness or negative emotionality. Moreover, the patterns of interactions suggested that children high in fearfulness or negative emotionality often displayed regulatory behaviors in the presence of low-power parenting and positive mother-child relationships, but had lower scores on regulation when mothers used more power-assertive parenting and mother-child relationships were less desirable. Similarly, using data collected from observations and maternal and teacher reports, Bradley and Corwyn (2008) found that parenting variables were more strongly associated with behavioral problems for children with difficult temperaments than for children with easy temperaments. Whereas children with difficult temperaments had fewer problems when their parents were sensitive and supportive but more problems when their parents used insensitive and harsh parenting practices, the trends were weaker or nonsignificant for children with easy temperaments.

In short, researchers have interpreted interactions between temperament and personality traits and environment factors in terms of individual vulnerability to adverse environmental influences. The differential susceptibility model (Belsky & Pluess, 2009) provides a useful alternative perspective that is receiving increased attention. Research findings supporting this model have generally been mixed. Clearly, children vary in their sensitivity to external influences, either positive or negative, perhaps due to the features of their nervous or other biological systems (Ellis et al., 2011). However, it is unclear (a) what child characteristics (e.g., anxiety, fearfulness, difficult temperament, frustration) reflect sensitivity or susceptibility, (b) whether children with a high level of sensitivity react to different environmental influences (e.g., parental support, control, childcare settings) to the same extent or in the same manner, and (c) whether children's sensitivity is manifested similarly or differently in terms of developmental outcomes (e.g., externalizing problems, internalizing problems, regulatory behavior). It will be important to clarify these issues, which will allow researchers to formulate more explicit hypotheses (e.g., whether a particular characteristic is a vulnerability, resource-potentiating, or sensitivity factor) and make more meaningful interpretations of findings. At the same time, researchers should continue to explore how individual characteristics and

environmental factors contribute to adjustment from different perspectives. Different frameworks and models, such as those focusing on socialization receptiveness and vulnerability, may be complementary when addressing development of temperament and personality in different domains.

Summary

Research has shown that temperamental and personality characteristics are associated with parenting and peer relationships, although the directions and processes of causality underlying the associations remain largely unclear. There is empirical support for each of the arguments about child temperament and personality eliciting reactions from parents and peers, parent and peer socialization leading to change in child characteristics, and reciprocal influence between child characteristics and social relationships. Research has also revealed joint and interactive contributions of child characteristics and environmental factors in predicting adjustment outcomes. To achieve a more in-depth understanding of trait \times environment interactions beyond the statistical representations (e.g., simple slope analysis) that have been provided in most studies, researchers need to explore, perhaps using strategies such as experimental or quasi-experimental, intervention, and multiwave longitudinal designs, the processes by which specific socialization factors buffer or potentiate the effects of child desirable or undesirable characteristics and the processes by which specific characteristics make children vulnerable or sensitive to the influence of rearing conditions.

The associations between child characteristics and socialization and their contributions to adjustment occur in broader socioecological settings (Bronfenbrenner & Morris, 2006). Factors such as family socioeconomic status (SES), immigration and ethnic minority status, parental mental health, and community conditions may be involved in the processes. Paulussen-Hoogeboom, Stams, Hermanns, and Peetsma (2007), for example, found that child negative emotionality was negatively associated with parental support, but the association was stronger in families from lower socioeconomic and ethnic minority backgrounds. The results suggest that child negative emotionality is likely to gradually elicit unsupportive parenting from parents with low-SES and ethnic minority backgrounds. However, parents from resourceful, middle- to high-SES, and European American families may be more

sensitive to their children's characteristics and more capable of adjusting their parenting behavior to children with difficult temperaments. Therefore, another future direction is to study how SES and other macro-level socioecological factors affect relations and interactions between child characteristics and parenting or peer relationships.

CULTURE AND THE DEVELOPMENT OF TEMPERAMENT AND PERSONALITY

The influence of culture on personality has been an interesting topic in anthropology, psychology, sociology, and other behavioral sciences. In the history of culture and personality studies, cultural anthropologists such as Benedict (1934) and Mead (1928) had a major impact on theoretical and empirical work. However, the culture and personality school or movement that emerged in the first half of the 20th century was highly controversial and was eventually abandoned by researchers, due to a number of factors including the strong criticisms of its assumptions about homogeneous personality types within cultures, stereotype-related national character studies, and simplistic explanations of the relation between culture and personality (e.g., G. Marshall, 1998).

In the developmental field, interest in how cultural factors influence children's and adolescents' temperament and personality has been growing rapidly, with little connection to the traditional culture and personality school. Using a variety of research strategies, including behavioral observations in naturalistic (e.g., home and school) and controlled laboratory settings, surveys, narrative interviews, and longitudinal analysis, researchers have investigated the role of culture in the development of emotionality, self-control, and other characteristics. Although cross-cultural comparisons have been made, most studies are concerned with similarities and differences among children in different societies or communities on specific characteristics and their development rather than with identifying "national characters" or "modal personality types" as in the culture and personality school. Moreover, researchers are generally aware that (a) enormous variations exist in any society or community; (b) group differences in temperament and personality are associated with specific social, economic, and ecological circumstances, lifestyles, and values that are constantly changing; (c) sociocultural conditions may affect the display as well as the meaning of temperament and personality characteristics; and (d) it is important to examine the processes by which sociocultural factors are

involved in individual development (Chen & French, 2008; García Coll, Akerman, & Cicchetti, 2000).

The issues of cultural influence on human development, including temperament and personality development, have been discussed mainly from two broad perspectives—the sociocultural perspective (Vygotsky, 1978) and the socioecological perspective (Bronfenbrenner & Morris, 2006). The sociocultural theory emphasizes the internalization of external symbolic systems, such as language and signs, from the interpersonal level to the intrapersonal level. During development, after mastering these systems, human beings can use them to perform psychological processes and manipulate the environment. Social practices or activities of human beings are an important part of cultural influence on development, and changes in sociocultural structures and related social practices are likely to result in reorganization of mental processes and the formation of new psychological functions (Rogoff, 2003). From a different perspective, the socioecological theory indicates that culture, as a part of the ecological environment, affects individual attitudes, emotions, and behaviors mainly through a series of more proximal systems. The cultural beliefs and values endorsed in a society or community may serve to organize other ecological settings, such as community services, school and daycare arrangements, and family interaction patterns, which in turn shape individual development (Super & Harkness, 1986).

Consistent with the sociocultural and socioecological perspectives, researchers have argued that different societies and communities may place different values on children's characteristics such as emotion expressivity, obedience, and independence (García Coll et al., 2000; Rogoff, 2003). According to Chen and French (2008), two major dimensions of socioemotional functioning, social initiative and self-control, are reflected in most of these values. Social initiative represents the tendency to initiate and maintain social participation, which may be indicated by reactivity in challenging social situations, whereas self-control is concerned with the ability to modulate behavioral and emotional reactivity in social interactions. In Western self-oriented societies, in which acquiring personal autonomy and assertiveness is considered a major socialization goal, social initiative is viewed as an important aspect of competence. Although self-control is considered necessary to achieve personal goals, children are encouraged to maintain a balance between the needs of the self and those of others (Maccoby & Martin, 1983); both under- and overcontrol are regarded as maladaptive. In group-oriented societies, on the other hand, social

initiative may not be highly valued because it may cause disturbance to, or interfere with, interpersonal and group harmony. To maintain interpersonal relationships and group harmony, however, children are encouraged to restrain personal desires in order to address the needs of others. Therefore, self-control, particularly effortful control, is strongly emphasized in these societies (Chen, Yang, & Fu, 2012).

Cultural values regarding social initiative and self-control provide a frame of reference for social judgments about temperamental and personality characteristics such as sociability-agreeableness (active social initiative with effective control), defiance-impulsivity (high social initiative and low control), and shyness-inhibition (low social initiative and adequate control to constrain behaviors and emotions toward self) (Chen & French, 2008). Thus, when adults and peers evaluate and respond to the characteristics that children display in social settings, culture serves as a guideline for social evaluations and responses. Through social evaluation and response processes in interactions, culture plays a role in determining the display and development of temperament and personality.

Culture and the Display of Temperament and Personality Characteristics

Numerous findings have been reported concerning cross-cultural similarities and differences in children's and adolescents' temperamental and personality characteristics. For example, researchers have found that children in some Asian societies are less expressive of both positive and negative emotions than children in Western societies (Camras, Chen, Bakeman, Norris, & Cain, 2006; Gartstein et al., 2006). Indian, Kenyan, Korean, Mayan, and Mexican children tend to be less sociable and to engage in less self-expressive activities than Western children (Edwards, 2000; Farver, Kim, & Lee, 1995). Adolescents and young adults in some African (e.g., Nigeria, South Africa), Asian (e.g., China, Korea, Japan), and South American (e.g., Costa Rica) societies seem to be less extraverted and more introverted than their Western counterparts (e.g., Lee, Okazaki, & Yoo, 2006; Oakland, Pretorius, & Lee, 2008). Whereas cross-cultural differences in aspects of temperament and personality such as emotionality or expressivity are interesting, in the sections that follow, we focus mainly on children's reactivity or social initiative and self-control, which may systematically reflect the influence of cultural values on individual characteristics.

Reactivity to Challenging Situations

Cross-cultural research has revealed that Asian children may differ from Western children on negative reactivity to stressful or challenging situations in the early years. According to parental reports, for example, relative to their American counterparts, Japanese, mainland Chinese, Taiwanese, and Vietnamese infants and toddlers tend to display greater negative reactivity, as indicated by higher intensity, irritability, fear, and reluctance to approach in unfamiliar situations (e.g., Gartstein et al., 2006). Austin and Chorpita (2004) also found that Chinese American, Philipino American, and Japanese American children displayed higher levels of social anxiety than their European-American counterparts. Huntsinger and Jose (2006) found similar results, indicating that second-generation Chinese American adolescents scored higher on sensitivity and withdrawal, and lower on emotional stability, excitability, and cheerfulness than European-American adolescents. When the scores were aggregated to form higher-order personality factors, Chinese American adolescents were clearly lower on extraversion and independence. Interestingly, in a follow-up study that was conducted 5 years later, most of the group differences disappeared. Chinese American adolescents differed from European American adolescents on only two dimensions: cheerfulness and boldness; Chinese American adolescents were less cheerful and less bold. Huntsinger and Jose (2006) argued that increased similarity in personality might be related to some universal developmental processes and acculturation.

Consistent with the findings based on parental reports and self-reports, researchers have found differences between Asian and Western children on reactivity to stressful situations in observations. Farver et al. (1995), for example, found that Korean American children displayed more shy behavior than European American children in peer interactions in preschool settings. Chen et al. (1998) found that Chinese toddlers were generally more reactive and inhibited than Canadian toddlers in novel laboratory situations. Compared with Canadian toddlers, Chinese toddlers stayed closer to their mothers and were less likely to explore the environment in mother-child free play sessions. Chinese toddlers also displayed more anxious and fearful behaviors in interaction with strangers, as indicated by their higher scores on the latency to approach strangers and to touch toys when they were encouraged to do so. In a later analysis of data from multiple samples, Rubin et al. (2006) found that Korean and Chinese toddlers exhibited

higher levels of inhibition than Australian, Canadian, and Italian toddlers in multiple stressful episodes.

It should be noted that, although researchers have generally found Asian children to be higher on reactivity than Western children, different results have been reported in several studies. Kagan et al. (1994), for example, found that Chinese infants were less active, irritable, and vocal than American infants. The lower levels of activity and vocalization in Asian infants may be understandable considering their greater anxiety and wariness in challenging situations. The expression of less explosive emotions such as irritability in Asian children may be related to their higher levels of self-control, either automatic or effortful, over the emotions.

Relatively little research has been conducted on reactivity with non-Asian children in non-Western cultures. Gudiño and Lau (2010) investigated acculturation and shyness among Hispanic/Latino American children. The results indicated that parental familiarity with, and endorsement of, American culture were associated with lower levels of shyness as reported by parents and children. Researchers have examined specific types of reactivity in stressful social situations such as social anxiety in Hispanic/Latino youth, but the findings are largely mixed. Hispanic/Latino and European American children and adolescents differed on social anxiety in some studies (e.g., Pina & Siverman, 2004), but not in others (e.g., Schreier et al., 2010). When cultural or ethnic differences were found, however, Hispanic/Latino youths tended to display greater social anxiety (Pina & Siverman, 2004; Varela et al., 2004). Polo and López (2009) argued that, as in many East Asian societies, collectivistic values such as group harmony and interdependence endorsed in Latino societies might facilitate the development of sensitivity to social evaluations and vulnerability to social anxiety. On the other hand, according to Schreier et al. (2010), Latino cultures stress sociability, self-expression, and avoidance of criticizing and rejecting others, which may reduce, rather than enhance, anxious behavior in social situations.

Finally, researchers found that, compared with European Americans, more African Americans showed high social anxiety in some studies (e.g., Neal & Turner, 1991), but not in others (e.g., Ferrell, Beidel, & Turner, 2004). Moreover, it was reported that, relative to their European American counterparts, African American youths tended to have lower levels of social anxiety (e.g., Compton, Nelson, & March, 2000). A major problem in the previous studies is the reliance on self-report data such as those from questionnaires, which may be confounded with methodological

issues such as culturally specific response styles and the reference group effects. Clearly, research using more rigorous methods is needed to obtain a better understanding of cultural differences.

Self-Control

Parents in Chinese and some other East Asian societies often rate their children as more persistent in orienting than do parents in the West, and the differences appear to increase with age (Gartstein et al., 2006). Consistent with parental ratings, Chen et al. (2003) found in an observational study that, compared with Canadian toddlers, Chinese toddlers were more likely to display compliant behaviors without adult intervention during a clean-up session, indicating internalized control. Chinese toddlers also waited longer on a brief delay task in which the experimenter told the child to wait to play with a packet of attractive crayons until she returned to the room. Compared with their counterparts in the West, Chinese, Korean, and Japanese children and adolescents also showed higher levels of control, persistence, and conscientiousness in other studies including those concerned with executive function and personality (e.g., Oh & Lewis, 2008). It has been argued that the Asian cultural values of group orientation and behavioral restraint promote the socialization of self-control (Chen & French, 2008).

Findings concerning self-control of children in other cultures are less evident and coherent than those based on Asian and Western children. Galindo and Fuller (2010) found that, according to ratings by kindergarten teachers, Latino American children had lower scores than European American and Asian American children on self-control (e.g., controlling temper, responding appropriately to peer pressure). Among the Latino children, however, substantial subgroup differences were found: Children of Cuban and South American heritages were significantly higher on self-control than children of Mexican and Puerto Rican origins. Socioeconomic class was related to self-control; whereas children in economically poor Latino American families were rated lower on self-control than children in European American and Asian American families, children growing up in middle-class Latino families did not differ from other ethnic groups.

Gartstein and colleagues (e.g., Gartstein, Peleg, Young, & Slobodskaya, 2009) examined parental perceptions of infant temperament in Russian and other cultures, and found the influence of cultural context on parental perceptions of infants' control abilities. Russian infants in Israel were described by their parents as displaying

greater regulation, such as requiring a shorter time to recover from distress, than Russian infants in the United States. According to the authors, it is important to learn to effectively cope with daily life stress in Israel because recovery from distress is critical to adjustment in the environment. This argument was consistent with the finding that, among the Russian immigrants in Israel, parental involvement in the Israeli (host) culture was positively associated with infants' regulatory capacity, such as the duration of orienting/persistence of attention.

Culturally Directed Social Attitudes Toward Children's Characteristics

An important part of the cultural belief system is how people view desirable and undesirable characteristics of children. In Western societies that value personal autonomy and self-realization as major socialization goals, people typically hold positive views about stable and positive mood, sociability, and adaptability in children. But these characteristics may not be viewed as ideal in some non-Western societies that emphasize group harmony and interdependence (Klein, 1991). Cultural beliefs and values, particularly those related to socialization goals, affect adult and peer attitudes toward children's characteristics, which constitute distinct social environments for temperament and personality development.

Parental Attitudes

Parental attitudes toward children's characteristics are determined in large part by societal values. In a multi-national study of child temperament, Super et al. (2008) found that low approach and adaptability were associated with parental perceptions of "difficulty" more strongly in an Italian sample than in samples from other countries such as Australia, Spain, and Sweden. The results, as argued by the researchers, were consistent with the model of parenting in the Italian culture that encourages children to be active in exploring social situations while maintaining close relationships with parents.

Relative to parents in Italy and some other Western countries, parents in China have more positive attitudes toward children's shy-inhibited behavior. Chen and colleagues (1998) found that, whereas in Canada inhibition in toddlerhood was positively associated with mothers' negative attitudes such as rejection and punishment orientation, in China inhibition was positively associated with warm and accepting maternal attitudes. Positive parental attitudes toward shy-inhibited behavior were also found in older

children in China. Several studies showed that shyness in Chinese school-age children was positively associated with parental acceptance and negatively associated with parental rejection and power assertion (e.g., Chen, Rubin, & Li, 1997).

Cross-cultural differences have also been found in parental attitudes toward children's self-control. Kohnstamm et al. (1998) noticed that, when the researcher asked parents to describe their children, relative to parents in Western countries including Belgium, Greece, Holland, Poland, and the United States, Chinese parents focused more on child conscientiousness (careless or diligent) and were more concerned about the lack of control in their children. Cole, Tamang, and Shrestha (2006) examined parental attitudes in two villages in Nepal occupied by Brahmins and Tamangs. Brahmins are high-caste Hindus who value power and hierarchy, and Tamangs value social equality and compassion. Consistent with the cultural orientations, Tamang parents were more likely than Brahman parents to criticize angry children, indicating their disapproval of anger and undercontrol.

Keller and colleagues (2004) studied parent-child interactions that might reflect parental attitudes toward children's self-regulation in Cameroonian Nso, Costa Rican, and Greek cultures. The researchers found that, on a proximal parenting style such as body contact and body stimulation, Cameroonian Nso mothers were higher than Costa Rican mothers, who were higher than middle class Greek mothers. Nso mothers were also more likely to engage in body contact than German mothers (Kärtner, Keller, & Yovsi, 2010). According to the researchers, the early experience of body contact or proximal parenting is conducive to the development of self-regulation and compliance. Thus, higher levels of body contact in Nso mothers indicate their greater tendency to socialize their children to be self-regulated and compliant.

Peer Attitudes

Cultural norms and values may affect peer attitudes, such as social evaluations and responses in peer interactions. In a study of peer interactions among 4-year-olds, Chen, DeSouza, Chen, and Wang (2006) found that shy-inhibited children received different reactions from peers in China and Canada. In Canada, when shy children tried to initiate social interaction, peers were likely to make negative responses such as overt refusal, disagreement, and intentional ignoring of the initiation. However, in China peers responded in a more positive manner by controlling their negative actions and by showing support. The passive and wary behaviors that shy children displayed were perceived

by peers as incompetent in Canada, but appropriate in China. Peers in China tended to view these behaviors as indicating courtesy and a desire for social engagement. The observations of peers' voluntary initiations indicated that peers were forceful in Canada but more supportive and cooperative in China in their interactions with shy-inhibited children.

Overall peer acceptance and rejection may also reflect cultural evaluations of temperament and personality characteristics. In a study with Indonesian school-age children, Eisenberg, Pidada, and Liew (2001) found that shyness was negatively associated with peer nominations of dislike, which was different from what is typically found in the West. Chen and colleagues (e.g., Chen, Rubin, & Sun, 1992) found that shyness was associated with peer rejection in Canadian children, but with peer acceptance in Chinese children in the early 1990s. As urban Chinese society became competitive and individualistic during the transformation to a market-oriented system, however, children's shyness was associated with increasingly negative peer attitudes (Chen, Cen, Li, & He, 2005; Chen, Wang, & Wang, 2009).

Rapee and colleagues (Heinrichs et al., 2006; Rapee et al., 2011) conducted several studies of peer attitudes toward social anxiety that included shyness-inhibition. This group found that youth in East Asian countries including China, Japan, and Korea reported greater levels of social anxiety and fear of blushing than youth in Western countries including Australia, Canada, Germany, the Netherlands, and the United States. Moreover, youth in East Asian countries were more accepting of socially reticent and unassertive behaviors than their counterparts in Western countries. In these studies, for example, the participants were presented with vignettes describing individuals who displayed shy and reserved behaviors or outgoing behaviors and were then asked to indicate the extent to which they would expect the individuals in the vignettes to be socially liked and to succeed in their careers. Compared to Western youths, East Asian youths perceived smaller differences between shy and outgoing vignettes in their social and career impact. The researchers argued that cultural norms concerning social anxiety and inhibition determined, in part, social judgments of the characteristics.

Culture and the Significance of Temperament and Personality for Adjustment

According to a revised goodness of fit view (e.g., Lerner & Lerner, 1983), the adjustment of children depends

on how their temperament and personality fit specific environmental conditions, including opportunities, demands, and cultural expectations in the society. The role of socioecological conditions may be illustrated by DeVries's (1984) striking findings concerning the adaptive nature of "difficult" infant temperament in East Africa. In the Western literature (e.g., Thomas & Chess, 1977), difficult temperament, such as high negativity and irregularity, represents a risk factor in maladaptive development. However, DeVries (1984) found that difficult temperament was associated with lower infant mortality among the Masai people of East Africa during a famine. In a harsh environment such as the sub-Saharan region during the drought that occurred in 1974, infants with a difficult temperament got more parental attention because of their fussiness, which increased their chances of survival.

From the contextual-development perspective (Chen, 2012), culture may affect the development of children's characteristics through social interaction processes. When children display culturally valued characteristics, adults and peers likely provide approval and support. This favorable experience in turn strengthens the maintenance and development of the characteristics and at the same time helps children develop self-confidence and positive self-feelings. On the other hand, children who display characteristics that are inconsistent with cultural norms may receive negative feedback in social interactions, which places a pressure on them to change or suppress those characteristics. Those who are unable or unwilling to do so may develop negative emotions such as frustration and distress, which may lead to externalizing problems such as antisocial behaviors if directed toward others, internalizing problems such as negative self-feelings and depression if directed toward the self, or both. Children in certain contexts such as socially deviant groups and dysfunctional families may receive approval and support for the exhibition of characteristics that are incompatible with the general cultural norms in the society. In the long run, however, the socialization processes in these contexts may eventually lead to adjustment problems in the larger social environment.

Shyness-Inhibition and Adjustment Outcomes Across Cultures

Increasing evidence indicates that shyness-inhibition is associated with less problematic outcomes in societies where social initiative and assertiveness are not highly valued. For example, Eisenberg et al. (2001) found that shyness in Indonesian children was negatively associated with behavioral and emotional problems. In a longitudinal

study of the outcomes of shyness in Swedish society, Kerr, Lambert, and Bem (1996) followed a sample of children born in a suburb of Stockholm in the mid-1950s and found that, although shyness predicted later marriage and parenthood, it did not predict adulthood career stability, education, or income among Swedish men; this result is different from what was found in the United States (e.g., Caspi et al., 1988). According to Kerr et al. (1996), shy-reserved behavior was less maladaptive in Sweden because the social welfare and support systems based on the egalitarian cultural values assured people that they did not need to be highly competitive or assertive to achieve success.

Chen, Chen, Li, and Wang (2009) examined in a Chinese sample how behavioral inhibition in toddlerhood as observed in the laboratory predicted social and school adjustment 5 years later. The results indicated that early inhibition predicted cooperative behavior, peer liking, perceived social integration, positive school attitudes, and school competence; inhibited Chinese toddlers displayed more socially desirable behaviors and were better adjusted socially and psychologically than others in middle childhood. The relations between shyness-inhibition in childhood and later adjustment in Chinese children were also found in other studies (e.g., Chen, Rubin, Li, & Li, 1999). For example, shyness, as assessed through peer nominations, in elementary school children in China positively predicted teacher-assessed competence, academic achievement, and perceived general self-worth in adolescence. Shy Chinese children were likely to achieve leadership status in the school and to perform well in academic and socioemotional areas. Recent studies showed that, although shy children in urban areas of China started to experience learning difficulties, depression, and other adjustment problems as a result of social change (e.g., Chen et al., 2005), shy children in rural areas were still well adjusted in social, academic, and psychological areas (Chen, Wang, & Cao, 2011).

The results of studies with Chinese, Indonesian, North American, and Swedish children suggest that different social experiences of shy-inhibited children are likely to lead to different developmental outcomes. The difficulties that shy-inhibited children in North America experience in social activities may foster negative emotional reactions and psychopathological symptoms. In contrast, peer interactions that shy-inhibited children in some other societies engage in provide the opportunity for them to learn the skills needed to function appropriately in social situations. Moreover, the supportive relationships that shy-inhibited children in these societies establish with others help them

develop self-confidence and motivation to achieve success in life.

Self-Control and Adjustment Outcomes Across Cultures

Children's self-control or regulation in most cultures is associated with positive social and behavioral outcomes. Eisenberg, Zhou, Liew, Champion, and Pidada (2006) found that high levels of self-control were associated with adjustment in social relationships and other domains in Chinese, French, and Indonesian children. Researchers have also found robust links between low self-control and externalizing behaviors among children in North American and other societies (e.g., Olson et al., 2005). Zhou, Lengua, and Wang (2009) reported that low control and high anger-irritability were associated with high externalizing problems in both American and Chinese children, although the associations were stronger in the Chinese children. As argued by Eisenberg et al. (2006), cross-cultural similarities in self-control and adjustment may be due to the fact that control involves the executive system, which is likely to have similar functions for most children in any culture. Moreover, there are situations in most societies (e.g., completing tasks in the home and school) in which children are expected to modulate (e.g., suppress or strengthen) their behaviors, and children's self-control abilities are necessary for the achievement of individual and group goals.

Nevertheless, children's self-control is associated with different developmental outcomes across cultures in some socioemotional domains. Research findings concerning relations between self-control and internalizing problems in American children have been generally mixed. Whereas some studies found virtually no associations between self-control and internalizing problems, other studies revealed that self-control was positively associated with internalizing problems (e.g., K. T. Murray & Kochanska, 2002). Unlike the results based on American children, Eisenberg et al. (2007) found, based on teacher and parent reports, that behavioral control was negatively associated with fearfulness and anxiety in Chinese school-age children. Similarly, Chen, Zhang, et al. (2012) found in China that self-control as assessed by performance on delay tasks at 2 years positively predicted perceived self-worth and negatively predicted self-reported loneliness and depression at 11 years. Apparently, self-control abilities help children display compliant and cooperative behaviors, which are highly valued in the Chinese society. In this context, social approval and support that well-controlled children acquire may enhance positive self-perceptions and

impede the development of negative self-feelings. Children who are poor in self-control may experience great pressure and stress, which in turn may contribute to maladaptive development.

Consistent with the results of Eisenberg et al. (2007) and Chen, Zhang et al. (2012), Cheung and Park (2010) found that anger suppression was positively and more strongly associated with depression in European Americans than in Asian Americans. Moreover, an interdependent self-construal reduced the magnitude of association between anger suppression and depressive symptoms. Cheung and Park (2010) argued that emotional control or suppression mainly served a self-protective function for individuals holding Western values but helped to achieve social engagement and prosocial goals for individuals who hold more Asian values.

Summary

Research has revealed substantial cross-cultural differences in the display and developmental significance of temperament and personality characteristics such as reactivity to challenging situations and self-control among children and adolescents. Culture plays a central role in organizing the development of temperament and personality by facilitating or constraining the exhibition of specific characteristics, by regulating their developmental processes, and by moderating their relations with adjustment outcomes. Thus, research findings based on children and adolescents in particular societies such as European American societies cannot be assumed to be universal without considering distinct cultural circumstances that may affect the meaning and development of the relevant characteristics.

A major task is to understand how cultural beliefs and values are involved in temperament and personality development. Traditional approaches that rely on Western-based theoretical models and focus on comparing mean scores of self-report measures among youth and adults in different cultures without considering the social contexts are likely to provide limited information about the processes by which culture affects temperament and personality.

Developmental researchers have started to explore in different societies how socialization practices and social interactions are related to aspects or dimensions of child temperament. The results suggest that cultural norms and values guide social evaluations and responses in interactions, which in turn regulate the display and development of individual characteristics. These results have shed some

light on the social processes bridging culture and temperament and personality development. Nevertheless, the role of social processes in mediating cultural influences has not received adequate consideration in research, especially outside East Asia and North America. It will be important to examine how cultural norms and values are involved in social processes in adult-child and peer interactions and how social processes regulate individual development in other societies.

THE PERSON IN CONTEXT: CONCLUSIONS, IMPLICATIONS, AND FUTURE DIRECTIONS

The study of temperament and personality waxed and waned from the 1920s in North America and Europe, with learning theory and the cognitive revolution achieving prominence in psychology for most of the period. Although the zeitgeist began to shift in the 1960s with the work of Thomas and Chess, the systematic investigation of child temperament has grown substantially only after Buss and Plomin, Kagan, Rothbart, and other researchers developed their conceptual frameworks in the early 1980s. Nevertheless, research on children's and adolescents' temperament and personality in the past several decades has led to a comprehensive understanding of human dispositions.

As indicated by research findings, infants differ considerably on basic dimensions of temperament such as reactivity and regulation, and individual tendencies on these dimensions become increasingly discernible and stable within the first several years. The dimensions or aspects of temperament also become more coherently organized with age, which allows for identification of children with distinct temperamental profiles. The development of temperament and personality involves major biological systems, including the frontal brain networks, the autonomic nervous system, and the neuroendocrine system. Child characteristics such as irritability/anger, inhibition/fear, and regulatory behavior in the early years may independently or interactively predict later personality and adjustment outcomes. However, the development of temperament and personality and their contributions to adjustment are constrained by experiences and socialization factors. Parenting practices, peer relationships, and other rearing conditions may interact with temperament and personality during development, and they jointly determine adjustment outcomes. Finally, cultural norms and values direct social evaluations and responses in interactions, which in turn attribute meanings to individual

characteristics and, at the same time, regulate the display and development of the characteristics.

Research on temperament and personality has many noticeable implications for education and applied work. For example, individual differences in dispositional tendencies to react to life experiences and self-regulatory abilities suggest that some children are inevitably more vulnerable than others to the development of psychopathological symptoms (Strelau, 1998; Rothbart & Bates, 2006). Researchers have consistently found that reactivity to stressful situations and neuroticism predict internalizing problems such as anxiety and depression and that irritability and behavioral undercontrol predict externalizing problems such as aggression and antisocial behaviors in Western and some other societies (e.g., Asendorpf et al., 2008; Caspi et al., 2003). Detecting temperament and personality tendencies in childhood that represent risk for maladaptive development is an important first step for prevention and intervention.

Findings concerning temperament \times environment interactions, however, indicate that whether children possessing a "risk" disposition eventually develop problems depends on their socialization experiences and other environmental conditions. Highly reactive children may be susceptible to stress in undesirable conditions, leading to maladaptive behavior, but become adaptive in desirable conditions. Thus, it is critical to provide a supportive environment, particularly positive social relationships in the family, school, and community, for children who show high reactivity. It may also be a useful strategy to help these children develop self-regulatory skills to handle their negative emotions such as fear and frustration in challenging situations. Moreover, as suggested by the contextual-developmental perspective, social interaction processes are involved in maintaining and modifying the development of temperament and personality characteristics. Thus, parents, educators, and professionals should consider social interaction context such as the peer group in designing programs for children who are at risk for maladaptive development. In addition, because adaptive and maladaptive characteristics are determined, in part, by cultural norms and values, researchers and professionals need to be sensitive to the cultural interpretations of temperamental and personality characteristics of children from different backgrounds when making assessments and judgments. It is important to take into consideration how specific characteristics are perceived and evaluated in the society or community in order to develop culturally effective and appropriate prevention and intervention programs.

We conclude this chapter with several suggestions for future exploration, based on our review and discussion of the theoretical and empirical work in the field. First, one of the major issues that theorists and researchers have been exploring over the past century concerns the structures of temperament and personality in childhood and adulthood. The identification of dimensions or components of temperament and personality often relies on theoretical considerations and the factor analysis of self-report and observational data. To obtain a more complete understanding of temperament and personality structures as well as of their connections, researchers should examine relevant characteristics from a developmental perspective. As indicated earlier, findings about the similar and different developmental origins, patterns, and outcomes associated with children's and adolescents' characteristics will help us understand the underlying constructs and their general and domain-specific nature at a higher level.

Second, a related issue is the lack of adequate efforts to explore developmental processes. For example, researchers have conducted a number of studies concerning relations between early temperamental characteristics (e.g., behavioral inhibition and effortful control) and adjustment outcomes (e.g., anxiety and delinquency). However, it is unclear how temperamental characteristics contribute to the development of adjustment and maladjustment. The contributions inevitably occur in social contexts with multiple factors exerting mediating and moderating effects. According to the cascade model (e.g., Masten & Cicchetti, 2010), for example, the influence of early temperament may spread to various domains of individual functioning progressively over time. The progressive dynamic cascade process may be reflected in both direct and indirect or mediated effects of temperament on adjustment. Moreover, the process may be domain-specific and developmentally variant. Analyses of cascading and other transactional processes in the relations among various temperament characteristics, contexts, and adjustment outcomes across different developmental periods will likely help us achieve an in-depth understanding of the issues in the area.

Third, given the strengths and weaknesses of each of the major methods used to assess temperament and personality (e.g., self-reports, observations, and physiological measures), a multimethod approach is obviously ideal if relatively accurate information is to be obtained. Perhaps due to practical difficulties, this approach has not been common. This is particularly the case in personality research, which relies heavily on self-reports. With technological and methodological advances in conducting observational and

physiological assessments, researchers should combine different methods, and this may help clarify confusions and inconsistencies in the literature.

Fourth, the past several decades have witnessed an exponential increase in the use of biological measures to understand complex human behavior and traits, which has led to important new insights and discoveries. However, a cautionary note is warranted. A common perception is that the use of biological measures somehow makes the science more rigorous and legitimate, and with this perception comes the tendency to collect data on phenomena in the absence of good theory and research questions. Biological methods and measures help researchers to explore processes underlying complex behavior, but the data are likely sterile without theoretically driven questions.

Fifth, there needs to be a broader conceptualization of the environment in the study of temperament and personality development. Much of the work highlighted in this chapter, and on human development in general, defines the environment in terms of influences residing outside of the individual (e.g., peers, parents, communities). Researchers need to consider endogenous environmental influences that affect gene expression and their interaction with other biological factors in shaping brain-behavior relations in development (e.g., physiology, electrochemical states, neural dynamics; see Fortier et al., 2014; Schmidt et al., 2009; Schmidt & Miskovic, 2013). Findings from other disciplines studying biological phenomena have indicated that the consideration of these proximal internal influences may help develop more complete models of human temperament and personality.

Sixth, in this chapter, we have focused mainly on reactivity and regulation in the discussion of the development of temperament and personality. Relative to these two fundamental dimensions, other important dimensions or aspects, such as surgency/agreeableness, empathy, activity, and openness to experience, have been studied less systematically, especially in longitudinal projects. As a result, little is known about their developmental origins, processes, and outcomes, or about factors that affect their development. Researchers should pay more attention to these dimensions or aspects in the future.

Seventh, researchers have proposed a number of models from different perspectives about the influences of parents and peers on temperament and personality and about interactions between socialization forces and child characteristics in predicting developmental outcomes. Mixed results have often been reported. Moreover, because most of the studies are correlational and cross-sectional

with insufficient control for confounding factors, it may be difficult to discern causal directions of influence. Longitudinal, experimental or quasi-experimental, and interventional studies are needed to clarify the associations and to provide information that helps better understand the models.

Eighth, researchers who study cultural influences on human development are often interested in comparing children in Western self-oriented societies with those in other more group-oriented societies. The framework focusing on broad categories has been criticized for its inadequacy in describing the complex cultural systems, the substantial within-culture heterogeneity, and differences between cultures that are assumed to be extreme. Moreover, extensive and intensive cultural interactions due to international migration and communication across nations over the past decades have resulted in the coexistence and integration of different values. It will be important to investigate how children with different temperamental and personality characteristics adjust to diverse and integrated cultural environments. It will also be interesting to examine whether these environments provide opportunities for children to develop sophisticated qualities that allow them to function effectively in different circumstances.

Finally, it has been argued that children play an increasingly active role in development with age through participating in socialization and constructing the environment for their activities (e.g., Chen, 2012; Corsaro & Nelson, 2003). This argument is consistent with the findings concerning the mutual influences of child characteristics and parenting and the moderating effects of self-regulation on relations between reactivity and adjustment. In general, however, the active role of children has been largely neglected in the conceptualization and study of temperament and personality. Therefore, it is crucial to engage in continuous exploration of this issue in order to achieve a more thorough understanding of the person in context.

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CHAPTER 6

Relationships, Regulation, and Early Development

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Relationships and regulation. Throughout the history of developmental science, these terms have been in frequent juxtaposition. Classic developmental theories have underscored the regulatory influence of parent–child relationships, for example, in the context of socialization. Viewed from different theoretical perspectives, relational regulation arises from the security experienced by the infant, the child’s identification with the parent, the parent’s use of rewards and sanctions, the influence of discipline strategies, and many other processes. The purpose of the parent’s regulatory influence is to help organize and guide developing behavioral systems, but with the expectation that it will be progressively replaced by the child’s growing competence at self-regulation according to individual needs, family values, and cultural practices. Other relationships, such as with peers and teachers, also have regulatory influence, but parent–child relationships have received preeminent attention because of their early, enduring, and wide-ranging influence.

Over the years, this general model has been criticized in several ways. Culturally oriented developmental scientists, many working from a neo-Vygotskian perspective, have noted that socialization processes and goals vary

according to the developmental outcomes valued by the culture (e.g., Rogoff, 1991). Bell’s (1968) famous critique of the unidirectional socialization model was one of the earliest arguments for the importance of understanding child effects on parents. A more trenchant critique from developmental behavioral genetics claimed that most alleged parenting effects were actually derived from the shared genetic characteristics of family members, leading some to argue that peer, not parental, relationships are the more significant developmental influence (e.g., J. R. Harris, 1998). These critiques have altered developmental theory and productively broadened empirical inquiry into parent–child relationships even as this topic remains one of the most vigorous in developmental research.

The task of this chapter is to provide a perspective on early parent–child relationships and the development of self-regulation. This is a different goal from the previous edition of this *Handbook*, in which my chapter focused on early developing social understanding, parent–child attachments, the growth of conscience and self-awareness in considering the “development of the person” (Thompson, 2006). These topics remain important, and themes from these research literatures can be found

in the discussion that follows. But in the context of other excellent reviews of the research literature on parent–child relationships and socialization (see especially Grusec & Hastings, *in press*), a comprehensive review of research in this area is not really needed (or possible, given the length of this chapter). Rather, the goal is to do something new by focusing primarily on two research literatures that have grown significantly since the previous edition of this *Handbook*. These research fields present new opportunities for understanding the nature of parent–child relationships and their influence on the development of self-regulation.

The first concerns the biological consequences of the quality of parental care. Beginning with the expanding literature in developmental neuroscience, researchers have broadened their attention to the influence of early experience on other developing biological systems, including stress neurobiology, immune system functioning, and gene expression. Because the most relevant aspect of early experience is the quality of parental care, these research literatures together underscore the significance of parent–child relationships for the organization of biological systems that affect reactivity and self-regulation. These experiential influences begin prenatally, have potential multigenerational consequences, and have important implications for intervention and for classic developmental issues such as our understanding of nature and nurture.

The second concerns the representational consequences of parent–child relationships. Building on the rich work on theory of mind, researchers have been examining its foundations in the social representations of infants and toddlers. Their findings are drawing attention to the importance of young children’s first-hand interactions with social partners from which they construct understandings of goal-oriented agency, shared intentionality, helpful and harmful actions, and other early social-cognitive achievements relevant to developing theory of mind. These generic representations of human behavior develop at the same time that young children are also constructing representations of the specific propensities of their attachment figures, and together contribute to developing capacities for cooperation and prosocial conduct, an emergent premoral sense, and other constituents of self-regulation. These relational influences on developing social representation begin early, have implications for intervention, and address classic developmental issues related to the construction of core knowledge in the social domain.

An expanding understanding of relational influences on developing biology and representation complements but significantly extends traditional understanding of

socialization processes in the parent–child relationship. It provides an opportunity, for example, to reconceptualize the characteristics of parental care that have consequences for young children by including biological and representational outcomes as well as behavior. It encourages developmentalists to explore in greater depth how parental practices affect not only behavioral development but also its representational correlates and, for some children, its biological correlates as well. For children in poverty, for instance, it requires inquiring into how heightened stress reactivity deriving from early economic insecurity affects developing representations of the social world. And for the study of developing self-regulation, it suggests that studying the association of relationships and regulation must be conducted in a multilevel manner involving transactional influences between developing behavior, representation, and biological functioning. This is important because research in this area also highlights the contributions of the child to developing self-regulation, both in the powerful capacities for learning from social experience and in the influence of developing temperamental individuality. For this reason, a developmental systems perspective is well-suited to exploring these multilevel interactions. The final section of this chapter draws these ideas together as they are applied to an understanding of the early development of emotion regulation in children.

Before proceeding further, however, it is important to establish a general framework of thinking about the nature of early parent–child relationships and their developmental influence. The relationships between parents and their young children constitute one of the most enduring and iconic research topics in developmental science, occupying a central place in virtually every theory of social and personality development. Infants and young children live in a social world, but they develop in an environment of relationships that has singular importance. Central are their relationships with parents.

A relationship can be characterized as an integrated network of enduring emotional ties, mental representations, and behaviors that psychologically connect one person to another over time and across space. A young child’s interactions with relational partners are distinct from interactions with other social partners in several ways. First, they are ubiquitous in early experience, enabling repeated shared experiences that compound the developmental influences of relational partners. This is one reason that relational partners afford security, buffer stress, or generate expectations in a manner that other social figures do not. Second, extensive shared experience enables familiarity.

It is the experience of knowing and being known by another person that contributes to central socioemotional achievements of the early years because familiarity facilitates the kind of statistical learning by which first-person experience generates an understanding of people's behavior, intentions, feelings, and other mental states. Third, relational interactions are mutual and reciprocal and involve continuous coaction over time between partners that enables interactions to be fine-tuned to the individual characteristics of the child. Importantly, relationships are characterized both by interactive synchrony (involving collaborative goals, joint attention, mutual imitation, and responsiveness) and dyssynchrony (entailing divergent intentions, expectations, and other mental states), and both provoke early social and personality growth. Finally, relationships are infused with emotion that influence young children's appraisals, motivate their social engagement, influence their own emotions and other mental states, and contribute to their self-regulation. Indeed, relationships become affectively colored as sources of assurance, protection, stress, or threat that constitute, in a sense, the prior probabilities that are generalized to other social partners, and by which relationships themselves acquire regulatory influence.

Relational experience begins early as infants recognize and develop expectations for familiar people (although some would argue that fetal experience prepares infants for this), and becomes increasingly mutual and bidirectional with the growth of social skills and mental representations. Traditionally, researchers have emphasized parental characteristics as the primary influences on relational quality. The most notable example is the emphasis of attachment researchers on parental sensitivity as a key determinant of attachment security, with sensitivity viewed as a characteristic that accommodates to differences in infant temperament and other attributes. In a similar vein, researchers have focused on parental warmth, emotional communication, contingent responsiveness—and at older ages, coaching and rational discipline methods—as definitive of relational quality (see Laible, Thompson, & Froimson, in press). This general focus on parental attributes is based, in part, on the view that a young child's confidence in parental solicitude is a central foundation for healthy socioemotional development, and that parental investment in the child's well-being, which is biologically mandated for early survival, is manifested in these attributes of parental care.

However, a number of alternative formulations have emerged. Kochanska (2002; Kochanska, Aksan, Prisco, & Adams, 2008) is one of several developmentalists who

characterize early parent-child relationships dyadically, such as by assessing their "mutually responsive orientation" on the basis of their joint cooperation, harmonious communication, coordinated routines, and emotional ambiance. A mutually responsive orientation contributes, in her view, to the child's self-motivated compliance and adoption of the parent's values and expectations. Another interactionist perspective draws from self-determination theory and emphasizes the young child's need for autonomy, or the need to take initiative and to be self-directed. From this perspective, Grodnick and Pomerantz (2009) have distinguished parental control that is autonomy supportive—which they call "structure"—from "control" that is intrusive or coercive. A different dyadic approach is to examine episodes of parent-child conflict as critical forums for socialization. Viewing conflict episodes as important opportunities for understanding conflicting desires and goals, for example, Laible and Thompson (2002) reported that the ways in which disputes between mothers and their 2½-year-olds were discussed and resolved predicted critical aspects of children's socioemotional development at the age of 3.

Besides their greater attention to the mutual influences of mothers and children, perspectives such as these also share a broadened view of what early parent-child relationships are meant to provide for young children. Confidence in parental solicitude is certainly important, but may not be all. The most detailed articulation of this view is Grusec and Davidov's (2010) domain perspective on parent-child relationships. In this view, parental practices are best understood as functioning within multiple interconnected socialization domains, each incorporated into parent-child relationships by the time a child is the age of 2. The domains are *protection* (which promotes child coping, empathy, and cooperation), *mutual reciprocity* (fostering children's receptive compliance), *control* (promoting internalized moral conduct and respect for authority), *guided learning* (encouraging knowledge and skill acquisition), and *group participation* (fostering children's conformity to group expectations and ingroup-outgroup differentiation). Grusec and Davidov argue that such an analysis sharpens understanding of parental influences by recognizing that certain parental practices have domain-specific influence and that some practices (such as sensitivity) serve different functions as they are manifested in contexts relevant to different domains (see, e.g., Leerkes, Weaver, & O'Brien, 2012).

Grusec and Davidov argue that children are biologically prepared to acquire skills relevant to each domain

because of the importance of each domain to social functioning (see also Bugental, 2000). Thus they claim that these domains are universal, although they may be differentially emphasized in different cultural systems that require different constellations of skills and knowledge. Such a view articulates a basic dynamic in the study of early parent–child relationships between recognizing the biologically adaptive processes that have fostered our species’ reproductive success and the diversity of cultural practices relevant to early care. Infants require protection, nurturance, positive social interaction, instruction, and other species-typical requirements in order to survive and develop into competent persons suited to group living. Yet there is considerable cultural diversity in how infants and young children receive care, including the extent of holding, touching, and proximity to one or many caregivers; cosleeping and breastfeeding practices; promptness of response to infant crying; biological parenting or alloparenting; and manner of teaching (see, e.g., Hewlett, 1996; Hewlett & Lamb, 2005; Keller, 2007). These alternative cultural practices are adapted to the biological, ecological, and historical conditions in which they function yet they must also address the species-typical requirements of early care. The crucial and interesting question for developmental analysis is, how do alternative cultural practices affect the nature and timing of core achievements in behavioral development and also in biological self-regulation and representational growth? This chapter addresses this question where limited data permit reasonable inferences concerning the developmental processes discussed. The data required for evaluating claims of universal socialization domains or species-typical conceptual accomplishments are complex, however, involving theoretically guided, culturally comparative research (and, in some cases, studies of early care of other primates), and thus constitutes an important research agenda for the field.

There is another manner in which questions about how the social and relational context addresses early developmental needs are considered, and this is with respect to young children living in conditions of psychosocial risk. With child poverty rates rising significantly during the Great Recession beginning in 2008 and, as of this writing, more than 1 in 5 of the youngest children in the United States living in families in poverty (along with many children worldwide), researchers have been especially interested in the developmental consequences of early poverty. On this issue, as well, a broadened view of parenting to include biological and representational influences is valuable. In the next section, for example, the multiple

levels of biological systems affected by family conditions associated with poverty is discussed, along with how positive relational influences can buffer some of these stressors. These findings help to extend other literatures addressing the multilevel consequences of psychosocial risk factors, and also have implications for early intervention.

The longstanding interest of developmental scholars in parent–child relationships and their regulatory influence has broadened considerably, therefore, to encompass the mutual influences of parents and offspring, the diverse contexts in which they interact, the diverse developmental outcomes (beyond security) that relationships influence, and the multifaceted characteristics of parenting practices that contribute to these outcomes. This chapter underscores the advances that derive from considering parental influences not only for their behavioral outcomes, but also affecting the organization of developing biological processes and representational capacities relevant to self-regulation.

In the next section, research on fetal programming, developing stress neurobiology, gene–environment interaction, and epigenetics is profiled to understand the nature of relational influences on developing biological systems that shape emergent reactivity and self-regulation. In the section that follows, relational influences on developing representations of the social world—both the generic characteristics of people and the specific attributes of their attachment figures—are profiled to understand further the catalysts to developing self-regulation through early understandings of human agency, cooperation, helping and hurting interactions, and the emergence of a premoral sensibility. In the fourth section, these relational perspectives on developing self-regulation are reintegrated in a discussion of the growth of early emotion regulation. A final concluding section identifies themes for future research.

BIOLOGY

From ancient Platonic beliefs and Confucian thought through Enlightenment philosophy to the present, the tension between nature and nurture has defined Western and Eastern thinking about human behavior. This tension was later incorporated into psychological thinking, especially research on human development. In the early 20th century, for example, the debate between Watson’s environmentalism and Gesell’s maturationism helped to define nature versus nurture as a central developmental theme. The view that developmental outcomes should be attributed either to the child’s intrinsic tendencies or to

social (especially parental) influences set up a dichotomy in thinking about human origins that endured, despite the efforts of each generation of developmentalists to argue that such a dichotomy was unnecessary and misleading.

The nature versus nurture debate has been a particular problem in thinking about parent–child relationships. Developmentalists inherited from their philosophical forebears ideas about the importance of early nurturance, education, and social opportunity, and these ideas were incorporated into psychological theories that (with few exceptions) devoted little attention to biological influences. Later, developmental behavioral geneticists moved to the opposite extreme, arguing that parental nurturance is primarily a setting for the unfolding of the child’s genetic individuality, and using heritability estimates as quantitative indicators of the proportion of phenotypic variance attributable to nature and nurture. As much as developmental scholars have argued that the nature–nurture distinction is scientifically misleading, they have persisted in reinstating it.

Throughout this period, to be sure, researchers and theorists were proposing more complex and interesting portrayals of the interaction of biology and experience. From the primatology literature (see Clancy, Hinde, & Rutherford, 2013, for a review), elegant experimental studies of gene \times environment interaction and the experiential canalization of biological and behavioral phenotypes have equipped human developmentalists with provocative models of these processes. Evolutionary/ecological systems theory has also offered developmentalists theoretical portrayals of the biologically adaptive processes that influence human growth and that function in concert with environmental experience.

Some of the strongest evidence for complex portrayals of the interaction of biology and experience has come from research on human brain development. When the National Academy of Sciences committee that wrote *From Neurons to Neighborhoods* (National Research Council and Institute of Medicine, 2000) concluded that the debate over nature versus nurture was “overly simplistic and scientifically obsolete” (p. 6), they devoted considerable attention to the interaction of experience with maturation in the developing brain to show how this was true. As is now well known, neurobiological development is a function of experience-expectant and experience-dependent processes that incorporate environmental exposure into structural and functional capacities of the developing brain. This has been shown most clearly in cases of experiential deprivation or adversity, and implicates the quality of parental care as an

essential, multidimensional component of the experiences that the brain biologically “expects” as part of its normative growth.

Other ways of portraying the complex interaction of biology and experience have emerged from allied fields of developmental study. Taken together, they offer the genuine prospect of a sustained confirmation of the conclusion of the authors of *From Neurons to Neighborhoods*. Equally important, they are leading scientists to a new understanding of behavioral and biological development in which distinctions between “nature” and “nurture” are obscured in favor of a more biologically dynamic, experientially based understanding of human growth. Besides the work in developmental neuroscience, these research literatures focus on the influence of the prenatal environment on the developmental “programming” of biological and behavioral functioning, the experiential shaping of stress neurobiology and behavior, new work on molecular gene \times environment interaction, and the emergence of epigenetic models of behavioral development. Together, they show how early experience “gets under the skin” to influence behavior through its effects on multiple biological systems.

The purpose of this section is not to provide a comprehensive review of these important advances (which are discussed more fully in other chapters of this *Handbook*), but rather to highlight the ideas they introduce and, in particular, how they are changing understanding of the nature of parenting and of the influence of parent–child relationships on the development of self-regulation. Why do these research literatures have implications for parent–child relationships? Stated simply, the quality of parental care is the most important element of the functional environment that influences gene expression, fetal programming, and developing stress neurobiology, and differences in the quality of care are operationally what is most often measured in studies of experiential influences on developmental neurobiology and gene \times environment interaction. As a result, these studies underscore that the quality of parental care (and, by extension, the quality of parent–child relationships) has biological as well as behavioral consequences, that these influences begin very early in development, and that they potentially have multigenerational consequences that are psychobiological in nature. Contrary to the view that parenting is merely the setting in which biologically based characteristics of offspring emerge, it now appears that neglect of the significance of parenting processes as fundamental influences on developing biological systems may lead to an underestimation of their importance. Beyond this, because they also address the

development of stress responding and regulation, emotional arousal and coping, social buffering of stress reactivity, and the experiential moderation of biological regulatory systems, these studies have important implications for thinking about the early biological foundations for developing self-regulation. It is not possible at present to identify the new theoretical model(s) that will emerge from these advances in understanding human development, but it is possible to begin to outline how they are changing our understanding of the developmental impact of early parenting and relationships, and their implications for the development of self-regulation.

Fetal “Programming”

During World War II, the German military occupying the Netherlands imposed a blockade of food transports in reprisal for a strike on the Dutch railways in support of the Allied invasion. As a result, official rations for the adult population fell abruptly to 400 to 800 calories daily from December 1944 to April 1945, when the Allied liberation of the Netherlands began to succeed and nutritional adequacy was quickly restored. These tragic circumstances created a unique opportunity for researchers to subsequently examine the effects of a specific period of maternal malnutrition and subsequent nutritional adequacy on immediate and long-term developmental outcomes for offspring. Although malnutrition was accompanied by maternal stress and other hardships (the winter was unusually severe), scientists could examine its effects during a time-delimited period with a sample that had been previously well-nourished, who had received adequate medical care, and who were quickly restored to adequate nutritional status. The children born to the cohort of women who were pregnant during the Dutch famine have been followed into late adulthood. The findings from this large research literature indicate that although many of the immediate effects of maternal malnutrition on newborns (such as birth weight) were not strongly predictive of later outcomes, there were important latent effects of time-delimited nutritional inadequacy. In adulthood these children exhibited significantly heightened risk for a variety of health and mental health problems, including adult obesity, heart disease, and schizophrenic disorders, compared with children of different gestational age or same-sex sibling controls (see Lumey et al., 2007, for a review).

These findings are consistent with other studies in a variety of fields that have also documented long-term associations between prenatal risks and poorer adult health

and well-being using normative datasets, research on early deprivation, and experimental studies with animals (see reviews by Almond & Currie, 2011; Hodgson & Coe, 2006). Viewed in the context of research on the enduring developmental effects of maternal smoking, fetal alcohol exposure, environmental pollutants, and other teratogens, they point to the prenatal period as especially sensitive to environmental challenges, particularly those associated with the quality of nutrition, stress, and other aspects of maternal care. These hazards have been found to pose risks to healthy development because of their threats to placental functioning, CNS integrity, and fetal organ system development during critical stages of prenatal growth (Barker, Eriksson, Forsén, & Osmond, 2002).

An important mediator between fetal adversity and later health and well-being is maternal stress. There is considerable evidence in the animal literature, including experimental studies, showing that significant prenatal maternal stress predicts later deficits in stress regulation and emotional and cognitive functioning in offspring (Weinstock, 2008). Demonstrating such associations in humans is challenging, however: The gestational timing of stress, its intensity and duration, and careful measurement of stress and its hypothesized developmental outcomes complicate nonexperimental human research on this issue (DiPietro, 2012).

Nevertheless, a clearer but complex picture of the consequences of fetal stress exposure is beginning to emerge. Elevated and extended prenatal exposure to maternal cortisol is associated with a larger neonatal cortisol response and slower recovery (E. P. Davis, Glynn, Waffarn, & Sandman, 2011). But gestational timing and stress severity are important in predicting longer-term effects. Davis and Sandman (2010) reported, for example, that elevated exposure to maternal cortisol *early* in gestation was associated with a slower growth rate and lower mental development scores on the Bayley Scales at 12 months, but elevated cortisol exposure *late* in gestation was associated with accelerated cognitive growth and higher scores at 12 months. Similarly, DiPietro, Novak, Costigan, Atella, and Reusing (2006) found that maternal reports of moderate anxiety and stress mid-pregnancy were positively associated with postnatal Bayley mental and physical development scores, even with control for postnatal maternal anxiety and stress. At 7 years, maternal cortisol early in gestation was associated with higher maternal-report Child Behavior Checklist (CBCL) scores reflecting affective difficulties, and this association was mediated by larger right amygdala volume in girls (Buss et al., 2012). These associations with prenatal stress exposure are modest, but they

have been found for a variety of developmental outcomes extending to middle childhood, and are consistent with the view that heightened stress exposure, especially early in gestation, may influence the development and functioning of several developing biological systems, including the hypothalamic-pituitary-adrenocortical (HPA) axis (see, e.g., Oberlander et al., 2008).

Taken together, the findings concerning the effects of maternal stress, malnutrition, and other aspects of fetal adversity on long-term developmental outcomes underscore the sensitivity of prenatal development to environmental challenge. To some, they also reflect biologically adaptive processes. According to the *predictive adaptive response model*, these prenatal conditions allow early detection of characteristics of the environment after birth to which developing organisms must adapt (Gluckman & Hanson, 2005). Viewed in this light, for example, heightened maternal prenatal stress signals postnatal environmental adversity for which upregulation of the developing HPA axis may prepare human young for these conditions after birth (Sandman, Davis, & Glynn, 2012). Likewise, fetal malnutrition causes changes in energy metabolism and growth rate that potentially have long-term benefits for living in an environment of food scarcity. Biological and behavioral adaptations like these can render the child better capable of coping with these environmental conditions and enhance chances of long-term survival if those conditions endure. If they do not, however, then deleterious developmental outcomes may ensue. In the case of the survivors of the Dutch famine whose prenatal experience prepared them for a life of food scarcity, for example, growing up instead in conditions of plenty for which they were biologically unprepared may have contributed to their later health and mental health outcomes (e.g., adult metabolic disorder).

These studies indicate that biological and behavioral self-regulation begins to take shape prenatally in response to the conditions affecting fetal development, and that individual differences in self-regulatory processes can be influenced by prenatal exposures. The prenatal stress literature, in particular, suggests that differences in early temperament, stress-related coping, and other characteristics have origins in maternal stressors as they are mediated by prenatal cortisol exposure (e.g., DiPietro, Ghera, & Costigan, 2008). Early developing emotionality and self-regulation at birth, therefore, already reflect an experiential history based on the characteristics of prenatal care, and these characteristics may be associated with broader external conditions like family income and poverty.

Experiential Guidance of Developing Stress Neurobiology

The view that early adversity and environmental exposures calibrate developing biological systems extends beyond the prenatal period to characterize considerable research on the effects of early life experience. This is because developing biological systems mature slowly during the postnatal period, rendering them vulnerable to stress and challenge, and experiences during this time may also provide significant guidance concerning the life conditions to which these systems must adapt to promote long-term survival. Whereas research on fetal programming focuses on intrauterine exposure to maternal stress hormones, research on the experiential shaping of stress neurobiology emphasizes the child's direct experience of stressful circumstances. And whereas the research on fetal programming highlights the quality of maternal care as the primary mediator of fetal adversity, the work on developing stress neurobiology underscores parental care as a stressor or stress buffer.

Much of the research in this area has focused on the development of the HPA axis, one of several stress-relevant neurobiological systems that develop significantly during the initial postnatal years (Loman & Gunnar, 2010; see also Gunnar, Doorn, & Esposito, Chapter 4, this *Handbook*, this volume). The HPA response matures over an extended period in the early years, with the emergence of an adult-like circadian rhythm not apparent until after the pubertal transition (Wiik & Gunnar, 2009). During this period, experience has considerable influence on the development of HPA responsivity, which is most apparent in studies of the impact of severe, chronic stress on the functioning of the HPA system, and in research on the social buffering of stress reactivity.

In ordinary circumstances, the brain's detection of threat-related stimuli provokes acute activation of the HPA axis, which has many consequences including the production of cortisol that contributes to the mobilization of energy, suppression of immune functioning, enhanced cardiovascular tone, and other critical components of the stress response. In addition, basal levels of HPA functioning, following a circadian clock, are important to ongoing cortisol output that helps to maintain self-regulation and coping capacities. Chronic stress, however, alters HPA functioning over time by altering the neurocircuitry underlying the regulation of stress responsiveness. This occurs as repeated exposure to stressors changes the sensitivity of the HPA system, in part through its effects on the limbic

and cortical regulators of HPA activity (Ulrich-Lai & Herman, 2009). These biological changes have behavioral consequences.

In some cases, the organism becomes *hyperreactive* to stress owing to the effects of repeated shocks to the stress system, such as in prior experiences of physical abuse or threat. Higher basal cortisol levels have been found, for example, in maltreated children exhibiting internalizing symptomatology compared with nonmaltreated children (Cicchetti & Rogosch, 2001), in infants and toddlers in poverty (Blair et al., 2008; Blair et al., 2011), and in young children of chronically depressed mothers (Essex, Klein, Cho, & Kalin, 2002). In other cases, prior exposure to stress results in the organism's *hyporesponsiveness* to stress owing, it appears, to the deprivation or withdrawal of social support. Diminished cortisol levels have been found, for example, in young children who have lived in deprived institutional care (Carlson & Earls, 1997), neglected children placed in foster care (Dozier, Manni, et al., 2006), and young children living in homes characterized by domestic violence and/or maternal emotional unavailability (Sturge-Apple, Davies, Cicchetti, & Manning, 2012).

This delineation of hyperreactive and hyporeactive response profiles remains provisional because there is considerable variability in the patterns of HPA reactivity and regulation identified in studies of children and adults experiencing chronic stress (Gunnar & Vazquez, 2006; G. E. Miller, Chen, & Zhou, 2007). For children in foster care, for example, basal cortisol levels vary depending on whether children had primarily experienced physical neglect (low basal levels) or emotional maltreatment (high basal levels) (Bruce, Fisher, Pears, & Levine, 2009). Similarly, Essex and her colleagues report that patterns of hypercortisolism and hypocortisolism were each apparent in their sample depending on the nature, duration, and severity of early life stress (Essex et al., 2011). The important conclusion, however, is that significant deviations from developmentally normative patterns of stress responding result from chronic early stress exposure, and may be risk factors for long-term biological and behavioral functioning. Moreover, contrary to prevalent concepts of "toxic stress," dysregulated stress functioning in children may arise not only from chronic threat but also from the deprivation of nurturant care.

These risk factors arise, in part, because of the effects of persistent HPA activity on other biological systems (Bruce, Gunnar, Pears, & Fisher, 2013). Chronic cortisol output alters the functioning of cortical and limbic regulators of HPA functioning (e.g., hippocampus, hypothalamus,

amygdala, medial prefrontal cortex) and, through these, contribute to some of the behavioral correlates of persistent stress including heightened vigilance, self-regulatory deficits, and learning and memory problems (Ulrich-Lai & Herman, 2009). Stress is associated with acute increases in autonomic nervous system activity, including elevated blood pressure and other sequelae (El-Sheikh & Erath, 2011). Chronic stress also alters immune system functioning by increasing sensitivity to infectious challenges, increasing cytokine response, and embedding "proinflammatory tendencies" into biological responding in other ways (G. E. Miller, Chen, & Parker, 2011). Taken together, these attributes of chronic stress are consistent with the portrayal of "allostatic load," an index of the progressive "wear and tear" on biological systems attributable to the long-term effects of chronic stress activation (Danese & McEwen, 2012).

The predictive adaptive response model would regard some of these biological and behavioral responses as adaptations to promote survival in an aversive environment. For young children who are maltreated, for example, biological reactions that foster rapid responding to perceptions of threat, allocation of attentional and cognitive resources to threat vigilance, and altered immune response render children better prepared to cope with a home environment that may persistently pose unexpected, severe dangers (Pollak, 2012). But these behavioral adaptations are poorly suited to social environments outside the home, such as school and peer settings. When considered together with the biological costs of chronic neuroendocrine, nervous system, and immunological activation, it is more appropriate to view these adaptations as double-edged swords that purchase immediate coping advantages at the cost of longer-term health and mental health (Blair & Raver, 2012; Repetti, Robles, & Reynolds, 2011).

Because of these health and mental health consequences, there has been growing interest in the social buffering of stress reactivity. Several studies indicate that early emerging HPA system dysregulation can be altered by planned interventions, and in these studies the quality of relational support is central to intervention design. In one such program, Fisher and colleagues designed an intervention to ease young children's transition to new foster care placements and enhance continuity of care through individualized sessions with child therapists, weekly playgroup sessions, and support for foster parents (Fisher, Stoolmiller, Gunnar, & Burraston, 2007; Fisher, Van Ryzin, & Gunnar, 2011). Compared with children assigned to regular foster care placements, who showed

the pattern of HPA hyporesponsiveness earlier described, children in the intervention group showed patterns of HPA reactivity that progressively resembled the normal patterns of a nonabused community comparison group over the course of 6 to 12 months of treatment. Reductions in foster parent stress were directly implicated in these changes in young children's HPA function recovery (Fisher & Stoolmiller, 2008). Consistent with these findings, Dozier and colleagues (Dozier, Peloso, et al., 2006; Dozier, Peloso, Lewis, Laurenceau, & Levine, 2008) have reported that following a 10-week intervention based on attachment theory, infants and toddlers in foster care showed more typical diurnal patterns of HPA activity and lower cortisol reactivity in the Strange Situation.

As these findings suggest, caregiver support can alter acute HPA reactivity to immediate stressors as well as normalizing basal cortisol levels (Gunnar & Donzella, 2002). In a study of families living in rural poverty, one research group found that toddlers' chronic exposure to domestic violence was associated with elevated cortisol reactions to challenge tasks at 24 months. However, when mothers had been observed to respond sensitively to their children in observations at 7, 15, and 24 months, this buffered the effects of partner violence on cortisol reactivity at 24 months (Hibel, Granger, Blair, Cox, and the Family Life Project Key Investigators, 2011). These findings underscore the plasticity of developing neuroendocrine and other biological systems, even when their development has been subject to chronic and severe stress. They also highlight the importance of relational support as a stress buffer. Plasticity and recovery are bounded, however, even in childhood. In their study of a sample of children rescued from profoundly depriving Romanian institutions, for example, Gunnar, Morison, Chisholm and Schuder (2001) found that after 6½ years of supportive adoptive care, the basal cortisol levels of children who had been early adopted (less than 4 months in the institution) resembled those of typically reared comparison children. However, children who had lived 8 or more months at the orphanage did not show such recovery, and evidence of enduring cortisol dysregulation was greater the longer that children had been in institutional care.

Studies of experiential dysregulation and social buffering of stress reactivity highlight the significant influence of caregiving experience on biological regulation and the need for multilevel examination of the processes by which this occurs (Hostinar, Sullivan, & Gunnar, 2014). This research draws attention to the effects of psychosocial stress on early developing stress reactivity and regulation and the

importance of caregiving support on the social buffering of stress, and these influences may also have potentially enduring influences on other developing biological systems. Luby and colleagues (2013) found, for example, that early childhood poverty was associated with smaller hippocampus volume, and that this association derived from the impact of stressful life events in childhood and hostile parenting. There is also emerging evidence of broader neurobiological outcomes from maternal support, such as increased hippocampal volume at school age (see Luby et al., 2012). These studies also highlight how these processes are likely to be associated with broader economic and social factors that affect caregiver functioning. In such a multilevel system, the interaction of early experience with dynamic biological growth is centered on the parent-child relationship.

Molecular Gene-Environment Interaction

The idea that developing biological systems are environmentally sensitive has long been incorporated into concepts of sensitive periods and developmental canalization that underscore the dynamic, environmentally responsive qualities of developing biological systems. By contrast, genes have traditionally been viewed as conferring biologically stable organization to developing systems. Experience does not alter structural DNA, and consequently genetic influences have been regarded as functioning interactively with environmental influences but not being altered by them.

Developmental behavioral genetics researchers have long recognized, however, that genetic influences might have different behavioral manifestations based on experience. Gene-environment interaction indicates that genetic characteristics may increase or decrease an individual's sensitivity to specific environmental influences—and that environmental conditions affect how genetic influences are manifested. Unfortunately, the research methods of twin or adoption studies do not provide powerful tools for examining gene-environment interaction and, indeed, their interaction is often unmeasured in developmental behavioral genetics research (Rutter, Moffitt, & Caspi, 2006). Molecular genetics research, however, provides better understanding of environmental moderation of genetic effects because specific gene alleles and environmental influences can be identified. The clearest examples of these can be found in research with animals because of the greater control over genetic and environmental characteristics, but research with humans also illustrates the significance of conditions of parental care for gene \times environment interaction.

Three gene polymorphisms have been of particular interest in research with humans and nonhuman primates. First, a specific “short” allele in the promoter region of the serotonin transporter (5-HTT) gene confers low transcriptional efficiency compared with the “long” allele, and is thus a risk factor for decreased serotonergic function and its behavioral correlates, such as depression and anxiety. Second, a functional polymorphism in the promoter region of the monoamine oxidase A (MAOA) gene, an X-linked gene, produces high or low levels of the MAOA enzyme that metabolizes serotonin, norepinephrine, and dopamine, rendering them inactive. The behavioral correlates of low MAOA activity include proneness to aggression and antisocial behavior. Third, a polymorphism of the dopamine receptor D4 (DRD4) gene is based on the number of 48-base-pair tandem repeats in exon III; the 7-repeat allele is associated with low dopaminergic efficiency and its behavioral correlates, including novelty-seeking and conduct problems. These polymorphisms have been the focus of research attention because findings related to their behavioral consequences have been replicated across different samples and because some of the intermediary biological processes between gene expression and behavioral functioning are understood.

In research with nonhuman primates, extreme differences in raising conditions—such as maternal care versus peer group raising—have been found to moderate genotypic expression. Studies with rhesus macaques (reviewed by Suomi, 2011) indicate, for example, that peer-raised monkeys with a homologous short 5-HTT allele show higher levels of aggression as juveniles than mother-raised monkeys or peer-raised monkeys with the long allele. The quality of care moderates, in other words, expression of a genotype conferring risk for behavior problems. Kinnally and colleagues (2010) extended these findings by documenting an interaction between the effects of the 5-HTT polymorphism and the MAOA polymorphism that was particularly evident for monkeys living in nursery raising conditions without their mothers (Kinnally et al., 2010). Living with the mother in a free-range condition (typical for monkey colonies) buffered these associations. This study is noteworthy because gene \times gene interactions of this kind are likely to be typical, especially in the development of complex behavioral phenotypes.

Research with human children fortunately does not compare such extreme differences in rearing conditions. Many developmentalists were introduced to the significance of molecular gene \times environment interactions in a highly publicized study by Caspi and colleagues (2002), who analyzed

data from the large Dunedin longitudinal study to find that, although indicators of harsh or negative parenting in childhood (indexed as maltreatment risk) predicted multiple measures of young adult antisocial behavior, this was moderated by a significant interaction between maltreatment risk and the MAOA gene. Males with low levels of MAOA activity were the most antisocial if they had also been at high risk for maltreatment in childhood; for those with high MAOA activity, the effect of childhood maltreatment risk was much smaller or nonsignificant (Caspi et al., 2002). This study has been replicated by several others (Kim-Cohen et al., 2006), and is consistent with a growing research literature examining candidate gene \times environment interactions in the prediction of developmental psychopathology (for reviews, see Dodge & Rutter, 2011; Rutter et al., 2006).

Gene \times environment interactions have further been noted in studies of personality development. Bakermans-Kranenburg and van IJzendoorn (2006) observed maternal sensitivity when infants were 10 months old and measured externalizing problems at 39 months. Maternal insensitivity was significantly associated with later externalizing, but only for children with the DRD4 7-repeat polymorphism; for children without this polymorphism, earlier maternal insensitivity was unpredictive. An intervention study subsequently enlisted this gene \times environment interaction in an effort to improve developmental outcomes (Bakermans-Kranenburg, van IJzendoorn, Pijlman, Mesman, & Juffer, 2008). A video-feedback parenting program was provided to a sample of mothers who had rated their toddlers high on externalizing behavior on the CBCL. A posttest after 1 year revealed that the parenting program succeeded in improving positive disciplinary practices. In a follow-up assessment 1 year later, the children of the intervention group showed less externalizing behavior, but this was significant only for children with the DRD4 7-repeat polymorphism. There were no intervention program-related changes for children without the 7-repeat allele.

The results of this intervention highlight the need for thoughtful interpretation of the findings of gene \times environment studies related to developmental outcomes. It is possible, indeed likely, that some genotypes function not only as risk alleles in contexts of environmental adversity (consistent with diathesis-stress models), but also as “beneficial” alleles in contexts of environmental support, consistent with differential susceptibility and biological sensitivity to context models (Belsky & Pluess, 2009; Boyce & Ellis, 2005; see also Ellis, Boyce, Belsky,

Bakermans-Kranenburg, & van IJzendoorn, 2011). In much of the research reviewed here, in fact, children with a specific genotype not only functioned more poorly in contexts of harsh or negative parenting, but they also showed more positive outcomes (although not as strongly) in contexts of sensitive, supportive care (see Bakermans-Kranenburg & van IJzendoorn, 2011 for relevant meta-analytic findings). How environmental conditions interact with the biochemical processes associated with gene expression thus requires considerably further thought and research. Environmental conditions can be contextual triggers that alter genetic susceptibility when conditions change above or below a particular set-point; they can impose constraints on the behavioral manifestations of gene expression; they can foster or inhibit competing behavioral (or biological) tendencies—these and other mechanisms of gene \times environment interaction can be envisioned.

In this research, the functional environment of gene \times environment interaction is parental care. The quality of parenting moderates gene expression (and, conversely, gene expression moderates the effects of parenting quality) such that children with the same allele manifest different phenotypical characteristics based on the quality of care they receive. Moreover, the phenotypes of interest primarily concern developing self-regulation: Behavioral impulsivity, antisocial conduct, and externalizing problems illustrate the outcomes of interest, especially when the quality of parental care is poor, owing in part to the focus of researchers on genetic moderators of dopaminergic and serotonergic systems. By contrast, some research suggests that when parental care is supportive, the same genotypes are more likely to result in diminished rates of behavioral problems (other positive indicators of self-regulatory competence are rarely measured in these studies) (Bakermans-Kranenburg & van IJzendoorn, 2011; Belsky & Pluess, 2009). Together, this research illustrates the significance of parent-child interaction to the behavioral manifestation of genotypical tendencies related to the growth of self-regulation.

The quality of parenting in this literature is, however, operationalized broadly. In the primate studies, it consists of the distinction between maternal deprivation, various forms of species-atypical peer raising, and normal maternal contact. In the human studies, parenting quality ranges from harsh, abusive practices to sensitive caregiving. These broad-brush distinctions raise important questions about the particular characteristics of parental care that function to moderate genetic risk. For a young child with a genetic tendency to low dopaminergic efficiency, for example,

is the central feature of supportive care the provision or deprivation of emotional warmth? Positive responsiveness? Consistency in rewards? Are the same qualities most relevant to a child with risk for decreased serotonergic functioning? Or is the presence or absence of threat-related cues or conflict management more important? Further consideration of such questions would be helpful in moving the field beyond broad characterizations of parenting quality and might have practical applications when tailoring parenting interventions to the genetic characteristics of offspring.

As this research has implications for developmental theory and intervention, it also faces significant challenges. Prominent among these is the “missing heritability” problem (Plomin, 2013; Turkheimer, 2011). Simply stated, the problem is that there is a substantial gap between the large heritability estimates for many human characteristics derived from behavioral genetics methods and the small proportions of variance explained in these characteristics by molecular genetics methods. As of this writing the problem is unresolved, but potential avenues for attacking it include (a) reconsidering the size of heritability estimates derived from quantitative genetic methods, (b) the likelihood that complex human characteristics have many, many genetic contributions of very small effect size, (c) elucidating the potential importance of gene \times environment interactions for genetic effect size estimates, and (d) consideration of epigenetic processes profiled below. A full discussion of these considerations is beyond the scope of this chapter, except to note that the missing heritability problem and its possible solutions have significant implications for how developmental scientists may think in the future about the nature of genetic influences on the complex phenotypes of interest to them.

A second related problem is the unreliability of findings from small-scale genetically informed studies that are often underpowered in relation to their models. Future research will require much larger samples to yield reliable results. The frequent failure to replicate molecular genetics effects in human studies using small samples typical of developmental research has raised questions about the small effect sizes of the genetic effects reported and their meaning as well as their reliability (see, e.g., Roisman, Booth-Laforce, Belsky, Burt, & Groh, 2013). These issues also have yet to be resolved, but they are at the heart of this research literature.

Taken together, therefore, the challenges in studying molecular genetic effects and gene \times environment interaction in human research are substantial. But this work is also

contributing to an understanding of the environmentally responsive, dynamic quality of gene expression in which early parental care moderates the behavioral manifestation of genetic characteristics associated with self-regulation.

Behavioral Epigenetics

Epigenetics is the study of potentially heritable changes in gene expression that occur without changes in DNA sequence. For gene expression to occur, gene transcription must be activated—it does not occur automatically. How genes are activated or deactivated results from the activity of the epigenome, which is a complex biochemical regulatory system that can activate, silence, or change the transcriptional activity of genes without changing the DNA sequence itself. This is accomplished through chemical processes that change the chromatin, or the protein structure surrounding the DNA molecule, to alter transcription, such as through DNA methylation, acetylation of histone proteins, or other processes. While many epigenetic modifications of the genome are stable throughout life, such as those contributing to cellular differentiation, others are environmentally responsive. In a sense, epigenetics is another way of understanding gene \times environment interaction, because some epigenetic changes in gene expression incorporate the experience and history of the organism into the phenotype.

Epigenetics has long been studied in plants and animals, and research has documented changes in gene expression associated with exposure to environmental toxins, disease, stress, diet, and other influences. In recent years, behavioral scientists have begun to appreciate the potential significance of epigenetic processes through the elegant research of Meaney and his colleagues, who have systematically conducted multilevel work documenting epigenetic processes associated with maternal care in rodents (see Meaney, 2010, for a review). They have shown that differences in maternal licking and grooming (LG) are associated with enduring differences in stress reactivity in pups, with the offspring of low-LG mothers showing heightened behavioral and neuroendocrine responses to stress compared to the offspring of high-LG mothers. Cross-fostering studies indicate that these cross-generational influences arise through early experience. Meaney and his colleagues (e.g., Weaver et al., 2004) have documented the chemical processes by which maternal LG changes the chromatin that regulates glucocorticoid receptor gene expression in hippocampal neurons through DNA methylation and histone acetylation, which in turn moderates HPA activity.

These epigenetic “marks” on genes are preserved under ordinary circumstances every time genes are copied to create enduring effects on HPA activity, contributing to the behavioral differences in stress reactivity observed in the offspring of high-LG and low-LG mothers.

This research has also documented other phenotypical consequences of epigenetic processes in rat pups deriving from high and low levels of maternal LG. For example, the offspring of high-LG mothers also show increased synaptic density and greater synaptic plasticity in the hippocampus that is related to diminished methylation of glucocorticoid receptors. This is associated with their stronger performance on measures of learning and memory in low-stress contexts compared to the offspring of low-LG mothers. By contrast, the offspring of low-LG mothers show better learning in high-stress contexts of fear conditioning, perhaps owing to their greater HPA activation, consistent with their generally stress-reactive, threat-vigilant phenotype (Champagne et al., 2008). Epigenetic processes, particularly those associated with histone acetylation, may thus be very important to processes of learning and memory (Roth & Sweatt, 2011). There is also evidence for epigenetic influences on pubertal age and reproductive activity, with the offspring of low-LG mothers showing early pubertal maturation, greater sexual receptivity, and high fecundity (consistent with a *r*-selection strategy) and offspring of high-LG mothers investing in high maternal care, consistent with a *K*-selection strategy (Cameron et al., 2008). These studies show, therefore, that differential rates of maternal LG stimulated epigenetic changes in various aspects of the genome that had effects on stress reactivity, neurocognitive responding, reproductive functioning, and other behavior in offspring.

Meaney and his group have also documented some of the processes underlying the intergenerational effects of early experience of maternal care (see Meaney, 2010). Epigenetic changes can be inherited, of course, as a result of epigenetic markers in the germline being transmitted to offspring. But there are also behavioral processes of intergenerational transmission. Low maternal LG results, for female offspring, in greater methylation of estrogen receptor gene expression in the hypothalamus, decreased oxytocin levels, and lower activation of dopamine release during nursing bouts that together contribute to their lower LG activity with their own pups (Champagne, 2011). Thus low-LG mothers have pups that grow up to become low-LG mothers because of epigenetic changes in maternal neurobiology evoked by earlier levels of maternal licking and grooming when they were pups.

Because these intergenerational influences on gene expression are experience-dependent, they can also sometimes be changed experientially. If the offspring of low-LG mothers are raised in conditions of social enrichment, for example, they subsequently engage in high levels of LG, and it is the high-LG phenotype that is transmitted to their own offspring. Similarly, if the offspring of high-LG mothers develop in conditions of social isolation, they engage in low levels of LG and it is this phenotype that is passed on to their offspring (Champagne & Meaney, 2007).

These epigenetic processes have been elegantly worked out in Meaney's lab with Long-Evans rats (and replicated by other groups; see e.g., Roth & Sweatt, 2011), but generalization to other species (and even other rat strains) must be considered cautiously. Homologous neuroendocrine and behavioral patterns across species must be balanced against different adaptive pressures and developmental processes pertinent to each species. Research studies with humans and nonhuman primates are, however, beginning to yield findings that are consistent with this account of behavioral epigenetics. In a whole-genome study of children experiencing institutional care compared with those reared by their biological parents, for example, Naumova and colleagues (2012) reported greater DNA methylation in the institutionalized group, including in genes associated with brain development and functioning, stress reactivity, and immune functioning, consistent with predictions and with the research discussed earlier (Naumova et al., 2012). Radtke and colleagues (2011) reported that children and adolescents born to women who reported intimate partner violence while pregnant exhibited enhanced methylation of the glucocorticoid receptor gene. There was no association with methylation in offspring when mothers experienced partner violence either before pregnancy or after the child's birth (Radtke et al., 2011).

Epigenetic processes may, in fact, help to account for some of the experiential influences on developing biological systems earlier discussed, such as the effects of fetal programming. Oberlander and colleagues (2008) assessed maternal depressive symptomatology during late pregnancy and found that higher levels of maternal depression were associated with increased neonatal methylation of a specific site of the glucocorticoid receptor gene. They also found that methylation of this region predicted heightened cortisol levels when infants were observed in an information-processing task at 3 months, suggesting an association between maternal prenatal stress and infants' HPA dysregulation through epigenetic mediation. Heijmans and colleagues (2008) studied adults who were

exposed prenatally to the Dutch famine of World War II and found that, compared to unexposed same-sex siblings, these adults had diminished methylation of the insulin-like growth factor II (IGF2) gene six decades later. This epigenetic effect may help to account for some of the metabolic and health problems that developed in this sample (Lumey et al., 2007). And in a prospective longitudinal study, Essex and colleagues (2013) reported that differences in adolescents' DNA methylation were predicted by maternal reports of stress in the child's infancy and paternal stress when children were preschoolers.

As these findings suggest, stress in caregiving conditions has been reliably associated with changes in DNA methylation, particularly of the glucocorticoid receptor gene. This would be consistent with the view that epigenetics is a mechanism by which phenotypic plasticity adapts to the environmental conditions signaled by caregiving quality to promote long-term behavioral adaptation. In light of research indicating that more than 900 genes in the rat are stably regulated by maternal care (Weaver, Meaney, & Szyf, 2006), however, it seems likely that a far broader range of regulatory processes are subject to epigenetic modification, as the findings earlier summarized seem to suggest. More generally, early care may have to be seen in a new light: as an important influence on gene expression with effects that are potentially heritable, and which may also be altered through subsequent caregiving experience. The quality of early care contributes, in other words, to heritable differences in phenotype that are not genetic, but rather epigenetic. And many of these phenotypic differences are associated with the regulation of stress reactivity, as well as of learning and memory, and parenting of the next generation.

Epigenetics is the best-known but only one of several significant scientific challenges to conventional thinking in genetics. Potentially equally significant are discoveries related to the structural variation of the human genome, such as the influence of transposable elements (especially retrotransposons), copy number variations, and somatic and chromosomal mosaicism (see Charney, 2012; Zhang et al., 2013). The significance of these discoveries for research on human development has not been fully worked out, but Charney (2012), among others, argues that it has significant implications for our understanding of the genetic and epigenetic similarities and differences between MZ and DZ twin pairs, how heritability is calculated and its meaning, the nature of the shared and nonshared environment, and other core elements of developmental behavioral genetics and developmental theory.

Interim Conclusion

It is clear, then, that the conventional distinction between nature and nurture is untenable. Are conduct problems observed in young adult males with a history of harsh parenting—but only when they have low MAOA gene activity—an example of nature or nurture? Is the association of fetal stress, glucocorticoid receptor gene methylation, and stress reactivity in offspring an example of nature or nurture? The answer to each question underscores, once again, the fruitlessness of partitioning phenotypic variance into nature and nurture components.

As part of the recognition that development is a biologically dynamic, experience-driven process, researchers must also begin to reconceptualize the biological and behavioral consequences of early care. Early parenting, and the quality of parent–child relationships, influences the regulation of developing neuroendocrine, immunological, neurological, and other systems through processes that include experientially instigated epigenetic modification of gene expression and the effects of experience-dependent influences on the developing brain. Many of these influences occur through the effects of early stress, experienced prenatally or early in life, that ranges in severity in this literature from the profound deprivation of institutional care to daily experience with a depressed and emotionally unavailable caregiver. The biological effects of positive caregiving qualities, such as sensitivity and support, are also observed in the social buffering of stress reactivity, the remediation of HPA dysregulation in foster children, and the positive behavioral outcomes of children with “risk alleles” who receive supportive care. Experience of stress and support are both important, and there are indications in these studies that although they impact common systems, their effects are also mediated by different neuroendocrine and gene \times environment processes. One important task for future research is to elucidate these biological mediators of the effects of different attributes of parental care, with special attention to mediators of positive behavioral outcomes that have been less well examined, such as the oxytocinergic system in human young (Hostinar et al., 2014; see also Feldman et al., 2012). In so doing, researchers should also unpack variability in the quality of parental care that is biologically influential, moving beyond global characterizations of aversive and sensitive parenting to better specify and measure what it is about parental conduct that is important to the organization of biological regulatory systems.

These biological influences of caregiving quality are important because of their behavioral consequences.

Although the connections between experiential influences, biological remodeling, and behavioral outcomes are still being worked out, researchers are establishing pathways between HPA system dysregulation and emotional reactivity, threat vigilance, and other self-regulatory problems, with downstream implications for cognitive functioning owing, in part, to the impact of cortisol on cortical and limbic systems. Similarly, some researchers are documenting associations between stress and the biological embedding of “proinflammatory tendencies” that impair physical and behavioral health (G. E. Miller et al., 2011), while others are elucidating the social buffering of stress reactivity through the impact of positive caregiver responsiveness on neuroendocrine, limbic, and prefrontal systems that regulate HPA activity (Hostinar et al., 2014). What makes these efforts so interesting is that their multilevel analysis is both theoretically integrative and generative of new hypotheses about the connections between early caregiving experience, developing biological systems, and behavioral functioning in the early years. The field is ready for more contributions like these.

The view that relationships are biological regulators hearkens to Hofer’s (2006) enduring ideas about the “hidden regulators” of early psychobiological organization in young organisms. These regulators are no longer so hidden, but they do cast a different light on the association of relationships with regulation. In addition to the behavioral embedding of self-regulatory skill in parental socialization, these studies shed light on the biological embedding of self-regulatory capability in the setting conditions created by parental care. A multilevel analysis invites questions about the interaction between, and perhaps the dependency between, different levels of regulation involved in parent–child relationships.

The focus of several of these research programs on children in poverty illustrates how these developmental influences interact with broader social processes (Thompson, 2014). This is illustrated by Blair and Raver’s (2012) experiential canalization model of the effects of poverty on children’s biological and behavioral self-regulation (see also Evans & Kim, 2007). As they note, children in poverty experience a variety of stressors deriving from economic hardship, including parents’ depression and distress, poor and crowded housing conditions, neighborhood violence, and poor schools. Consistent with the literatures reviewed here, they show how these hardships have biological effects on stress neurobiology, immune function, and cortical and limbic systems with behavioral consequences that include heightened emotional reactivity,

impaired executive function, and poorer self-regulation. Importantly, Raver has enlisted this multilevel analysis into the design of an intervention program to support the development of self-regulatory skills in at-risk young children in Head Start (Raver et al., 2009). Like the foster care interventions of Fisher and Dozier discussed earlier, this effort draws on an understanding of the biological and behavioral consequences of aversive early life experience to try to benefit young children (Thompson & Haskins, 2014).

Translational research of this kind is more likely in the future, and it is another welcomed direction for future work. Fortunately, researchers in this field have used a variety of research populations, including children and families in different socio-demographic groups, at-risk children in challenging ecologies, animal populations that permit greater experimental control and research simulations of human adversity, and even historical studies. (Despite the focus of this review on mothers, moreover, paternal influences have also been examined in several human studies on the social regulation of stress neurobiology.) This attention to diverse populations has enabled researchers to better understand the biological and behavioral difficulties of at-risk children and ask how this understanding might change thinking about assisting children at risk. Beyond contributing to the design of intervention strategies, for example, this research might prompt more searching inquiry into why some interventions seem to be more effective than others (e.g., does beginning home visiting prenatally, as the Nurse Family Partnership model does, provide opportunities related to averting fetal stress that postnatal visitation programs do not?). Furthermore, research in this field highlights the potential value of using biomarkers as well as behavioral measures of intervention outcome. As one illustration, Fernald and Gunnar (2009) showed that after 3½ years of participation in a conditional cash-transfer antipoverty program in Mexico, preschool children showed lower basal cortisol levels, and this was partly moderated by maternal depression, with children of mothers with high depressive symptomatology showing the greatest program benefit. As another, O’Neal and colleagues (2010) reported that the effectiveness of an intervention program for at-risk 4-year-olds to reduce later aggression was mediated by the intervention effect on cortisol response. These and other translational questions also await further research advances in this field.

Finally, it is noteworthy what is missing from this multi-level analysis thus far. Children’s representations of their experience do not figure into these innovative studies of early life experience. Consideration of this omission raises

interesting and potentially important questions about how representational processes contribute to and potentially moderate some of the behavioral and biological outcomes discussed in this section. How much is the social buffering of stress reactivity a function of how children interpret the meaning of parental solicitude (such as in relation to attachment security)? How might early stresses, and the experience of chronic HPA reactivity, affect young children’s developing social representations, such as their inferences of others’ emotions, or emergent concepts of fairness? These questions provide the transition to another kind of relational regulation through the effects of parent-child interaction on developing representations of the social world.

REPRESENTATION

The influence of social experience is moderated by how it is represented. In adults, the importance of social representation can be seen in the influence of self-schemas, relational expectations, stereotypes, attributional biases, and many other ways that the interpretations of others affect how people respond. With children, these representations are developmentally evolving and relationally guided. Children construe social experience in increasingly complex and nuanced ways as they cognitively mature, and throughout this process their beliefs and expectations are influenced by social experience, particularly with caregivers. The development of social representation is important as a means by which social experience “goes underground” to influence developmental outcomes, as a foundation for individual differences in adult beliefs and attitudes, as an important source of developmental continuity from childhood to later years, and as another means by which relationships contribute to self-regulation (Dweck & London, 2004; Thompson, 2000).

To illustrate, consider two examples. First, in a classic analysis, Grusec and Goodnow (1994) reinterpreted longstanding research on parent discipline practices and children’s internalization of values by considering the mental processes mediating children’s internalization. They summarized research showing how internalization is influenced by the accuracy with which children perceive and understand parental messages, their judgments of the appropriateness of parental intervention, the consistency of the parents’ messages with the child’s other beliefs, the affect associated with the parent’s behavior, and many other factors. Their analysis provided less insight,

however, into the *origins* of individual differences in these mental processes because there was much less research at the time relevant to understanding their development. Since then, however, there has emerged an expanding research literature into these and other aspects of developing social cognition (see, e.g., Banaji & Gelman, 2013; Hughes, 2011). Researchers have documented how the child's response to the parents' messages is influenced by the mutuality and warmth of the parent–child relationship (Kochanska, 2002), the extent to which parental practices are perceived as normative for the community (Gershoff et al., 2010), children's evaluations of the parents' veracity (P. L. Harris, 2012), social domain judgments (Lagattuta, Nucci, & Bosacki, 2010), and many other social-cognitive processes.

Second, using violation of expectancy procedures with preverbal infants, Johnson and her colleagues (2010) documented what they describe as evidence for emergent internal working models associated with the security of attachment (Johnson et al., 2010). Twelve-month-olds were habituated to a video scene in which a large red orb and a smaller blue orb were together at the bottom of an incline. Subsequently the red orb moved away from the other and up the incline, after which the sound of a baby cry was heard while the smaller orb pulsed and changed color. After habituation, two test trials were presented in counterbalanced order, each beginning as the habituation scene had ended, with the sound of the baby cry and the smaller, pulsing orb. In one, the red orb reversed course to rejoin the smaller one; in the other, the red orb moved farther up the incline and away from the other. Johnson and her colleagues (2010) reported that infants who were securely attached (based on the Strange Situation) looked longer at the trial in which the red orb moved away, while insecurely attached infants looked longer at the trial in which the red orb returned to the smaller one. In each case, the authors concluded, their visual behavior reflected surprise at the scenario that was most inconsistent with their attachment history: Secure infants were surprised when “the caregiver ignored the infant's cries,” and insecure infants were surprised at outcomes “in which the caregiver responded” (p. 813). There were no differences between insecure-avoidant and insecure-resistant infants.

The juxtaposition of these papers illustrates two themes of this section: how relational representations moderate the influence of social experience, and how relational experience contributes to the development of social representation. Discussing these dual themes requires surveying and integrating two research literatures that have developed

in a surprisingly independent fashion. One literature is the rapidly growing research on early developmental social cognition. Contemporary social-cognitive researchers portray the growth of early social representation as a continuous interaction between the young child's powerful inductive capacities (whether interpreted with reference to naïve theory construction, statistical learning, teleological reasoning, innate systems of core knowledge, or other processes) and the social experiences that provide data for these inductions. But the relevance of social experience has not been well specified in this experimental literature, so one of the goals of this research review is to better identify its nature and importance. The other literature is the work on social representations arising from early relationships, much of it conducted by attachment researchers. In this view, social experience shapes the mental “working models” that influence other relationships, but the representational processes by which this occurs have also not been well specified. The task of this section is to create bridges between these two approaches to early social representation, and to urge further work on their integration.

The central argument is that, through the development and influence of these early social representations, relationships contribute to the development of self-regulation in the early years. As young children are developing the neurobiological and cognitive foundations for self-control, they are enlisting understanding of what people are like and what motivates them, the implicit rules for interacting with them, the social obligations people share, and other forms of developing social awareness that guides their emerging self-regulatory efforts. This developing understanding is fundamentally constituted by early social experience. Both the developmental social-cognition literature and the attachment literature speak to these issues but in very different ways, suggesting that greater dialogue between researchers in each field would be mutually rewarding.

This section begins with a discussion of the early foundations for developing social cognition in the core knowledge or conceptual primitives that might exist at birth. Next is a selective review of research on social-cognitive growth, highlighting the social influences on these developing competencies in the early years, with a particular focus on developing understanding of intentionality, the growth of shared intentionality, and emerging judgments of observed third-party actions, as well as the role of language in these early achievements. This is followed by consideration of studies that have focused on individual differences in the quality of parent–child relationships and

their representational implications. Central conclusions from these reviews are considered in a final section.

Early Foundations

What do infants know, and when do they know it? More important, why do they know it? In the study of cognitive development, longstanding interest in the conceptual primitives or core knowledge underlying cognitive growth has inspired considerable research and provoked debate over the rich or lean interpretation of research findings. This has been important for addressing fundamental questions about whether young infants possess innate or very early developing representations that guide reasoning in critical domains of experience. The field of social-cognitive development is a latecomer to this debate, but several studies have suggested remarkable early capacities for social representation in infancy. Thomsen, Frankenhuys, Ingold-Smith, and Carey (2011), for example, report that 10- to 12-month-olds represent events in terms of social dominance and acquiescence; Hamlin, Wynn, and Bloom (2007) indicate that 10-month-olds prefer actors who help others and avoid those who are antisocial; Luo (2011) reports that 3-month-olds attribute goals and dispositions even to a self-propelled box; Powell and Spelke (reported by Spelke, Bernier, & Skerry, 2013) indicate that 8-month-olds expect actors to conform to the behaviors of their group.

These and related studies share several characteristics in common. First, each uses a violation of expectancy procedure which, like the Johnson et al. (2010) study described above, habituates (or familiarizes) infants to a standard set of events and then presents them with test trials, one of which is consistent with the expectations hypothesized to be generated by the standard, and one of which is inconsistent. Second, looking time to the test trials is the primary dependent measure (with younger children, choice preference is sometimes used as an alternative dependent measure; see Hamlin, Wynn, & Bloom, 2010, for an example with 3-month-olds). Consistent with typical habituation procedures, differences in looking time are interpreted to reflect a discrimination between the test trials, and enhanced looking is often viewed as an indication of surprise at an unexpected or inconsistent event. Third, these procedures use moving objects—orbs, blocks, triangles, sometimes with eyes, that are animated in human-like ways—as actors in these scenarios presented on a puppet stage or on video. Finally, the findings of these studies are often taken to reflect innate representational biases

originating in human evolution to provide a foundation for group cooperation, morality, or other social capacities. Infants' behaviors, in other words, are interpreted to reflect species evolution, not early developmental influences.

Because this research literature is small and relatively new, well-designed replication studies are necessary to better characterize the nature of the discriminations that these studies reveal and to eliminate competing explanations (see, e.g., Scarf, Imuta, Colombo, & Hayne, 2012, and reply). As has been true in the cognitive literature (e.g., Aslin, 2007), some argue that the reliance on looking time in these studies is interpretively challenging, as considerable research has shown that responses to these measures are multidetermined. As a consequence, even when infants discriminate between test trials, it can be difficult to know why.

To illustrate, compare the following well-known studies. Hamlin et al. (2007) habituated 10-month-olds to scenes in which a red ball appeared to try to move up an incline and was either (a) pushed uphill by a yellow triangle or (b) pushed downhill by a blue square. On the subsequent test trials, infants looked significantly longer when the red ball moved to rest alongside the blue square than when it rested alongside the yellow triangle. From these results, the authors concluded that 10-month-olds expected actors to affiliate with those who were helpful, not unhelpful, because they looked longer (reflecting surprise) when the red ball acted in the opposite manner. Kuhlmeier, Wynn, and Bloom (2003) used computer animations but a very similar procedure in which 12-month-olds were habituated to scenes involving a circle trying to move up an incline that was similarly “helped” (by a triangle) and “hindered” (by a square), and then saw test trials in which the circle moved to rest alongside either the triangle or the square. This time, infants looked significantly longer when the circle rested alongside the triangle, which was interpreted as reflecting the infant's preference for a coherent continuation of the habituated scene. The looking time results were the opposite of each other, but interpreted to reflect the same preference for helpers over hinderers. These studies indicate that infants discriminate between the test events, but it is unclear on what basis (see Wynn, 2007, for further discussion of these studies).

There is a long way to go, therefore, before researchers can characterize the core knowledge underlying early social representations, and further research using multiple convergent and well-validated methods will be required. Three-month-olds may discriminate “helpful” from “hurtful” actions (Hamlin, 2013) and toddlers may

offer instrumental assistance to a stranger (Warneken & Tomasello, 2009), but without further knowledge of the meaning of these responses or their developmental origins, researchers are wise not to rush to inferences of innate morality or altruism.

It is, however, likely that certain early conceptual primitives facilitate emergent social representations. These enable very young children to represent social phenomena in unique ways, preparing them for social relations on which their survival depends. As children mature cognitively, it is likely that these conceptual primitives become supplanted by broader, more flexible representational systems (a similar view has been advanced by students of cognitive development such as Apperly and Butterfill, 2009). If core knowledge underlies early social representations, what might these foundational conceptual primitives consist of? Here are some possibilities.

Contingency perception is one candidate. Newborns are sensitive to contingent responses to their behavior and are particularly attuned to perfect contingencies that are likely to reflect self-generated outcomes (Gergely & Watson, 1999; Watson, 2001). High (but imperfect) contingencies also elicit the infant's attention because they are often associated with social interaction. As early as 8 months, infants seem to represent even inanimate objects as agentic—visually following their apparent attentional focus much as they do with human partners—but only when objects had previously responded contingently to the infant's behavior (Deligianni, Senju, Gergely, & Csibra, 2011). By the end of the first year, infants make similar attributions to inanimate objects after observing their contingent third-party interaction with an experimenter, but only if the interaction has the attributes of sociability, characterized by the experimenter's attentional and affective reciprocity with the object (Beier & Carey, 2014; Meltzoff, Brooks, Shon, & Rao, 2010). In addition to contributing to basic forms of self-awareness, therefore, contingency perception may be important to early attributions of social agency.

Contingency perception is important to other kinds of social cognition. In the development of person-specific social expectations, infants are especially attentive to the contingency of others' responses to their signals. The statistical learning involved in early "distress-relief sequences" (Lamb, 1981) depends on baseline levels of infant distress and adult remediation as well as the strength of the association between them (Watson, 2001). By 6 months, infants act in ways suggesting that they have begun to perceive such contingencies, such as by quieting

in anticipation to the sound of mother's approaching footsteps and protesting if she approaches but does not pick them up (Gekoski, Rovee-Collier, & Carulli-Rabinowitz, 1983; Lamb & Malkin, 1986). Similar responses can be observed at the same age in infants' expectations for adult responses to their nondistress vocalizations (Goldstein, Schwade, & Bornstein, 2009). Findings such as these help to explain why contingent responsiveness to infant signals figures prominently in theoretical views of the origins of parent–infant relational quality. They underscore the sensitivity of young infants to the reliability of the association of their behavior with others' responses in developing person-specific social expectations.

A second candidate is the capacity to represent others' actions self-referentially. An early emerging capacity for social imitation, which can be observed in chimpanzee and rhesus neonates as well as human newborns, possibly draws on delegated neurobiological systems (such as the mirror neuron system) and may have evolved to support rudimentary learning and social engagement of the caregiver (Paukner, Ferrari, & Suomi, 2013). In human infants, neonatal imitation may also provide a bridge to later, more complex forms of imitative social activity that enable infants to interact intersubjectively with adults and denote correspondences between self-initiated and other-initiated activity. This has been described as a "like me" orientation (Meltzoff, 2010), although this is a rich characterization of the conceptual primitive present at birth. Meltzoff (2007, 2010) argues that self-referential action representation leading to newborn imitation provides a foundation for later inferences concerning others' intentionality, perception, desire, and referentiality because of the toddler's capacity to generalize between personal experience and interpretations of others' behavior. In this respect, self-referential action representation early in infancy may provide a basis for the development of more sophisticated understanding of self–other correspondence that follows later.

A third candidate is the infant's attentional and affective engagement with human faces and voices. More specifically, infants are highly sensitive to eye contact with another person, and to infant-directed speech (characterized by exaggerated prosody, repetition, and simple syntax) from birth. Indeed, when these occur in the context of socially contingent interaction, Csibra and Gergely (2011; Csibra, 2010) argue that they constitute signals of ostensive communicative acts from which infants are innately prepared to learn. Wherever this "natural pedagogy" leads, it underscores how this suite of social

orientation biases in young infants, long viewed as supporting developing social interaction and attachment, may also be enlisted for early generic learning.

There may be other forms of core knowledge associated with emergent social representation, but three observations about these candidate capacities warrant note. First, these are sparse rather than rich primitives to enable foundational inferences of human agency and action and to permit early interaction and social learning. More may not be needed to construct more sophisticated representations of the social world from direct social experience. Second, each of these conceptual primitives—contingency perception, self-referential action representation, and privileged orientation to human faces and voices—facilitates social interaction and social-cognitive understanding. This suggests the possibility that they function to support social representational development *through* facilitating experiences of social interaction, especially with relational partners whose familiarity and ubiquity provide compounding catalysts to social-cognitive growth. Finally, these elements of core knowledge underscore the importance of first-person experience in developing social representation. It is, in other words, not only an infant's observations of others' behavior that is important, but essentially the child's direct experiences of social *interaction* that underlie social representational development.

Understanding Goals and Intentions

Contingency perception is important to early attributions of agency to human actors. But contingency perception is just the beginning of infants' understanding that people act intentionally, and considerable conceptual growth is required before young children can make more sophisticated inferences of what actors intend and why. Nevertheless, this process begins early. Studies using visual habituation indicate that as early as 5 to 6 months, infants represent others' behavior in terms of the goals of their actions rather than representing physical movement alone (see review by Woodward, 2013). At about the same age, infants selectively imitate only the behavior of actors whose actions are goal-oriented (rather than goal-ambiguous), adding convergent evidence to the visual habituation studies (Hamlin, Hallinan, & Woodward, 2008). Infants in the second half of the first year use a variety of behaviors—such as the actor's focused attention, grasping, pointing, and even emotional expression (i.e., smiling toward an object)—to predict the actor's interest in and subsequent behavior toward the object.

It is no accident that these behaviors by which infants interpret adult activity as goal-directed are the same behaviors that infants are beginning to enlist into their own goal-directed efforts. By 6 months, infants are familiar with the sight of their own hand reaching toward an object, and thus may be prepared to interpret others' object-directed reaches as similarly goal-oriented. During the months that follow, infants use pointing, gaze-following, gesturing, and other actions to infer others' goal-orientation at about the same time as they become competent in using these behaviors to accomplish their own goals. Experimental studies support the association between infants' first-person experience of goal-directedness and their interpretation of the goal-orientation of others' actions. Sommerville, Woodward, and Needham (2005) showed, for example, that when 3-month-olds were provided first-hand experience with picking up toys using Velcro-equipped mittens it resulted in greater amounts of visually guided reaching, and their subsequent performance in a habituation study revealed greater sensitivity to the actor's goal-orientation compared to infants without this experience (see also Brune & Woodward, 2007). During the second half of the first year, as infants are becoming more competently agentic, they increasingly interpret others' actions in goal-oriented ways. By 10 to 11 months, for example, infants become proficient at parsing the ongoing stream of human behavior they observe into meaningful segments based on their inferences of the actor's goals (Saylor, Baldwin, Baird, & LaBounty, 2007).

During this time, of course, infants have other kinds of first-person social experience that supports developing understanding of intentionality. This includes parent-infant face-to-face play at 2 to 6 months of age, characterized by mutual gazing, contingent responsiveness, proto-conversational turn-taking of vocalizing, and sharing emotional expressions (Hobson, 2002; Stern, 1985). Social experience of this kind, in different relational and cultural contexts, likely extends the "like me" orientation to shared (or mirrored) emotions, mutual (later referential) gazing, shared (or reciprocal) movement, and kinesthetics. [Moreover, an equally important internal awareness of "not like me" is also likely to emerge in the comparably frequent experiences of interactional dyssynchrony that characterize early social play, motivating both partners to reestablished shared goals, visual orientation, and coordinated activity again.] Most important to the organization of shared activity is the adult's structuring of play (or its repair) around the maintenance of positive emotion in the infant by responding appropriately and contingently to the

child's interests, expressions, and other behavior—and, in doing so, strengthening the infant's experience of agency and intentionality.

Later in the first year, infants and parents also engage in cooperative games, such as rolling a ball back and forth, or taking turns putting objects into a bin or stacking blocks. This shared activity is more complex than adults simply responding to the child's initiatives because now it involves coordinated activity in which each partner has intersecting roles. This cooperative social interaction also contributes to developing representations of human goal-orientation. Henderson, Wang, Matz, and Woodward (2013) showed that 10-month-olds who had personal experience with collaborative activity (i.e., jointly retrieving a ball from a box with an adult) subsequently represented the actions of two other adults they observed in terms of their collaborative goal, whereas infants without this first-hand experience did not comparably interpret the adults' behavior as collaborative. Direct experience with social cooperation was essential; simply observing other people engaged in cooperative activity was insufficient.

In play and other contexts, adults often interpret the infant's behavior as goal-oriented and they respond accordingly (Kaye, 1982). They react to the infant's directed gaze or reach by retrieving the object of interest; they imitate the infant's emotional expressions or gestures; they applaud the child's effortful accomplishments; they query and talk to the preverbal child about intentions and goals. Notably, caregivers also intervene to deter the infant's goal-directed efforts, such as by removing a prohibited object before the child reaches it, or removing the child from a potentially hazardous activity, and thus respond to the infant's intentionality in these ways also. In each case, adults are acting from a mentalistic interpretation of the infant's behavior in terms of underlying internal states.

One reason that infants have considerable first-person experience with goal-oriented agency, therefore, is that caregivers are responding to the infant as a intentional, agentic person. This adult characteristic has been described as "mind-mindedness" (Meins, 1997), which can be defined as an adult's interpretation and response to the infant's behavior in terms of underlying intentions, goals, feelings, desires, and other mental states. The concept of mind-mindedness is based on mentalizing theory, which argues that the development of psychological self-awareness derives, in part, from the organization of the parent's behavior toward the infant around these mental states (Fonagy, Gergely, & Target, 2007). According to this view, when the parent responds consistently with the

infant's intentions, feelings, and desires, especially when mirroring the infant's emotions, it contributes to the infant's developing self-awareness of these internal states and the growth of a sense of agency (see also Kaye, 1982). Studies of mind-mindedness show, for example, that infants whose mothers frequently comment on the infant's mental states during play later show stronger performance on theory of mind tasks (Laranjo, Bernier, Meins, & Carlson, 2010; Meins et al., 2002).

Research on parental mentalization typically relies on verbal assessments through interview protocols to elucidate adults' interpretations of the child's behavior. The important question, however, concerns how mentalization is manifested in interaction with the infant in a manner that contributes to the infant's developing representations of the self and others. Shai and Belsky (2011) have argued that parental responsiveness of this kind can be observed in the adult's expressive, kinesthetic, and nonlanguage vocal responses (see also Stern, 1985). When a parent responds with a questioning vocal sound or word, together with gaze-following and moving closer to the baby in response to the child's directed reach to an object of interest, for example, a mentalized interpretation of the infant's gesture is conveyed that reinforces the infant's intentionality and also supports the infant's communicative efficacy. In a related vein, Brand, Baldwin, and Ashburn (2002) have reported that parent–infant interaction during the second half of the first year is structured in a way to enhance awareness of the intentionality and goal-structure of each partner's behavior. They call this characteristic "motionese" as a counterpart to the well-documented "parentese" that facilitates language acquisition. "Motionese," they conclude, facilitates infants' interpretation of social behavior in terms of its intentional structure.

These studies suggest, then, that parental responsiveness to infants' goal-directed behavior in the first year contributes the child's developing awareness of intentionality. Parental behavior, especially when it is coordinated with the child's actions, also contributes to the infant's awareness of the intentionality of other people. Interestingly, this period is also when the security of attachment develops in response to the sensitivity of parental care. Parental mental state awareness is incorporated into classic definitions of sensitivity (i.e., noticing the baby's signals, interpreting them accurately, and responding to them appropriately and promptly) that is the basis for a secure attachment. Sensitivity that is organized around responsiveness to perceived intentions and goals, especially as the infant is becoming a more competent and

self-aware agentic being, contributes to the security of attachment. If the infant is better representing parent activity as intentional and goal-directed at the same time, it may conceptually imbue the child's interpretation of the meaning of the parent's solicitude in security-relevant ways: that is, as an adult who *intends* support.

Shared Intentionality

A major advance in understanding intentional human activity occurs in the second year with advances in "shared intentionality" (Tomasello, Carpenter, Call, Behne, & Moll, 2005). Shared intentionality is not just the coordinated interaction of infant and adult but their doing so in a manner that shares mental states, especially shared goals and intentions. "Shared mental states" hearkens back to the reciprocal exchange of emotional expressions and the emergence of joint attention in the first year, of course, but what is different about shared intentionality in the second year are the mutual intentions encompassed in this sharing. The toddler's ability to enter into another's behavior in terms of that person's goals and plans for accomplishing them is distinctive about shared intentionality. Examples of shared intentionality can be observed in toddlers' cooperative problem solving and social games, especially when shared intentions are reflected in the child prompting an adult who fails to continue participating (Brownell, 2011; Warneken, Chen, & Tomasello, 2006). Shared intentionality can also be observed in toddlers' participation in activities that involve reversing roles with the adult (Carpenter, Tomasello, & Striano, 2005), and assisting the adult with simple prosocial acts (Warneken & Tomasello, 2006). Tomasello and his colleagues (2005) argue that owing to this sharing of mental states, shared intentionality provides the conceptual foundation for language acquisition and other forms of cultural learning.

Sharing intentional states with another is predicated on earlier forms of mental and emotional sharing in the first year. Once infants have developed a salient awareness of their own goal-directed intentionality and have incorporated intentionality into their interpretation of others' behavior, entering into another's intentional stance becomes a valuable means of understanding another's actions. Shared intentionality also permits better coordinated, complex, and more emotionally engaging social interaction. This may be why toddlers seek the participation of another in collaborative activity even when that person's involvement is not necessary for the activity to succeed (Warneken, Gräfenhain, & Tomasello, 2012).

Shared intentionality thus derives from an interaction between the young child's expanding understanding of the intentional origins of human action with social experiences that stimulate and support these inferences in developmentally evolving ways. As it develops, furthermore, the capacity to enter into and share another's intentional stance contributes to other advances in social understanding. Imitative behavior changes, for example, as toddlers respond on the basis of their inferences of the adult's goals even if the adult's observed actions failed to accomplish them (Carpenter, Call, & Tomasello, 2005; Gergely, Bekkering, & Kiraly, 2002). Shared intentionality may also be associated with the development of desire psychology as young children begin to understand the association between intention, desire, and emotion: People are happy when they get what they want or accomplish their goals, but they are unhappy when they do not. Because these goals and intentions are often shared with another person, toddlers' shared emotions in joint activity provide opportunities to comprehend the connections between these mental states. Finally, the growth of shared intentionality may also transform the impact of parental sensitivity, causing the toddler to interpret the adult's responsiveness as entering into and supporting the child's intended activity. As the child generalizes the adult's example, it may provide a foundation for early prosociality and contribute to the development of the mutually responsive orientation toward the parent that Kochanska (2002) views as a basis for conscience development.

Interpreting and Responding to Third-Party Actions

As these examples illustrate, shared intentionality provides toddlers with greater conceptual flexibility in understanding the mental origins of human activity. In particular, it provides them with a "bird's-eye view" of social interaction involving both first-person and third-person perspectives incorporated into the child's representation of events (Tomasello, 2007). What happens, then, when children of this age observe someone else cooperating with another person, or preventing them from accomplishing their goals? If shared intentionality derives from young children understanding the goals of others' behavior and being able to enter into their intentional stance, then this might also influence their appraisal of third-party actions.

There is growing evidence that this is so for children in their second year. Using puppets, for example, Hamlin, Wynn, Bloom, and Mahajan (2011) showed that 19- to 23-month-olds were more likely to provide rewards

to a puppet who was previously observed as helpful to another puppet (i.e., retrieving a ball the other puppet had dropped), and to take rewards from a puppet who had previously acted harmfully to another (i.e., taking away the dropped ball). It is noteworthy that in these situations, young children's responses could not directly address the consequences to the "victim" of what was done. Instead, children provided benefits to the victim, or denied them to the perpetrator, in response to observing the effects of a third party's actions on an actor's intentions and desires.

A similar conclusion derives from a study involving children's direct participation in a social drama (Vaish, Carpenter, & Tomasello, 2009). Toddlers aged 18 to 24 months watched as one adult either stole or damaged the possessions of a second adult (experimental condition) or took or damaged comparable items that did not belong to the second adult (control). After moving to another room, toddlers were given two balloons and the second adult only one, and subsequently the latter's balloon was lost. Young children who had previously witnessed that adult being victimized by another in the experimental condition were significantly more likely to help that person, such as by giving her a balloon, hugging or patting the adult, or making suggestions for retrieving the balloon, than children in the control condition. Toddlers appeared to be responding, as in the Hamlin study, to the harm previously caused by the third party's actions to the recipient's goals. Toddlers responded comparably even when one adult only intended, but failed, to harm the interests of another (Vaish, Carpenter, & Tomasello, 2010).

At somewhat older ages, children make comparable judgments in more complex circumstances. In a study using doll play, 3½-year-olds showed that they believed that a protagonist would prefer to give rewards to another doll who had previously helped her compared to one who had not (Olson & Spelke, 2008). In a reflection of indirect reciprocity, moreover, they also indicated that a protagonist would prefer to give rewards to a doll who had previously been generous to another doll compared to one who had not. Another study showed that children of this age not only assist the victim of harm that they have witnessed, but also protest the harmful act and tattle on the perpetrator (Vaish, Missana, & Tomasello, 2011). Taken together, shared intentionality means that toddlers not only can share another person's goal-directed intentionality, but can use their understanding of another's goals to appraise the conduct of third parties and respond appropriately.

What evaluations of third-party actions account for these responses by young children? Judgments of other

people as "nice" or "mean" figure prominently in the spontaneous comments of young children about the people they observe, and such judgments derive from how the actions of one person affect another's goals, feelings, or welfare (Wright & Bartsch, 2008). Intuitive judgments of "fairness," which also appear early, may also be influential. Children of 3½ years were more likely to share undeserved rewards with a peer partner, for example, when rewards were derived from a collaborative task than when they received undeserved rewards from a noncollaborative task (Hamann, Bender, & Tomasello, 2014). When children of this age were shown a story about two girls who started baking cookies, but only one completed the task, three-quarters of the children judged that the child who contributed more should receive more of the cookies (Baumard, Mascaro, & Chevallier, 2012).

Taken together, these studies suggest that one of the consequences of shared intentionality is young children's sensitivity to the effect of third-party actions on another's goals, which may result in person-centered evaluations and motivate efforts to restore fairness by rewarding those who assist another, punishing those who hinder, offering assistance to those who were previously victimized by a hinderer, and ensuring that benefits are distributed fairly among all parties. Although the experimental studies described here—conducted with puppets, stories, and emotionally impassive experimenters—are designed to minimize the influence of emotion, in everyday experience emotion is likely to be important to how young children appraise the actions of helpers, hinderers, and victims, especially in light of their developing understanding of the associations between the fulfillment of intentions, goals, and desires, and positive or negative feelings.

The importance of emotion in representations of third-party action is particularly apparent when considering that children of these ages have substantial first-hand experience with these concerns in family contexts. Rewarding those who are helpful, sanctioning those who are harmful, comforting or compensating those who have been harmed, concerns about the fair allocation of shared resources or rewards, and drawing attention to another's wrongdoing are familiar experiences for toddlers, especially those growing up with siblings (Dunn, 1988, 2006; Dunn & Munn, 1985). Indeed, the stories enacted by puppets or experimenters in these studies seem very similar to everyday family dramas. What is equally remarkable in these findings, moreover, is the unexamined variability in children's responding that may also be associated with prior family experience. Baumard and colleagues (2012)

reported, for example, that most of the children in their sample initially preferred allocating resources equally rather than differentially according to effort, but some later settled on differential allocation after planned follow-up questioning. Likewise, in the Vaish et al. (2009) study, more than a third of the control condition children helped or shared with the experimenter even though the adult had experienced no prior harm. Further exploration of the bases for variability in children's responding, especially in light of their own first-person experience in the family, seems warranted.

The rewarding, punishing, compensating, comforting, protesting, prosocial, and even tattling behaviors documented in these studies have a moral cast, but are they moral conduct? Thompson (2012, 2015) has argued that these responses by young children reflect a premoral sensibility derived from their capacities to understand the association of goals with emotions and desires, represent these in terms of first- and third-person perspectives, and derive intuitive evaluations of "nice," "mean," and "fair" on this basis. But these capacities become incorporated into a more explicitly moral perspective through relational experience. Mothers' coaching of care for others' needs increases linearly from 1 to 4 years to parallel these social-cognitive achievements, and helps to connect children's actions with another's goals and feelings (Gralinski & Kopp, 1993). At times, maternal socialization messages related to others' welfare are emotionally powerful communications, explicitly linking another's emotions with causal attributions and intentions, even if the child was just a bystander (e.g., Zahn-Waxler, Radke-Yarrow, & King, 1979). This may explain why parent-child discourse about people's feelings and needs—but not about rules and consequences—is a predictor of conscience development in preschoolers (Laible & Thompson, 2000, 2002). According to Smetana (1989), mothers justify their enforcement of moral rules to their 2- to 3-year-olds on the basis of people's needs or welfare, but justify social conventional rules instead in terms of social order and regulation. Consequently, by 3 to 4 years of age, young children view moral violations as more serious and less revocable than violations of other domain rules, justifying their judgments in terms of unfairness and the harm to others entailed in moral violations (Nucci & Weber, 1995; Smetana, 1989). In this relational context, therefore, a young child's premoral sensibility becomes enlisted into a broader system of values as caregivers build on children's intuitive judgments of human conduct in their moral socialization (see, e.g., Schmidt, Rakoczy, & Tomasello,

2012). In this manner, early social representations assume self-regulatory significance.

Simply stated, family relationships provide first-person experiences that enable young children to integrate their intuitive appraisals of human conduct into a system of values. If this conclusion is warranted, however, it requires a broader reconsideration of early moral development. First, by contrast with traditional moral development theories that portray young children as externalized and consequentialist until they internalize moral values, this view suggests that the primary incentives for moral behavior are internal from the beginning. Early developing appraisals of human conduct in relation to people's goals and feelings are foundational to the values orientation that caregivers subsequently build into their moral socialization efforts (Thompson, 2012). Indeed, external sanctions and incentives may impede, not facilitate, the cooperation, helping, and sharing that emerges from this premoral orientation (Warneken & Tomasello, 2008). Second, the emergence of an early premoral sensibility in young children is a developmental process that does not require assumptions of innate and universal sociomoral norms as core knowledge (cf. Sloane, Baillargeon, & Premack, 2012). Instead, moral awareness develops in a similar manner to other complex cognitive skills through the interaction of the young child's powerful inductive capacities (in this case, appraisals of human conduct based on consequences for others' goals, desires, and feelings) and the data provided by social experience (in this case, values socialization through family interaction).

Further Advances in Social Cognition

As young children proceed to more advanced social-cognitive achievements, the influence of social and relational experience remains significant (see, e.g., Astington & Baird, 2005; Carpendale & Lewis, 2004; Hughes, 2011). Developmentalists have studied a variety of social influences (e.g., parent-child discourse; culture and socio-economic differences; family size; attachment security) in relation to a broadening range of later social-cognitive achievements (e.g., false-belief understanding; ingroup-outgroup differentiation), and a comprehensive review of these influences is beyond the scope of this discussion. One aspect of this literature that merits further consideration, however, relates to the influence of adult mental state language on developing social representation.

There is a large research literature documenting a substantial predictive association between adults' use of

mental state language and central features of preschoolers' social understanding, especially false belief and emotion understanding (see Hughes, 2011; Milligan, Astington, & Dack, 2007; Thompson, 2006, for reviews). The more important, and interesting, question concerns *why* adult mental state language might have such influence. There are several alternative views, each of which may be influential (see Astington & Baird, 2005; P. L. Harris, de Rosnay, & Pons, 2005).

First, exposure to adult mental state language "lexicalizes" young children's preverbal conceptions of emotional and psychological states. In this semantic view, acquiring words like "know," "sad," and other mental state terms provides children with explicit referents for mental concepts that can then be the object of shared discourse. Second, exposure to adult mental state language may also sensitize young children to mental states through the ways in which language is structured (de Villiers & de Villiers, 2000). In this syntactic view, certain language constructions convey the open-ended characteristics of mental states, such as the use of sentential complements ("Mary thought that her father was arriving this morning.") and embedded propositional phrases referring to the objects of mental activity ("I don't know whether it's a dog or a cat.").

Third, exposure to adult mental state language may be important in the context of shared discourse in which mental concepts are incorporated into representations of the child's direct experience. In this pragmatic view, it is not the number of mental state terms that is important, but rather their enlistment into conversation about everyday events that reveal different points of view, conflicting interpretations, portrayals of emotion or desire, communication of beliefs, and other mental state references. From this perspective, therefore, young children develop an understanding of mental events through their engagement in discourse in which references to these mental events are incorporated into the narrative structure and causal attributions. Such a view is consistent with a Vygotskian portrayal of the internalization of linguistically mediated interaction with others to create "dialogic" cognitive representations (see Fernyhough, 2005).

A complementary approach to this pragmatic view comes from Fivush and her colleagues, who argue that the content and quality of an adult's verbal representations of the child's experiences contributes to developing understanding of mental states (Fivush, Haden, & Reese, 2006). To these researchers, maternal *elaborative* speech—a style characterized by the use of open-ended questions, statements, and evaluations that add new information to a shared

representation of the child's experience—contributes significantly to the quality of children's autobiographical narratives about past events. Their focus on autobiographical narratives is based on the view that, in constructing a shared representation of the past, a child's memory, sense of self, and social-cognitive understanding internalize the content and form of parent-child discourse and also the beliefs and values of the culture. From this neo-Vygotskian perspective, therefore, a developing awareness of mental states is dialogically scaffolded.

There is research evidence (reviewed by Fivush et al., 2006) that a maternal elaborative style of parent-child conversation is associated with greater mental state understanding (especially emotion understanding) in young children. Other research indicates that language in the context of social-relational interaction has this influence. A training study showed, for example, that preschool children who were engaged in discussion about deceptive experiences improved on theory of mind tasks, especially when discussions incorporated sentential complements that made reference to open-ended mental states as illustrated above (Lohmann & Tomasello, 2003). Ensor and Hughes (2008) reported that not only mothers' mental state references but their incorporation into her "connected" conversational turns with the child (i.e., building on the child's previous utterance) predicted a suite of measures of children's social understanding. Other studies indicate that *causal* language related to people's emotional or other mental states is associated with more advanced understanding of mental states in children (see Thompson, 2006, for a review; see also Hughes, 2011).

It is important to note that the influence of mental state language on developing social understanding is not limited to parent-child relationships. Indeed, researchers have shown that in interactions with siblings and peers, preschoolers talk about mental states more frequently than they do with their mothers (Brown, Donelan-McCall, & Dunn, 1996). It is not difficult to understand why. Conversations with other children typically involve comparisons and conflicts about feelings and intentions, negotiating goals and desires, discussions about differing preferences or viewpoints, explicit contrastive statements, and many other elements of mental state discourse. Mental state discourse with siblings and peers, whether focused on cognitive or emotional dimensions, also predicts children's social understanding (e.g., Hughes, Lecce, & Wilson, 2007; see Hughes, 2011, for a review).

Whether parents, siblings, or peers are concerned, the influence of mental state language on developing social

understanding underscores the importance of language in the context of relationships. In relationships, shared experiences are discussed, different perspectives matter and are compared and resolved, emotions are recognized and understood, conflicting intentions and desires are recognized and resolved, group membership is identified, and other mental states are explored by young children. These experiences of mental state discourse assume meaning because talking about them is one way that relationships develop and grow stronger as children become better known by, and better know, another person. As the content and quality of shared discourse in relational contexts influence children's developing representations of the social world, moreover, it also provides an avenue by which the parent's causal attribution biases, moral judgments, trait attributions, and other interpretive biases are also conveyed intergenerationally. Stated differently, parent-child discourse shapes the beliefs, values, and goals that underlie children's developing self-regulation.

Individual Differences in Relational Experience

Humans are biologically adapted to develop in the context of social relationships. But these relationships differ in quality, and humans are also selected to be sensitive to differences in the quality of relationships early in life because of their relevance to survival and well-being. Life history theory and other viewpoints (such as the predictive adaptive response model) argue that the quality of early social experience provides implicit cues concerning the broader environmental conditions to which human young must adapt. Viewed in this light, therefore, early social representations must comprehend not only generic human characteristics but also individual differences in these characteristics, especially between adult caregivers. In this respect they are different from representations of objects, number, geometry, and other core domains. Infants are neither likely to encounter nor are biologically prepared to adapt to significant variability in the functioning of other ontological domains because gravitational, geometric, quantitative, and other processes function fairly consistently in experience. But this is not true for social functioning, in which individual differences in others' behavioral propensities and the representations that derive from them are relevant to biological survival and psychological adjustment.

Thus we should expect that, in addition to generalizable representations of mental states discussed above, young children would also develop differentiated representations

based on their social experiences with specific partners. The literature on developmental social cognition has been much more concerned with generic knowledge than person-specific representations, although there is room in this research for serious consideration of the latter. Infants develop differentiated social expectations, for example, based on statistical regularities in the responsiveness of caregivers. Securely attached children have a better grasp of false belief in their mothers than do insecurely attached children, and they also have a more discriminating view of the veracity of her claims. Variations in social experience also affect the quality and timing by which generic advances in social cognition occur. Young children vary in their development of false-belief based on how much caregivers respond mentalistically to the infant as a psychologically motivated being (e.g., "mind-mindedness"). Preschoolers' emotion understanding is affected by variations in maternal use of mental state language in conversation with the child. Viewed more broadly, variations in cultural practices influence the timing and sequence of these early social-cognitive milestones even though they do not result in fundamental differences in their nature or acquisition (see, e.g., Callaghan et al., 2011; Liu, Wellman, Tardif, & Sabbaugh, 2008; Wellman, Cross, & Watson, 2001).

Differences in early relational experience and their representational correlates are important, therefore, for expanding understanding of how relationships influence children's understanding of themselves, their social partners, and their broader social ecology. They are also important for understanding how these representations mediate children's social experience. Two research programs illustrate these contributions.

First, based on the ideas of emotional security theory, Cummings and Davies (2010) and their colleagues have studied the behavioral, emotional, and representational consequences of young children's exposure to marital conflict and their mediation of later internalizing and externalizing problems. One of the outcomes of marital conflict is children's insecure representations of the marital relationship, which is typically assessed using the MacArthur Story Stem Battery in which children's responses to family-related story stems are scored for themes of marital conflict, parental caregiving, and overall emotional insecurity. When 6-year-olds' representations of the marital relationship were assessed in this manner, insecure representations mediated between children's exposure to marital conflict in the home and their subsequent poorer school adjustment (Sturge-Apple, Davies,

Winter, Cummings, & Schermerhorn, 2008). There was also evidence that parents' depressive symptomatology was comparably associated with children's behavioral problems through children's representational insecurity (Cummings, Schermerhorn, Keller, & Davies, 2008). As a further illustration of the moderating influence of these representations on other social experiences, children's insecurity in the marital relationship affected their representations of peer relationships which, in turn, also contributed to problems in school adjustment (Bascoe, Davies, Sturge-Apple, & Cummings, 2009).

Second, the work of Pollak and his colleagues has focused on more extreme family stresses associated with child maltreatment and their association with representations of emotion and relationships (Pollak, 2008). When children were asked to identify pictures of adult facial expressions of emotion that had been progressively "morphed" from one prototypical expression (e.g., sadness) to another (e.g., anger), maltreated children were more likely to identify blended expressions involving anger elements as angry than were nonmaltreated children (Pollak & Kistler, 2002). They did not, however, misidentify other emotion blends. Maltreated children exhibited a lower attentional threshold for detecting anger in the vocal expressions of their mothers (Shackman & Pollak, 2005), and had more difficulty attentionally disengaging from perceived angry cues (Pollak & Tolley-Schell, 2003). They also misattributed hypothetical situations as likely to evoke anger and sadness that children without a maltreatment history better distinguished (Perlman, Kalish, & Pollak, 2008). Together, these findings are consistent with the view that maltreated children are sensitized to signals of adult anger as the result of their family experiences, perhaps because doing so enables them better to anticipate and prepare for aversive encounters with an adult who has abused them in the past. However, as noted earlier, hypersensitivity to anger expressions and aggressive cues may also contribute to the social problems of maltreated children in out-of-home settings involving peers and adults, and further contribute to the dysregulation of neurobiological stress responding.

Several characteristics of these research programs, and others that also examine the representational correlates of variations in family experience, warrant note. First, the nature of the representations are similar to, but also different from, those of the developmental social-cognitive literature. Emotion understanding is studied, for example, but with an added focus on misrepresentations arising from a history of abuse or insecure attachment. Representations

of "helpers" and "hinderers" are captured with reference to specific family members in the context of family experience. Second, representations are studied with respect to the particular vulnerabilities (or benefits) hypothesized to derive from specific kinds of relational experience. The differential approach of this literature sharpens predictions to later behavior, which is part of the purpose of this research, but can make it more hazardous to generalize conclusions to the development of social representations in other circumstances. Finally, methodology is comparably diverse, with researchers using semi-projective story stems, measures of preattentive processing, coding of verbal discourse in parent-child conversation, and other approaches in addition to carefully designed experimental probes. These and other differences in approach and orientation can make it difficult to appreciate that individual differences in these relational representations must draw on comparable processes of social representation to those profiled in the social cognition literature. Integrating these approaches is a necessary and desirable goal.

Mental Working Models of Attachment Relationships

The attachment literature is the most enduring and theoretically sophisticated effort to understand the representational correlates of individual differences in early relational experience (see Cassidy & Shaver, 2008, for a general overview). As such, it exemplifies both the strengths and weaknesses of this approach to social-cognitive development.

Attachment theorists argue that, in addition to the other influences on socioemotional development derived from secure or insecure parent-child attachments, young children develop mental working models (or "internal working models" [IWMs]) of themselves, significant partners, and relational interaction from their experience with caregivers (Thompson, 2008a). These mental models change developmentally and with experience (hence "working"). IWMs are hypothesized to bridge the security of attachment and other aspects of social and personality development, such that young children with secure attachments develop different self-referential beliefs, relationship schemas, and personality organization compared to children with insecure attachments. These representational processes constitute, in turn, interpretive filters through which children choose new social partners and interpret their social experiences with them in ways that are consistent with past experiences and expectations arising from secure or insecure attachments. Insecurely attached children may,

for example, so anticipate another's unfriendliness that they remain distant and unengaged and, in so doing, evoke the responses they expect. By contrast, securely attached children, guided by different IWMs to expect people to respond warmly to them, act in such a positive manner as to create more affirming, intimate relationships with them.

In portraying mental working models in this way, attachment theorists articulate three functions of these mental working models. IWMs enable the *prediction* of the behavior of attachment figures, which is especially (but not exclusively) apparent early in life when children are most dependent on the reliable responsiveness of their caregivers. IWMs also assist in the *interpretation* of social behavior of attachment figures and others. Finally, IWMs underlie the *self-regulation* of relational responding in accordance with these interpretations. These multiple functions of IWMs help to explain their influence on the development of new relationships, social construal, and personality.

The concept of internal working models is simultaneously used by attachment theorists to refer to the initial representations in infancy leading to a secure or insecure attachment, the representations deriving from that attachment in childhood and adolescence, and even the relational representations that adults enlist in their romantic partnerships and parenting. Herein is one of the strengths and liabilities of the IWM concept. It is a richly inclusive theoretical construct describing relational representations that are dynamic and emotionally colored, but the breadth and inclusiveness of the IWM construct undermines specificity in its conceptualization and measurement.

With respect to conceptualization, attachment theorists have struggled to mine the rich potential of this theoretical idea by specifying more clearly its defining features. Some theorists have focused on the *content* of the mental working models deriving from parent-child attachment. Thompson and his colleagues (Thompson, 2008b; Thompson, Laible, & Ontai, 2003), for example, have argued that the relational experiences associated with secure attachments, particularly the more candid communication shared by parents and children, provides children with enhanced social understanding and better social problem-solving skills. There is considerable research supporting this view. A number of studies have shown that the mothers of securely attached preschoolers are more elaborate in their conversational style with their children, which may contribute to their enhanced mental state understanding (see Fivush et al., 2006, for a review). As reviewed by Thompson (2008b), securely attached children have greater

emotion understanding, exhibit more positive expectations for peer behavior, show greater compliance, cooperation, and other indicators of emergent conscience, have a more positive self-concept, and exhibit enhanced emotion regulation when compared with insecurely attached children. With respect to the self-regulatory function of mental working models, Raikes and Thompson (2008a) found that securely attached children were more likely to identify socially competent and relevant solutions to social problem-solving tasks, were less likely to attribute negative social motivations to peers, and were less lonely than were insecurely attached children. These social problem-solving skills may help to account for the greater peer social competence of securely attached children. In this formulation of IWMs, one can see aspects of developing social cognition studied by researchers outside of the attachment framework reviewed above, suggesting that something in secure relationships—perhaps in the positive dialogic construction of understanding—facilitates developing social cognition.

Other attachment theorists have focused on the influence of IWMs on the *processing* of social information (Dykas & Cassidy, 2011). Drawing on classic concepts of defensive exclusion, they propose that securely attached children are biased to process in a relatively open manner a broad range of positive and negative social information relevant to attachment concerns, and to do so in a positively biased manner. By contrast, insecurely attached children are biased to process social information, particularly negative information, much differently. On one hand, they are expected to defensively exclude from awareness negative information that is likely to cause them psychological pain. On the other hand, they are expected to process information that will not cause them pain in a negatively biased manner, consistent with their attachment history. Studying these formulations in children requires assessing selective attention to and memory for social information, and there is some evidence for these processing biases in children in a manner that is consistent with studies of attachment in adolescents and adults (see Dykas & Cassidy, 2011; Thompson, 2008b, for reviews). Few researchers outside of attachment theory study these kinds of defensive influences in children, but one can see in this formulation elements of social-cognitive research in adults, such as the confirmation bias, the self-fulfilling prophecy, and processes of constructive memory.

In light of these different formulations of the nature and functioning of IWMs, it is understandable that there is methodological pluralism as well. In addition to the

kinds of measures described above, attachment researchers use semi-projective doll play, story stems, drawings, or picture cards to elicit children's representations of family experience, as well as direct interviews about children's experiences with family members (Solomon & George, 2008). In some respects, this methodological diversity makes sense in light of the complexity of the construct that researchers are seeking to capture, especially within the neoanalytic orientation of attachment theory. On the other hand, as others have argued, the lack of theoretical clarity of the IWM construct is an impediment to articulate methods development as well as to its appropriate conceptual application to research findings (Belsky & Cassidy, 1994).

Despite these drawbacks, the attachment research based on the IWM concept has been uniquely generative in establishing reliable associations between early relational experience and the development of social representations that influence self-regulation and predict later behavior. Together with research outside of attachment theory, it provides some of the strongest evidence to date for how representations, drawn from previous relational experience, moderate subsequent social relations and contribute to developing self-regulation.

Interim Conclusion

The developmental account that emerges from this research is that, in the early months and years of life, young children are learning both about the generic characteristics of people and the specific propensities of those they live with. They are rapidly acquiring understanding of the goal-directed quality of human action at the same time that they are developing specific expectations for the intentional behavior of people toward them. They are evaluating the influence of actors on the goals and desires of other actors at the same time that they are having first-hand experience with helping and hindering behavior among family members. At the same time that language contributes to children's understanding of false belief and emotion, the quality and content of parent-child conversation is shaping children's representations of themselves, their experiences, and the characteristics of specific people. Relational experience is central to the social influences from which young children derive this understanding, and these representations influence their subsequent social interactions, emotion regulation, and behavior management.

In this manner, the representations derived from relational experience contribute to the development of self-regulation. Representations of the intentions, desires,

and feelings of other people become incorporated into cooperative conduct as well as a premoral sensibility that contributes to children's judgments of fairness, their developing capacities for cooperation and helping, and other manifestations of shared intentionality, especially as it is enlisted into a values orientation through relational guidance. Representations of the self and other people acquired dialogically through parent-child conversation contribute to a developing network of beliefs, values, and goals that guide how young children respond to social partners. The relational security inspired by sensitive care contributes to the growth of mental models of people, the self, and relationships that become incorporated into how children regulate their interactions with attachment figures and other partners.

The research literatures surveyed in this discussion each contribute to this account with complementary but different orientations that underscore the potential value of creating bridges between them. On one hand, the insightfully descriptive yield of developmental social cognition research, based on carefully designed experimental studies, better portrays the young child as embedded in a collection of social figures than in a relational network of affective significance. On the other hand, the research based on attachment theory has shown how relational representations predict later behavior but without clarity concerning the nature of those representations or their assessment. Each research field addresses common issues related to the nature of early social representations and the influence of social experience on their development, and greater connections between them would be mutually informative.

There have been several efforts to bridge these perspectives. Repacholi and Trapolini (2004), using a false belief task focused on the mother's beliefs, reported that securely attached children performed better than insecurely attached children, with avoidant children showing the greatest difficulty understanding maternal false beliefs compared with those of an unfamiliar adult. Building on the research literature on children's trust in testimony (P. L. Harris, 2012), Corriveau et al. (2009) reported that securely attached children generally preferred to believe their mothers when evaluating the veracity of her claims, but wisely did not do so when the evidence warranted disbelief. By contrast, insecure-avoidant children showed less reliance on their mother's claims, while insecure-resistant children displayed more. Not everything has to be associated with the security of attachment, however. Forman and Kochanska (2001) examined individual differences in toddlers' propensity to imitate their mothers, and found that it was

associated with other measures of children's receptiveness to the parent's socialization initiatives, and these differences in responsive imitation also predicted later measures of conscience development (see also Forman, Aksan, & Kochanska, 2004). Taken together, studies like these indicate that examining variability in children's performance on assessments of social-cognitive understanding may yield informative understanding of individual differences related to children's prior relational experience.

Other kinds of research directions are required to move deeper toward understanding relational influences on developing social representation. It is important to better understand, for example, the everyday social experiences shared by young children with their parents that provide data for the social representations that develop so rapidly and easily in the early years. How are a parent's mentalizing interpretations of an infant's behavior manifested in response to the child's initiatives and expressions? How do parents and toddlers engage in cooperative social interactions that derive from, and foster, the growth of shared intentionality? What sorts of verbal messages accompany parents' evaluations of young children's behavior, and how do these messages relate to the mental constructions children are developing with respect to third-person responsibility for helping or harming another (see Thompson & Winer, 2014)?

Theoretically driven, culturally comparative investigations may contribute to addressing such questions. Although studies comparing the performance of children from different nationalities are a good start, what the field really needs are hypothesis-testing efforts that predict variations in children's social-cognitive skills from assessments of parent belief systems and the organization of everyday social relations between young children and their caregivers. In cultures where parents think it is nonsensical to talk to infants until they are capable of language (e.g., Richman, Miller, & Levine, 1992), for example, how does this influence parental responses to infants' goal-directed efforts and does this result in significant differences in developing shared intentionality? Such efforts would contribute to understanding the extent to which processes of early interaction observed in Western societies (on which most research on social development is based) are broadly generalizable. But equally importantly, such research would help to clarify the extent to which such differences, when observed, result primarily in variations in the timing or sequence of developmental milestones, or instead in more significant variations in the organization of early social-cognitive development. Advancing this kind of research might also help to reveal how different patterns

of social interaction in Western and non-Western cultures contribute to common social-cognitive achievements through different means. Keller (2007) offers a useful model of such inquiry with respect to the development of self in infancy.

Understanding relational influences on the development of social representation would also benefit from theory development. In particular, the concept of "internal working models" within attachment theory lives up to the criticism that it can constitute a "catch-all, post hoc explanation" (Belsky & Cassidy, 1994) for any research linking attachment security to other behavior. Besides the vagueness of this concept, it is applied to a developmentally wide range of attachment-related processes without a coherent theory to explain how IWMs themselves change with development. The idea of dynamic, integrative, affectively endowed mental working models is a powerful conceptual tool for understanding the representational dimensions of early relationships, but as Bowlby (1969/1982) himself recognized, the general idea of mental working models is only the beginning of the systematic theoretical work required to make this idea a meaningful theoretical construct. One way of addressing this challenge is to unpack the concept of mental working models to specify the specific components that emerge developmentally in relational experience. This discussion has identified a number of candidate elements of developing social cognition that must be encompassed within the general rubric of IWMs, and other research literatures in social psychology offer additional candidates that might be particularly relevant to adult attachment. Only when this occurs will it be possible to understand how IWMs are associated with the initial development of secure or insecure attachments in infancy, how IWMs change or remain stable with increasing age and the relational influences that are relevant to their consistency, and how the nature of attachment security developmentally evolves as the IWMs on which it is based also change developmentally.

In the end, the importance of this work derives not just from its significance for developmental theory and research. Understanding relational influences on developing social representations and their impact on self-regulation is also important for its applications to improving early developmental outcomes, especially when caregiving relationships go awry. An intervention study highlights the potential value of efforts to change the representations that young children derive from living with an abusive or depressed caregiver, and also tests some of the ideas discussed in this section. In Preschooler-Parent

Psychotherapy, an attachment-based program, the intervention focused on helping mothers achieve insight into their own representations of the child and self. Mothers were encouraged to reflect on how these representations derived from past experience and their influence on parent-child interaction and, in sessions involving the child, therapists helped mothers develop healthier patterns of caregiving behavior. In one evaluation of this program, Toth, Maughan, Manly, Spagnola, and Cicchetti (2002) reported that preschoolers' representations of the mother and the mother-child relationship, as well as of the self (assessed using story-stem narratives), became more positive from intake to follow-up and were better at outcome than those of a non-maltreating comparison group. Other comparable interventions with maltreating mothers (Moss et al., 2011) and depressed mothers (Toth, Rogosch, Manly, & Cicchetti, 2006) have improved rates of secure attachment in intervention group children from intake to follow-up using similar procedures. In light of concerns about the intergenerational transmission of psychological risk mediated through the representational processes that derive from disordered parent-child relationships, further exploration of these kinds of representation-based interventions seems warranted.

TOWARD SELF-REGULATION

Development proceeds from external regulation to self-regulation in most behavioral domains. External regulation is needed to provide protection and support to guide the growth of behavioral systems. But for development to proceed optimally, external regulation is never meant to endure alone. Rather, the child's maturing self-regulatory capacities should progressively interact with and eventually supplant regulation from outside. In this manner, children become competently autonomous.

Portrayed in this simple manner, however, the development of self-regulation is complex. Whether considered with respect to the growth of cognitive self-control, moral conduct, emotion regulation, social competence, or other domains, the development of self-regulation integrates multiple developmental processes from within and outside the child. These include the maturation of many biological systems, most notably in the developing brain, relevant to the development of reactivity and self-control. They include diverse developing cognitive skills for enlisting self-regulatory procedures to effect behavioral change. They include a developing sense of self that motivates

self-regulatory efforts in order to achieve desired results. They include parents' socialization strategies, framed by personal beliefs and goals, to guide children's conduct according to expectations for mature conduct. They include cultural values that are influential in defining those expectations, as well as establishing a system of practices in a social ecology that includes the child. These developmental processes are integrated into a network of reciprocal influences that, over time, not only enable children to be competently self-regulating but to do so adaptively within their social contexts.

The development of emotion regulation illustrates these complex, integrated processes of self-regulation. Developmental scientists have devoted considerable attention to emotion regulation because it contributes significantly to social and behavioral competence and because emotion dysregulation is viewed as a risk factor for affective psychopathology. Scientific interest in emotion regulation is also consistent with cultural beliefs about the value of self-control and theoretical interest in functionalist theories of emotion. This section proposes that understanding the growth of emotion regulation—and self-regulation generally—as a multilevel system involving continuous interaction between biological, representational, and social processes is necessary to comprehend its development and its implications for behavioral competence. This multilevel orientation makes developmental systems theory a useful theoretical context for studying emotion regulation (e.g., Gottlieb, Wahlsten, & Lickliter, 2006; Thompson, 2011). The portrayal by systems theory of the multidirectional interactions between influences at different system levels is one contribution of this perspective. Additional contributions are its emphasis on coaction between different levels of developmental systems and the portrayal of these levels of influence as embedded in a richly complex social context.

One illustration of the value of a systems perspective is the neurobiological organization of emotion regulation. Emotion regulation is believed, according to many accounts, to modulate the intensity of emotion activation through the imposition of cognitive controls (such as response inhibition) or cortical controls (such as prefrontal regulation) on emotional arousal. This view is important and influential, but it captures only part of the model generated by research on the neurobiology of emotion. This literature shows that responses to emotional stimuli activate complex neural networks that are widely distributed throughout the brain, integrating areas typically regarded as relevant to emotion activation (including the amygdala,

hypothalamus, brainstem, and striatum) and those viewed as relevant to emotion regulation (including the lateral and medial prefrontal cortex and anterior cingulate). There is increasing evidence from neuroimaging research that these multilevel emotion-relevant areas are *coactive* in response to emotion stimuli rather than functioning primarily in activation-inhibition associations (Kober et al., 2008; Ochsner et al., 2009; see also Ulrich-Lai & Herman, 2009). Stated differently, emotion regulation can function in a conventional “top-down” fashion (such as how prefrontal processes regulate amygdala function) or in a “bottom-up” fashion (such as how conditioned fear arising from limbic processes alters higher-level threat detection). Regulatory influences can occur at different levels of the system throughout the process of emotional responding.

The orientation of developmental systems theory to multilevel processes with continuous coaction between different system levels is consistent with this neurobiological account, and also offers new ways of thinking about the development of emotion regulation. It inquires, as earlier sections of this chapter have done, how experiences of parental care influence the development of biological systems underlying emotional reactivity and self-regulation. It poses questions about how the child’s representations of emotions and their management are affected by differences in biological reactivity and parent socialization, as well as cultural values, and how these representations influence emotion management. It asks how the parents’ representational systems, shaped by cultural values as well as personal experience, influence their guidance for developing emotional self-control. It explores how the child’s biological reactivity affects parents’ socialization strategies and their effectiveness. And with respect to risk for affective psychopathology, the contextualism of developmental systems theory inquires how processes of emotion regulation that are dysfunctional in certain social contexts may have developed because they are most adaptive in the contexts in which children are at greatest risk, presenting an inherent trade-off in strategies of emotion regulation because of inconsistent contextual demands. These are potentially important questions to ask of the development of emotion regulation, although addressing them well requires considerably more research than currently exists.

Development of Emotion Regulation

It is customary to begin a discussion of the development of emotion regulation with birth. But the fetal programming

research indicates that individual differences in stress reactivity and self-regulation begin to develop prenatally owing to the biological effects of prenatal care. These prenatal influences contribute to differences in children’s reactivity to postnatal environmental events and stress regulation.

Experiential influences on developing biological systems continue after birth in children’s exposure to adversity or receipt of support, especially as these experiences are mediated by the quality of care. In interaction with the child’s genetic characteristics (and, in certain circumstances, affecting their expression), these experiences influence the development of biological systems underlying emotional reactivity and self-regulation and, as earlier noted, affect other systems related to immunological functioning, autonomic reactivity, and cognitive functioning. These biological changes have behavioral consequences for many aspects of developing individuality, including temperament (e.g., DiPietro et al., 2008). More broadly, they also contribute to the development of individual differences in susceptibility to environmental stresses and support that moderate children’s reactivity and self-regulation in response to challenge (Ellis et al., 2011). Owing in part to the effects of early experiences, in other words, some children become more sensitive to environmental conditions than others.

The neurobiological systems associated with reactivity and self-regulation have a fairly extended maturational course. The HPA axis and prefrontal areas associated with emotion, for example, continue to develop into adolescence (Casey, Giedd, & Thomas, 2000), which is one reason why the development of emotion regulation has such an extended timeline. This long maturational period is also why these systems remain amenable to experiential influences for so long. Throughout this period, for example, individual differences in autonomic functioning and parasympathetic regulation are influenced by the quality of parental care, including parental sensitivity and the effects of family conflict (El-Sheikh & Erath, 2011; Propper & Moore, 2006).

This makes the caregiver’s responsiveness to the infant’s emotions important, especially before capacities for self-control are well developed. Young infants possess a small repertoire of behaviors that can manage their arousal, including attentional redirection, behavioral withdrawal, self-soothing, social signaling, and later using motor actions to move toward or away from arousing events. Caregiver sensitivity and responsiveness are important to supporting this rudimentary self-regulatory repertoire and providing external regulation of the infant’s arousal.

Sensitive responding to a young infant is not an easy task, however, because recurrent bouts of unexplained fussiness (e.g., colic) and unpredictable changes in behavioral state can make it difficult to understand, predict, or regulate arousal states, causing some parents to approach early care as ministering to the needs of an inexplicably energized organism (Robson & Moss, 1970). This difficulty in managing early arousal also explains why so much of parents' external emotion regulation is proactive (or antecedent) in nature. Parents manage the daily routine to reduce upsetting events as much as possible, they promptly avert fussiness before it escalates by soothing, redirecting attention, or other means, they seek to induce positive affect by modeling, entertaining, or otherwise stimulating the baby, and they analyze the infant's cues to discern the causes of distress (for which their own capacities for mentalization or "mind-mindedness" can be helpful).

These parental efforts are not always successful, but they cumulatively contribute to the infant's emotion management. Consistent with the research on physiological stress buffering, for example, Braungart-Rieker, Hill-Soderlund, and Karrass (2010) found that although infant fear and anger reactivity generally increased from 4 to 18 months, sensitive mothers had infants who showed more modest increments in fear than infants with less sensitive mothers. Besides the immediate impact of nurturant contact on soothing infant distress, sensitive care may also be influential by lowering the threshold for distress-incompatible responses, such as attentional focusing elicited by the adult's touch or voice, or positive affect through emotional contagion. Parental practices become more effective as the infant becomes capable of representing experiences of care in more complex ways. Over the course of the first year, as earlier noted, distressed infants increasingly respond with anticipatory quieting to the sound of the adult's approach (Gekoski et al., 1983; Lamb & Malkin, 1986), and social expectations in these circumstances regulate distress. The relief of distress in situations like these provides further opportunities for associating the caregiver's presence and characteristics (voice, face, quality of touch) with soothing and reassurance. The development of these early social representations, especially as adult responses are encoded as intentional conduct by the infant, are likely to be important contributors to secure attachment.

With increasing age, young children acquire more active strategies of emotion regulation deriving from their growing understanding of the causes and consequences of emotion (see Thompson, 1990, 1994). Understanding the

association between perceptual processes and emotional arousal, for example, young children leave situations that they find distressing, cover their eyes or ears, or restrict perceptual access in other ways. Their developing comprehension of the referentiality of emotional expressions contributes to their use of social referencing in uncertain situations to receive reassurance or a cautionary alert. Their experience with caregivers teaches them the value of seeking nurturant assistance for managing emotions, or even using reassuring self-talk. Not all of these advances in representing emotion contribute to better emotion regulation. Toddlers' knowledge of the association between sadness and unfulfilled desire may cause them to be insistent on getting what they want before they can feel better. In general, however, these advances in emotion understanding contribute to the development of behavioral strategies for managing emotion that rely on young children's actions to change their exposure to emotionally arousing events or access to social support.

This account is incomplete, however, because of increasing evidence that young children also recognize the value of mentalistic strategies of emotion regulation. E. L. Davis, Levine, Lench, and Quas (2010) and Dennis and Kelemen (2009) each used short story vignettes to probe preschoolers' understanding of the efficacy of different strategies for managing negative emotions, and each reported surprising sophistication in young children's endorsement of mentalistic strategies such as cognitive reappraisal, deliberate distraction, and goal substitution. The major difference in strategy endorsement between younger and older children in these studies was the continued reliance of younger children on relatively ineffective means of managing emotion. Several research groups have also noted that young children evaluate the efficacy of alternative emotion regulation strategies on an emotion-specific basis, describing problem-solving approaches as most effective for anger, emotion-focused strategies (such as seeking social support) as most useful for sadness, and altering thinking (especially emotion-relevant interpretations) as most suitable for fear (see Sayfan & Lagattuta, 2009, and Waters & Thompson, 2014).

The realization that children as young as age 3 recognize the value of mentalistic strategies for managing emotion raises the question of why there is so little evidence that young children use these strategies in everyday circumstances. There are several potential explanations, including the obvious difference in task requirements between responding to short story vignettes and enacting self-regulatory strategies in personal circumstances. But

this discrepancy between emotion representations and emotion regulation also suggests that something more is necessary to bridge understanding and application. To many developmentalists, that “something more” consists of the development of executive functions.

Executive functions consist of higher cognitive capacities that enable self-regulation by managing more basic mental and behavioral processes. Zelazo and Cunningham (2007) distinguish “hot” executive functions that are motivationally significant from “cool” executive functions that are not on the basis of different brain areas and processing characteristics, and emotion regulation is clearly more closely associated with “hot” executive functions. Executive functions relevant to emotion regulation include inhibition, focused or sustained attention, cognitive flexibility (including switching perspectives, goals, or mental focus), self-monitoring, error detection, manipulating information in working memory, and reappraising the meaning of events. It is not difficult to see the significance of these executive functions for emotion regulation. Inhibition is crucial to resisting the inclination to respond in an emotionally impulsive manner and instead enlist self-regulatory efforts. Working memory is important to recognizing multiple considerations relevant to emotional responding, including the nature of the provoking event, the social context, one’s goals, the emotional reactions of others, and other factors. Reappraisal is a means of managing emotion by reinterpreting circumstances to yield more emotionally satisfying responses. Cognitive flexibility is necessary for reappraisal and for anticipating the probable outcomes of an emotional response. In some definitions of emotion regulation (Thompson, 1994), self-monitoring of one’s feelings is important to managing them.

Executive functions have an extended developmental course, but the most significant advances occur between the ages of 3 and 5 (Best & Miller, 2010). Subsequently children can be observed using more strategic, cognitively sophisticated strategies for managing their emotions, such as cognitive reappraisal, substituting goals, mental distraction, and other approaches (Thompson, 1990). Their greater understanding of the association between thinking and feeling also enables older children to better appreciate the value of positive thinking, even in difficult circumstances, and the detriments of ruminating on the negative (Bamford & Lagattuta, 2012). Children of this age also recognize how the anticipation of feeling good can be a motivator for moral compliance, even in circumstances when compliance requires doing what you do not want to do (Lagattuta et al., 2010). These developing cognitive

competencies are important to the growth and flexibility in emotion self-regulation.

There are further advances in the development of emotion regulation that have been less studied but are also important. These include

- Increasing breadth, sophistication, and flexibility in the use of different emotion regulation strategies, substituting effective for ineffective approaches, and using multiple strategies when necessary;
- Growing skill in understanding and enlisting emotion regulation skills appropriate to the interpersonal context, such as knowing about differences in suitable emotion regulation strategies for use with peers versus adults (Thompson & Waters, 2010);
- Increasing use of emotion-specific self-regulatory strategies as well as emotion-general strategies;
- Growing sophistication in the social and personal goals motivating self-regulatory efforts, including enlisting emotion regulation for managing social relations, protecting self-esteem, and facilitating cognitive functioning, consistent with cultural expectations; and
- Developing a consistent individual style of emotion regulation focused on personal goals and preferred strategies, consistent with developing personality organization.

These developing competencies are co-constructed by children and parents, with parents at the leading edge of fostering children’s emotional self-control. It is in parents’ interest to foster children’s emotion regulation, of course, and they are also motivated by their developmental expectations for children’s self-control. A national survey in the United States showed that nearly half the parents with very young children reported that 3-year-olds could control their emotions when frustrated, and most thought that children of this age could competently share and take turns with other children (Newton & Thompson, 2010). These expectations may explain why parents are so concerted in their efforts to foster young children’s emotional self-management, and why they become frustrated when children are not self-controlling in circumstances where parents believe they should be capable of doing so.

Parents’ beliefs about children’s emotions and emotion regulation are thus important to how they respond. Wong, McElwain, and Halberstadt (2009) reported, for example, that parents who believed that young children’s negative emotions should be accepted were less likely to report responding nonsupportively to children’s distress.

With a middle childhood sample, Ramsden and Hubbard (2002) likewise found that mothers' acceptance of children's negative emotions, together with low negative family expressiveness, together predicted teacher ratings of children's emotion regulation.

Not surprisingly, parent beliefs incorporate cultural values concerning the appropriate expression of emotion. In a culturally comparative study, Cole, Tamang, and Shrestha (2006) observed mothers with their preschool-age children from Tamang and Brahman ethnic groups in Nepal and interviewed village elders about characteristics of the competent child. Consistent with cultural values concerning these emotions, Tamang mothers were observed teasing or rebuking their angry children but responding with nurturance when children were ashamed, while Brahman mothers were more likely to respond with nurturance and teaching to an angry child but ignore children when they were ashamed. Consistent with these practices, Tamang children in an independent study indicated that they did not respond angrily to situations that angered children from the other cultural groups (Tamang elders indicated that competent children did not get angry when things did not go their way) but instead felt shame. Brahman children admitted feeling angry while shame was not a salient emotional experience for them (Cole, Bruschi, & Tamang, 2002).

Parental beliefs about children's emotions are thus important. So also is how parents represent emotion in their own experience. Consistent with the concept of mentalization, parents who are better able to regard their own emotional experiences with acceptance and insight may be more capable of doing so with respect to the feelings of their children. Meyer and her colleagues found that mothers' beliefs in attending to and accepting emotions, along with their endorsement of the value of emotion management, together predicted their reports of children's competence in emotion regulation. This association was mediated by mothers' constructive emotion socialization practices, such as problem- and emotion-focused responses to children's expressions (Meyer, Raikes, Virmani, Waters, & Thompson, 2014). One reason that parents' emotion representations are influential is that they affect how adults interpret how children feel. Prior research indicates that parents can be surprisingly discrepant from children's self-reports in their retrospective descriptions of how their children felt during shared experiences. Sometimes this occurs because adults and children perceive their shared experience with different goals, expectations, and interests (Levine, Stein, & Liwag, 1999). A study by

Waters et al. (2010) likewise found that when mothers and children independently reported on what children were feeling during an emotion regulation probe earlier in the research session, mothers were much less concordant with children's self-reports than were independent observers, with fewer than 50% reporting that their children felt mad or sad when their children reported those feelings about themselves. However, mothers who responded most consistently with children's self-reports were higher in their own beliefs that emotions should receive attention and be accepted, and they also had secure attachments with their children (Waters et al., 2010).

These findings are consistent with Gottman, Katz, and Hooven's (1997) concept of a parental "meta-emotion philosophy" that guides their emotion socialization of children. A meta-emotion philosophy incorporates the adult's awareness of her or his own emotions, an understanding and acceptance of children's emotions, and the parent's approach to managing the child's feelings. Gottman and his colleagues (1997) have distinguished two kinds of philosophies based on interviews of parents in the United States. Emotion-coaching parents are attentive to their own feelings and those of their child, consider the child's emotional expressions as teaching opportunities, and offer support and guidance for managing feelings. Emotion-dismissing parents tend to ignore their own emotions or belittle their importance, may not constructively attend to their children's feelings, and view emotions (especially negative ones) as potentially harmful, and thus they see themselves as responsible for subduing negative outbursts in their children.

An extensive interview is typically used to distinguish emotion-coaching from emotion-dismissing parents, and studies based on this formulation have yielded supportive results (Katz, Maliken, & Stettler, 2012). The view that parents' emotion socialization practices are guided by a meta-emotion philosophy is heuristically powerful. Much more research is needed to unpack this formulation, however, and to identify relevant elements of parents' socialization practices, clarify the nature of their emotion coaching, and examine its association with parents' emotion-related beliefs and children's emotion regulation.

With respect to parent socialization, for example, there are many ways that family experience affects emotional development and emotion regulation (Morris, Silk, Steinberg, Myers, & Robinson, 2007; Thompson, 2013). The importance of sensitive responding and proactive interventions were considered earlier. In addition, parents' modeling of emotional reactivity and self-control are

likely to be influential in the context of the family's general emotional expressiveness (see, e.g., Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997). In a series of studies, for example, Eisenberg showed that preschoolers' social competence was affected by how constructively mothers conveyed positive or negative feelings in the home, and this association was mediated by differences in children's self-regulatory behavior (e.g., Eisenberg et al., 2001; Eisenberg et al., 2003). These and other studies suggest that moderate to high amounts of positive emotion among family members contributes to children's self-regulatory competence, while the effects of the expression of negative emotions depends on their frequency, intensity, and threat to the child (Thompson, 2013). Consistent with Gottman's formulations, moreover, parental dismissal of children's emotions tends to be associated with poorer emotion coping than problem-focused responses (Eisenberg, Fabes, & Murphy, 1996; Meyer et al., 2014). Much more remains to be understood about how these and other socialization practices coincide to guide children's emotional development. Developmental changes in the nature of these influences also merit further study.

With respect to emotion coaching, there are many direct and indirect ways that parents prompt children's emotion regulation efforts. In one example, Morris and her colleagues found that mothers' prompting the use of cognitive reframing or attention refocusing when their young children received a disappointing gift was associated with lower-intensity expressions of anger and sadness (Morris et al., 2011). Emotion coaching can also occur during conversations about past emotional experiences. In one study, for example, mothers and their preschool children talked together about recent experiences that had provoked the child's sadness or anger, and 88% of the mothers spontaneously talked about different means of managing emotion in these situations. Many mothers explicitly commented about the effectiveness of these strategies for making one feel better (Thompson, Virmani, Waters, Raikes, & Meyer, 2013). In such conversational contexts, knowledge of emotion regulation can be integrated with broader emotion understanding and cultural beliefs about emotional expression and its management. Our research group has also observed that emotion self-regulatory strategies are sometimes prompted by mothers in conversations about anticipated future events that may be upsetting to the child, such as a visit to the dentist. In doing so, mothers often make reference to strategies in the past that have proven effective for the child.

Finally, it is important to frame the study of parents' emotion philosophy and socialization practices in a broader cultural context. Cultural and subcultural groups differ in their beliefs about emotional expressivity in children, the emotional characteristics of an admirable child, the use of emotion in socialization practices (such as shame in moral socialization), how emotions are acceptably conveyed, and the role of the parent in emotion socialization (see Parker et al., 2012, for an analysis). Supporting children's emotional expressiveness and validating their feelings are not necessarily universal values. In general, considerable work remains to better understand the socialization practices relevant to developing emotion regulation in children.

The same could be said for understanding emotion regulation and the security of attachment. There is a reliable association between secure attachment and competence in emotion regulation in studies with infants, preschoolers, grade-schoolers, and adolescents (see Thompson, 2008b, for a review). The foregoing discussion indicates several reasons that this would be so. Sensitive responding to distress, which is foundational to developing a secure attachment, is also likely to alter infants' implicit representations of distress and its management. This is consistent with the lower HPA reactivity of secure infants (compared to insecure infants) observed with their mothers in situations that were challenging to them (Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996). Securely attached young children are also more advanced in emotion understanding (especially of negative emotions) than are insecurely attached children, which may provide them with greater insight into the causes of emotion and its regulation. The mothers of secure infants may contribute to emotion understanding through their more elaborative style of talking with children about their experiences, including experiences involving heightened emotion. Mothers in secure relationships are more consistent with their children in their understanding of what the child is feeling (Waters et al., 2010) and their conversational style also incorporates greater validation of the child's feelings and constructive emotion regulation coaching (Thompson et al., 2013; Waters et al., 2010; see also Raikes & Thompson, 2008b). Taken together, these aspects of secure attachment relationships contribute to their characterization as a "psychological secure base" for young children to learn about their emotions and how they can best be managed.

One of the disadvantages of an inclusive construct like the security of attachment is that it enfolds many aspects of relational variability into a single concept that is then

used as a predictor of diverse components of psychological development. This undermines the ability to identify the specific features of relational experience that are most influential to the behavioral differences associated with the security of attachment, such as emotion regulation. On the other hand, if the different features of relational experience associated with secure attachment—sensitive responding, elaborative emotion-related discourse, validation of the child's feelings, emotion coaching—have been independently confirmed as positive influences on the development of emotion regulation, then their combined influence in the context of a secure attachment may be theoretically informative. Developing competence in emotion regulation is a multifaceted, multilevel process involving responsiveness to children's emotional expressions, guidance of children's representations of emotion and its management, constructive practical assistance in managing emotions, and other processes that affect the biological and psychological dimensions of emotion and its regulation.

The studies of emotion regulation and attachment also illustrate the multilevel influences of relational experience on emotional reactivity and its management, which range from the effects of caregiver responsiveness on biological stress regulation to the effects of parent-child conversation on representations of emotion. To some attachment researchers, differences in attachment security are primarily differences in the relational management of emotion. In light of this, it is striking how little is known about the representational, biological, and behavioral characteristics of children in the three insecure groups relative to emotion regulation. To even the casual observer of infants or preschoolers in the Strange Situation, these differences in emotion and its management between the insecure groups are striking, and they constitute fertile ground for further research into the development of emotion regulation. Such work would be especially informative for understanding how relational experience defines the socioemotional context to which skills of emotion regulation become adapted.

Emotion Regulation and Behavioral Competence

Research on the development of emotion regulation is motivated by the view that it contributes to social competence, emotional adjustment, and even cognitive functioning. From this perspective, self-regulatory processes help to ensure that emotional arousal—which has the potential to undermine behavioral organization—is enlisted effectively into the child's ongoing transactions, and to avoid

problems such as aggression and social withdrawal that are associated with emotional dysregulation.

Yet the foregoing analysis shows that competence in emotion regulation is also context specific. Well-regulated Tamang children acknowledge feeling shame rather than anger, while Brahman children respond in the opposite manner to similar circumstances, and children in the United States seek ways to express their anger acceptably (Cole et al., 2002). Children understand that some ways of responding emotionally may be more appropriate when parents are present than with peers (Thompson & Waters, 2010). Children who are maltreated maintain heightened vigilance for signs of adult anger that may foreshadow further abuse, and thus have a lower threshold for distress (Pollak, 2008). Although some approaches to managing emotion improve the chances for constructive behavioral outcomes, these and other findings caution that strategies of emotion regulation are rarely inherently optimal or maladaptive. They contribute to behavioral competence in the contexts in which they develop, consistent with a developmental systems perspective. They may or may not function comparably in other contexts.

Further evidence for this view comes from studies of children at risk for affective disorders. Young children with a genetic vulnerability to anxiety disorders show hyper-vigilance in situations associated with fearful events, attentional orienting to anxiety-provoking stimuli, and a tendency to construe benign situations as disproportionately threatening (Fox, Henderson, Marshall, Nichols, & Ghera, 2005). These appraisal and preappraisal processes develop to accomplish the immediate goal of avoiding anxiety-provoking events despite their broader dysfunctional consequences. Children in families characterized by frequent marital conflict engage in strategies to preserve a sense of security in their parents' relationship but which also render them more vulnerable to affective problems. These strategies include trying to mediate, comfort, or pacify parents, aggressing against one or both parents, and maintaining perceptual vigilance to cues of impending conflict, each of which can cost further enmeshment in parental conflict (Davies & Woitach, 2008). In circumstances like these, children's emotion regulatory strategies involve inherent trade-offs that purchase immediate coping at the price of long-term difficulty, and which may ultimately increase rather than diminish their emotional vulnerability. Emotion regulation for these children is a double-edged sword.

This functionalist analysis is sharpened by the recognition that in the contexts in which children seek to manage

the emotions generated by these conditions, there may be multiple goals they are seeking to accomplish with different immediate and long-term consequences. Maintaining vigilance for the angry outburst of a maltreating or maritally conflicted parent helps in preparing for an aversive encounter, but exacts continuing costs to the child's emotional security. Avoiding exposure to adult anger may support a sense of well-being at the cost of unpreparedness. In each case, these self-regulatory strategies are likely to be dysfunctional outside of the contexts in which they develop, contributing to hypersensitivity to threat that can lead to aggressive encounters with peers (Cicchetti & Toth, 1995), difficulties in school adjustment (Sturge-Apple et al., 2008), and other problems. When mothers in an urban working-class neighborhood coached their young children on strategies for expressing anger that would serve them well in challenging situations, the tactics of aggression and intimidation that children learned might have been adaptive in a potentially dangerous neighborhood, but not necessarily in the neighborhood school (P. Miller & Sperry, 1987).

The value of examining emotion regulation within this functionalist context is that it encourages developmental researchers to consider the contextual demands to which self-regulatory strategies are adapted. This is important both for developmental analysis and for research in developmental psychopathology. In each case, broad characterizations of individuals as emotionally dysregulated should be only the beginning of an incisive analysis of the contextual demands to which individuals are responding, the emotion goals to be accomplished by observed self-regulatory strategies, the trade-offs that might be involved in how emotion is managed, and their relevance to other social contexts in which individuals must emotionally function. For developmental study, this kind of analysis can sensitize researchers to the ways that children's emotion goals change with age along with their strategies of emotion management. For developmental psychopathology, this analysis causes researchers to confront whether and how more optimal means of emotion regulation are possible in the circumstances in which these children live.

Interim Conclusion

The development of emotion regulation, whether in typical circumstances or conditions of risk, illustrates the multi-level analysis required of the study of self-regulatory growth. The social ecology, especially conditions of care, affects the development of biological systems of

stress reactivity and regulation depending on whether that ecology is aversive or supportive. In these conditions, children develop representations of their experiences, parental responsiveness, emotion, and the self that contribute to their efforts to manage emotion in ways that are adapted to these life circumstances and their emotion goals. As the research described above indicates, these biological and representational processes are important mediators of the behavioral outcomes that are associated with self-regulatory differences.

Within this multilevel system, furthermore, not just children's representations but also the belief systems of parents are important contributors to the development of emotion regulation because those beliefs are manifested in socialization practices, evaluations of children's emotionality, and their coaching of adaptive self-regulation. Indeed, parents' representations may also be crucial to their social buffering of children's stress that has biological as well as representational consequences. The heuristic value of a parental "meta-emotion philosophy" underscores the importance of the parental beliefs underlying their responsiveness to the child: beliefs about the self and the parenting role, inferences about children's understanding and feelings, cultural values and expectations, representations of the admirable child, and other implicit and explicit beliefs also merit study as influences on developing self-regulation in children.

Finally, the study of emotion regulation highlights the importance of context, which is also important to self-regulation in general. Children develop skills in managing their emotions to accomplish their goals in response to the emotion challenges they face, and how they do so is influenced by whether they are with adults or peers, their socioeconomic and cultural identity, the behavior and values of other family members, as well as individuality in temperament and self-concept. Future study of the development of emotion regulation would benefit from greater attention to the contextual demands to which these skills become adapted, and to children's negotiation of different contexts requiring different goals and skills for self-regulation.

CONCLUSION

The themes of this chapter—developing biology, social representation, emotion regulation, early relationships—are some of the most vigorous research fields of contemporary developmental science, and there is every reason to expect that this will continue. In light of this, a central

goal of this discussion is to underscore how biology, representation, and relationships are interconnected in early development and, in particular, how relationships contribute to self-regulation through their influences on developing biological systems and social representations. This approach to parent-child relationships significantly broadens understanding of the impact of the quality of care on children's development, has important practical applications, and addresses classic theoretical issues in developmental science.

By contrast with some formulations that emphasize children's self-initiated self-regulatory strategies, the term "regulation" is used broadly here to refer to implicit as well as deliberate self-regulatory processes arising from outside as well as within the child. This choice recognizes that long before young children become capably self-regulating, their abilities and dispositions have already been shaped by experiences that affect how they respond to events, how they think about those events, and what they expect will happen when they respond. Considering the development of self-regulation without respect to these influences risks entering the developmental process well after it has begun. It is arguable that such a broad conception of "regulation" encompasses so much that regulation becomes simply one aspect of behavioral functioning, but that is also the point. Regulatory influences are incorporated into behavioral functioning on many levels and in most behavioral and biological domains, and although this means that "unregulated" behavior, biology, or thought is a theoretical fiction, this recognition constrains neither theoretical analysis nor empirical inquiry (cf. Campos, Frankel, & Camras, 2004).

In each section, future research directions have been identified, but several general themes also emerge from this chapter. First, context is missing from many of these research areas, particularly developmental social cognition research, and greater understanding of the influence of the large and narrow social context would complicate theory and enliven research on developing self-regulation. Concerning social-cognitive development especially, it would be valuable for more researchers to consider more deeply the first-person experiences that contribute to the early development of social understanding. The elegant experimental studies of this literature appropriately divorce young children from confounding social influences, but it sometimes appears as if young children are theoretically viewed as inhabiting comparably barren social worlds. Yet the findings from several groups that direct social experiences are important to these social-cognitive advances should spur

more researchers to consider their influence further. Young children inhabit an environment of relationships of affective significance, and it would be astonishing if relational experiences (and variations therein) were not influential to developing generic social-cognitive achievements as well as relationship-specific representations.

Second, researchers need a richer characterization of early relational experience on which to build this understanding of context. Following the discovery of the "competent infant" in the 1970s, students of social development embarked on the intensive study of parent-infant interaction in the first year that informed attachment research, temperament theory, and other fields. There is no comparably rich database concerning parent-child interaction beyond infancy and its relevance to emergent understanding of shared intentionality, collaboration, fairness and reciprocity, prosocial motivation, and other elements of a developing premoral sensibility. Our understanding of relational influences on other constituents of developing self-regulation, such as emotion regulation, is comparably impoverished. What occurs in the structure of social interchange and the nature of social discourse to provide very young children with first-hand experiences that contribute to their developing social representations or their developing skills of emotional control?

Third, culturally informed investigations could potentially be a useful contribution to addressing this question. The most useful culturally comparative studies would be hypothesis-testing efforts that predict variations in children's social-cognitive skills or behavioral outcomes from direct assessments of parent belief systems and study of the organization of everyday social interactions between parents and children. The goal is not simply the documentation of cultural variability but the determination of its meaning in relation to important developmental outcomes, some of which are likely to be species typical. Stated differently, do variations in cultural practices achieve comparable developmental outcomes (perhaps with variations in their timing) or contribute to significantly different outcomes adapted to different social ecologies?

Fourth, there are formidable challenges to future research on the biology of developing self-regulation, including the missing heritability problem, the potential unreliability of small sample studies of genetic influences, and other issues (see Dennis, Buss, & Hastings, 2012, for an overview). If these can be resolved, however, there is hope for the potential yield of further multilevel studies in this area that integrate attention to context (such as poverty and family stress), measurement of biological

reactivity and regulation, developing behavioral outcomes in children, and implications for intervention. Particularly promising are efforts to complement studies of stress reactivity and regulation with stress-buffering influences deriving from relational experience (see, e.g., Hostinar et al., 2013). Such efforts provide further insight into the biological effects of relational experience, and have implications for the design of interventions to strengthen buffers in the experience of children in stressful conditions.

Finally, the research literatures reviewed here are beginning to provide a more multifaceted, multidimensional portrayal of the nature of early parenting. Studies of developing biological systems emphasize the importance of early relationships for buffering stress and moderating adversity and highlight how genotype moderates the nature of these influences. Research on developing social representations suggests that embedded into everyday parent-child interactions are implicit lessons on human agency, intentionality, mutuality, self-other correspondence, and other building blocks for generic social understanding and the development of social expectations. Work in developing emotion regulation draws attention to what caregivers say, how they say it, and the implicit understanding of the child's characteristics and feelings that make conversational discourse meaningful to developing self-regulation. Although much more remains to be understood, as noted earlier, these literatures encourage developmentalists to move beyond global characterizations of parental sensitivity (or aversiveness) to develop theoretical portrayals of why specific parenting practices are important to what early developmental outcomes, and how.

Developmental science has a longstanding (perhaps necessary) habit of parcelling the developing child. Yet building bridges between different orientations to the developmental process has always proven fruitful. Developmental science is on the verge of resolving some of its past conceptual pitfalls and moving toward a biologically dynamic, experience-based understanding of development integrating developing biology, representation, behavior, and relationships. Our capacities as research scientists to see the developing child as a coherent, integrated being underlies our capacities to imagine the developmental process for all of its complexity, scope, and vitality.

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CHAPTER 7

Resilience and Adversity

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Since the 1970s, developmental science has seen incremental increases in research on the construct of resilience: *A dynamic process reflecting positive child adjustment despite significant risk or adversity* (Garmezy, 1971; Luthar & Zigler, 1991; Masten, Best, & Garmezy, 1990; Rutter, 1987; Werner & Smith, 1982; 1992). The 1990s through the 2000s witnessed an eightfold increase in references to resilience in the scholarly literature (Ager, 2013), testifying to its salience in developmental science.

The objectives underlying this chapter are to describe the major developments in the field of resilience across the span of almost six decades. The chapter is organized in four sections, the first one presenting a brief history of work on resilience. In the second section, we describe critical

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features of research on this construct, highlighting definitions of major terms and distinctions between resilience and related constructs (e.g., competence and ego-resiliency); the operationalization and measurement of vulnerability and protective processes; and statistical approaches used to illuminate major risk-modifiers.

In the third section of the chapter, we describe major research findings on vulnerability and protective factors across different at-risk populations. These are discussed in terms of the specific factors found to modify risk within three broad categories, that is, attributes of the family, community, and child. The fourth and final section includes major considerations for future work on resilience among at-risk children and families, including directions for both research and interventions.

HISTORICAL OVERVIEW OF CHILDHOOD RESILIENCE RESEARCH

The roots of resilience research can be traced back to the 1970s, with pioneering research on positive adaptation

among children of schizophrenics. Whereas these children as a group are at high risk for psychopathology, Garmezy and Rutter, along with Anthony and Koupnik, found that a subset of them manifested surprisingly healthy adjustment (for a fuller description of these early studies and citations, please see Luthar & Zigler, 1991; Masten et al., 1990). Their scientific focus on the positive outcomes of these children reflected a substantive departure from the illness-based medical models of the time.

Shortly after, Werner published the first of many reports on a cohort born in Hawaii (Werner & Smith, 1982, 1992), and the 1980s and early 1990s marked substantive changes in conceptualizations of resilience, two of which were especially salient. The first concerned perspectives on the roots of resilience. In early studies, the focus was largely on positive personal qualities of manifestly resilient children, such as autonomy or charisma. As work in the area evolved, however, scientists noted that resilient adaptation often could stem from forces external to the child. Thus, three sets of factors came to be commonly cited as implicated in resilience: attributes of the children themselves, characteristics of their families, and influences from their wider social environments (Garmezy & Masten, 1986; Rutter, 1987; Werner & Smith, 1982).

The second change involved acknowledgement that resilience fluctuates over time, as opposed to being fixed. In some early writings, terms such as “invulnerable” were used for children who functioned well in spite of multiple risks. Recognizing that this risk-evasion was not absolute and unchanging, researchers began to use the more qualified term “resilience” instead. Implicit in this change of labels was cognizance that positive adaptation despite adversity is never permanent; rather, it is a developmental progression, with new strengths and vulnerabilities emerging with shifting life circumstances (Garmezy & Masten, 1986; Werner & Smith, 1992).

A related qualifier was explicit recognition that resilience is never an across-the-board phenomenon, with uniformly positive adjustment across diverse domains. Just as children in general do not manifest consistently positive (or negative) adaptation across different spheres of adjustment, it was clear that at-risk children, too, could display remarkable strengths in some areas while showing significant deficits in others (Luthar, Doernberger, & Zigler, 1993). Most important, children under stress could appear resilient in terms of their behaviors while still experiencing considerable covert distress in the form of depression or anxiety (Farber & Egeland, 1987; Luthar, 1991). Recognizing such variability in adjustment levels across

domains, researchers now tend to use more specific terms that indicate the domains of manifest resilience, referring, for example, to academic resilience (Obradović et al., 2009), emotional resilience (Jain, Buka, Subramanian, & Molnar, 2012), or external (behavioral) resilience (Yates & Grey, 2012).

RESEARCH ON RESILIENCE: CENTRAL CONSTRUCTS

Reviews of research on resilience reflect converging definitions of the core constructs within this area (see Cicchetti, 2013; Luthar, Cicchetti, & Becker, 2000; Masten & Narayan, 2012; Rutter, 2012; Ungar, Ghazinour, & Richter, 2013; Vanderbilt-Adriance & Shaw, 2008): resilience, adversity, and positive adaptation. As noted at the outset of this chapter, resilience is a phenomenon or process reflecting relatively positive adaptation despite significant adversity or trauma. Because it is a superordinate construct subsuming two distinct dimensions—*adversity* and *positive adaptation*—resilience is never directly measured, but instead is indirectly inferred based on evidence of the two subsumed constructs.

Adversity, in developmental science research on resilience, is defined in terms of statistical probabilities: A high-risk condition is one that carries high odds for measured maladjustment in critical domains. Exposure to maternal depression or community violence, for example, constitutes high risk because children experiencing each of these manifest significantly greater maladjustment than those who do not. Aside from discrete risk dimensions such as parent psychopathology, researchers have also examined composites of multiple risk indices, such as parents’ low income and education, histories of mental illness, and disorganization in neighborhoods (Sameroff, Seifer, Zax, & Barcas, 1987). When risks such as these coexist (as they often do, in the real world), effects tend to be synergistic, with child outcomes being far poorer than when any of these risks exists in isolation.

Positive adaptation, the second component in the construct of resilience, refers to adjustment that is much better than what would be expected, given exposure to the risk condition under study. In studies of resilience in childhood, this construct is most commonly operationalized in terms of behaviorally manifested social competence, or success at meeting stage-salient developmental tasks (Luthar, 2006; Masten & Tellegen, 2012). To illustrate, competence is often operationally defined in terms of observed secure

attachment behaviors among young children, and in terms of positive relationships with peers and teachers, as well as good academic grades, among older children and adolescents.

In addition to being developmentally appropriate, indicators used to operationalize “positive adaptation” must be of high conceptual relevance to the particular risk condition examined, in terms of both domains assessed, and stringency of criteria used. When communities carry many risks for antisocial problems, for example, it is logical to assess children’s maintenance of socially conforming behaviors (Jain et al., 2012), whereas among offspring of depressed parents, the absence of depressive problems would be of special significance (Beardslee, Gladstone, & O’Connor, 2012). With regard to stringency of criteria, similarly, decisions must depend on the seriousness of the risks being studied. In research on children facing major traumas, it is appropriate to define risk-evasion in terms of the absence of serious psychopathology rather than excellence in everyday adaptation (Luthar et al., 2000; Rutter, 2012). Finally, positive child adaptation must be considered across multiple adjustment spheres; overly narrow foci on particular behaviors can be misleading in suggesting that risk-evasion has in fact occurred.

In some instances, competence is most appropriately operationalized in terms of better-than-expected functioning of families or communities, rather than of the children themselves. Toddlers, for example, are still too young to be judged as reliably manifesting resilience because their functioning is largely regulated by caregivers; it makes more sense, therefore, to operationalize positive adjustment in terms of the parent-child dyad or family unit. In parallel, the label of “resilience” can be most appropriate for communities of at-risk youth who are functioning well. To illustrate, some low-income urban neighborhoods reflect far higher levels of organization, cohesiveness, and social efficacy than do others (Jain et al., 2012), with the potential, therefore, to minimize the negative effects of poverty on children.

Given that positive adaptation fluctuates over time rather than being immutably fixed, an important area of resilience research concerns those who “bounce back” from earlier dysfunction. Long-term prospective studies have been invaluable in identifying critical turning points not just in childhood and adolescence, but also later in adulthood, illuminating instances where negative adjustment trajectories were transformed into positive, healthy ones (Hauser, Allen, & Golden, 2006; Laub & Sampson, 2003; Vaillant, 2012; Werner & Smith, 1992).

Competence and ego-resiliency are two constructs that are each related to resilience, but differ in substantive ways. Competence and resilience both represent positive adaptation, but there are four major differences. First, resilience presupposes risk but competence does not. Second, resilience encompasses both positive and negative adjustment indices (presence of health and absence of disorder), whereas competence reflects the former. Third, resilient adaptation is defined in terms of both behavioral and emotional indices, whereas competence typically involves only manifest, observable behaviors. Finally, resilience is a superordinate construct that subsumes dimensions of competence (along with exposure to risk).

Ego-resiliency is a personal trait reflecting general resourcefulness, sturdiness of character, and flexibility in response to environmental circumstances (Block & Block, 1980); like resilience, this involves positive adaptation. Differences are that (a) only resilience presupposes conditions of adversity and (b) resilience is not a personality trait, but is a process or phenomenon. Finally, just as competence is subsumed within the definition of resilience, ego-resiliency is among the personal attributes that can foster resilient adaptation, mitigating the negative effects of stressful life experiences (e.g., Cicchetti & Rogosch, 2007).

It is critical that scientists proactively guard against suggestions that resilience is a personal trait, as this can foster perspectives that blame the victim (Luthar & Brown, 2007; Ungar, 2013). Toward this end, several precautions have been noted (Luthar et al., 2000). Most important, all reports must include clear definitions of resilience, unequivocally clarifying that this refers to a process or phenomenon and *not* a trait. Second, it is preferable to avoid using the term *resiliency*, which carries the connotation of a personal attribute even more so than does *resilience*. Furthermore, it is best to avoid using the term resilient as an adjective for children and apply it instead to trajectories or profiles, because phrases such as “resilient adaptation” carry no implication of who (the child or others) might be responsible for manifest risk-evasion.

Vulnerability and Protective Processes: Operationalization and Measurement

The central objective of resilience researchers is to identify *vulnerability* and *protective factors* that might *modify* the negative effects of adverse life circumstances, and then, to identify *mechanisms* or *processes* that might underlie associations found. Vulnerability factors or markers are indices that exacerbate the negative effects of the adverse condition

(e.g., poverty) on children, such as parent mental illness or alienation from peers. Promotive or protective factors are assets that modify the effects of risk in a positive direction, such as support from informal mentors and good coping skills.

Quantitative studies of resilience have entailed two major statistical approaches in identifying protective or vulnerability factors (risk-modifiers), that is, variable-based and person-based analyses. Variable-based analyses such as multivariate regressions allow researchers to look at how adjustment is predicted by continuous scales of risk-modifiers and risk indices, examining how the former are directly related to outcomes (as main effects), and in interaction effects with the latter. An early illustration of this variable-based approach was the ground-breaking paper by Garmezy, Masten, and Tellegen (1984), in which high IQ was shown to be protective: Intelligent children seemed to be far less affected by increasing levels of life stress than did their low-IQ counterparts. Person-based analyses in resilience research, by contrast, involve comparisons between groups categorized according to their risk exposure and adjustment profiles. For example, comparisons of two groups of risk-exposed youth, manifesting positive and negative adjustment respectively, can illuminate critical factors that protect against adversity.

In variable and person-based analyses, a hallmark of the current generation of resilience research is attention to underlying processes; this is essential for guiding effective interventions. In working with at-risk groups of children, it is far more prudent to promote positive adjustment early in development than to treat disorders after they have already crystallized, and knowledge of processes potent in specific at-risk circumstances can be critical in pinpointing issues that most urgently warrant attention. To illustrate, maternal depression can affect children through various environmental processes including high family conflict, children's modeling of ineffective coping styles, and negative parenting behaviors ranging from inattentiveness to enmeshment (Valdez, Mills, Barrueco, Leis, & Riley, 2011). With regard to protective processes, similarly, supportive relationships with caregivers can benefit children through multiple pathways, including feelings of being cherished as an individual and a strong set of personal values (Werner & Smith, 1992).

Interpreting Findings: Main Effects and Interaction Terms

In variable-based analyses, a complication with interpretation has to do with whether significant main effect

associations imply that low levels of the hypothesized asset imply unusually poor adjustment, that high levels imply excellence in functioning, or both. There are, admittedly, a few "pure" vulnerability indices that can only create disorder when present but not excellence when absent, such as child maltreatment, whereas others can be beneficial when present without conferring vulnerability when absent, such as artistic or musical talents. Many, if not most, indices, however, are bipolar in nature, with the potential for effects at both extremes. For example, a significant main effect involving social skills could imply either that high levels lead to exceptional competence (protection), or that low levels lead children to unusual maladjustment (vulnerability).

Although researchers have often used these terms interchangeably, choosing somewhat arbitrarily between labels of vulnerability or protection for such "bipolar" variables, it can be useful to examine the distribution of scores to guide choices in this regard (see Luthar & Latendresse, 2005). To continue with the same example, this could be done by demarcating, for interpretive purposes, groups that are high and low on social skills (e.g., defined by the top and bottom tertiles). Depending on the degree to which the mean competence scores of these two groups each deviate from the sample mean, this could illuminate whether low social skills connote significant vulnerability (with competence scores much poorer than average), or whether high social skills reflect protection (competence well above the sample average). A more statistically sophisticated method to address issues such as this has been elucidated by Roisman and colleagues (2012). These authors suggest that researchers apply a Regions of Significance (RoS) test (Dearing & Hamilton, 2006) to determine if Y (the outcome variable) and Z (the risk-modifier) are correlated both at the high and low ends of the distribution of X (levels of stress), bounded by a conventional range of interest that is $+2$ standard deviations from the mean of X .

Although there has been some lack of clarity about main effect findings, there has, historically, been more confusion about interaction effects, wherein, for example, the presence of a particular attribute (e.g., peer support) conferred stable, adaptive functioning despite increasing stress, whereas low levels of this variable connote maladjustment. In the 1980s and 1990s, such interaction effects were viewed as being at the crux of research on resilience, sometimes emphasized as more important for inferring protection than were direct, main effects (see Luthar et al., 2000).

At this time, however, there is consensus that researchers are centrally concerned with illuminating constructs that

distinguish between well- and poorly functioning youth *within* a given risk condition, and with substantial effect sizes (what occurs in the absence of risk is not of central concern). Interaction terms typically have very small effect sizes and thus are notoriously unstable, and when researchers include multiple interaction terms in predictive models, this can greatly constrain the detection of potentially important *main effect* links, due to a loss of degrees of freedom in statistical models (Luthar et al., 2000).

VULNERABILITY AND PROTECTIVE PROCESSES: SUMMARIZING EXTANT EVIDENCE

This section of the chapter encompasses major findings from over 60 years of research on resilience. While describing the forces that modify effects of high-risk life circumstances, we discuss the categories of risk-modifiers in order of relative salience in conferring positive adaptation despite risk exposure. Resilience researchers have been criticized for producing lists of sundry protective and vulnerability factors (see Luthar et al., 2000); such lists are of limited practical value because all items (ranging from parents' intelligence, to neighborhood safety, to children's social skills) can never be addressed in a given intervention. From a pragmatic standpoint, therefore, what is needed is conceptual prioritization of domains in terms of overall likelihood of yielding substantial benefits.

Accordingly, organization of this section is based on the following considerations. In general, primacy in discussions is given to the most *influential* risk-modifiers, that is, those whose effects are relatively enduring, robust, or hard to overcome by others. Second, more emphasis is placed on *modifiable modifiers*. Whereas personal characteristics like gender or race certainly can affect outcomes, these are afforded less prominence than are those that are more amenable to change, such as parental discipline or teacher support. Third, we prioritize constructs that are *broadly deterministic*, that is, those with high potential to generate other assets (or vulnerabilities, as the case may be), in what Rutter (1987) called "chain reactions."

With these considerations in mind, our discussions focus, in sequence, on vulnerability and protective forces in the domains of the family, the community, and the children themselves (see Luthar, 2006). The family is not only the most proximal of children's external environments but also the most enduring; it is logical, therefore, to focus first on families in the triad of influences. The community,

in turn, affects children both directly as well as indirectly through their parents, so that modifying aspects of the wider environment can have benefits through both routes. With regard to children's own attributes, these obviously do play a major role in resilient adaptation, but many "child attributes" (such as self-efficacy or even intelligence) are themselves shaped by forces in the environment (Hanson & Gottesman, 2012; Luthar, 2006; Ungar, 2012). These are therefore discussed third in the sequence.

Rather than describing findings of individual studies in the research literature, our emphasis, in this section, is on summarizing major themes that have emerged regarding salient vulnerability and protective processes with selected investigations described for illustrative purposes. Along with empirical evidence on the three sets of risk-modifiers, relevant evidence from intervention efforts is also considered; data from interventions can provide valuable lessons for science by showing, for example, whether targeting hypothesized protective factors does in fact predicate resilient adaptation (Cicchetti & Hinshaw, 2002; Luthar & Cicchetti, 2000).

Family Relationships

As the key context for early development, the family environment has been the focus of much of the literature on resilience. In this section, we begin by addressing findings on resilience in the face of an especially potent vulnerability familial factor, maltreatment by caregivers. Following this, we review evidence on protective family processes, with particular attention to malleable aspects of relationships that hold the strongest implications for future interventions.

Effects of Maltreatment

Of the many processes that affect the adjustment of at-risk children, among the most powerful is maltreatment by primary caregivers. Maltreatment co-occurs with many high-risk circumstances including poverty, community violence, parental conflict, and parent mental illness (Cicchetti & Toth, Chapter 13, this *Handbook*, this volume), thus operating as a rampant vulnerability factor. Maltreated children show deficits spanning multiple domains, with functioning disrupted in interrelated areas over time; this is unsurprising, as maltreatment entails serious perturbations in the most proximal level of the child's environment (for a full discussion of the developmental impact of maltreatment, see Cicchetti & Toth, Chapter 13, this *Handbook*, this volume).

Long-term, multidomain resilience is rare among maltreated children—as seen in diverse adult health problems linked with child maltreatment (Felitti & Anda, 2010)—but profiles of adjustment are, obviously, not homogeneous (Cicchetti, 2013). Forces that can mitigate vulnerability to some degree include positive relationships with others. As will be described fully later, good quality of caregiving is the single most robust of protective factors for children exposed to various adversities, so that positive relationships with alternate caregivers could serve protective functions for maltreated youth (Lawler, Shaver, & Goodman, 2011). Unfortunately, experiences of maltreatment also thwart access to these potentially beneficial influences, as maltreated youth struggle more than others to establish close relationships with alternative adult caregivers (Cicchetti, 2013). Furthermore, the protective function of social support can vary with the seriousness of maltreatment, with buffering effects diminishing, for example, with increases in the number of maltreatment subtypes experienced and chronicity across developmental periods over time (Cicchetti, 2013).

Beyond caregiver-child bonds, support from other relationships may be protective. Potential in this regard is seen in Bolger and Patterson's (2003) longitudinal research showing that among chronically maltreated children, having a positive, reciprocal friendship was associated with an increase in self-esteem over time. Mediating processes implicated might include improved social skills, changes in working models of attachment, increases in perceived acceptance, and decreases in felt loneliness.

Personality factors can also make a difference. Cicchetti and Rogosch (2007) found that ego-resiliency and ego-overcontrol predicted relatively competent functioning in maltreated children, as Bolger and Patterson (2003) found that maltreated children with higher internal locus of control manifested lower levels of symptoms than others. As with access to alternative supportive caregivers, however, the experience of maltreatment also compromises the very personal attributes that could confer protection. As Cicchetti (2013) has noted, maltreated children as a group show many deficits in emotional regulation, either showing excessive amounts of negative affect or blunted affect with little positive or negative emotion. Given their difficulty in effectively modulating physiological arousal, they also have trouble coping with emotionally stressful situations, particularly in the case of early-onset maltreatment. In summary, then, repeated developmental disruptions of a maltreating environment not only directly increase risk for maladjustment, but, in addition, work against positive

attributes that could have served protective functions (see Cicchetti & Toth, Chapter 13, this *Handbook*, this volume).

Acknowledging the breadth of processes affected, there have been calls for multilevel examinations of social-ecological pathways affecting outcomes among maltreated children (see Luthar & Brown, 2007). For example, Ungar (2013) has argued that for children who have been maltreated, individual attributes will be protective to the extent that they enable engagement with available resources, from community and mental health services, to features of the physical environment. In this case, analyses that consider the quality and availability of resources and services, alongside children's individual characteristics, may provide a more nuanced understanding of variations in adaptation among samples of maltreated children.

Protective Family Forces: Attachment, Nurturance, and Support

Whereas maltreatment is pernicious, child abuse is obviously not inevitable among families facing major life adversities, and positive relationships with adults can be powerful in promoting resilience among children confronting diverse risks. The critical importance of strong family relationships has long been emphasized by child development theorists from diverse perspectives. This theme is at the core of classic psychodynamic perspectives ranging from Freud's stages of psychosexual development and Mahler's notion of human symbiosis to Bowlby's attachment theory and Erikson's emphasis on trust versus mistrust. Besides psychodynamic viewpoints, Havighurst's earliest developmental tasks—learning to walk, talk, and relate age-appropriately to others—presuppose the presence of an attentive adult to foster mastery of these tasks. Similarly, learning theorists such as Bandura and Skinner emphasized the power of parents' reinforcement patterns as well as modeling behaviors in shaping the child's personality.

Consistent with these classic theories of child development, the earliest studies of resilience established that the presence of a close relationship with at least one parent figure was highly protective across a range of risks, ranging from chronic family poverty and early institutionalization to serious parent mental illness and multiple coexisting adversities (for summaries, see Luthar & Zigler, 1991; Masten et al., 1990). Recurrent reviews of the literature, similarly, have consistently pointed to responsive and supportive parenting as being the single most robust predictor of resilient adaptation in the face of diverse adversities

(Crnic & Neece, Chapter 8, this *Handbook*, this volume; Luthar & Brown, 2007; Masten, 2011; Vanderbilt-Adriance & Shaw, 2008).

Particularly important in shaping long-term resilient trajectories are early family relationships. In Shonkoff and colleagues' (2012) call to action to combat toxic stress in early childhood (with its long-term effects on the individual's stress response system), nurturing relationships with significant adults are afforded top priority, listed beside children's most basic needs for survival including adequate nutrition and safe physical environments. The critical role of early relationships is seen in longitudinal evidence that early experience places people on probabilistic trajectories of relatively good or poor adaptation, shaping the lens through which they view subsequent relationships, as well as their capacities to utilize support resources in the environment (Sroufe, Coffino, & Carlson, 2010). Thus, when early attachments are insecure in nature, at-risk children come to anticipate negative reactions from others and can eventually elicit these; experiences of rejection, in turn, further increase feelings of insecurity. Conversely, at-risk children with at least one positive relationship are able to draw upon nurturant others with whom they interact subsequently in development (Shonkoff & Phillips, 2000; Sroufe et al., 2010).

Biological research has also pointed to sensitive periods in early attachments. Across various animal species, separation from the mother after birth can lead to permanent changes in neurochemistry, endocrine responsivity, and problem behaviors (for a summary, see Luthar & Brown, 2007). Powerful evidence in this regard is seen in studies with rhesus monkeys by Suomi and his colleagues (see Suomi, 2006). After an initial month in a neonatal nursery, these monkeys were raised for 6 months away from their biological mothers, but in the presence of three to four other infants. These peer-only raised monkeys came to display several maladaptive behaviors including greater aggression, greater consumption of alcohol during "happy hour" situations, and greater biological stress reactivity (Suomi, 2006).

In humans, Gunnar and her colleagues have demonstrated that secure attachments to caregivers can prevent elevations of stress hormones in situations that typically elicit distress in infants (see Gunnar, Doorn, & Esposito, Chapter 4, this *Handbook*, this volume). In contrast, children with insecure attachments usually react to threatening situations with increased levels of the stress hormone, cortisol. Reviewing research on the ontogeny of the stress system, comprising the limbic-hypothalamic-pituitary-

adrenocortical (L-HPA) and sympathetic-adrenomedullary (SAM) systems, Gunnar and Quevedo (2007) concluded that (a) individual differences in the regulation and reactivity of both systems are related not only to temperamental characteristics but also to quality of caregiving, and importantly, that (b) the impact of the former may indeed be best understood in the context of the latter.

Among older children as well, competent parenting plays a critical role in promoting child well-being over and above the effects of contextual factors such as family poverty (Werner & Smith, 1982, 1992). Adolescent perceptions of maternal warmth, for example, are related to diverse positive outcomes including better personal adjustment and academic achievement (Suizzo et al., 2012; Walton & Flouri, 2010).

Even when risk factors stem from within the family—as when one parent has a mental illness—a strong relationship with the other parent can be substantially protective. In families affected by parental depression, for instance, Beardslee (2002) underscored the importance of strong, supportive relationships with at least one parent for resilient adaptation. Similarly, Edwards, Eiden, and Leonard (2006) found that, among young children of alcoholic fathers, a secure attachment to mothers could protect against the development of externalizing symptoms, and in a longitudinal sample of children of alcoholics, Werner and Johnson (2004) reported that the presence of a supportive, nonalcoholic mother was a critical protective factor among those who functioned well in young adulthood.

The protective potential of strong relationships has been demonstrated not only for mothers but also for fathers and father-figures. In low-income, African American families, warm, stimulating paternal behavior during early childhood was found to benefit children's academic skills in middle childhood, irrespective of whether fathers lived with their children, and independent of maternal characteristics (Coley, Lewin-Bizen & Carrano, 2011). In the Iowa Youth and Families Project, strong emotional ties to fathers were associated with resilient adaptation among youth, whereas their absence contributed to vulnerability (Elder & Conger, 2000). Indirect effects of nonresident fathers' involvement have also been shown, predicting to fewer child behavior problems via improvements in the mother's parenting, and the quality of mother-father interactions (Choi & Jackson, 2011).

Whereas close involvement with fathers can yield several benefits, it has also been found, in some cases, to be linked with relatively poor child outcomes (see Coley, 2001). Negative effects may derive from elevated conflict

between highly involved fathers and mothers, resulting, for example, from disagreements about disciplinary practices for their young children. Additionally, problem behaviors in some children of highly involved low-socioeconomic status (SES) fathers may stem from exposure to high levels of paternal antisocial behaviors (Coley, Carrano, & Lewin-Bizan, 2011). As Carlson and Magnuson (2011) note, there remains a need for more studies on the impact of low-income fathers in particular, with careful consideration of the many contextual variations in which fathering takes place (e.g., according to culture, ethnicity, child age and gender, and family living arrangements). In parallel, Luthar, Barkin, and Crossman (2013) underscore the need for more research on fathers in upper-middle-class families, given their high-stress, demanding careers and frequent absences from the home and family.

Still insufficiently explored are the benefits—or in some cases, the costs—of “social fathering” a phenomenon common in low-income, ethnic minority groups wherein men other than biological fathers fulfill the father-figure role (Coley, 2001). At this time, the existing literature on social fathering appears inconclusive, with some studies showing benefits for children, and others reporting outcomes that are no better than for children living in single-parent families (Carlson & Magnuson, 2011).

Apart from parents, siblings can also help modify the effects of high-risk circumstances. In research on rural African American families, older siblings’ competent behaviors at school were linked with increases in younger siblings’ competence over time, through the intervening variable of younger siblings’ self-regulation (Brody, 2004). By the same token, siblings can exacerbate vulnerability within at-risk families. This might occur through bullying, through modeling of negative behaviors that are emulated by younger siblings, or through mutual collusion to undermine adult caregivers (Bullock & Dishion, 2002; Fosco, Stormshak, Dishion, & Winter, 2012).

A potentially critical source of support to at-risk children lies in extended kin, with the beneficial effects occurring, directly as well as indirectly, via their parents’ adjustment (Elder & Conger, 2000). Grandmother involvement in childrearing, in particular, can serve critical buffering functions for children, moderating against the negative effects of mothers’ depressive problems and their harsh parenting behaviors (Barnett, Scaramella, Neppl, Ontai, & Conger, 2010; Silverstein & Ruiz, 2006). Indirect effects are evident in findings that kin support can bolster parents’ feelings of well-being and competence, as well as their positive parenting behaviors and involvement in

children’s schools, benefits which in turn, lead to positive child adaptation (Oberlander, Black, & Starr, 2007; Parent, Jones, Forehand, Cuellar, & Shoulberg, 2013).

Can Subsequent Good Relationships Compensate for Lack of Parental Nurturance?

Early relationships are critical in shaping the lens through which people view their subsequent interactions, but “faulty lenses” can be corrected to some degree. As noted earlier, developmental psychopathologists contend that there is generally continuity and coherence in development, such that positive adaptation in the early years predicts, in probabilistic rather than deterministic fashion, likely success at later stages (Sroufe et al., 2010). At the same time, lawful discontinuities often do occur and in the context of attachment status, these changes derive from alterations in the caregiving environment (Aikins, Howes, & Hamilton, 2009; Van Ryzin, Carlson, & Sroufe, 2011).

Such lawful discontinuities are exemplified by findings that children show shifts from secure to insecure patterns if the availability of the parent becomes reduced because of circumstances such as chronic mental or physical illness, or life events such as divorce (Moss, Cyr, Bureau, Tarabulsky & Dubois-Comtois, 2005; Pinquart, Feussner, & Ahnert, 2013). In longitudinal research, preschool children who moved from a secure classification at Age 3, to disorganization at Age 5, were more likely to have experienced decreases in the quality of mother-child interactions as well as negative family events such as the hospitalization of parents (Moss et al., 2005). Similar effects were found in prospective research spanning infancy through late adolescence. Individuals’ insecure attachment at the age of 19 years was not related to insecure status at 1 year, but it was related to more frequent maternal reports of high life stress, and lower-quality observed family interactions in early adolescence (Weinfield, Whaley, & Egeland, 2004).

In parallel, lawful discontinuities in shifts from insecure to secure attachment status occur with improvements in the primary caregiver’s well-being. A study of low-income rural children revealed that nearly half of those who were classified as insecure at 15 months were securely attached by the age of 4, changes that were associated with factors such as stability of primary caregiver and higher maternal social support (Fish, 2004). Similarly, among low-income children with insecure and avoidant patterns of early attachment, several came to show secure attachments by adulthood, manifesting close relationships with romantic partners and good parenting behaviors themselves

(Roisman, Padrón, Sroufe, & Egeland, 2002). Again, changes in attachment status were seen as deriving from positive experiences with caregivers through the later childhood and adolescent years.

Intervention studies provide consistent evidence that attachment status can be responsive to improvements in caregiving. Among mothers and children in maltreating families, positive changes in attachment status have been achieved via home-based interventions that are based on psychoeducational and psychotherapeutic frameworks, targeting improvements in maternal sensitivity (see Cicchetti & Toth, Chapter 13, this *Handbook*, this volume). Similar benefits have been seen following interventions for low-income families (Heinicke, Rineiman, Ponce, & Guthrie, 2001), and for young children of depressed mothers (Cicchetti & Toth, Chapter 13, this *Handbook*, this volume).

Consistent evidence is seen among children who received good quality foster care experiences following significant early disruptions in relationships with caregivers. Dozier and her colleagues have shown that insecure early attachments were somewhat remediated among children by intervention services and foster caregivers' positive qualities, including responsiveness, nurturance and their own attachment states of mind (Dozier, Albus, Fisher, & Sepulveda, 2002).

The ameliorative potential of strong relationships is not restricted to childhood, as seen in long-term prospective studies. Rutter (1987) showed that, among women who had been institutionalized as young children, those who had good marital relationships as adults—characterized by harmony and a warm, supportive spouse—fared much better than others in the quality of their own parenting behaviors. Similarly, among delinquent adolescent boys followed through the age of 70 years, Laub and Sampson (2003) found that changes in rates of crime over time were strongly linked with adult transitions to marriage, with this variable alone explaining as much as a 40% reduction in rates of crime (see also Vaillant, 2012). Similar reversals of negative trajectories have been associated with enrollment in the army (and with relocation out of high-crime, low-income neighborhoods), ostensibly deriving from the structure and positive socializing influences in the new social contexts (Laub & Sampson, 2003; Ludwig et al., 2012; Werner & Smith, 1992).

Obviously, the reversibility of early insecure attachments depends on the duration and severity of early deprivation, as seen in longitudinal research on children adopted into UK families following early severe deprivation in

Romanian orphanages. At Age 6, dose-response associations were found between length and intensity of early deprivation and psychological functioning, but this relationship weakened somewhat by Age 11, suggesting the reversibility of early attachment problems (Rutter, Sonuga-Barke, & Castle, 2010). Research by Gunnar and colleagues (see Gunnar, Doorn, & Esposito, Chapter 4, this *Handbook*, this volume) has shown similar dose-response effects with levels of the stress hormone, cortisol, as the outcome of interest. A meta-analysis of attachment patterns in adopted children (van den Dries, Juffer, van IJzendoorn, & Bakermans-Kranenburg, 2009) showed a trend for those adopted before the age of 12 months to be as securely attached as nonadopted children, while those adopted at older ages were less likely than comparison peers to be securely attached.

Over a longer developmental period, dose-response associations are evident in findings on ramifications of family climate during early childhood, middle childhood, and early adolescence, for intergenerational relationships between participants at Age 26 years and their parents (Belsky, Jaffee, Hsieh, & Silva, 2001). Results showed that unsupportive childrearing during one of the three developmental periods could be offset if family relations in the other two periods were relatively supportive. Such amelioration was not found if two of the three periods reflected disruptions.

It is unclear, however, whether the required potency of "corrective" nurturing relationships is comparable to that experienced by well-functioning individuals who did not face early deprivation. In a study comparing children who were adopted from international institutions to those who were raised by their biological parents, researchers found that caregiver emotional availability at 18 months benefited emotional understanding and indiscriminant friendliness at 30 months for postinstitutionalized children, suggesting that emotional availability potentially moderates the ill-effects of early deprivation (Garvin, Tarullo, Van Ryzin, & Gunnar, 2012). At the same time, parents of these adopted children tended to be less structured and more intrusive in their care, indicating that "parents of children adopted from conditions of deprivation may need to provide even more supportive care than is needed for nondeprived children in order to enhance their social development" (Garvin et al., 2012, p. 46).

In parallel, it is not clear that positive adoptive environments entirely expunge the ill-effects of early disturbances in attachment. Among the previously mentioned children in Romanian orphanages, Rutter and colleagues (2010)

found that, at the age of 6 years, most showed social and cognitive functioning in the normal range after being adopted into British families. Follow-up assessments, however, revealed that a substantial minority manifested major persistent deficits, both at 6 and 11 years old. Persisting psychological problems in this subgroup were interpreted as suggesting some form of early biological programming or neural damage stemming from severe institutional deprivation (Rutter et al., 2010). Similarly, among adults with secure attachments in current partner relationships, those who had insecure attachment representations based on early relationships were more reactive to stress than were those who had secure attachments in their early relationships as well (Treboux, Crowell, & Waters, 2004).

Protective Parenting: Discipline and Monitoring

Aside from dimensions of attachment and warmth, another broad parenting construct critical for resilient adaptation falls in the broad domain of discipline: limit-setting and monitoring. Limit-setting—which refers to the use of appropriate rules and expectations and consistent rule-enforcement—is critical in shaping future compliance and socially desirable behavior in children (Schneider, Cavell, & Hughes, 2003).

When discipline is inappropriately harsh, this exacerbates vulnerability to maladaptive behaviors. Patterson's Social Coercion Theory (Patterson, Reid, & Dishion, 1992) maintains that if parents typically respond to young children's annoying behaviors in ways that are based on power assertion, children tend to escalate their own aversive behaviors in attempts to control the parents. Thus, the frequent use of physical discipline leads children to become more noncompliant and hostile, and as the children's aversive behaviors increase in intensity and frequency, parents sometimes acquiesce, thereby reinforcing the maladaptive behaviors.

Strong support for Patterson's coercion theory is seen in Shaw and colleagues' Pitt Mother-Child Project (PMCP; Shaw, Bell, & Gilliom, 2000), involving 310 low-income families with boys first assessed at 18 months, and tracked until Age 17. The researchers postulated that when mothers were unresponsive to infants' continued bids for attention, this would lead to later coercive exchanges between mother and child by Age 2, which in turn would be linked with elevated risk for externalizing behavior problems. Results at 3 years of age were consistent with expectations (Shaw et al., 2000), and subsequent follow-up research pointed to long-term detrimental effects. Unresponsive patterns of parenting documented during early childhood were

associated with juvenile court involvement and increased risk for clinical depression during the boys' adolescent years (Shaw, Hyde, & Brennan, 2012).

In other studies, the focus has been not on maternal unresponsiveness, but on hostility. Noting toddlers' tendencies to evoke frustration from caregivers (e.g., because of their increase in mobility and assertion of "independence"), a critical developmental task for mothers is the maintenance of a nonhostile, relatively positive approach while shaping their children's behaviors. Negative mother-child interactions during toddlerhood, as well as maternal hostility and frustration, were significantly associated with conduct problems at 5 to 6 years of age (Lorber & Egeland, 2011). Similarly, assessments of the PMCP cohort between the ages of 10 and 15 years showed that mother-reported physical discipline in a given year predicted child ratings of antisocial behavior in the next year (Lansford et al., 2011). When such rejecting, overcontrolling behaviors reflect a general parenting approach, children show escalated risk for conduct problems not only at home but also at school, with such effects documented during the preteen years and adolescence (Shaw et al., 2012).

Interpretation of hostile parenting (in the form of verbal and physical discipline) is based somewhat in cultural context, and can vary by gender (Evans, Simons, & Simons, 2012). In a study of 10-year-olds and their mothers from China, India, the Philippines, and Thailand, Lansford and colleagues (2010) demonstrated that the effects of harsh verbal discipline by mothers were more severe when children viewed these behaviors as nonnormative, as opposed to normative, within their own cultural contexts.

Related to limit-setting and also important for resilience is parental monitoring, a "set of correlated parenting behaviors involving attention to and tracking of the child's whereabouts, activities, and adaptations" (Dishion & McMahon, 1998, p. 61). The benefits of consistent parental monitoring are particularly pronounced among preadolescents and adolescents, who have increasing independence from parents, and thus growing exposure to a host of risks in the peer and community environments. Studies have shown that when their parents tend to know of their daily activities and associations, adolescents are less likely to engage in delinquent behavior, alcohol and drug use, and risky behaviors involving sex or online exchanges while using social media (Luthar et al., 2013; Piko & Eszter, 2010; Rosen, Cheever, & Carrier, 2008; Shaw et al., 2012). Consistent parental supervision also significantly aids adolescents with delinquent histories to desist from offending, over and above the effects of high housing quality

and parent stress (Walker, Bowen, & Brown, 2013). Even in areas of armed conflict, parental monitoring has been shown to be protective, leading to more positive mental health outcomes for adolescents exposed to violence (Tol, Song, & Jordans, 2013).

Links between parent monitoring and adolescent adjustment are not always simple linear ones; they can be curvilinear, and they can vary with coexisting risks in the community. To illustrate, O'Donnell, Richards, Pearce, and Romero (2012) suggested that the influence of parental monitoring on delinquency depends on environmental factors such as peer groups, as well as on the child's gender. In a high-risk sample of low-income urban African American youth, these authors found that parental monitoring was associated with boys' delinquent behavior, while peer groups had a stronger relation to delinquency in girls, possibly because adolescent females tend to be highly sensitive to close interpersonal relationships.

Importantly, effective monitoring necessitates not just parents' efforts to know about their children's whereabouts, but also the latter's willingness to disclose to their parents, and each can have independent effects. Positive adjustment outcomes such as academic effort, for example, are related to both adolescent disclosure and parental solicitation, whereas negative outcomes like delinquency and violence are related to minimal adolescent-parent communication, including low honesty with parents as well as low time spent together (Cheung, Pomerantz, & Dong, 2012; Lahey, Van Hulle, D'Onofrio, Rodgers, & Waldman, 2008). Overall, parents' knowledge regarding their adolescent offspring's whereabouts and company tends to result more from youth disclosure than from active parental monitoring (see Lahey et al., 2008).

In terms of discrete underlying processes, ethnographers have delineated several expeditious limit-setting and monitoring strategies used by inner-city families (see Weisner, 2005). These include the avoidance of dangerous areas, temporal use of the neighborhood (e.g., not being outside at night), and restriction of children's relationships with deviant and older peers. Other posited protective mechanisms include those resting on psychological processes: Structure and continuity in the environment can promote the development of effective coping skills among youth, as parental expressions of interest and concern for the child's well-being tend to bolster positive self-esteem.

Related to monitoring—in some ways, the converse of it—is autonomy granting, also important for resilient adaptation. Observational research involving mother-infant

interactions suggests that maternal support of exploration and autonomy (versus maternal restriction and control) is associated with the child's self-regulation, positive affect, mastery motivation, and task-persistence through subsequent years (see Bornstein, Davidson, Keyes, Corey, & Moore, 2003). Among older children, perceptions of their own autonomy are linked with various indices of adaptive development such as interest-focused academic engagement and prosocial behavior (e.g., Roth, Assor, Niemiec, Ryan, & Deci, 2009).

Autonomy has particularly high significance during the teen years, because a major developmental task of adolescence is to negotiate the struggle between developing independence on the one hand, and maintaining close bonds with parents on the other. Research by Allen and his colleagues (see McElhaney & Allen, 2012) has shown that among teens from both low- and high-risk contexts, those with parents who encouraged autonomy and disclosure had higher levels of self-esteem as well as ego development. In addition, maternal behaviors promoting adolescent autonomy and relatedness were associated with coherence/security of attachment during the adult years. In parallel, research has established that low autonomy-granting during adolescence is detrimental. High school students who experienced high levels of parent control associated with authoritarian parenting showed relatively low levels of psychological flexibility (K. E. Williams, Ciarrochi, & Heaven, 2012).

Interestingly, adolescents and parents can have divergent perceptions of the degree to which parents influence their children, and the ramifications for teens' adjustment differ by source of ratings. Adolescents' reports of high parental influence are associated with warm, autonomy-granting parenting as noted by teens' own reports as well as unbiased observers (McElhaney & Allen, 2012). Conversely, when parents believe their own parenting to be highly influential on their children, lower levels of autonomy-granting and low relatedness tend to be reported and observed.

As in the case of parental monitoring, the "optimal" level of autonomy granted to adolescents can vary as a function of socio-demographic context. Among youth in urban poverty, maternal behaviors that undermined adolescents' autonomy (i.e., interrupting them to shut down discussions) were positively linked with mother-adolescent relationship quality, whereas among low-risk comparison youth, associations were inverse in nature (see McElhaney & Allen, 2012). It is plausible that behaviors potentially seen as "overprotective" are seen as expressions of concern and care among youth in high-risk settings, while they tend

to be seen as inappropriately inhibiting and even guilt-evoking by teens in other contexts.

Coexisting Warmth and Appropriate Control

Whereas high levels of warmth and appropriate control each have protective functions, the benefits of each depend to some degree on levels of the other: High warmth with lax discipline can be linked with poor adjustment as can strict discipline without affection. Optimal is the authoritative parenting style, “characterized by high warmth and expectations, with appropriate levels of autonomy granting” (Padilla-Walker, Day, Dyer, & Black, 2012, p. 4).

Among low-income mothers, efforts to facilitate warm and responsive interactions with infants or toddlers enhanced the quality of future discipline techniques, in turn serving as a powerful force against externalizing disorders in childhood and adolescence (Shaw et al., 2012). Conversely, among adoptive families, patterns reflecting overreactive parenting along with low maternal efficacy were associated with increases in the toddlers’ negative emotionality (Lipscomb et al., 2011). A study of academic trajectories among low-income Mexican American adolescents found that maternal warmth moderated the relationship between parental academic socialization (e.g., placing importance on school success) and students’ determination to succeed academically. In the presence of higher maternal warmth, students were more likely to respond positively to parental expectations to succeed at school (Suizzo et al., 2012).

Cavell (2000) has emphasized the importance of an appropriate balance of warmth and discipline within the notion of parental *containment*, that is, “any behavior that fosters in children a sense of restraint while not threatening their relationship security” (Cavell, 2000, p. 131). Other studies have pointed to the protective potential of this construct. Building upon Cavell’s (2000) arguments, Schneider et al. (2003) defined perceived containment as the child’s beliefs concerning the parents’ capacity to enforce firm limits, and the likelihood that the parents will prevail in conflict. Among upper-middle-class teens—who are at much higher risk for alcohol and drug use than national normative samples—teens’ perceived parent containment for substance use was a potent predictor of both females’ and males’ use levels, even after considering other more traditionally examined indices of parent monitoring (see Luthar & Barkin, 2012). Thus, affluent adolescents who believed their parents would enforce rules in response to detected substance use were much less likely to use them, than were their counterparts who believed their parents

would mete out few or no consequences (Luthar et al., 2013).

Intervention studies with at-risk youth further buttress the conclusions from basic research on the importance of firm, consistent discipline in the context of supportive parent–child relationships (see Biglan & Taylor, 2000). In a review of the literature, Kumpfer and Alvarado (2003) note that “Effective parenting is the most powerful way to reduce adolescent problem behaviors” (p. 457) and describe three approaches that are generally found to be successful. The first includes behavior training approaches that are highly structured and involve working only with parents; the second entails an integration of parent behavior training and children’s social skills training, both administered in group format; and the third involves family therapy programs to enhance positive within-family interactions.

Whereas warmth and developmentally appropriate discipline are two “universals” of good parenting, there are other dimensions that can serve important protective functions in particular risk contexts. In families of children with chronic developmental conditions, for example, Crnic and colleagues have pointed to the unique significance of emotional and cognitive scaffolding as well as parent involvement (Crnic & Neece, Chapter 8, this *Handbook*, this volume). In ethnic minority families, much can be gained from parents’ attempts to inculcate in their children a sense of pride in their racial backgrounds (see Spencer, Swanson, & Harpalani, Chapter 18, this *Handbook*, this volume). Among upper-middle-class families in hyper-achieving communities, children fare better when they see their own parents as having balanced value systems, prioritizing the children’s personal decency and integrity every bit as much as their personal accomplishments (Luthar et al., 2013).

Communities

The broader community context affects children and adolescents both directly and through its effects on parents and other adults. Ensuing discussions describe, first, the formidable effects of community violence, followed by various mechanisms through which schools, peers, and neighborhoods can affect trajectories of resilience versus maladjustment.

Effects of Violence

As with chronic maltreatment in the family, chronic exposure to violence in the community can have overwhelming inimical effects, difficult for other positive forces to

override and affecting multiple domains. Exposure to violence significantly exacerbates risks for internalizing problems such as anxiety, depression, and posttraumatic stress disorders, as well as externalizing problems such as delinquent and antisocial behaviors (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009). Academic performance has also been found to suffer in the context of exposure to violence, often through mediators, such as aggression or behavior problems, and lowered feelings of safety (Busby, Lambert, & Ialongo, 2013). Repeated exposure to violence, especially early in development, is a form of chronic stressor that also can fundamentally alter neurological system development, and thus may affect children's physiological arousal and ability to process stress (see Gunnar, Doom, & Esposito, Chapter 4, this *Handbook*, this volume).

Several aspects of violence exposure can affect the reactions of a child, including relationship to victims and physical proximity to the events (Fowler et al., 2009). Sharkey's (2010) examination of violence in Chicago neighborhoods showed that children living closest to the location of a homicide were most negatively affected, in terms of lower scores on literacy assessments soon after the event. In a study of urban 16-year-olds, witnessing a close friend or family member being the victim of violence was associated with heightened depressive symptoms among both boys and girls; this was not seen when the victim was a stranger or someone the adolescent did not know well (Lambert, Boyd, Cammack, & Ialongo, 2012).

Disorganization and violence in the community affect children directly as well as indirectly, via effects on their parents. Among low-income single mothers, higher levels of social disorder and maternal exposure to neighborhood violence predicted greater parenting stress (Franco, Pottick, & Huang, 2010), and women who reported moderate to high violence exposure were more likely to demonstrate physically aggressive parenting toward their 3-year-old children (Zhang & Anderson, 2010). Among at-risk preteens and adolescents in large cities, similarly, increased family conflict was a pathway via which violent victimization in the community affected children's adjustment problems (Formoso, Gonzales, & Aiken, 2000; Holtzman & Roberts, 2012).

There is modest evidence that parents' functioning can moderate the effects of community violence on children (e.g., Bailey, Hannigan, Delaney-Black, Covington, & Sokol, 2006), but when people's very survival is constantly threatened, parents are obviously constrained in how much they can confer psychological protection to their children.

This is evident in results of several studies on violence exposure, examining whether positive family functioning might show "protective-stabilizing" influences—helping children to function well even as exposure escalated. Considered together, the findings provided limited support at best for such effects (e.g., Ceballo & McLoyd, 2002; Jain et al., 2012). When study measures were particularly sensitive to level of violence exposure, a common theme was that indices of positive family functioning (e.g., time spent with parent, closeness to them) were beneficial at low levels of exposure. On the other hand, when violence exposure was high, the benefits of these family variables were considerably diminished.

By contrast, poor family functioning clearly does exacerbate the risks of community violence—when children experience significant disturbances in their proximal as well as their distal environments, their risk for psychopathology becomes substantial. To illustrate, low family cohesion predicted delinquency in adolescents who had witnessed violence in their communities, while those with similar violence exposure histories, but high levels of family cohesion, were not affected in the same way (Barr et al., 2012). Similarly, McKelvey and colleagues (2011) found that high family conflict was a moderator of community violence among boys, associated with increases in internalizing symptoms and risky behaviors by the age of 18 years. Among girls, high family conflict was a risk factor for internalizing symptoms regardless of community violence levels. Overall, such results corroborate the view that the lack of a reliable, supportive refuge, or low emotional connectedness to family, tends to exacerbate the risk for maladjustment for children exposed to high levels of community violence.

A specific type of exposure to violence that can be highly disruptive to child and adolescent development is exposure to war and political conflict. Reviewing extant evidence, Werner (2012) indicated that high rates of psychopathology, notably posttraumatic stress disorder, depression, and anxiety, have been documented among children exposed to violent conflict in various countries around the world. Children appear to be especially at-risk when they have been involved in close interpersonal violence, for example, as in the case of child soldiers (Betancourt et al., 2010). Additionally, youth can be differentially affected by wartime experiences according to developmental stage at time of exposure. Adolescents may be at heightened risk of symptoms of trauma due to their greater capacity to understand the implications of the violence they witness, while younger children may feel the effects of forced

separation from parents or caregivers more acutely (Masten & Narayan, 2012).

There is some evidence of resilient functioning among children exposed to the violence of war, though findings on both predictors and outcomes are not consistent (Barber, 2013; Tol et al., 2013; Werner, 2012). Relationship-based factors, including a positive and stable connection to a primary caregiver, parental monitoring, and perceptions of support from extended kin and/or members of the broader community, have in some cases been associated with better postconflict outcomes, such as fewer depressive symptoms (e.g., Betancourt et al., 2010; Durakovic-Belko, Kulenovic, & Dapic, 2003; Tol et al., 2013; Werner, 2012). By the same token, when family functioning is disrupted, risks for child maladjustment are exacerbated. In war-affected populations in Afghanistan, family violence particularly exacerbated the effects on adolescents' mental health (Panter-Brick, Goodman, Tol, & Eggerman, 2011).

Ecological sensitivity is critical in assessing the ways in which war exposure might affect children and adolescents. Commenting on work in this area, Panter-Brick and Leckman (2013) underscored the importance of ensuring that markers of resilience are culturally relevant, with attention to local mores about behaviors that are considered adaptive or maladaptive, as well as ways in which distress is experienced versus manifested. Illustrating the importance of this issue, Tol et al. (2013) cite ethnographic research in northern Uganda where children exposed to conflict did not report high psychological distress. Their ostensible resilience, however, was in fact related to cultural values emphasizing respect for others who suffered in silence, and not wishing to hurt those who did suffer. Thus, individuals' own distress was more freely expressed in somatic symptoms, which were addressed via use of tranquilizers.

Protective Processes in Communities: Early Intervention and the School System

Whereas the ill-effects of chronic exposure to severe violence in the community are rarely overridden by other protective processes, there are exosystemic forces—those in communities and schools—that can attenuate the damages conferred by other types of adversities. Again, the broader community can shape child outcomes by directly affecting youth themselves, and also indirectly, by effects on their parents.

In early childhood, the quality of childcare can serve critical ameliorative functions that endure across extended

periods of children's development. Reports by the NICHD Early Child Care Research Network showed that among families living in or near poverty, mothers whose children were in high-quality childcare showed more positive interactions with their infants. Furthermore, these benefits were evident even through the age of 15 years: High quality of early childcare was linked with lower externalizing behavior during adolescence as well as better cognitive-academic achievement, with the latter association partly mediated by earlier childcare effects on achievement (Vandell et al., 2010).

Among the major features defining "good quality of care," primary are the characteristics of the childcare providers (e.g., education and training levels), the emotional quality of caregiving, the child to adult ratios (e.g., with three or fewer infants per caregiver being optimal), and the stability of childcare providers (Phillips & Lowenstein, 2011). Studies have documented that when caregivers have positive personal characteristics and offer emotionally supportive caregiving, benefits are seen in a range of child outcomes including early academic skills, language development, and social competence (Lamb & Ahnert, 2006).

Unfortunately, accessing high quality care is generally the most difficult for the poorest and most needy families, and key aspects of quality are often in jeopardy, given the poor working conditions of most childcare workers (Hanson & Gottesman, 2012). The average hourly wage of these workers in the United States is \$10.07 (the average hourly wage of school bus drivers is \$14.01 and of animal trainers, \$14.59), and turnover rates are among the highest of any profession that is tracked by the U.S. Department of Labor (U.S. Bureau of Labor Statistics, 2013). Improving the quality of childcare available to all families, but particularly those at high risk, therefore must be treated as a critical social policy priority.

Involvement of families is critical, if not indispensable, in effective early interventions; indeed, some of the benefits of efficacious, multipronged programs derive directly from the support and mentoring that parents receive from childcare providers (Phillips, McCartney, & Sussman, 2006). Research on the relative effects of childcare has shown that despite the benefits that high-quality programs can provide, overall, family characteristics have the greater impact on young children's developmental outcomes, in both the short and long term (NICHD, 2006; Phillips & Lowenstein, 2011).

Exemplifying the effective involvement of parents while using existing resources to provide quality child care is

Zigler's "School of the 21st Century" (Zigler & Finn-Stevenson, 2007). In this program, public school buildings, which remain unoccupied for large portions of the day and the calendar year, are used to house childcare programs for children 3 years and older, and also to host regular support group meetings for parents. Referral and information networks also are developed in schools to help parents make better use of various existing services scattered across their communities, such as those offering counseling, physical health care, or night care for children. A similar approach is indicated in the Promise Neighborhoods initiative, inspired by the Harlem Children's Zone (HCZ) (Komro, Flay, Biglan, & Promise Neighborhoods Research Consortium, 2011). HCZ has included early childhood services in their extensive efforts to transform the educational opportunities for children in their communities, offering a Baby College for expectant and new parents, and pre-kindergarten for children who will be attending HCZ schools (Harlem Children's Zone, 2009).

Attachment-Based Interventions in Schools

Among older children, K–12 schools can bring substantial beneficial effects to youth in at-risk circumstances: Supportive relationships with teachers can be critical in fostering resilience (see Wigfield et al., Chapter 16, this *Handbook*, this volume). Writing from an attachment perspective, Pianta (1999) elucidated, in depth, the benefits that can derive from close child–teacher relationships developed and then sustained for as long a period of time as feasible. Along the same lines, Schneider and colleagues (2003) have suggested that children with low perceived containment—who do not believe in adults' capacities to enforce firm limits and are therefore at-risk for conduct disorder—might actually be better served by interventions focusing on sustained, positive relationships rather than short-term disciplinary techniques designed to counter misbehavior.

While children's past and concurrent attachments to parents remain important factors in their interactions with adults at school, intervention studies increasingly suggest (a) that children's relationships with teachers are modifiable within the school context, and (b) that positive attachments to teachers can serve important protective functions, improving behavioral as well as academic outcomes (J. N. Hughes, 2012; O'Connor, 2010; Sabol & Pianta, 2012; see also Wigfield et al., Chapter 16, this *Handbook*, this volume). Exemplifying such benefits are findings from the My Teaching Partner (MTP) program, a web-based course in which teachers collaborate regularly

with consultants to review and reflect upon videotapes of the teachers' interactions with students in the classroom. MTP was initially developed for preschool classrooms, but trials of an adaptation for middle and high school have shown positive effects on student engagement and academic test results (Pianta, Hamre, & Allen, 2012).

From a developmental standpoint, increasing informal school-based support systems could be particularly critical for the wellness of preadolescent and adolescent students because they face schools that are large and impersonal (as compared to elementary or primary schools), with diminishing supports infused in daily curricula (see Wigfield et al., Chapter 16, this *Handbook*, this volume). Additionally, adolescents can be particularly reluctant to seek professionals for help with even serious adjustment problems (Cigularov, Chen, Thurber, & Stallones, 2008). In engaging supportive adults for preteens and teens, furthermore, it is important to consider not only subject or homeroom teachers but also other individuals to whom students are naturally drawn. Some at-risk students may actually be inhibited about seeking support from their own subject teachers, perceiving them primarily as disciplinarians and evaluators of academic progress; many seek out, as confidants or mentors, other school-based adults ranging from sports coaches and music instructors to administrative or support staff (Luthar, Barkin, & Crossman, 2013; Noam & Hermann, 2002).

Some programs have also used outside facilitators to provide students with supportive relationships outside of the classroom. To illustrate, RALLY (Responsive Advocacy for Life and Learning in Youth) for students in middle school (Noam & Hermann, 2002), and Step-Up, for high (secondary) school students (Alicea, Pardo, Conover, Gopalan, & McKay, 2012) both establish mentoring relationships between students and program staff while also working on teacher, peer, and/or family engagement. Preliminary results for the Step-Up program have shown high engagement and retention within a sample of youth mostly of ethnic minority background, who had high initial rates of mental health symptoms, and were at risk of dropping out of school (Gopalan et al., 2013).

There are some promising school-based interventions that focus on the ecology of the whole school, rather than chiefly on the attachments to teachers. Felner and colleagues' (2001) High Performance Learning Communities Model is one early example of an embedded, whole-school approach. Another is the widely adopted Positive Behavioral Interventions and Supports (PBIS) program for elementary schools, which aims to reduce disruptive,

aggressive behavior while supporting social and emotional development (Bradshaw, Waasdorp, & Leaf, 2012). PBIS employs universal components by implementing school-wide organization and behavioral expectations, as well as more targeted components for students with greater need in these areas.

Another intervention that combines universal and targeted components is the BRIDGE program, which uses a coaching model pairing classroom teachers and school-affiliated mental health professionals. The program addresses classroom relationships and organization to enhance students' behavioral and emotional outcomes (see Cappella et al., 2012). An early randomized trial found positive results for elementary students in several targeted areas, including academic self-concept and perceptions of victimization. In particular, teacher-child closeness was significantly higher in the intervention group, with an impressive effect size of 0.47 (Cappella et al., 2012). Collectively, these findings attest to the promise of school-based interventions targeting teacher-child dyadic relationships within the subsuming contexts of the classroom and school milieu (Pianta et al., 2012; Sabol & Pianta, 2012).

Internationally, there has been growing use of teachers and schools to enhance resilient adaptation in children exposed to traumatic events such as war or political conflict. In such situations, well-functioning schools can be critical in providing children with a sense of routine, predictability, and safety (Masten & Narayan, 2012). Classroom-based intervention programs that have been evaluated in the context of conflict include the Psychosocial Structured Activities program in Uganda (Ager et al., 2011), a cognitive-behavioral/creative-expressive program in Indonesia (Tol et al., 2010), and a preventive intervention based on stress inoculation, for children exposed to rocket attacks in Israel (Wolmer, Hamiel & Laor, 2011). In general, the results of these studies demonstrate that interventions in schools can help to reduce problems such as symptoms of posttraumatic stress disorder and more broadly, to promote effective coping skills for participating children.

Peers and Social Networks

Aside from adults at school, positive relationships with peers can also serve critical protective functions for at-risk children (Elder & Conger, 2000; Furman & Rose, Chapter 22, this *Handbook*, this volume). Among children of divorce, for example, a supportive relationship

with a single friend can help to buffer children from the deleterious effects of marital disruption (Hetherington & Elmore, 2003; see also Bolger & Patterson, 2003). Other longitudinal studies have shown that peer acceptance and friendships attenuated the links between aspects of family adversity and subsequent externalizing behaviors, at the time of enrollment in school, and between the ages of 10 and 12 years (see Lansford, Criss, Pettit, Dodge, & Bates, 2003). Findings such as these are seen as reflecting three potential processes, involving (1) the provision of "remedial" socializing contexts for skills not acquired in dysfunctional homes; (2) modification of children and parents' negative behaviors by the more well-functioning peers and their parents; and (3) enhanced bonds with the social institution of the school (Lansford et al., 2003).

Intervention studies have also suggested that peer-assisted learning can result in improvements in academic achievement as well as nonacademic outcomes such as self-concept, particularly for youth from low-income backgrounds (Ginsburg-Block, Rohrbeck, & Fantuzzo, 2006). The potential in this regard is seen in Fantuzzo and colleagues' resilient peer treatment (RPT) program, a peer-mediated intervention involving pairing of socially withdrawn preschoolers with manifestly resilient peers in the classroom (Fantuzzo, Manz, Atkins, & Myers, 2005). A randomized study revealed that the program led to greater engagement in the salient developmental task of collaborative play based on researcher observation, with a moderate effect size of 0.36 (Fantuzzo et al., 2005).

Further potential for positive socialization is seen in interventions targeting at-risk students in elementary school, such as the PAX Good Behavior Game (PAX GBG; Embry, Staatemeier, Richardson, Lauger, & Mitich, 2003) and the Promoting Alternative Thinking Strategies (PATHS; Greenberg and Kusché, 2006). In the PAX GBG, teams of 6-year-olds received rewards from teachers (e.g., stickers) when the team behaved well. Because individual students' misbehavior lowered the team's chances of winning, students tended to encourage and help each other to conform. Long-term follow-up assessments have shown that by the ages of 19–21 years, participants in this program had been assigned to fewer school-based services such as placement in special classrooms, and they had significantly lower substance abuse problems as well as less involvement in the juvenile and adult criminal justice systems (Poduska et al., 2008).

Just as positive peer relationships can mitigate the effects of adversity, problems in this domain can exacerbate vulnerability. In longitudinal research, both relational

and physical peer victimization were associated with increased internalizing symptoms during adolescence (Yeung Thompson & Leadbeater, 2013). Peer rejection and bullying can lead to poor outcomes in later life across multiple domains, including internalizing problems, school drop-out, and delinquency, with the combination of aggression and peer rejection connoting particularly high risk for long-term adjustment outcomes (see Kupersmidt & Dodge, 2004).

Affiliation with deviant peers is well known to exacerbate vulnerability among at-risk youth, particularly in relation to conduct problems and substance use. Among children and adolescents living in neighborhoods with high poverty and crime, affiliation with deviant peers has been a robust predictor of psychopathology (Barrera et al., 2002; Tiet, Huizinga, & Byrnes, 2010). Data on 9–15 year olds assessed during the first three waves of the Great Smoky Mountains Study showed that association with deviant peers, along with increasing levels of circulating testosterone, contributed to increases in conduct disorders over time. Furthermore, these links were mediated primarily by increases in nonphysically aggressive behaviors (Rowe, Maughan, Worthman, Costello, & Angold, 2004). In some cases, affiliating with deviant peers has been found to be connected to level of monitoring by parents; specifically, such affiliations mediate the relationship between parental monitoring of adolescents' behavior and teens' delinquency and substance use (O'Donnell et al., 2012).

The ill-effects of associations with deviant peers may be particularly strong during adolescence. Dishion's work on this topic has shown that these effects may reflect a combination of both self-selection into deviant peer groups, and deviancy training in adolescent friendships wherein delinquent behaviors and attitudes are socially reinforced (Dishion & Tipsord, 2011). Deviancy training, particularly in close friendships, predicts increases in delinquency, substance use, violence, and adult maladjustment, and tends to weaken connections to positive socializing influences. Longitudinal follow-up data have shown that associating with delinquent peers was predicted by, and in turn exacerbated, poor connections to school and other prosocial ties during adolescence (Tiet et al., 2010).

The potential for iatrogenic effects of peer relationships has often been discussed in relation to the ecology of urban poverty (Dishion & Tipsord, 2011). Within inner-city neighborhoods and schools, the peer culture tends to reflect the larger community such that youth growing up in high-crime neighborhoods can be exposed to more delinquent peers than are others (Murry, Berkel,

Gaylord-Harden, Copeland-Linder, & Nation, 2011). In turn, affiliation with delinquent peers intensifies the risk for adolescent behavior problems. Furthermore, the personal characteristics valued by peers in inner-city settings are often at odds with those endorsed more conventionally. To illustrate, high peer popularity can be associated with disruptive, aggressive behaviors at school as well as low academic effort (Becker & Luthar, 2007), ostensibly reflecting low belief, in poor urban communities, that conformity and application at school will actually result in long-term life successes.

Negative peer socializing influences are not limited to the context of poverty, however; they are found, as well, in upper-middle-class settings. As noted earlier, affluent teens are clearly at elevated risk for the high use of drugs and alcohol, and those youth who report using them frequently are among the most popular in their peer groups (Luthar et al., 2013). This association is particularly strong among boys. Among girls in upper-middle-class settings, negative peer influences are seen most prominently in the inordinate emphasis on their physical attractiveness. Far more so than affluent boys, or inner-city girls or boys, peer acceptance is significantly linked to whether these young women are judged by peers as attractive. The extreme peer emphasis on their physical appearance is likely linked with elevated vulnerability, among these girls, to diverse problems including psychological distress, substance use, and eating disturbances (Luthar et al., 2013).

Adding to the complexities of peer group effects, some studies have shown that teenage peer group influences can be beneficial in some spheres of adjustment even as they are detrimental in others. A study of low-SES urban early adolescents and their affluent, suburban counterparts showed that in both samples, peer admiration was simultaneously associated with high academic effort on the one hand, and with aggressive behaviors on the other (Becker & Luthar, 2007).

There are also probably varying effects of high status in the wider peer group as opposed to support from close friends. Gutman, Sameroff, and Eccles (2002) found that support from peers—as opposed to popularity with the wider peer group in previously discussed studies—was associated with higher math achievement for high-risk adolescents, but not their lower-risk counterparts. The authors argued that peer support for academics may be limited for ethnic minority teens, and that among those exposed to multiple risks, teens who feel that they can depend on peers for help with problems fare better than those with low peer supportiveness.

Unfortunately, negative contagion effects can occur in close dyadic friendships as well as the larger peer group. To illustrate, Rose, Carlson, and Waller (2007) showed that close friendships are a source of support, but they can also involve contagion of internalizing symptoms due to *corumination*, which entails rehashing problems in conversations and focusing on negative affect. Similarly, intervention programs that target adolescents in groups can trigger negative peer socializing influences (Dishion & Tipsord, 2011). Results from controlled studies show that in comparison with control conditions, peer-group interventions for high-risk youth can actually increase problem behaviors in adolescence, and negative life outcomes in adulthood. Developmental processes accounting for the powerful iatrogenic effects included active reinforcement for deviant behavior through laughter and social attention, as well as engaging in conversation about deviance, particularly during unstructured periods.

By the same token, opportunities for deviancy training appear to decrease when intervention sessions are highly structured and well-supervised, though more research examining this moderator is needed (Dishion & Tipsord, 2011). Dodge, Dishion, and Lansford (2006) further asserted that aggregating deviant youth within interventions should be avoided where possible, in favor of more mixed groupings, such as within universal school interventions, or family-centered programs. This recommendation is also relevant to youth in the juvenile justice system (Dodge et al., 2006). In a natural experiment involving first-time adolescent offenders, higher rates of recidivism were seen among those who spent the weeks before their final disposition hearing in a residential facility with other young defendants, as compared to those who spent that time at home (Shapiro, Smith, Malone, & Collaro, 2010).

Among adolescents, an area that warrants further exploration is whether peer leaders can be used as positive socializing influences. While antiestablishment behaviors elicit admiration from peers across socioeconomic settings as previously described, there is always a subset of teens (albeit small) who retain peer admiration by occasional rule-breaking, while at the same time, remaining focused on doing well academically and being prosocial toward others. In future research, we will need to learn from these youth about ways in which they, and others like them, might help sway counterparts who gravitate more strongly toward behaviors destructive to others or themselves. Given the established power of negative contagion effects among adolescent peers, there may well be the potential for parallel “positive contagion” effects that we can

harness in future efforts to promote adaptive adolescent outcomes.

The value of further exploring “positive peer contagion” is evident in the “Names Can Really Hurt Us” anti-bias, anti-bullying program implemented with over 65,600 high school students in Connecticut since 1995, under the sponsorship and supervision of the Anti-Defamation League. Guided by league facilitators, students speak candidly about diverse bullying behaviors and their consequences, addressing topics ranging from gossip and physical harassment, to homophobia and racism, substance abuse, self-mutilation, and suicide. The goals are to empower victimized students to stand up for themselves, to teach bystanders to become allies, and to develop empathy among the bullies themselves. Qualitative data and the students’ willing participation rates conjointly attest to the promise of the “Names” program (see Hirshey, 2007).

Aside from peer group members, relationships with informal mentors can serve important protective functions, as seen in evidence from the Big Brothers Big Sisters of America (BBBSA) movement, a program that typically targets youth aged 6 to 18 years from single-parent homes. Service delivery is by volunteers who interact regularly with a youth on a one-to-one basis, and are supervised on a monthly basis for the first year, and on a quarterly basis subsequently. Benefits of BBBSA have included reductions in substance use and better engagement with school, and improved mentees’ relationships with parents accounted for some of the improvements in adjustment (Rhodes, Grossman, & Resch, 2000).

Continuity of the mentor relationship, however, is critical in ensuring sustained benefits. In a randomized trial of BBBSA (Herrera, Grossman, Kauh, & McMaken, 2011), mentees’ showed improved academic achievement as compared to nonparticipating peers. However, this effect was seen only as long as the mentoring relationship was active, a finding consistent with earlier reports that longer mentoring relationships are associated with better outcomes (Grossman & Rhodes, 2002).

Salutary effects can derive from adolescents’ religious affiliations as well (Elder & Conger, 2000; King, Carr, & Boitor, 2011). Studies by L. Miller and her colleagues have shown that religious teens have attenuated risk for problems such as depression and substance use (see L. Miller & Gur, 2002). Processes posited include indirect effects involving “primary socialization” sources (in that religion shapes major socializing influences including parents, peers, and school), as well as direct ones (aiding in the adolescent search for meaning, purpose, and identity in

life). Research has also suggested that religion and spirituality can have particular benefits for adolescent girls in protecting against depression (Desrosiers & Miller, 2007), possibly reflecting the effects of high social support.

The benefits of community supports for at-risk children are paralleled by those among their parents: Parents with informal social support networks show better psychological well-being and more effective parenting (Ammerman et al., 2005). Kotchick, Dorsey, and Heller (2005) tested the role of social support in the context of neighborhood stress over a 15-month period with a sample of single, African American mothers. For those mothers who felt they received low levels of support from friends and family, neighborhood stress and related psychological symptoms were detrimental to their parenting behaviors over time, while parenting was less negatively affected among mothers who felt well supported.

Intervention trials further establish indirect benefits to children of support received by primary caregivers. For example, immediately following a supportive, relationship-based parenting group intervention with low-income, drug abusing mothers (Luthar, Suchman, & Altomare, 2007), significant improvements were seen in the women's personal adjustment as well as their children's reports of mothers' maltreating behaviors; this, despite the fact that the children were not directly involved in the intervention. Results from the Keeping Families Strong program for families affected by maternal depression have shown multiple positive effects, with improvements in maternal mental health, and in overall family functioning, apparently leading to improved adjustment among the children (Valdez et al., 2011).

Support gleaned from involvement in religious communities can also be beneficial for mothers. In a multi-city study of low-income women, Hill, Burdette, Regnerus, and Angel (2008) found that more frequent attendance at religious services was associated with greater satisfaction and less stress in their parenting role. Similarly, frequent attendance at religious services has been linked with lower parenting stress and also fewer behavior problems in children (Petts, 2012). Associations such as these might reflect, in part, the social supports experienced by those who attend church regularly, as church attendance provides a place for families to gather and socialize. In addition, intrapersonal processes, such as reliance on relatively effective coping strategies, might be implicated.

The connotations of religiousness are not invariably positive, however; in fact, it can sometimes exacerbate vulnerability among youth and adults. King has cautioned that ill

effects can derive from religious contexts that inhibit intellectual or identity exploration, or that encourage exclusion of others (see King & Boyatzis, Chapter 23, this *Handbook*, this volume; King et al., 2011). Similarly, strong beliefs in the supernatural may sometimes take the form of fatalism, and if at-risk youth and parents come to believe that nothing can be done to improve their life situations, this can create formidable barriers to improving the overall quality of their lives (Luthar, 2006).

Neighborhoods: Protective Processes

Moving on from the relatively proximal extrafamilial contexts of school, peers, and interpersonal supports to those more distal: Aspects of the wider community may also play an important role in buffering risk for children (Gorman-Smith & Tolan, 2003; Ungar et al., 2013). Particularly important are social organization processes in the neighborhood, including levels of cohesion, a sense of belonging to the community, supervision of youth by neighborhood adults, and high participation in local organizations. Such social processes can help buffer the impact of structural characteristics of the community (e.g., poverty or violence) either by directly benefiting children themselves, or affecting parents and families (Leventhal, Dupéré, & Brooks-Gunn, 2009).

Direct benefits to children are seen in Gorman-Smith and Tolan's (2003) findings that when inner-city families are lacking in warmth and closeness, children's vulnerability can be reduced somewhat if they feel a sense of belonging and support in the neighborhood. Indirect benefits for youth have been found in longitudinal research, through, and in tandem with, family factors. For example, research in the United Kingdom showed that children in disadvantaged communities benefited significantly from collective efficacy in their neighborhoods, which was operationalized as high trustworthiness and cohesiveness of community members, and the likelihood that local adults would intervene to disrupt altercations or protect local resources (Odgers et al., 2009). Even after controlling for several family factors, collective neighborhood efficacy was associated with fewer antisocial behaviors among children as they started school, though the relationship did not hold when the children were in middle childhood. The authors noted that given the young age of the children at the earlier assessments, the benefits were likely to be transmitted via the impact of positive neighborhood processes on parents.

Further evidence for indirect effects are seen in longitudinal data on adolescents at risk for delinquency: When

parents felt more connected to their neighbors, their children were less likely to report involvement in violent altercations by late adolescence (Kurlychek, Krohn, Dong, Penly Hall, & Lizotte, 2012). Similarly, among participants in the Project on Human Development in Chicago Neighborhoods (PHDCN), high neighborhood collective efficacy strengthened the effect of high family attachment—feeling emotionally and socially supported by family members—which in turn protected against adolescent suicide attempts (Maimon, Browning, & Brooks-Gunn, 2010).

Relocating out of at-risk neighborhoods can also yield some benefits for youth. In the PHDCN study, adolescents who moved from neighborhoods with high violence and low collective efficacy to homes outside the city manifested fewer violent behaviors, lower exposure to violence, and higher self-efficacy, as compared to those teens who remained in such neighborhoods. No such effect was found for youth who made the smaller change of relocating to other neighborhoods within the city (Dupéré, Leventhal, & Vitaro, 2012). These findings appear to reflect another instance of multiple systems at work. As Sharkey and Sampson (2010) point out, youth who move to communities outside of the city engage with a different school system and may leave behind other negative structural factors such as racial segregation, while those who remain in the city stay connected to the same systems. Consistent with these suggestions, Dupéré et al.'s (2012) analyses indicated that attitudes toward school and future educational plans mediated the effect of neighborhood change on self-efficacy, suggesting that youth felt more positive about their educational opportunities in their new communities.

The impact of neighborhood relocation may also differ according to gender. Longitudinal results from the randomized, experimental Moving to Opportunity study—in which families in disadvantaged neighborhoods in several cities were provided with vouchers to enable them to move—indicate benefits for adolescent girls, but not boys. In follow-up studies conducted between 4 and 7 years later, girls who moved to low-poverty neighborhoods had better mental health and educational outcomes, and reported fewer high-risk behaviors, than girls who remained in disadvantaged, high-poverty neighborhoods. No advantage was found for boys who relocated, compared with their counterparts who did not (see Leventhal & Dupéré, 2011). In explaining such findings, researchers have suggested that girls may benefit from reduced exposure to sexual harassment in their new, less-disadvantaged neighborhoods, and that boys who are already teenagers when they move may

bring their patterns of socializing with them (which may be less normative in their new setting), and may also be removed from the positive influence of male kin (Clampet-Lundquist, Edin, Kling, & Duncan, 2011). Adolescent boys in particular who move out of disadvantaged neighborhoods may therefore require greater support to benefit from this transition (Leventhal & Dupéré, 2011).

Within low-income neighborhoods, youth-serving community organizations, such as those providing organized after-school activities, can provide critical protective functions, associated with lower rates of aggression and violent crime as well as positive social and emotional outcomes (Mahoney, Harris, & Eccles, 2006). The protective potential of youth organizations is well illustrated in the 5Cs model of Positive Youth Development, which posits that young people are better able to develop into healthy and constructively engaged citizens when their strengths are aligned with and supported by resources in their families, schools, and communities, promoting development of the 5Cs—character, confidence, connection, competence, and caring (Lerner, Dowling, & Anderson, 2003). Within this model, organizations and programs for youth can be conceptualized as one element making up important ecological assets of the neighborhood, besides resources such as high average education and employment levels, recreation spaces, and neighborhood groups. Analysis of a subset of data from the 4-H study of Positive Youth Development (see Lerner, von Eye, Lerner, & Lewin-Bizan, 2009), based on the 5Cs model, showed that for girls in neighborhoods low on ecological assets in general, participation in youth programs as 10-year-olds was associated with higher scores on a measure of the 5Cs, and lower depressive symptoms and risk-taking behaviors, as 12-year-olds. However, the same was not found for boys. This finding lends further evidence for the iatrogenic effects of exposure to deviant peers to which boys may be particularly vulnerable, and underscores the importance of structured after-school activities for boys in particular.

Finally, the benefits of structured community activities can be amplified if parents are actively engaged with the programs. To illustrate, Mahoney and Magnusson (2001) reported that among at-risk boys in Sweden, fathers' involvement in community activities in late childhood was associated with lower risk for criminal involvement of youth by the age of 13 years. These findings were seen as possibly reflecting the effects of more conventional values of community-involved fathers, their greater personal resources, or their higher levels of involvement in their sons' lives.

Individual Attributes: Malleability Within Contexts

In overviewing the triad of vulnerability and protective processes in resilience, we reiterate that children's own attributes should be considered after aspects of their families and communities, for three critical reasons (see Luthar, 2006). From a basic research perspective, several studies—described in detail below—have shown that many positive child attributes are themselves dependent on influences from the proximal and distal environments. From an applied perspective, it is logical that interventions to foster resilience should focus less on what young children are able to do for themselves, and more on what adults must do to bolster the children's own efforts. From a policy perspective, finally, to place primary emphasis on child attributes could carry the risk that public debate will shift away from the major environmental risks that affect children, leading to decreased allocation of resources to ameliorate these risks (see Luthar & Brown, 2007; Ungar, 2013). These considerations—rather than any devaluing of children's own strengths—lead us to place emphasis on families and communities in transaction with the children, rather than the other way around.

To underscore the perils of overemphasizing children's own attributes, we begin this section by presenting evidence on the malleability of some of the most commonly cited "protective child attributes," starting with intelligence (probably the single most often mentioned asset). Studies on diverse risk groups find that individuals with high IQ tend to fare better than others (Luthar, 2006; Masten & Narayan, 2012). Among 4- to 6-year-old children experiencing homelessness, Masten et al. (2012) showed that superior executive functioning (related to high IQ) was associated with relatively positive social and academic development. At the same time, the potency of environmental influence on intelligence itself is seen in Sameroff and colleagues' (1987) findings that children facing eight or nine environmental risk factors scored more than 30 points lower than children with no risks. Of preschoolers in the high-risk group, 26% had IQs below 85, whereas none in the zero-risk group did.

Powerful testimony on this issue lies in Rutter and colleagues' (2010) data from "natural experiments" involving adoptees from Romanian orphanages. Caregiving conditions in these orphanages ranged from poor to appalling: Infants were usually confined to cots, there was no personalized caregiving and few toys, feeding often occurred via propped up bottles, and washing by hosing the babies down. When these children entered into adoptive families in the

United Kingdom, many showed developmental retardation, with over half functioning in the cognitive/intellectual disability range. Longitudinal evaluations then showed catch-up effects, wherein babies who were adopted by 2 years of age lost their profound early deficits, and by the age of 4, came to show near-average developmental status. Despite these ameliorative effects, however, head circumference for the adopted children remained about 1 standard deviation below the normal population means by Age 11, suggesting the incomplete nature of this catch-up effect by this age (Rutter et al., 2010).

Other researchers have shown that disturbances in parents' functioning can affect child intelligence. Maternal depression, for example, has been linked with relatively low child cognitive functioning both in the postpartum period (Kingston, Tough, & Whitfield, 2012) and in the preschool years (C. Hughes, Roman, Hart, & Esnor, 2013). Among high-risk African American and refugee adolescents, youth exposed to domestic abuse showed a decrease in academic success, as abandonment trauma and direct abuse was linked to a decrease in IQ (Kira, Lewandowski, Somers, Yoon, & Chiodo, 2012).

In terms of underlying processes, environmental deprivation may engender cognitive deficits because of a lack of appropriate stimulation, and even adverse effects on brain development (see Hedges & Woon, 2011). Depressed and psychologically withdrawn caregivers, for example, tend to provide little of the stimulation that fosters the development of cognitive skills and expressive language, and deficits in the mother-child relationships can constrain children's developing sense of self-efficacy and agency, in turn inhibiting their active exploration of the environment (Cicchetti & Toth, Chapter 13, this *Handbook*, this volume). Biologically, we know that stress generates high levels of cortisol and catecholamines, and chronic activation of the stress response can lead to the death of neurons in specific brain regions, with these effects most profound during early childhood when neuroplasticity is high (Cicchetti & Toth, Chapter 13, this *Handbook*, this volume). Results of animal studies clearly establish that early exposure to enriched rather than deprived environments is associated with substantial differences in animals' neurochemical, physiological, and neuroanatomical functioning (Gunnar, Doorn, & Esposito, Chapter 4, this *Handbook*, this volume).

One might argue that high IQ would remain more consistently beneficial later in development than in early childhood; while probably true, the evidence is not unequivocal even at older ages. Up through middle childhood, it does

seem that bright children tend to show stability in everyday competence despite increasing levels of life stress (e.g., Garnezy et al., 1984). On the other hand, among different samples of low-income adolescents, intelligence was not found to be protective. To the contrary, bright youth seemed to be more sensitive than others to negative environmental forces (Gutman, Sameroff, & Cole, 2003; Luthar, 1991). In other words, intelligent adolescents fared far better than did less intelligent ones when life stress levels were low, but when stress was high, they lost much of this advantage. More strikingly, among adults, Fiedler (1995) found that high-IQ people showed leadership success under conditions of low stress, but that when stress was high, IQ was *inversely* correlated with success. Similar findings have been shown for high ego development, a construct closely linked with high IQ (Luthar, 2006).

Collectively, findings such as these have been viewed as suggesting that the manifest “benefits” of innate intelligence vary depending on aspects of the proximal environment. To illustrate, in areas of concentrated poverty with a dearth of conventional means of achieving self-worth (e.g., good grades, productive employment), intelligent, creative teenagers may use their talents in ways that bring more immediate gains—such as illegal entrepreneurship—rather than through striving for excellence at school (Gutman et al., 2003). Consistent with this suggestion, Loeber and colleagues (2012) found that youth with high IQ and high impulsivity showed greater law-breaking and delinquency over time than did low-IQ individuals (although the effects were attenuated as the adolescents aged).

Rather than IQ as measured by standardized intelligence tests, it is probably several assets that are usually associated with cognitive and overall developmental maturity that confer protection against adversity. These include the ability to come up with different problem-solving strategies; the capacity to generalize learning across situations; the unfolding of high motivation to explore and master new challenges; the capability for long-term planning; and finally, histories of various successful experiences, academic and interpersonal, that tend to derive from the aforementioned skills (Luthar, 2006; Masten, 2011; Rutter, 2012; Shonkoff & Phillips, 2000).

There is accumulating evidence concerning the protective role of such assets derived from research on diverse at-risk groups. In an inner-city sample, for example, Noam and Hermann (2002) noted the protective potential of both insight and the capacity to use problems to motivate positive change. Among children who had experienced the death of a parent, Haine, Ayers, Sandler, and Wolchik

(2008) found that the ability to reframe negative, unhelpful beliefs associated with the parents’ death (into more positive thoughts) was of significant help through the grieving process. Beardslee (2002) found that among children of depressed parents, well-functioning youth had good cognitive awareness of what they were facing—they recognized the parents’ illness, knew that they were not responsible for it, and saw themselves as separate from their parents. In addition, they were able to put this experience in words, and could articulate strategies to offset the effects of the illness on them (e.g., forging close relationships with non-family adults). Hauser and colleagues’ (2006) follow-up of individuals who were psychiatrically hospitalized as adolescents showed that major attributes of those who seemed resilient later in life included self-reflection or high awareness of their feelings and thoughts; self-efficacy or agency in making conscious choices about their lives; self-complexity in recognizing multiple facets to different situations; and persistence and ambition in education and careers.

Vaillant (2012) has established that tendencies to use developmentally mature defenses—such as altruism, suppression, humor, and sublimation—are associated with relatively positive outcomes, over and above the effects of IQ, education, and social class. In a long-term follow-up study of 73 adolescent inner-city boys, and a socioeconomically matched group with an average IQ of 115, Vaillant and Davis (2000) found that at the age of 65, one-half of the low-IQ men were comparable to the high-IQ group in terms of their own incomes and their children’s levels of education. These resilient low-IQ men were far more likely than their low-IQ, poor outcome counterparts to use predominantly adaptive defenses, with the latter group more often using maladaptive defenses such as turning against the self, projection, and fantasy.

Finally, there is accumulating evidence on the benefits of high emotional intelligence—the ability to perceive and express emotions, to reason about and use them, and to manage them to foster personal growth (Mayer, Roberts, & Barsade, 2008; Rivers et al., 2012). This construct is linked to higher social skills and fewer behavior problems in childhood (Mayer et al., 2008; Rivers et al., 2012), and among older youth, is associated with lower substance use and better academic grades (Parker, Summerfeldt, Hogan, & Majeski, 2004; Trinidad & Johnson, 2002).

Based on the accumulated evidence, therefore, there are two major conclusions about the role of intelligence in resilience. First, highly intelligent individuals are likely to reflect what Belsky and Pluess (2009) call “differential

susceptibility," that is, greater sensitivity to good *and* bad environmental influences. Second, rather than high IQ per se, resilient outcomes likely rest on more adaptive "meaning making" (Rutter, 2012)—individuals' phenomenological interpretations of events in their lives—with generally superior problem-solving abilities, better planning for future events, and more effective, developmentally mature coping styles.

Environmental Influences on Diverse Personal Assets

The previously described evidence on intelligence is paralleled by similar evidence on temperament, which has also been shown to confer protection against stress (Chen & Schmidt, Chapter 5, this *Handbook*, this volume; Luthar, 2006; Masten, 2001). Benefits have been found not only in relation to psychological and behavioral indices, but also biological ones. To illustrate, children low on behavioral inhibition may react less to stress than others, as suggested by evidence of resting right frontal EEG activation in inhibited children (Calkins & Fox, 2002), a pattern that is linked with tendencies to respond to stressors with negative affect or depression (Cicchetti, 2013).

Several studies have established the deleterious effects of poor self-regulation from early childhood onward (see Shonkoff & Phillips, 2000). In infants of families facing high adversity, lack of self-regulation at the age of 12 months was linked with increased behavioral problems over time (Halligan et al., 2013). Among low-income children, poor emotion regulation at the age of 3½ was related to low self-control at age 6 (Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002) and among children with low emotional knowledge at 7 years of age, significant increases in internalizing symptoms were seen over the next 4 years (Fine, Izard, Mostow, Trentacosta, & Ackerman, 2003). In a study of adolescents, those with high negative emotionality and low regulation exhibited the most maladaptive responses, including aggression, anger, and distress (Laible, Carlo, Panfile, Eye, & Parker, 2010). Overall, findings suggest that children with poor self-regulation tend to get into a cycle where dysfunctional social exchanges lead to isolation and thus sadness, and these emotions in turn jeopardize future interactions with others.

Whereas temperamental differences can be seen as early as infancy and they do show continuity over early childhood, both the manifestation and ramifications of temperament can be modified by environmental features. As Rutter (2000) noted, scientists have long moved past erroneous assumptions that "constitutional" factors are unalterable. Some children do have a tendency to be more impulsive or

oppositional than others, but their interactions with significant others shape the behavioral conformity they display. In a similar vein, some children are temperamentally more exuberant than others—and some feel negative emotions more intensely than do others—but the external manifestation of these emotions, and whether they lead to problematic social interactions, depends on the degree to which the children can modulate their emotions (Eisenberg et al., 2004). And children's abilities to modulate or inhibit the expression of emotions depend—as will be described in the paragraphs that follow—on the nature of their interpersonal relationships, particularly those early in life.

Emerging self-regulation depends squarely on relationships (see Thompson, Chapter 6, this *Handbook*, this volume). As Sameroff (2010) has underscored, "self-regulatory capacities are heavily influenced by the experience of regulation provided by caregivers.... This regulation by others provides the increasingly complex social, emotional, and cognitive experiences to which the child must self-regulate and the safety net when self-regulation fails" (p. 15). Consistent with these assertions, among young boys in low-income families, secure attachment to mothers and positive maternal control at the age of 1½ years predicted effectiveness of emotion regulation at the age of 3½, and this in turn was related to capacities for self-control at around 6 years of age (Gilliom et al., 2002). Beyond early childhood, Crossley and Buckner (2012) demonstrated that positive parenting practices were related to effective self-regulation skills in older children and adolescents living in poverty.

Other than IQ and self-regulation, there is parallel evidence showing that many other child attributes commonly labeled as protective factors are themselves shaped by the environment. Self-efficacy is strongly influenced by the degree to which adults encourage or hinder the child's attempts at manipulation and control (Bandura, 1997). Positive self-esteem can be protective for at-risk children but is itself affected by parental warmth and communication (McClain et al., 2010). Internal locus of control is often beneficial but chronic ill-treatment by parents or teachers sharply reduces children's capacities to maintain internality of control (Cicchetti & Toth, Chapter 13, this *Handbook*, this volume; Skinner, Zimmer-Gembeck, & Connell, 1998). Finally, spirituality can protect against depression and related problems, as can empathy and altruistic behaviors (Beardslee, 2002; Eisenberg, Spinrad, & Knafo-Noam, Chapter 15, this *Handbook*, this volume; L. Miller & Gur, 2002; L. Miller et al., 2012; Zhou, Valiente, & Eisenberg, 2003); these assets, in turn, rest on a strong sense of ethical

values transmitted to the child, and then reinforced by significant others in the family and community.

The preceding examples not only resonate with cautions in highlighting “protective child attributes” that are continually shaped by the environment (see Hanson & Gottesman, 2012; Luthar et al., 2000; Ungar, 2012), but underscore the importance—indeed, the necessity—of involving significant caregivers in child-focused interventions. In any efforts to bolster children’s own competencies, long-term success can be attained only when programs simultaneously involve adults in the children’s natural settings, including parents or teachers (Luthar & Cicchetti, 2000; Ungar et al., 2013). This is true even among children well past the infancy and preschool years, as seen in the exemplary work of Sandler, Wolchik, and colleagues (see Wolchik, Schenck, & Sandler, 2009). Working with school-age children of divorce, these investigators designed an intervention with separate programs for mothers and for children. Follow-up assessments, conducted several months after the program and then 6 years later, indicated that experimentally induced improvements in the mother-child relationship did lead to a reduction in children’s mental health problems, whereas working with children’s coping skills alone did not. The investigators credit changes in the mother-child relationship for later increases in program effects on adolescent self-esteem and effective coping, via cascading effects (Wolchik et al., 2009).

THE STATE OF THE SCIENCE: ISSUES OF CONSENSUS, CONTROVERSY, AND FUTURE DIRECTIONS

In this final section of our chapter, we review the state of the science of resilience in contemporary times, following almost 70 years of research. In turn, we discuss issues about which there is now broad consensus, and which can now be put to rest. Following this, we review major issues about which there are currently differing perspectives by scientists in the field, which pertain to broad research directions most profitably pursued at this stage. We conclude by reviewing salient directions for future interventions on resilience.

Issues Established or Confirmed

There are several issues that have been amply demonstrated, and are now considered “givens” in the field of resilience. The first is that this is a field of research and scholarship that is fundamentally applied in nature (Luthar

& Brown, 2007; Yates & Masten, 2004). This theme is recurrently emphasized in a special issue of the journal *Development and Psychopathology*, dedicated to Norman Garmezy, major progenitor of research on resilience. Masten and Tellegen (2012) underscored Garmezy’s recognition of the significant “potential for informing prevention, practice, and policy if the pathways that led away from psychopathology could be understood” (p. 346). Cicchetti and Rogosch (2012) noted that Garmezy advocated the study of protective processes toward informing models of primary prevention. Rutter (2012) pointed to Garmezy’s central goal of understanding, through rigorous research, how to best help children who contend with serious stress and adversity. Rutter’s (1987) own highly influential early paper on protective mechanisms was critical in illuminating how science can most effectively inform interventions (Werner & Smith, 1992). Similarly, describing her interest in uncovering protective processes across diverse high risk-contexts, Werner underscored that, “If we encourage and nurture these dispositions and competencies in our children as best we can, we have a basic survival kit for meeting adversities that tax the human spirit” (Werner & Smith, 1992, p. 204).

Aside from the fact that the central goal of resilience research is to benefit humanity, a second issue of consensus is that “resilience does happen”; we do not need more research that simply establishes its occurrence. Across all risk circumstances and age groups, there is inevitably a subset of individuals who show relatively positive adaptation. Some retain well-being right after exposure to the stressor under study; others falter for a while but then bounce back to health.

Third, the core finding derived from accumulated research is that resilience rests fundamentally on relationships (Luthar, 2006). This is true for adults as much as children, as evident in pithy assertions, in research reviews, that “Resilience is social, after all” (Zautra, 2014), and “Other people matter” (Peterson, 2006, p. 249).

Fourth, it is clear that there are multiple transactional systems involved in children’s resilient functioning. Proximal and distal environments affect the child, and the developing child in turn affects each of these, as the behaviors of youth affect their parents and their teachers. Furthermore, different aspects of the environment influence each other, as community cohesion affects parents who, in turn, contribute to cohesiveness as opposed to disorganization in neighborhoods.

Fifth, resilience is not fixed over time. At-risk children who reflect positive adaptation can falter over time if

there are unremitting stressors in their environment, just as those who reflect maladjustment can show dramatic improvements with positive changes in their caregiving environments.

Sixth, overt “successful adaptation” among at-risk children can coexist with nontrivial disturbances in adjustment; the more serious the adversity experienced, the more likely that some problems will coexist (unless there are major corrective experiences). These covert forms of maladjustment can include not just symptoms of depression or anxiety as was established decades ago, but also potentially serious problems of physical health (Brody et al., 2013; Felletti & Anda, 2010).

These last two issues were noted at the very outset of this chapter, but they warrant reiteration in this concluding section as there are major policy implications associated with declarations on “rates” of resilience (Luthar & Cicchetti, 2000). Scientists must be extremely cautious about making summary statements in this regard, because “diagnoses” of resilience obviously depend on the (necessarily limited) criteria that are used to define risk-evasion within a particular study. As Luthar and Cicchetti (2000) emphasized, for those whose science can significantly affect social policy with real implications for decisions to enhance or reduce external resources for highly vulnerable groups, it is imperative to maintain the very highest standards of self-scrutiny in scientific research and conclusions.

Issues Unresolved: Critical Directions for Future Research

Given the current state of the science, there are two major potential directions for future research on resilience. As these involve sharply different priorities in scientific foci—and attendant allocation of resources—we consider in some detail the likely yield of each toward effectively maximizing the well-being of at-risk youth and families.

The first direction involves multilevel studies that include biological indices as well as psychosocial ones. Starting around the turn of the century, there were several calls for the incorporation of biology into models of resilience (e.g., Charney, 2004; Luthar et al., 2000; Masten, 2001), given major advancements in studies of biological processes including technologies to manipulate the genome, examine endocrine functioning, and image the brain. Thus, multilevel models were considered important to illuminate biological processes implicated in psychopathology and well-being, and possibly to get some insights

into constraints within which environmental influences operate.

Over time, the accumulated evidence on biological processes has not only vastly enriched the basic science knowledge-base on developmental processes, but has been invaluable in advocating for the investment of resources in preventive interventions (Luthar & Brown, 2007). For decades, psychologists have noted the long-term negative effects of deleterious caregiving environments on children’s adjustment. Findings based on self-reports or observed behaviors, however, could be dismissed as partly reflecting personal choices or motivations. More persuasive as “objective evidence” are data that significant early adversity has substantial ill-effects on the brain’s architecture, and on the physiological systems implicated in coping. Equally powerful is evidence that sensitive and responsive caregiving can substantially *reduce* these negative effects of toxic stress (National Scientific Council on the Developing Child, 2005).

From the standpoint of advancing future applied work in the field of resilience, however, the yield of studies on biological mediators and moderators remains unclear (Luthar & Brown, 2007). As noted earlier, the central goal of resilience research is to make a difference via a concerted focus on “modifiable modifiers” (Garmezy, 1971), and changing biology is not in the realm of psychologists’ expertise.

To consider this issue more carefully, let us consider the three aspects of biology that have most often, in the decade prior to the time of this writing, been discussed in the context of resilience: brain plasticity, stress-reactivity (HPA axis), and gene by environment ($G \times E$) interactions. Beginning with the first two, studies in both neuroscience and neurobiology have established significant physical changes in reaction to the environment. As described earlier in this chapter, the quality of early environments affects neural networks and brain size, and these changes in the brain, in turn, have major implications for vulnerability to psychopathology (Cicchetti & Toth, Chapter 13, this *Handbook*, this volume). Neurobiological studies similarly show that the HPA axis is negatively affected by early adversity and conversely, that sensitive and supportive caregiving significantly buffers the developing HPA axis (Gunnar, Doorn, & Esposito, Chapter 4, this *Handbook*, this volume).

In both these instances, it would seem that the biological changes documented are more accurately described as *markers* of vulnerability or resilience, rather than “causes” that might be effectively altered in behavioral interventions. When institutionalized children show improvements in

gray matter of the brain after their adoption (see Sheridan, Fox, Zeanah, McLaughlin, & Nelson, 2012) or demonstrate normal growth trajectories for head circumference (Rutter et al., 2010), for example, they also show improvements in developmental quotient scores, and in various aspects of psychosocial functioning. Thus, changes in the brain's structure are among many markers of improved functioning. Similarly, children who show poor stress regulation via cortisol levels are also those likely to show poor regulation on psychological and behavioral dimensions, for example, via faulty attributions of others' behaviors (Cicchetti & Toth, Chapter 13, this *Handbook*, this volume; Gunnar, Doorn, & Esposito, Chapter 4, this *Handbook*, this volume). Again, dysregulation of the HPA axis may more aptly be characterized as a marker rather than a "modifiable" risk modifier.

As these biological changes inextricably co-occur with, and are manifested in, children's behaviors and affect (Cicchetti, 2013; Rutter, 2012; Sameroff, 2010)—dimensions that are far easier and less expensive to assess—one has to question the utility of measuring them in work that is centrally focused on promoting resilience. Intensive study of such processes is of obvious value to basic developmental science and to researchers who are committed to developing effective psychopharmacological treatments. But for those with expertise in psychological, behavioral interventions, the inclusion of biological mediators and moderators, in hopes that they will substantively and usefully guide future interventions, remains questionable (see Luthar & Brown, 2007; G. A. Miller, 2010).

We next turn to $G \times E$ interactions, the third aspect of biology increasingly mentioned in the context of resilience. Again, there is not yet compelling evidence that this is highly relevant to the field of resilience. Effect sizes are very small in these interaction effects, and even when they are statistically significant, it is not necessarily the risk-exposed child but rather the nonexposed child who is helped (Cicchetti & Rogosch, 2012).

Most important, there is no way that behavioral scientists are going to change the "G" part of this equation; at the same time, there is much that can and should be done to address potent risks in the "E" part. Discussing $G \times E$ research on child maltreatment, Cicchetti and Rogosch (2012) have cautioned that "gene variation is unlikely to be useful to identify maltreated children who may be more in need of intervention" (p. 425), even as they underscore the urgent need for concerted prevention efforts to alter the child's deleterious environment.

In future exhortations for the study of biological processes (and discrete psychosocial processes) toward

promoting resilience, therefore, it will be essential for researchers to explicate clearly (a) the modifiability of each of the vulnerability/protective risk processes posited as well as (b) the likely magnitude of their respective effects. This is particularly crucial at a time when national funding priorities—and concomitantly, developmental research foci—have veered disproportionately to a focus on biologically based research on mental health (see Eisenberg, 2014; Luthar & Brown, 2007; Miller, 2010; Sameroff, 2010). As many as 75%–80% of American children and adolescents who need mental health services today do not receive them. For the thousands of at-risk children and families lacking health insurance compelling evidence is needed to show that there is, in fact, hope for individualized tailoring of mental health interventions for children according to their unique psychobiological or genetic profiles, and that these will yield substantial improvements in their well-being.

We emphasize that our central point here is by no means to be "psychosocial evangelists" (Rutter, 2006, p. 224), but to be aware of the potential costs to prevention science. A large-scale, collective insistence on including biology in research designs (not to mention intervention trials) will inevitably detract substantially from bringing promising behavioral interventions to scale. Our central messages, therefore, are for those whose scholarship and research, based in an understanding of transactional, developmental systems, are committed to illuminating effective programs and policies that foster positive human development—where so very much remains to be done in understanding and changing environmental risks that are known all-too-well to have a profound influence.

Central Priorities: Reducing Child Maltreatment

With this applied conceptualization as a backdrop, we now discuss what we believe are the most pressing needs in future research on resilience. We begin this discussion with the single most important potent "vulnerability factor" that has been identified to date, and one that continues to be an alarming problem for today's youth: maltreatment by parents.

The damage caused by prolonged maltreatment is staggering—this has been repeatedly emphasized (Cicchetti, 2013)—yet, there is a startling lack of understanding about how best it might be reduced. Little is known about protective processes that substantially reduce risks for maltreating behaviors among at-risk children's primary caregivers, usually—and across settings—their mothers (relationships with fathers are obviously also important, and are discussed later).

Because it is well-known that depression and stress vastly impair all aspects of mothers' parenting, a concerted attention to *mothers' well-being as a dependent variable* is needed (see García Coll, Surrey, & Weingarten, 1998; Luthar, 2010). A mother who is psychologically depleted cannot consistently express warmth, enforce appropriate limits, and maintain regular schedules in the home, and without respite, will inevitably be in danger of neglecting or maltreating her children and of failure to shield them against maltreatment by others (Luthar & Brown, 2007). Echoing these assertions, Shonkoff and Fisher (2013, p. 1645) argued that "Promoting resilience in young children who experience high levels of adversity depends upon the availability of adults who can help them develop effective coping skills.... Caregivers who are able to provide that buffering protection have sound mental health and well-developed executive function skills in problem solving, planning, monitoring, and self-regulation."

Future resilience research must focus, therefore, on disentangling what might significantly minimize at-risk mothers' "ego-depletion," and promote their "ego-replenishment." Knowledge of appropriate parenting behaviors is important but this alone is by no means enough; indeed, mothers who fall short (impoverished as well as affluent) often know what are "bad" or "good" parenting behaviors, but do not have the energy or strength to do what is called for (Luthar et al., 2007; Luthar et al., 2013). Thus, developmental scientists must systematically illuminate what most benefits the well-being of "mothers as persons" (Gewirtz, Forgatch, & Wieling, 2008; T. M. Williams et al., 1987), an overarching construct that shapes all parenting behaviors and interactions with children. Moving beyond our long-standing focus on the many critical ways in which mothers affect their children, researchers must examine, with equally rigorous science, the processes that most affect mothers' own states of despair versus equanimity.

One might contend that social support is known to be helpful to mothers (as described earlier in this chapter), but at this time, there is no clear understanding of which specific forms of support are most beneficial. Existing studies have operationalized support in various ways, including instrumental support such as willingness of family members to lend money or help with childcare; emotional support, such as feelings of belonging, emotional security, trust, and nurturance; or combinations of these.

A postulate worth testing in the future is that—as for children—the single biggest predictor of a mother's well-being is whether she feels dependable acceptance and support for herself, as an individual and as a parent.

This was long argued by Knitzer (1982, 2000), a pioneer in children's mental health, who consistently advocated relationship-based interventions for at-risk mothers. It is a postulate consistent with early findings on low-income mothers that more than the actual receipt of social support, it was the expectation that it would be there if needed, that was more powerfully benefited women's parenting (e.g., Hashima & Amato, 1994). Indeed, it is entirely logical that when mothers feel a sense of psychological safety and of being "tended" themselves (Taylor, 2006), they will function well across multiple parenting behaviors (Luthar, 2010; Rotheram-Borus et al., 2011).

Multilevel, Transactional, Relationship-Centered Models

Future research on resilience must, therefore, be grounded in multilevel, transactional models that have, at the core, the quality of relationships between children and their primary caregivers, with these in turn ensconced within the contexts of extra-familial support systems (see Figure 7.1). Reis, Collins, and Berscheid (2000) have provided a useful guiding paradigm in this regard, with the following tenets: (a) From conception onwards, individuals are nested in social relationships; (b) each dyadic relationship is itself nested within a social and physical environmental system; (c) these systems in turn are embedded in larger societal

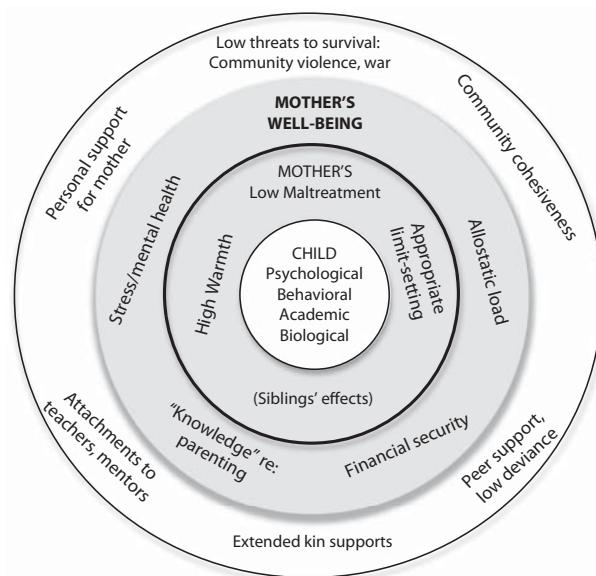


Figure 7.1 Multilevel, transactional systems: Prominent risk modifiers fostering childhood resilience.

Note: As used here, the term "Mother" refers to the child's primary caregiver, but this could be the father in some at-risk families. The emphasis is on ensuring gender-sensitivity in conceptualizing predictors of the primary parent's well-being.

systems; (d) all of these systems continually evolve and influence each other over time. Given all we have learned from developmental research on resilience, the primary focus, in the years ahead, must be to illuminate which aspects of the ecological surround most powerfully bolster the single most powerful dyadic relationship affecting children's development, that with the primary caregiver.

In future efforts to identify exosystemic processes that benefit children's caregivers, developmental scientists will need to collaborate with sociologists and anthropologists with expertise regarding cohesiveness in communities. Researchers will need to draw upon accumulated knowledge—including ethnographic and qualitative evidence (see Weisner, 2005)—about processes that best help to enhance mutual supportiveness among parents in neighborhoods, then derive testable hypotheses, and begin to test these systematically in increasingly sophisticated, multilevel quantitative developmental models.

Research Designs: Within-Group and Within-Gender Analyses

In terms of research design, developmental scientists will have to prioritize in-depth studies of salient processes within particular high-risk contexts (see Spencer, Swanson, & Harpalani, Chapter 18, this *Handbook*, this volume). The inclusion of "low-risk" comparison groups in resilience research is not just unnecessary, but detracts from resources well-spent in disentangling critical protective processes among samples of youth facing major risks (e.g., Hauser et al., 2006; Laub & Sampson, 2003).

The value of within-group studies is well-illustrated in García Coll's work on the "immigrant paradox," wherein first-generation immigrants to the United States often fare better than their children, who are more assimilated into American ways (García Coll & Marks, 2011). A mixed-methods longitudinal study of three groups of immigrant families—Cambodian, Dominican, and Portuguese—revealed several group-specific processes. The Cambodian children reflected the immigrant paradox, with better academic performance among those whose mothers had recently immigrated to the United States. In contrast, for the Dominican youth, higher acculturation to the United States was associated with better grades, whereas cultural attitudes had no effects—negative or positive—among Portuguese youth. These differential sets of predictors were likely related to group differences in the degree of contact retained with families in countries of origin (the lowest for Cambodians and highest for Dominicans) and the degree to which they blended in with mainstream

American culture (the highest for Portuguese, with fair-skinned complexions).

In a related vein, developmental research on at-risk parents must entail rigorous exploration of within-gender processes. Whereas mothers are generally primary caregivers across cultures and socioeconomic settings, there are many instances where it is fathers who maintain primary responsibility in rearing their children, and what affects a mother's personal well-being cannot be assumed to be the same as what affects fathers. In reviews of the literature, Lamb and his colleagues have established that fathers on average spend less time with their children than do mothers, and in some though not all cultures are involved more in play than in caregiving (see Lamb, 2004; Lewis & Lamb, 2003). In traditional families, fathering may also be more impacted by the quality of the marital relationship (satisfaction and level of support) than is mothering. Accordingly, it will be critical, in future research on resilience, to conduct analyses separately by parents' gender, and instead of using gender-neutral terms about at-risk "parents," to describe patterns specific to fathers and to mothers (see Phares, Lopez, Fields, Kamboukos, & Duhig, 2005; Rotheram-Borus, Stein, & Lin, 2001).

Cross-national interventions further attest to the critical importance of attending to gender-specific needs of at-risk parents. Randomized trials with families affected by HIV indicated that across countries (United States, Thailand, and South Africa), men typically responded to stress with flight-or-flight responses, and women with tending and befriending (M. J. Rotheram-Borus, personal communication, September 12, 2013; Rotheram-Borus et al., 2011). Accordingly, interventions were designed to accommodate these gender differences in both delivery formats and activities. Community-based "mentor mothers" were most beneficial for affected women, for example, whereas men were more likely to be engaged via group activities such as those involving sports or vocational training.

Operational Definitions of Core Relationships: Predictors and Outcomes

With all the rich evidence on discrete parenting behaviors that foster resilience, more research is needed to disentangle what exactly it is that forms the central, essential ingredients of children's beliefs that they are truly loved and cherished. All of the manifestly resilient children in Werner's Kauai study had "at least one person in their lives who accepted them unconditionally, regardless of temperamental idiosyncrasies, physical attractiveness, or intelligence" (Werner & Smith, 1992, p. 205). In developmental

science, researchers need to finesse how best to operationalize and capture this broad, overarching dimension from the children's own perspectives.

A critical component is likely to be a steadfast sense of safety; a conviction that the adult will "be there" in times of need. Among youth who experienced considerable disruptions of early foster placement, Dozier, Lindhjem, and Ackerman (2005) identified the importance of children's confidence that their caregiver would stand between them and danger. This sense of security was powerful in predicting long-term indicators of well-being (psychological and biological), more so than the quality of early attachments, or whether the caregiver would comfort the child when distressed. Resonant with these research findings is the description of his mother, by NBA star LeBron James—who grew up in dire poverty, never met his father, and moved 12 times between the ages of 5 and 8.

Whatever my mom could do or could not do, I also knew that nobody was more important in her life than I was. You have no idea how much that means when you grow up without so many of the basic things you should have. You have no idea of the security it gives you, how it makes you think, "Man, I can get through this. I can survive." (Manfred, 2013)

In future research on resilience, it will be important to capture this sense of felt security not just in relation to mothers and fathers but also with other adults, and across different developmental periods. Studies thus far have tended to focus on relationships within particular ecological contexts, but rarely, simultaneously across multiple levels. It would be useful to capture the degree of overall security that the child subjectively experiences, considering not just parents but also teachers, mentors, extended kin, and other adults. Just as cumulative risk scores explain high variance in maladjustment, it is plausible that "cumulative love" scores will account for high variance in resilient adaptation.

Implicit in the aforementioned suggestions is the importance of capturing children's own perspectives on different socializing influences. A widespread tenet of developmental science is that self-report data are biased and thus nonoptimal, but in resilience research, there must in fact be concerted focus on children and adolescents' phenomenological, subjective interpretations of their own realities (Spencer, Swanson, & Harpalani, Chapter 18, this *Handbook*, this volume). The power of contextual factors, arguably, rests largely on the psychological meaning given them by the individual (Rutter, 2012). Emphasizing this point in the context of school climate, Deci and Ryan

(1987) noted that if a given child were to perceive his or her teacher as being highly controlling (regardless of others' ratings), this child could relate to the teacher in ways that lead the teacher to be more controlling with the child, resulting in a mutually exacerbating pattern.

It is important to note, furthermore, that the "problem of shared variance" is easily corrected for in multivariate analyses that include other reliable and valid self-report indicators. To illustrate, with self-reported distress of youth as an outcome, multivariate regressions can simultaneously consider the child's felt closeness to mothers and to fathers, alienation from each parent, monitoring and supervision, as well as perceived criticism. These multiple predictors clearly partial out shared method variance due to self-report of predictors and outcomes, and will illuminate the unique predictive power of each predictor variable (see Luthar & Barkin, 2012).

Obtaining children's own perspectives is critical not just in assessing the quality of their relationships (predictors), but also in capturing intrapsychic aspects of their own adjustment, including positive as well as negative dimensions. In studies of resilience of children and youth thus far, researchers have assessed internalizing and externalizing symptoms, but have neglected indices such as subjective well-being, personal equanimity, optimism, and orientation to intrinsic goals such as personal growth (Luthar, Lyman, & Crossman, 2014).

As the measurement of self-reported adjustment domains is expanded, so too must there be expansion of domains encompassing others' ratings to include—indeed, to prioritize—perceptions of kindness, compassion, and social justice (see Killen & Smetana, Chapter 17, this *Handbook*, this volume). In behavioral measures of "doing well," resilience researchers have relied chiefly on adults' and peers' judgments of whether children adequately meet stage-salient societal expectations, such as getting along with peers, conforming at school, achieving acceptable grades, or holding a job. What is missing are behaviors reflecting proactive generativity, or doing for the greater good—behaviors that are not just positive outcomes in themselves, but also carry the potential to engender cumulative benefits over time. Among the children of Kauai, youth who demonstrated resilient adaptation as adults were those who, "At some point in their young lives, usually in middle childhood and adolescence . . . were required to carry out some socially desirable task to prevent others in their family, neighborhood, or community from experiencing distress or discomfort" (Werner & Smith, 1992, p. 205). Similar findings are evident in Elder's longitudinal

research on youth growing up in the Great Depression, showing that the assumption of new responsibilities in the family was beneficial for adolescents (Elder & Conger, 2000), possibly reflecting “steeling” effects of successfully coping with early family adversities (Rutter, 2012).

Obtaining significant others’ judgments of altruism and social justice must be prioritized in future studies of resilience, among youth and adults alike. Little (2011) has argued that, in adulthood, the most compelling definition of a “life well-lived” is not just self-reported health and happiness, but when the person is judged as committed to doing for others, with positive contributions to society. Similarly, generativity can and should be considered a core positive outcome in operationalizing resilience among children and youth. If the ultimate goal is to promote the well-being of humanity or a “civil society” (Lerner et al., 2003), then humanitarian acts must be a central outcome in how we define children’s positive outcomes in the science of resilience (Luthar et al., 2014).

Intervention Needs: Understanding Mechanisms of Change and Going to Scale

As with directions for basic research on resilience of parents, scientists much disentangle the most powerful underlying active ingredients in parenting interventions that have proved to be effective. Again, it is plausible that over and above learning particular skills, it is improvements in mothers’ overall well-being, within the context of supportive relationships, that is an indispensable “engine” of change. This is suggested by the core components of many existing evidence-based programs. To illustrate, Webster-Stratton’s (2001) the Incredible Years intervention provides training to improve parenting skills and children’s school readiness, while helping parents’ cope with their personal problems; in this program, connections with “buddies” from parent groups allow members to create valuable support networks (Borden, Schultz, Herman, & Brooks, 2010). Ammerman and colleagues’ (2005) Every Child Succeeds program, combines in-home cognitive behavior therapy for depressed mothers with a supportive home visiting component. In other effective interventions described earlier in this chapter (Cicchetti, Rogosch, & Toth, 2006; Dozier et al., 2002; Luthar et al., 2007), a cardinal component is consistent respect, warmth, and support displayed by project staff or therapists to participating mothers.

In attempting to go to scale with relationship-based interventions for mothers, we in science might do well to learn from an effective, widely used intervention that has

been developed by laypeople and involves minimal costs—a critical consideration in these times of limited resources for mental health care—that is, Alcoholics Anonymous (AA). Begun in the 1930s, this is the most commonly sought after source of help for alcohol-related problems with more than 1.3 million Americans meeting each week. The therapeutic benefits of this program can be on par with those of professional interventions, and in some instances, even greater (see Kelly, Hoeppner, Stout, & Pagano, 2012).

Notably, this program is based on processes of change that have a strong basis in science on protective processes in resilience. These include the presence of adaptive, consistent support networks, a realistic, flexible locus of control, and an emphasis on spirituality (see Crape, Latkin, Laris, & Knowlton, 2002; Galanter, 2007; Kelly et al., 2012). Powerful benefits are believed to derive from attendees’ shifts to adaptive social networks (e.g., with reductions in pro-drinking network friends); members speak of unconditional acceptance in “the rooms,” the absence of shame in sharing their most private failings, and their ability to reach out to others at times of stress. With regard to locus of control, a cardinal program goal is striving to accept situations that are outside one’s control, and to actively address those in which outcomes can be personally influenced. The spiritual component, finally, does not necessarily imply practicing religion, but is akin to how it has been defined in science (Greenfield, Vaillant, & Marks, 2009), with an emphasis largely on tapping one’s inner resources, recognizing a power greater than oneself, and feeling a profound sense of caring for others.

Given its effectiveness—and again, the significant fact that it entails minimal costs, shared by members—the AA model might usefully be used for future community-based groups to promote resilience among at-risk mothers (and for at-risk custodial fathers). If in fact the power of AA meetings does lie largely in the authentic connections forged with others sharing similar struggles, with supportive reminders of their own behaviors that can and should be controlled (versus uncontrollable events), this is a model that might usefully be applied for caregivers vulnerable to parenting disturbances (see Luthar et al., 2007; O’Dougherty Wright, Fopma-Loy, & Oberle, 2012).

Increasingly, leaders in prevention and treatment have urged scientists to bolster relationship-based networks that already exist in communities, and to harness these in interventions that can become self-sustaining over time (Knitzer, 2000; Zigler & Finn-Stevenson, 2007). Noting the extensive support that existed among gay men during the early years of the AIDS epidemic, for

example, Rotheram-Borus has exhorted future wellness initiatives that are centrally focused on strengthening social networks within at-risk communities (Rotheram-Borus, Swendeman, & Flannery, 2009). Kazdin and Rabbitt (2013) have described several low-cost, feasible, and effective interventions that use trained laypersons (as opposed to professional psychotherapists), including hairstylists in beauty salons trained to assess depression and anxiety and to provide appropriate referrals, and lay counselors for treating such problems, again, with structured training and appropriate backup for those who need psychotropic medications.

Community and School-Based Systemic Interventions

We close this chapter with directions for interventions beyond the parents and family, beginning with illustrations of established, effective, multilevel interventions that we believe provide models of programs that could, profitably, be taken to scale. The interventions we describe differ somewhat in the core foci—on neighborhoods or schools, for example—but what they have in common is attention to relationships at multiple levels of children’s ecological systems. In other words, all of these interventions reflect explicit cognizance that as long as children remain in settings that are damaging to their adjustment—with failures in systems ranging from communities and schools to law enforcement and social service agencies—any pull-out efforts to promote particular child skills will have limited value; conversely, drawing upon assets across multiple systems is both cost-effective and efficacious over the long term (Pianta & Walsh, 1998; Ungar, 2012; Zigler & Finn-Stevenson, 2007).

Ensuring children’s physical safety in their neighborhoods and communities is the most basic goal in promoting resilience, and there now exist several programs addressing interconnected systems toward combating community violence (Ager, 2013). The Child Development-Community Policing Program (CD-CP) in New Haven (<http://childstudycenter.yale.edu/community/cdcp.aspx>), for example, utilizes a collaborative model involving mental health, law enforcement, education, juvenile justice, and judicial and social services in an effort to reduce the negative effects caused by exposure to violence, while appropriately addressing legal consequences.

There is also much promise in community-based interventions that focus on positive interactions within and across families, such as the “Schools and Families Educating Children” (SAFE Children) intervention (Tolan,

Gorman-Smith, & Henry, 2004). This preventive program is focused on promoting strong family relationships and developing support networks in the neighborhood, with attention also to children’s academic functioning. Similarly, the Promise Neighborhoods initiative (Komro et al., 2011) uses local resources to support the development of children in at-risk communities, with a focus on key malleable factors including influences from the family, peers, schools, and other organizations. Also warranting more exploration are preventive community efforts that involve collaboration directly with groups of youth, such as the Youth Empowerment Solutions for Peaceful Communities (YES) program (Zimmerman, Stewart, Morrel-Samuels, Franzen, & Reischl, 2011).

In efforts to go to scale with such evidence-based neighborhood interventions, attention to local contextual needs and priorities is crucial. Intervention programs that are established with sensitivity to concerns of those in the neighborhood (via needs assessments) have much greater success with recruitment and retention, and in addition, those programs that operate in partnership with local citizens, schools, and agencies are more likely to be sustained over time (Komro et al., 2011; Lapalme, Bisset, & Potvin, 2013).

In the setting of schools, researchers must capitalize more on the potential to use caring adults as allies in fostering resilience, expanding efforts based on existing interventions, and targeting not just elementary school students but also those in middle and high school (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; J. N. Hughes, 2012; Pianta et al., 2012; Sabol & Pianta, 2012). As with communities, in bringing school-based interventions to scale, it will be vital to build upon “indigenous resources” (Atkins, Hoagwood, Kutash, & Seidman, 2010, p. 42), that is, existing school personnel such as school psychologists, teachers, administrators, and support staff, as opposed to outside professionals. Involvement of local school personnel in planning and implementation stages is critical in ensuring that adopted programs will be sustained as part of a school’s regular programming, rather than a temporary, intrusive or cost-intensive add-on.

From a pragmatic standpoint, Becker, Darney, Domitrovich, Keperling, and Ialongo (2013) have provided specific, useful directions for the large-scale implementation of school-based programs that are known to be effective, addressing the important issue of teachers’ need for ongoing support. Using examples of two evidence-based programs (the Good Behavior Game and the PATHS curriculum; Embry et al., 2003; Greenberg & Kusché, 2006),

the authors outline directions for ongoing professional development in the form of a two-phased “coaching model.” This entails an initial universal coaching phase for all teachers, followed by a tailored coaching phase, varying according to the strengths and needs of each teacher. If childcare workers and teachers are to be the safety net when at-risk parents falter, it is imperative that they, in turn, receive support, validation, and guidance as needed, in their ongoing everyday responsibilities.

CONCLUSIONS

In the years ahead, resilience researchers would do well to adhere firmly to goals underlying the work of pioneers who initiated research in this field—to make a difference; to maximize the well being of children, families, and society. With this in mind, our first priority must be to systematically illuminate how harm to our young can best be minimized. This, in turn, will require careful choices in prioritizing vulnerability and protective influences included in research studies. No scientist can hope to examine all indices that affect children, psychosocial and biological. But for behaviorally trained researchers in the field of resilience, the choices are helpfully narrowed, knowing as we do that our central charge is to illuminate forces that are *broadly deterministic*: with large effect sizes, and set in motion other beneficial effects. Including biological mediators and moderators because the technologies are now available, or because it is the prevailing trend, is not necessarily helpful; this is not our realm of expertise, we cannot change these, and even if we could, effect sizes are small. Most importantly, many of these biological markers are themselves strongly affected by relationships in the environment—which lie squarely within our domain of expertise.

In conclusion, our pressing tasks may be summarized thus. Foremost, we must understand more clearly what minimizes maltreatment by primary caregivers, and promotes positive parenting; illuminating exosystemic, community-based processes that are most critical in affecting these. We need to go to scale with evidence-based interventions—especially those that build upon resources existing in communities—as we work with mothers and fathers, and with teachers and mentors, to provide and sustain the most nurturing possible environments. Concerted attention to bolstering positive relationships within families, schools, and communities is our best hope in fostering resilience of at-risk youth, and of the adults charged with their care.

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CHAPTER 8

Socioemotional Consequences of Illness and Disability

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Developmentalists have long been concerned with the ways in which individual child characteristics serve to affect the nature and course of development across childhood, as well as how ontogenetic processes influence the expression and function of child characteristics. Indeed, the study of such complex relations has a rich history that has in many ways defined developmental science, and can be easily seen across the chapters in this *Handbook*. Nonetheless, the presence of childhood illness or disability, both of which represent immensely influential characteristics that may serve to deflect or alter developmental trajectories, has

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had only a relatively minor reach into basic developmental science.

This historical lack of attention has several probable sources, and these sources may be either shared or differentiated depending on whether it is disability or chronic illness that is at issue. One concern is whether or not children with an atypical status are considered somehow categorically different from typically developing or healthy children, and therefore of less theoretical and empirical interest or relevance to basic developmental theory. Hodapp and Dykens (2004) raised this possibility with respect to mental retardation in particular. But the emergence of developmental psychopathology as an integrated field of inquiry, from its early conceptual roots (Cicchetti, 1984) to its current paradigmatic strengths (Cicchetti & Toth, 2009), suggests that atypicality alone is not a justification for exclusion from mainstream perspectives. In fact, the

presence of atypicality is a call for inclusion in the ways in which it can both inform and be informed by general developmental frameworks (Cicchetti, 1984). An argument for a focus on developmental approaches to understanding child illness can be traced back three decades as well (Maddux, Roberts, Sledden, & Wright, 1986), with notations of the importance of addressing complex developmental models and perspectives (Noll & Bukowski, 2012). Still, developmental interest has not materialized in a way that might have been expected given the salience for children with disabilities or chronic illnesses of particular constructs that dominate more mainstream developmental perspectives on socioemotional functioning, including issues related to emotion regulation and coping, executive function, parent-child relationships, peer relationships, and behavioral competence.

Disability and chronic illness represent a vast array of heterogeneous conditions in childhood that vary widely in severity and effect, and have their own unique characteristics and contexts that invite developmental study. But these differing conditions also represent a constellation of factors that may well be shared by any child whose experience entails some degree of atypicality. A chapter whose goal it is to somehow represent the developmental issues inherent in an understanding of children with developmental disabilities and chronic health conditions is faced with the challenge of determining just where these fields of inquiry cohere, and where they do not, with respect to the developmental processes involved. It is our task to identify the fundamental similarities, and determine how the developmental issues addressed have bridged ontogenetic models of risk and resilience in the prediction of children's socioemotional competencies over time.

Combining a discussion of the socioemotional consequences of both illness and disability within a single chapter suggests that there may be a broad overarching theory of atypicality that can be uniformly applied to such an understanding. Of course, that is something of a naïve or simplistic perspective and the current, much more nuanced and complex developmental models that engage transactions among risk, resilience, context, and systemic influence over time belie any such understanding (Sameroff, 2009). Nevertheless, there is a core group of issues that seem equally applicable across contexts of illness and disability. The chronic nature of the conditions, the additional stresses associated for both children and families, the risk for social relationships, the challenge for regulatory function across domains of emotion and behavior, and the need to negotiate multiple medical and educational contexts are

but a few of those for which some essential features may be shared. Indeed, a handful of studies have emerged that even address the context of coexisting illness and disability (e.g., Blackman & Gurka, 2007; Oeseberg, Dijkstra, Groothoff, Reijneveld, & Jansen, 2011). But although there are a number of features for which similarities can be found, there are also crucial differences that suggest the need for the two conditions to be considered separately with respect to developmental process. Differences may be found on issues that address the level of impairment across domains of functioning, the degree to which basic childhood and family activities must be restricted, and expectation for independent living among others. Additionally, chronic illness in childhood does not often share the same sense of stigma or of developmental "abnormality" that is associated with developmental disabilities, and especially intellectual disabilities (ID). Being typically developing but with a chronic illness that may affect some developmental competencies is perceived differently from having a disorder that is defined specifically by developmental compromise.

These issues are complex, and the integration across the two broad categories of childhood illness and disability challenge existing developmental perspectives to accommodate those differences as well as the similarities. Within the framework of this chapter, we will address both developmental disabilities (DD) and chronic health conditions (CHC) together within each section, separating the two when necessary but drawing both connections and distinctions where appropriate. Within the context of disability, we will focus predominantly on conditions associated with intellectual disability (ID), although where appropriate the broader, more inclusive context of intellectual and developmental disabilities (IDD) will be addressed. Our primary focus on intellectual disability will allow continuity with previous reviews in this series (Hodapp & Dykens, 2004), but also captures the particular depth and richness in developmental modeling that is continuing to emerge in the field (Crnic, Pedersen y Arbona, Baker, & Blacher, 2009). With respect to consideration of illness, we will use the terms illness (CI) and chronic health conditions (CHC) interchangeably as reflected in the relevant literatures reviewed. Given the breadth of the conditions that are subsumed under each of these categories, attention will be focused on those categories of disability and illness that have the greatest breadth with respect to conceptual and empirical approaches to understanding socioemotional functioning, and are grounded in developmental approaches that highlight the critical issues necessary to advance the next generation of study.

Contemporary perspectives on child development are growing more sophisticated at a rapid rate, reflecting the increasing complexity of our measurements, methods, and integrative conceptual models. Development is not only influenced by ongoing everyday interactions within microsystems that contain the child, but also by interactions between systems that operate at mesosystem levels (Kazak, Rourke, & Crump, 2003). Although the complexity and sophistication of emerging developmental science is often now taken for granted in the study of typically developing children and their families, such developmental modeling has not been as easily incorporated into research with children who experience chronic health or disabling conditions. Yet these conditions represent unique child characteristics that influence developmental processes over time, and operate within organizational and transactional frameworks to affect the course of children's well-being and competence (Power, 2006), despite the fact that much of the literature continues to reflect main effect approaches to understanding developmental differences between children with chronic conditions and those who are healthy and typically developing.

The lag in sophisticated developmental modeling for children's socioemotional competencies may reflect the historical expectation that the presence of delay or some other adverse chronic condition was likely to result in uniformly poor developmental outcomes, and those outcomes could be expected across domain. However, this ubiquitous negative or pathological approach has been mostly abandoned for contemporary models that reflect more balanced and nuanced perspectives in which developmental processes are not solely determined by the presence of some specific disabling or chronic condition but instead are influenced by the same complex pathways of influence that represent the interplay of genes, individual child characteristics, parenting, family, peer, school, and innumerable other contexts that emerge and exert their influence across the developmental period.

This chapter will attempt to explore in some depth the complexity of specific developmental processes that address the socioemotional functioning of children with chronic health or disability conditions. Our predominant focus on social and emotional issues reflects an emerging recognition of the importance of these developmental facets not only as outcomes associated with the presence of particular chronic conditions, but also as key process factors or mechanisms that link chronic conditions to related functional and contextual outcomes. We begin by defining the nature of illness and disability, and describing

the scope of the challenge presented by these conditions for children, their families, and society. This background is followed by an exploration of the salient emotional and social correlates and consequences of illness and disability, as well as the risk for psychopathology that has been extensively explored in these populations. Next, we highlight contemporary perspectives on genetic as well as contextual influences involving family, school, and culture as determinants of socioemotional functioning for children, followed by a brief review of intervention research that has addressed socioemotional competencies in these high-risk children and families. Finally, we consider critical directions for research in the next decade.

DEFINITIONS AND EPIDEMIOLOGY

There is substantial heterogeneity and range in developmental disabilities as well as chronic diseases seen in childhood. They both vary in severity of symptoms, time course, treatments or interventions, and their immediate and long-term effects on multiple domains of physical, cognitive, and social functioning (Noll & Bukowski, 2012).

Defining Chronic Illness

In an early attempt to conceptualize the variability in chronic illness, Rolland (1994) suggested that illness could be differentiated along five dimensions: the nature of its onset (acute versus prolonged), its course (consistent versus cyclic), its severity, the level of incapacitation, and its outcome (mild versus severe). Although helpful in framing the basic issues, this approach is limited by the fact that each of the dimensions represents factors that are intrinsic to the disease itself rather than representing any transactional relations among other child characteristics and the multiple contexts in which children develop (Power, 2006).

Multiple conceptualizations and definitions of child chronic illness exist, and this lack of consensus has proven troublesome in identifying the full scope of the issue (van der Lee, Mokkink, Grootenhuis, Heymans, & Offringa, 2007). Nevertheless, several reasonable conceptualizations have emerged. Van Cleave, Gortmaker, and Perrin (2010) suggested that chronic health conditions involve physical, emotional, or mental conditions that prevent regular school attendance and schoolwork, prevent a child from engaging in other typical activities, and require frequent and ongoing medical treatment. Mokkink, van der Lee, Grootenhuis,

Offringa, and Heymans (2008) defined chronic illness as a health problem that lasts at least 3 months, affects a child's normal activities, and requires frequent hospitalizations, home health care, or extensive medical intervention. Compas, Jaser, Dunn, and Rodriguez (2012) suggest that chronic illnesses that affect children and adolescents are often characterized by an acute phase that surrounds the diagnosis, which is followed by ongoing stresses that are linked to processes involving the needs for extended treatment, recovery time, and concerns involving survival. The various phases create ongoing stresses for children and families.

Scope and Prevalence of Chronic Illness in Childhood and Adolescence

Although the absolute numbers vary depending on the methods and definitions employed, the sheer scope of CHC in childhood and adolescence is staggering. It has been suggested that by 2015, worldwide, as many as 1.2 billion children between the ages of 5 and 14 years will have some form of significant chronic condition (Huff, McClanahan, & Omar, 2008). In the United States, the percentage of children and adolescents with chronic health conditions changed dramatically in the past 50 years, increasing from about 2% in the 1960s to more than 25% in 2007 (Van Cleave et al., 2010), although the reasons for such changes may not be entirely clear (Halfon & Newacheck, 2010). Notably, in the United States, more than 50% of the children with chronic health conditions are ethnic minority and/or low SES (Clay, 2009). Not surprisingly, rates of specific CHC range widely both in the United States and globally. For example, more than 10,000 children are diagnosed with cancer each year in the United States; and over 10.5 million children globally have epilepsy. Overweight and obesity are becoming especially more problematic for children's health globally. Estimates from the 2011 World Health Organization (WHO) report suggest that there were 40 million (6%) infants and young children globally with weight-for-height ratios above 2 standard deviations of the growth standards median (WHO, 2011). Prevalence of overweight was greatest for those in upper-middle-income families, although lower-middle-income families showed the fastest rise. Lower socioeconomic status in high-income countries, such as the United Kingdom and the United States, tends to be linked with a higher prevalence of obesity. Indeed, Van Cleave et al. (2010) have suggested that the increasing prevalence of chronic illness in children

overall may in some ways be driven by the epidemic in childhood obesity.

Defining Disability

Developmental disabilities is a broad construct defined by a set of abilities and characteristics that vary from the norm and pose limitations on independent participation and acceptance in society (Odom, Horner, Snell, & Blacher, 2007). These disabilities are "developmental" in nature because the limitations appear in core developmental areas including cognition, language, social, and motor functioning and appear during the "developmental period," typically before young adulthood (18–22 years of age). Subaverage intellectual functioning is a core feature of many developmental disabilities; however, disabilities may also appear in individuals with normal or above average intelligence. Currently, the term "developmental disabilities" captures the formal diagnostic categories of intellectual disability (formerly termed mental retardation), autism, pervasive developmental disabilities, cerebral palsy, and other specific syndromes that exhibit intellectual disability and/or specific behavioral and phenotypic symptoms such as Down, Rett, Fragile X, Prader-Willi, and Williams syndromes.

Theory and research on ID has a long and rich history that is pertinent to present perspectives on the socio-emotional consequences of the condition. As research and social constructions of disabilities have evolved, so has the definition of ID. Currently, ID is characterized by significant deficits in both intellectual functioning and adaptive behavior. The *Diagnostic and Statistical Manual*, Fifth Edition (*DSM-5*; American Psychiatric Association, 2013) criteria for ID include an intelligence quotient (IQ) below 70 and deficits in at least two behaviors related to adaptive functioning that must be present during the developmental period. This definition is consistent with the classification of ID in the international system (i.e., *International Classification of Diseases; ICD-10*; WHO, 1992) as well as the definition used by the American Association of Intellectual and Developmental Disabilities (AAIDD; Schalock, Luckasson, & Shrogren, 2007).

The most recent version of the *DSM* replaced the diagnosis of "Mental Retardation" with "Intellectual Disability" and moved away from the multiaxial approach placing intellectual disability and all other mental disorders on a single axis. Additionally, adaptive functioning is now organized into three domains: conceptual skills, social skills,

and practical, or self-management, skills, and severity levels of ID are now based on adaptive behavior rather than IQ scores because adaptive functioning determines the level of support needed. This shift represents growing movement to focus more on the skills and abilities of the individual with ID as well as the supports needed to function in his or her particular environment (Luckasson et al., 1992). From a broader international perspective, a revised version of the *International Classification of Diseases* diagnostic system is set for publication in 2015 (*ICD-11*) and these revisions may represent another change in the definition of ID.

As definitions of intellectual and other developmental disabilities evolve, so do the people that comprise the category, creating risk by potentially affecting the availability of services and educational interventions to affected children and families. Additionally, as definitions evolve and the composition of these groups changes, challenges are posed for researchers who must evaluate the relevance of previous studies using earlier diagnostic criteria to new research using revised criteria. Although it is imperative to have diagnostic criteria based on the most rigorous scientific research available, the impact of revisions must be assessed quickly so as not to impede emerging research.

Scope and Prevalence of IDD in Childhood and Adolescence

Similar to CHC in childhood, the prevalence of IDD in the United States is increasing, with 1 in 6 children having ID or DD in 2006–2008, representing a 17.1% increase over 10 years (Boyle et al., 2011). Much of this increase is likely accounted for by the exponential increase in the prevalence of autism spectrum disorders (ASD) in recent years (Centers for Disease Control and Prevention, 2012). In contrast to ASD, the prevalence of ID specifically has been relatively stable, accounting for 1%–2% of the general population of children and adolescents (Maulik et al., 2011).

There are four levels of ID—mild, moderate, severe, and profound—which account for 85%, 10%, 4%, and 2% of the overall prevalence, respectively (King, Toth, Hodapp, & Dykens, 2009). Approximately 30% more males are diagnosed with ID than females (APA, 2000), which may be partially explained by their increased risk for X-linked genetic mutations (Kaufman, Ayub, & Vincent, 2010). ID is present in every social class, although there tends to be a higher prevalence, especially of mild ID, in lower-SES populations (Emerson 2007; Maulik et al., 2011). In a meta-analysis of population-based studies examining the global prevalence of ID, Maulik and colleagues (2011)

found that the highest prevalence of ID was seen in low- and middle-income countries, where the rates were nearly double that observed in high-income countries. Social and economic disparities such as un- or underemployment and economic instability, inadequate access to health care, increased incidence of low birth weight, limited access to prenatal care and well-child visits, higher risk of exposure to trauma resulting in injury or illness, increased exposure to environmental toxins, and higher rates of infectious diseases are all likely contributors to such differential prevalence (Maulik et al., 2011). Prevalence rates also appear to change as a function of age, as rates are higher among children and adolescents than among adults.

Autism Spectrum Disorders

Autism spectrum disorders (ASD) are a group of developmental disabilities characterized by impairments in social communication and interaction as well as a restricted range of activities and interests, and often stereotyped repetitive behaviors. Although not a core symptom of ASD, sensory abnormalities are often common features of these disorders. Historically, subcategories of ASD (autistic disorder, Asperger syndrome, Rett syndrome, childhood disintegrative disorder, and pervasive developmental disorder not otherwise specified [PDD-NOS]) differed on the basis of age and onset of symptoms, associated features, and severity of core ASD features, although increasingly, research indicates that ASD represents the extreme end of normal varying traits and may be better classified from a dimensional rather than a categorical perspective (Beglinger & Smith, 2001). From a more dimensional approach, the reliability of subgroups has been questioned (Klin, Lang, Cicchetti, & Volkmar, 2000; Lord, Luyster, Guthrie, & Pickles, 2012), and revisions to the diagnostic system have been made to address these issues (APA, 2013). For *DSM-V*, diagnostic subcategories all fall under a single broad category of ASD and must be present in early childhood. Social and communication symptoms are combined into a single dimension, resulting in two domains of impairment: social/communication deficits, and restricted or repetitive behaviors, interests, or activities (APA, 2013). In contrast to previous versions of the *DSM*, the current revisions were included in international perspectives, and thus similar changes are expected in *ICD-11* (Harris, 2013). As with the evolving definition of ID, preliminary evidence suggests that these criteria may again alter the composition of children meeting criteria for ASD. Specifically, individuals with typical cognitive development and ASDs other than

autistic disorder may be less likely to qualify for the diagnosis of ASD (McPartland, Reichow, & Volkmar, 2012).

At present, ASD is estimated to affect 1 in 88 children in the United States (CDC, 2012), but rates have been rapidly changing. Between 1997 and 2008 the rates of autism quadrupled, representing the largest prevalence increase of any developmental disability (Boyle et al., 2011). Likewise, international rates of ASD have increased exponentially, though prevalence estimates vary greatly between countries. In general, Western countries show the highest rates of ASD, with estimates as high as 116.1 per 10,000, while many Eastern and African countries have lower estimated rates, such as an estimate of 16.1 per 10,000 in China (Elsabbagh et al., 2012). Estimates for the international average rate of ASD range from 27.2 per 10,000 to 62 per 10,000; however, it is generally believed that the prevalence of pervasive developmental disorders (PDD) is not strongly influenced by ethnic, cultural, or socioeconomic factors and that observed differences reflect discrepancies in awareness and service availability, which highlights the crucial need for more research and capacity building in non-Western countries (Elsabbagh et al., 2012). The increase in the prevalence of ASD is partially accounted for by changes in diagnostic criteria, inclusion of less severe cases, earlier identification, and elevated awareness; however, a substantial percentage of the increased rates still remain unexplained (Hertz-Pannier & Delwiche, 2009). Differences in prevalence rates across countries may be related to methodological variations, environmental factors, cultural differences, availability of health care, and differences in awareness (Elsabbagh et al., 2012). The prevalence of ASD is higher among males than females, with current estimates indicating that it affects 1 in 54 boys in the United States and appears to be up to 5 times more likely in boys than girls internationally. Although the rates of ASD are lower among girls, girls with ASD are more likely to have comorbid severe ID (Volkmar, Szatmari, & Sparrow, 1993).

SOCIOEMOTIONAL COMPETENCIES

Historically, research has assumed that the presence of a disability or CHC serves either to heighten risk or determine dysfunction across the range of social and emotional domains for children and adolescents, and leads to increased burden for families (e.g., higher levels of stress and caregiving demand), communities (e.g., accommodations in schools, work environments), and society

at large (e.g., high financial costs). Indeed, most studies have focused on identifying and predicting these negative effects, and this is reasonable from a public health perspective given the importance of identifying those conditions under which risk results in dysfunction. Nonetheless, more contemporary research indicates that, although individuals with CHC or IDD are at risk for problematic trajectories of socioemotional functioning, there is considerable variability observed in these competencies across children and adolescents, as well as in the processes that may operate to mediate and moderate the pathways to related outcomes.

Across conditions of CHC and IDD, the numbers of affected children and families is large and growing. The wide range of conditions, and variability in the degree to which impairments in basic developmental processes are involved, present a challenge for conceptualizations of socioemotional functioning in these children. Nonetheless, issues regarding emerging peer relations and social skills, emotion and emotion regulation, and comorbid behavior problems reflect specific focal concerns in the socioemotional domain that have been of predominant interest, although the depth of exploration of the developmental processes involved with these competencies has been somewhat limited.

Peer and Social Competencies

The study of children's social relationships and competencies has been a rich area of inquiry in developmental science. Peer relations are critical to multiple areas of developmental competence, and serve protective functions with respect to various adverse outcomes (Laird, Pettit, Dodge, & Bates, 2005). Although social competence is a somewhat nebulous construct that has lacked a consensual definition, it has typically incorporated features that include social skills, perceived status by peers, relationship quality, and a variety of functional social outcomes (Rose-Krasnor, 1997). The study of social competence and relationships has been major focus in understanding the consequences of illness and disability.

Social Competence in CHC

In the context of restrictions on physical activity, extended hospital stays, and other illness-related limitations, social competencies have long been considered a specific risk for children with CHC (La Greca, 1990). A wealth of research has approached the study of social competencies in children and adolescents with CHC, and there seems to be some consensus that, despite the reasonable concern for

risk, little convincing evidence exists for social competence deficits in children with CHC (Reiter-Purtill, Waller, & Noll, 2009). Exceptions appear to involve reports of more frequent bullying (Blackman & Gurka, 2007; Curtis & Luby, 2008), and social deficits associated with chronic conditions that involve CNS dysfunction (Pinquart & Teubert, 2012; Yeates et al., 2007).

A meta-analysis addressing social competence in children with a chronic illness compared levels of social competence in children with chronic illness to those of children without chronic illness (Martinez, Carter, & Legato, 2011). The authors identified 57 studies, calculating 90 unique outcomes, and reported a medium overall effect for decreased social competence, in contrast to results reported by Reiter-Purtill et al. (2009). The specific chronic illness, measurement strategy, and reporter-moderated social competence outcomes indicated that the impact of chronic illness varies as a function of child characteristics such as gender or illness type, and may be dependent upon methodological issues such as informant and measurement approach. Noll and Bukowski (2012) challenged this meta-analysis with respect to the studies included as well as lack of attention to critical moderators (e.g., CNS involvement), measurement indices, and validity of source information in the measurements.

Another meta-analysis found that children and adolescents with chronic physical illness had, on average, lower levels of academic, physical, and social functioning than their healthy peers (Pinquart & Teubert, 2012). Impairments were largest for physical functioning and smallest for social functioning. Average levels of impairments of social functioning were very similar to those presented by Martinez et al. (2011), but the larger sample of studies allowed for a broader range of moderator variables to be considered. Levels of social functioning varied by disease, rater, measurement, ethnic minority status, and demographic equivalence of patients and control group. These findings implicate the need to consider the complexity of processes that determine social functioning in children with CHC as was intimated by Noll and Bukowski (2012), rather than simply assuming that the presence of deficits has direct adverse effect.

Not only is there evidence of complexity in moderated relations to social outcomes, but there is also some evidence that connections to social competence deficits may be indirect for children with chronic illnesses. Curtis and Luby (2008) reported that the number of health conditions predicted higher depression scores in children with CI, as well as greater frequency of asocial behaviors

and impairment in cooperative behavior toward others. Preschoolers with at least one CI experienced more peer rejection and bullying than did healthy peers. Furthermore, depressive symptoms served to mediate the relation between illness and asocial behavior, suggesting that pathways to social and peer problems may be more indirect than tied specifically to the presence of the CI. Yeates et al. (2007) also proposed a complex model of indirect pathways to social adjustment, whereby severity of CNS insult, parenting, and information processing skills combined to influence the social interaction and social perceptions of children who experience chronic illness.

In sum, the answers to questions about whether children with CHC have compromised social competence are not straightforward. Evidence from various studies and larger reviews is equivocal, but also dependent on which moderators may be included in the studies, and whether potential mediators are considered in the prediction. The generally competent levels of social functioning for children who experience CHC is encouraging, but there may also be some specific conditions under which risk is manifest in problematic function. Developmental timing of the illness, severity of neurobiological involvement, concomitant effects on executive and cognitive processes, and parenting and family attributes are all likely contributors that transact over time in the determination of social competence in children with CHC.

Social Competence and ID

Social competence of children with ID has long been a focus of research interest, and has consistently shown deficit level performance commensurate with cognitive function in these children. There has been increased interest in skill deficits in social behaviors such as poor eye contact, social interaction difficulties, and lack of social play in children with ID. Historically, research has established reasonably consistent relations between ID and social skills, and those associations have typically suggested that ID leads to difficulties in social adaptation and functioning (Cook & Oliver, 2011).

A wealth of research on sociability in children with ID supports a deficit model, and related findings indicate that deficits or impairments in social skills have been linked to numerous other emotional and disruptive behavior problems (de Boo & Prins, 2007). Given the methodological limitations of much of this cross-sectional and correlational research, cause and effect relations between these associated problems and social skills of children with ID cannot be disambiguated. Nevertheless, available research

suggests a variety of critical correlates for sociability that create additive risk.

In addressing the multiple conceptual and measurement challenges inherent in the study of sociability in children with ID, Cook and Oliver (2011) note that social skill deficits in children with ID are potential indicators for other social problems such as deficits in specific prosocial skills and aggressive behaviors that may lead to an inability to develop relationships in early childhood as well as later social maladjustment. Guralnick's (1999) systematic research on the social play interactions of preschool-age children with mild ID has revealed well-documented problems in peer-related social competence whereby a variety of specific difficulties in social information processing and emotional regulation adversely affect numerous aspects of these children's social competence with peers. These deficits, along with parallel family processes, contribute to the low levels of interactive or group social play typically seen among young children with mild ID (Guralnick, Hammond, Connor, & Neville, 2006; Guralnick, Neville, Hammond, & Connor, 2007a).

Given the apparent deficits in social competencies, difficulties establishing friendships for children with ID are not surprising. Guralnick and his colleagues have found that young children with mild developmental delays rarely form reciprocal friendships (Guralnick & Groom, 1988; Guralnick, Neville, Hammond, & Connor, 2007b). The social deficits typically identified include limited sustained interactive play, difficulties with peer group entry, and generally high levels of solitary play (Guralnick, 1999). Conflict in peer interactions is more frequent, which has been attributed to problematic communication strategies, less responsiveness to peers, and difficulties in attempting to influence peer social play (Guralnick et al., 2007a). Guralnick et al. (2007b) suggest that the social competence deficits of children with ID not only limit their ability to engage in reciprocal friendships in early childhood, but also generally affect interaction with preferred playmates. Although most children with ID develop friendship preferences in early childhood, they do not engage in more socially interactive play with preferred peers than other peers (Guralnick & Groom, 1988). From a developmental perspective, evidence suggests that young children with ID show relatively little growth in peer-related social competence across early to middle childhood, with many showing no growth at all (Guralnick et al., 2006).

It seems apparent that social competence is a complex construct that incorporates a number of specific social and relational behaviors, and the various terms used to describe

similar constructs (e.g., social competence, social skills, sociability, etc.) creates some confusion as to what exactly is being measured or addressed. In contrast to children with CHC, there seems to be little controversy with respect to whether children with ID have compromised social competencies. Research has consistently identified group differences across a number of social domains among children with and without ID. However, the variability across specific social skills warrants closer examination. Although several developmental models and approaches have been promoted with respect to both chronic illness and developmental disabilities, there remains a need to develop and test more comprehensive models of social development that not only differentiate across type, range, and severity of chronic conditions during childhood but also reflect the multifaceted nature of social competence, integrate multiple components (e.g., social skills, peer status, friendship quality), and attend to developmental trajectories using longitudinal approaches that incorporate multiple perspectives and factors that both mediate and moderate the relations that have been established to date.

Emotion and Emotion Regulation

Children's regulatory capacities, especially those addressing emotional regulation, have long been implicated in the emergence of child socioemotional competence (Calkins & Mackler, 2011; Thompson, Chapter 6, this *Handbook*, this volume) as well as children's behavior problems (Cole & Hall, 2008; Suveg, Shaffer, Morelen, & Thomassin, 2011). Although such relations have been extensively explored in populations of children who are typically developing, there has been precious little attention paid to the emergence and function of emotion and emotion regulatory capacities in young children who experience developmental risk in the form of global developmental delay or chronic illnesses. This lack of attention comes as something of a surprise given the salience of executive function in the emergence of emotion regulation (Posner & Rothbart, 2000), the deficit in executive skill that is inherent in children with manifest cognitive delay (Japundža-Milisavljević & Mačešić, 2008), the uncertainties and pain often associated with chronic illness (Dahlquist & Nagel, 2009), and the general importance of the social context for emotion regulatory processes (Thompson, 1994). Emotion regulation involves the ability of an individual to control, modify, change, and direct emotional reactions and expression to achieve one's goals and effectively manage interpersonal relationships (e.g., Cole,

Martin, & Dennis, 2004), a set of abilities likely to be at risk for children with chronic conditions.

Despite their rarity, a handful of studies indicate that children with early developmental risk show specific deficits in regulatory abilities, or dysregulated emotion and behavior, that may be associated with emerging comorbid behavior disorder. Given limited cognitive capacities, for example, young children with ID more often struggle to adapt to the demands of emotionally challenging events, and the risk for behavior problems increases (Morris et al., 2007). In a longitudinal study of regulatory strategy use across the preschool period, Gerstein and colleagues (2011) reported that children with early developmental delays used more maladaptive and less adaptive regulatory strategies over time when observed in a series of mildly frustrating tasks. Jahromi, Gulsrud, and Kasari (2008) reported similarly that children with Down syndrome used more limited regulatory strategies than typically developing children when faced with a frustrating task. Several studies have addressed regulatory capacity in the context of social or peer relations, consistently reporting deficits for children with delays or disabilities (J. K. Baker, Fenning, Crnic, Baker, & Blacher, 2007; Wilson, 1999).

It is not surprising that regulatory capacities were lower or less adaptive in children who show early developmental delays, even though such effects do not appear to be ubiquitous (Gerstein et al., 2011). Such deficits would be expected as a function of the developmental delay itself. Of interest, however, are indications that more dysregulated functioning may serve as one specific process to explain the connections between early developmental status and later behavior and social problems. In the Gerstein et al. (2011) study, children's regulatory abilities were found to mediate the relation between early developmental risk and later behavior problems, suggesting that the relation between developmental risk and behavior problems was indirect and likely dependent on the quality of the regulatory strategies these children could employ. Reporting earlier on the same sample, J. K. Baker et al. (2007) found that, not only did global dysregulation at Age 4 significantly predict children's social skills at Age 6, but partially mediated the association between children's developmental risk and later social skills. These findings suggest that the high rate of behavior problems in populations of children who experienced some degree of early developmental compromise may not simply reflect factors endogenous to the disability itself, but may instead reflect indirect effects that operate through emerging regulatory capacities that are multiply influenced (Cole, Hall, & Radzioch, 2009).

A primary issue to be addressed is the extent to which the regulatory deficits associated with developmental delay are endogenous to the disorder or the result of exogenous family and parenting processes. Normative conceptualizations of emotion regulation have long noted that the development of regulatory ability is socially mediated, from early coregulated states to the eventual emergence of individual self-regulatory skills (Cole & Deater-Deckard, 2009). Integral to the critical contributions of physiological and genetic contributions to the development of emotion regulation (Thompson, Lewis, & Calkins, 2008), various parenting processes have been identified as key determinants of regulatory development in typically developing children (Leve et al., 2010; Morris et al., 2007). Parental affective behavior (Dagne & Snyder, 2011), parenting styles (Betts, Gullone, & Allen, 2009; Eisenberg et al., 2001), marital relationship quality and conflict (Cummings & Keller, 2006), and various aspects of parental well-being (Maughan, Cicchetti, Toth, & Rogosch, 2007) have all been implicated. These same predictive processes have not been studied in families of children with significant developmental delays despite consistent suggestions that such within-family processes may have even greater significance under conditions of risk (Sameroff, 2009). We address family processes below, but they likely only form one critical social base for regulatory challenges observed in children with ID.

In some degree of contrast to research on children with ID, attention to regulatory capacities in children with chronic illnesses is seen more in the study of coping processes, and implied by the presence or absence of internalizing and externalizing behavior problems (Vaalamo, Pulkkinen, Kinnunen, Kaprio, & Rose, 2002) than by traditional developmental conceptualizations of emotion regulation. The conceptual differentiation between coping and regulatory processes has not been especially well articulated to date, although the terms have been used interchangeably by some (Eisenberg, Baker, & Blacher, 1998), and regulation is implied in definitions or conceptualizations of coping (Compas et al., 2012). Regardless, for children with CHC, a substantial number of studies have been published incorporating a control-based model of coping that emphasizes the volitional nature of efforts to manage the stress of the illness (Compas et al., 2012; Rudolph, Dennig, & Weisz, 1995). In general, findings suggest that some types of coping efforts have more consistent effects than others, although type of illness is an important determinant. Secondary control, or coping efforts that address accommodative response to the illness,

is related to better adjustment, whereas disengagement or passive coping seems to more often predict poorer adjustment (Compas et al., 2012; Garnefski, Koopman, Kraaij, & ten Cate, 2009). The success of primary control coping efforts, which involves active behaviors directed at changing the stressor, was less consistent in predicting to better adjustment, likely because there are simply some elements of illness that are simply inaccessible to active efforts at problem solving.

Compas et al.'s (2012) review suggests a number of important themes with respect to effective coping or regulatory functions with chronic illness in childhood and adolescence. The links between secondary control coping, as well as accommodative coping, and greater well-being suggests that secondary control coping is a good match to the typically uncontrollable childhood illnesses. Similar results were reported by Kraaij and Garnefski (2012) in their study of depression in Dutch adolescents coping with CI, indicating that cognitive coping strategies were especially important in reducing depression. As suggested by Rudolph et al. (1995), regulatory strategies involving acceptance, cognitive reappraisal, and distraction often match well the specific demands of particular illnesses, whereas the low levels of actual or perceived control are not well suited to more passive or disengaged approaches. Avoidance, denial, and wishful thinking do not typically result in effective regulation of emotional distress and likely interfere with more effective coping strategies that promote adjustment.

To date, there has been relatively scant attention to emotion or behavioral regulation in children with chronic conditions, be it disability or illness. Perhaps in some ways a call for greater empirical and conceptual attention to this critical developmental skill is premature in that there has been far too little attention to basic processes of emotion development itself, let alone the complexity of regulatory function, in these populations. Issues of emotion recognition, emotion expression, and emotion understanding have generated some limited interest for children with ID (Adams & Oliver, 2011; Zaja & Rojahn, 2008); and emotion processes have typically been conflated with internalizing behavior problems in studies of children with CHC (Vaalamo et al., 2002). Yet, studies suggestive of reciprocity of effect between the experience of pain and children's negative affect (Vervoort, Goubert, Eccleston, Bijttebier, & Crombez, 2006), or those that suggest that both emotion expression and recognition may be compromised in children with significant ID (Adams & Oliver, 2011) give rise to the need to further study these processes

and their influence on developmental competencies. If the basis of emotion regulation is indeed social, as has been often suggested, and concerns about emotion recognition or expression are manifest in children with chronic conditions, then coregulated processes in ID (Crnic et al., 2009; Crnic, Hoffman, Gaze, & Edelbrock, 2004) or dyadic coping in CI (Wiebe et al., 2005) are likely to be affected. The conditions under which emotion processes facilitate regulation or dysregulation are likely to provide an important window on emerging competence as well as adjustment difficulties.

Behavior and Emotion Problems

Perhaps no domain has received more attention relative to socioemotional functioning of children with CHC or ID than has the presence of associated behavior and emotional problems. This is especially true of the past decade in which there has been a significant increase in research examining the mental health of children and adolescents with ID in particular. In general, there are strong and consistent indications that children with ID, and to a lesser extent CHC, show elevated levels of behavior problems compared to children who are typically developing and healthy (Barlow & Ellard, 2006; Blackman & Gurka, 2007; Curtis & Luby, 2008; de Ruiter, Dekker, Verhulst, & Koot, 2007; Emerson & Einfeld, 2010). Behavior problems are particularly concerning given their impact on academic functioning, parenting, family mental health, and later development of comorbid mental health problems (B. L. Baker et al., 2003, 2010; Herring et al., 2006; Neece, Green, & Baker, 2012).

IDD and Psychopathology

An exact estimate of the prevalence of dual diagnosis during childhood is virtually impossible given the considerable variability in assessment methods and measures, classification systems, and referral sources (Borthwick-Duffy, 1994). Epidemiological studies of youth with ID have reported clinically significant emotional and behavior problems and/or diagnosable mental disorders in a third to a half of cases (B. L. Baker et al., 2010; Dekker & Koot, 2003; Emerson & Einfeld, 2010; Neece, Baker, Blacher, & Crnic, 2011; Neece et al., 2012). A large-scale study that used structured clinical interviews to examine the prevalence, comorbidity, and impact of *DSM-IV* disorders among children and adolescents with intellectual disability in the Netherlands found that over 20% of the sample met criteria for an anxiety disorder, almost 5% met criteria for

a mood disorder, and the largest percent of youth (25.1%) met criteria for a disruptive behavior disorder (Dekker & Koot, 2003). Nonetheless, the heightened prevalence of estimates of mental disorders in youth with ID may actually be an underestimate as the diagnosis of ID can sometimes obscure mental health problems that would be diagnosed in a typically developing child. Such "diagnostic overshadowing" occurs when problematic behaviors are attributed to limited cognitive functioning without further assessment, diagnosis, or treatment of the comorbid diagnoses (Jopp & Keys, 2001; Reiss & Szyszko, 1983). Essentially, the salience of cognitive deficit in defining intellectual disability overpowers concerns with or attention to co-occurring problems. Similar overshadowing may occur for children with serious CHC that attract attention to the medical illness itself, although such processes have not been specifically identified.

Most studies examining co-occurring behavior disorders have included only samples of youth with ID rather than including reasonable comparison groups. Thus, less is known about the relative risks compared to same-age youth without ID. When studies included a typically developing comparison group, findings suggest levels of psychopathology that are $2\frac{1}{2}$ to 4 times as great for children with ID (Dekker, Koot, van der Ende, & Verhulst, 2002; de Ruiter et al., 2007; Emerson, Einfeld, & Stancliffe, 2010). Dekker and colleagues (2002), for example, examined a large sample of children aged 7 to 12 years with and without ID and found that 49% of the ID group had parent-reported behavior problem scores in the borderline or clinical range compared to 18% for non-ID children. Teacher-reported scores were comparable, with 46% and 19%, respectively, having elevated scores. Emerson and Hatton (2007), in a sample of over 17,000 children aged 5 to 16 from the United Kingdom, reported clinical range scores for 36% of children in their ID sample versus 8% in non-ID children. In our own research, we found slightly lower relative risk ratios during childhood (1.60:1; B. L. Baker et al., 2010) and adolescence (1.74; Neece, Baker, Crnic, & Blacher, 2013); however, in both cases, this lesser risk may have been accounted for by an elevated prevalence of ODD in the typically developing comparison groups.

The rates of psychopathology in children and adolescents are similar across the range of mild to severe ID, although one study found that the degree of psychopathology decreased over time more for persons with mild ID than for persons with severe ID (Einfeld et al., 2006). Still, however, knowledge is limited with respect to the developmental course of behavior and emotional disorders for

children with ID, as most studies of co-occurring psychiatric diagnosis have used age-mixed samples assessed in cross-sectional designs. In one notable exception, de Ruiter et al. (2007) conducted three assessments over a 5-year period and conducted multilevel growth curve analyses to examine developmental trajectories in a sample that was 6 to 18 years old initially. Children with ID had a higher level of problem behaviors than typically developing children at all ages; however, children with ID also had significantly greater decreases over time in aggressive and attention problems.

With respect to specific symptoms or diagnoses, disruptive behavior disorders appear to be the most prevalent co-occurring disorders among children and adolescents with ID (B. L. Baker et al., 2010; Dekker & Koot, 2003; Neece et al., 2011; Neece et al., 2013). Dekker and Koot (2003) found that 25.1% of their sample of 7- to 20-year-old youth with borderline to moderate intellectual disability met criteria for a disruptive behavior disorder, compared to 21.9% for any anxiety disorder and 4.4% for any mood disorder. Likewise, B. L. Baker et al. (2010) reported that every disorder assessed in a sample of 5-year-old children was more prevalent for children with developmental delays than for those who were typically developing, with ADHD most highly differentiating the two groups (risk ratio 3.21:1). A longitudinal follow-up (Neece et al., 2011) showed that children with ID continued to be at significantly higher risk for meeting ADHD diagnostic criteria at the ages of 6, 7, and 8 (risk ratios ranged from 3.10:1 to 4.07:1) and subsequently into adolescence (risk ratio 3.38:1; Neece et al., 2013).

In some contrast to CHC and ID, comorbidity appears to be the rule rather than the exception for children and adolescents with ASD (Gillberg & Billstedt, 2000). Estimates of prevalence vary dramatically based on subtype of ASD (autistic disorder, Aspergers syndrome, PDD-NOS) and the psychological disorder examined. Some studies have found up to a 15-fold increase in the odds of reporting a comorbid diagnosis among children with ASD (Gurney, McPheeters, & Davis, 2006). The most common co-occurring disorders among youth with ASD appear to be anxiety and ADHD (Gjevik, Eldevik, Fjæræn-Granum, & Sponheim, 2011). Some research suggests that ASD, ADHD, and certain anxiety disorders (e.g., OCD) may have similar genetic underpinnings, leading investigators to question whether these are separate and distinct disorders in these children (Grzadzinski et al., 2011; Ivarsson & Melin, 2008; Polderman et al., 2013; Taurines et al., 2012). Additionally, many children with ASD have been found to

have multiple comorbidities (Leyfer et al., 2006). The significant variability in cognitive functioning and language competence that characterizes children and adolescents with ASD appear to be associated with the extent to which psychopathology may be present. Some studies suggest that cognitive comorbidity may serve as a key mechanism that heightens child risk for developing a comorbid mental illness (Bradley, Summers, Wood, & Bryson, 2004) while others indicate that children and adolescents with high-functioning autism may actually have higher rates of comorbid mental illnesses, particularly anxiety and mood disorders, due to an increased awareness of poor social integration (Hedley & Young, 2006; Joshi et al., 2010). Prevalence estimates among children and adolescents with ASD may also vary as a function of children's language proficiency. One study found that children with lower IQ scores (less than 70) and less language proficiency had fewer psychiatric comorbidities (Witwer & Lecavalier, 2010). It may well be that certain disorders (e.g., generalized anxiety disorder) require some command of language in order for the child to represent internal emotional states. It may also be that symptoms of such disorders are expressed differently by nonverbal individuals (LoVullo & Matson, 2009) and, in order to explicate such possibilities, research must better address the clinical presentation of disorders in this population with more developmentally refined and focused approaches that adopt multimodal, multimethod measurements. Nonetheless, the conditions under which comorbidity of behavioral and emotional problems are present require much further attention as this field of inquiry develops.

Although there is evidence that the prevalence of psychopathology is elevated in children and adolescents with ID, questions remain about the validity of many of these diagnoses for this population. One critical problem in this area of research is that the base rate of most psychiatric symptoms among children and adolescents with ID has not been established and, therefore, the extent to which the symptoms of given disorders are intrinsic to ID is not clear. Thus, it is not known whether certain emotional and behavioral symptoms among youth with ID are solely an expression of impairments in intellectual functioning or if these disorders form a separate construct that accounts for variability in outcomes above and beyond the cognitive abilities of the youth. Limited research has examined the validity of mental health disorders among children with ID, with the exception of ADHD for which these questions have begun to be examined. Two studies from our own lab have examined the clinical presentation, as well as the

validity of ADHD, among adolescents with and without ID (Neece et al., 2011; Neece et al., 2013). In general, the presentation of ADHD was similar among adolescents with and without ID and similar "pre-pathway" influences were associated with ADHD regardless of cognitive functioning. This is a first step in establishing the validity of current diagnostics categories for children with ID.

CHC and Psychopathology

Although empirical evidence indicates that children with CHC have more mental health issues than their healthy peers, controversies and gaps in the literature exist (Huff et al., 2008). Although risks appear to be elevated in general, the nature of the relations between behavior disorders and chronic illness during childhood are complex and vary as a function of the type and severity of CI as well as the developmental period and the contexts in which children are assessed (VanScoyoc & Christopherson, 2009).

In an overview of research regarding the psychosocial well-being of children with chronic disease, Barlow and Ellard (2006) evaluated six reviews of the literature that addressed child and family well-being in the context of CHC. Evidence from this review indicated that children with chronic illnesses were at slightly elevated risk of psychosocial distress, although only a minority actually experienced clinical symptomatology. In a study of 107 Dutch children aged 8 to 12 with a CI, Meijer, Sinnema, Bijsstra, Mellenbergh, and Wolters (2000) found that, compared with healthy child norms, chronically ill children reported less aggressive behavior, a finding that was also consistent with parents' reports. Children with CI also tended to display more submissive behavior than healthy norms, as perceived by their parents. These findings were not, however, differentiated by type of CI with the exception of higher social anxiety for children with skin diseases or cystic fibrosis. Other studies find that the degree to which aggression may be higher in children with CI depends on reporter (teachers versus parents) and whether a variety of salient moderators are included in the predictive models (Gartstein, Noll, & Vannatta, 2000), or age at which the assessment is made (Borge, Wefring, Lie, & Nordhagen, 2004).

A meta-analysis (Pinquart & Shen, 2011) integrated the results of 569 studies to compare the level of behavior problems in children and adolescents with and without CI, and to contrast findings within differing CIs. Findings indicated that children with CI have elevated behavior problems across internalizing and externalizing dimensions in

comparison to healthy peers, and that ratings of internalizing problems were somewhat greater than were ratings of externalizing problems. Internalizing and externalizing problems also varied with respect to the type of CI, as well as gender and age, and parents reported more problems than did the children or adolescents themselves. Although elevations in behavior problems associated with CI were highest for developing countries, no moderating effects of ethnicity emerged.

A population-based study of children with asthma, neurological disorders, and other chronic illnesses compared children with CI to healthy children to assess differences across illness groups (Hysing, Elgen, Gillberg, & Lundervold, 2009). The three illness groups showed an increased rate of emotional and behavioral problems, as well as increased probability of a psychiatric disorder compared with children without chronic illnesses. Effect sizes were large for children with neurological diseases but relatively small for children with asthma or other CI. In children with neurological disorders, emotional problems, inattention/hyperactivity and peer problems were the most frequent concern. The links between severity of neurological or CNS involvement and children's behavior problems have likewise been observed in other studies designed to explore connections between CI and child behavior problems (Howe, Feinstein, Reiss, Molock, & Berger, 1993; Rodenberg, Stams, Meijer, Aldenkamp, & Deković, 2005). These relations closely parallel findings with ID (and to some extent ASD), because inattention/hyperactivity and emotional problems are also the most common concerns among children with ID, as noted above.

Despite some similarities with ID, the connection between CI and psychopathology is much more muddled. Although there are indications that children with CI have elevated behavior and emotional problems, the degree to which those elevations reach clinically meaningful thresholds is not always clear. Similar to indications that neurologically based CI presents the most problems for social relations, these same conditions seem most clearly associated with psychopathology. Nevertheless, the true proportion of children with CI who experience psychopathology or behavioral problems is difficult to disentangle given the variability across and within illnesses, and the interaction of factors such as age, gender, and culture that are likely to be influential (Surís, Parera, & Puig, 1996).

The consequences of comorbid behavior and emotion disorders, whether they are associated with CHC, ID, or ASD, are very concerning. These disorders are linked with

a host of negative correlates for children, their families, and society at large including increased likelihood of academic problems, failure in education or community settings, frequent moves, social isolation and rejection, and reduced employment prospects as they transition into early adulthood (Pearson et al., 2000; Seltzer & Krauss, 2001). These significant individual, family, and societal burdens highlight the need to refine attempts to model those processes that facilitate comorbidities and the consequences that emerge.

VARIABILITY IN SOCIOEMOTIONAL FUNCTION: SHIFTING PARADIGMS

Although there is the possibility that the presence of ID or CHC will result in some adverse consequences for children's social and emotional well-being, such trajectories are not ubiquitous across discrete social and emotion skills, nor are they necessarily present across developmental periods. Various facets of social and emotional functioning may operate differently at different points in time, or be more developmentally salient at some periods than others. With respect to CIs, age at onset may be particularly critical for determining the nature of effect, but again, there is little longitudinal research available from which to draw conclusions, and so much variability across illnesses with respect to the severity and treatment demands that generalization is nearly impossible to reach with respect to chronic pediatric illness.

Available conceptual and empirical efforts regarding chronic conditions of childhood suggest that the variability of effect on socioemotional functioning is indeed great, if poorly understood. Also, variability occurs not only between different diagnoses, but within diagnoses as well. For example, children with ASD appear to be more atypical in their developmental process across domains than are children with ID alone (Blacher, Kraemer, & Howell, 2010; Shattuck et al., 2012). These differences, however, are largely attributed to the behavior problems and social deficits observed in individuals who are identified as having ASD (Blacher et al., 2010). Overall, specific diagnoses may contribute to variability in developmental competence, but the many apparent overlaps in outcomes illustrate the limits to such predictive relations.

Within diagnostic condition, whether focused on health or developmental disability, variability in both proximal and distal effects is not sufficiently explained by the nature of the condition itself (intellectual functioning, type and

stage of cancer, etc.). Developmental effects predicted by individual factors, such as IQ or type of CI, may be limited to specific functional domains (e.g., executive functioning) while other areas (adaptive skill, elements of social and emotional function) align similarly with those of typically developing peers (Seltzer et al., 2005). Conversely, some of the greatest within-disability variability is observed in individuals with ASD, as those with Asperger's and PDD-NOS generally show more typical developmental trajectories than those with autistic disorders (Cederlund, Hagberg, Billstedt, Gillberg, & Gillberg, 2008). However, the specific type of ASD diagnosis still does not explain in total the variance in these domains of interest highlighting the need to identify multiple predictors as well as moderators of these outcomes.

Shifts Toward Positive Perspectives

For the most part, research on children with chronic conditions and their families has focused on the potential detrimental effects associated with the conditions. Positive outcomes have primarily been treated as the absence of negative effects (Shogren, Wehmeyer, Buchanan, & Lopez, 2006). Not surprisingly, when only adverse effects are explored, only adverse effects are found. In the 1980s, research slowly began to adopt strategies that allowed for strengths or positive competencies to be identified, and there have since been numerous calls to explore the entire range of developmental experiences to better capture the full variability of child and family functioning regardless of the presence of a high-risk health or developmental condition (Blacher & Baker, 2002; Kazak, Rourke, & Navsaria, 2009).

Given the historical emphases on more pathological or negative effects for children's socioemotional outcomes at any time point, knowledge of positive developmental competencies for children with chronic developmental and health risks is limited. However, there are a number of competencies that have been identified for individuals with ID. These predominantly include aspects of independent living, such as living completely alone or in an independent living facility, making decisions for oneself, and being able to maintain a job (Gardner & Carran, 2005) as well as social competencies such as establishing meaningful friendships (Gardner & Carran, 2005). The majority of these competencies have been examined in adult samples with ID, whereas "competencies" for children have typically been ascertained by the lack of negative effects rather than a gain in positive effects.

Many of the predictors of long-term positive outcomes for children with ID are externally based, and early support services are one of the strongest predictors of later social and emotional competencies. Claes, Hove, Loon, Vandervelde, and Schalock (2010), using a sample from the Netherlands, found the availability of support strategies, living arrangement, status of employment, and level of intellectual functioning uniquely predicted quality of life. Although external factors cannot be controlled on an individual basis alone, identifying factors that promote more positive outcomes should inform public policy, educational programs, and service delivery in support of high-risk children's development.

In general, information on specific socioemotional developmental strengths in children with chronic conditions is sparse, as is knowledge regarding the predictors of more positive developmental trajectories. Certainly, most children function as well as their healthy peers along many social and emotional dimensions (Barakat, Pulgaron, & Daniel, 2009), and the variability in behavior problem outcomes in children with ID are suggestive of resilient processes in children at risk (see Luthar, Crossman, & Small, Chapter 7, this *Handbook*, this volume). Nevertheless, preliminary research offers promising perspectives across a range of developmental attributes. Additionally, studies examining the developmental cascades triggered by these competencies will be informative (Masten et al., 2005). Just as deficits in one area of functioning affect development in others, it is likely that competencies or achievements in one domain may optimize development in other areas as well, and future efforts should address such reciprocity between domains of functioning.

ENDOGENOUS CONTRIBUTIONS TO SOCIOEMOTIONAL COMPETENCIES: GENETIC CONTRIBUTIONS

The genetic basis of disease and disability has long been of interest and has contributed extensively to current perspectives on causal processes. Genetic and epigenetic processes are gaining further popularity as informative methods for studying the complex interplay of genes, behavior, and context in determining the ways in which disease and disability emerge and influence socioemotional development. Despite their promise, however, genetic approaches are not without controversy, and the specific focus of genetic interest has varied across developmental disability and childhood illness.

The genetic underpinnings of ID are well recognized, at least for a subset of specific syndromes. Trisomy 21 (Down syndrome) was first identified by chromosomal studies in 1959 (Lejeune, Turpin, & Gautier, 1959) and since then, the majority of genetic research in ID has focused on single-gene causes of disorder. Genetic causes are thought to be present in approximately 25%–50% of cases, with the percentage increasing in concert with the severity of the ID (Kaufman et al., 2010). However, the degree to which ID is genetically determined varies from individual to individual. Mild ID is generally thought to represent the lower end of the normal variation in human cognitive functioning and results from interactions between genetic and nongenetic factors (e.g., malnutrition, neglect and deprivation, poor health care). More severe forms of ID have often been linked to specific genetic causes including chromosomal abnormalities or defects of single genes. In the decade prior to the time of this writing, significant progress has been made in elucidating new genetic mutations that result in ID. However, these new genetic defects comprise only a small proportion of cases of ID and the genetic factors involved in the majority of cases of ID are still unknown.

Although social and emotional skills are crucial determinants of longer-term outcomes of individuals with ID, few if any studies have examined the genetic underpinnings of socioemotional competencies in this population. Here we propose a new focus for genetic research in which specific candidate genes involved in ID or CHC continue to be identified, but the developmental cascades that emerge from individual genes and the interdependence between genes and the environment are also considered. These cascades address the wide gap between identification of individual candidate genes and eventual behaviors of interest. Genes code for proteins, which in turn code for cellular systems/signaling pathways, which result in neural systems that comprise the development of social/cognitive systems that ultimately code for behavior. This is the essential basis of the endophenotypic approach, which we detail later.

Different approaches to the study of genetic influences on behavior have emerged in psychiatric genetics (Caspi & Moffitt, 2006). The “direct link approach” assumes a direct linear relationship between genotype and behavior and examines correlations between variations in DNA sequence and behavior. The majority of genetic research in ID has employed this approach to identify specific genetic mutations that result in cognitive and adaptive behavior deficits. Genetic studies have also begun to examine

gene–environment interdependence, seeking to incorporate information about the environment into understanding the role genetics plays in determining the development of disorders. In this approach, genes determine the degree to which an individual is vulnerable to environmental risk factors and, therefore, the gene is not assumed to have a direct link in the absence of environmental risk. Similar approaches have also received attention in the CHC literature with the growing recognition of the interplay between genes, behavior (specifically health behaviors), and the environment in promoting or compromising health (Tercyak, 2009).

Direct Link Approaches

Historically, research has assumed that ID or CHC are the result of genetic defects; therefore, the majority of etiological investigations have focused on uncovering the genes involved in the emergence of disease and disability. Over 1,000 genetic causes of ID have now been identified and these disorders account for about 55% of cases of moderate to severe ID but only 10%–15% of mild ID (Tartaglia, Hansen, & Hagerman, 2007).

The surge of genetic research coinciding with increasingly sophisticated methodologies over the past two decades has led to improved characterization of hundreds of genetic syndromes, which has facilitated attention to behavior phenotypes. Behavioral phenotypes are specific patterns of behavior and cognition that present in syndromes caused by chromosomal or genetic abnormalities. Research on phenotypes characterizes the unique cognitive and behavioral profiles of genetic disorders and links these profiles to the specific genotype in an effort to tailor interventions to the individual profile of each disorder (Dykens & Hodapp, 2007; Hodapp & Dykens, 2004). Pioneering research has connected genetic, neural, and behavioral findings in specific genetic syndromes including Down, Williams, fragile X, Prader-Willi, Angelman, Rett, and velocardiofacial syndromes (Schaer & Eliez, 2007; Venkitaramani & Lombroso, 2007). Nonetheless, this effort has addressed only a small subset of the over 1,000 genetic causes of ID, and although the implications for understanding children’s behavioral and emotional responses to CI are likewise apparent (Tercyak, 2009), attention to illness phenotypes remains mostly promissory.

Improved identification and detection of genetic syndromes for both ID and CHC has increased the use of genetic testing in childhood. Use has been especially

prominent in research examining the social and emotional functioning of children with CHC, with studies identifying both benefits and consequences of genetic testing for at-risk children. Studies generally find that both children with CHC and their parents experience a sharp increase in anxiety upon learning about a positive test, but anxiety subsides over time and these children generally return to their baseline social-emotional functioning (Johnson & Tercyak, 1995). However, the trajectories of social and emotional functioning appear to vary by type of CHC (Simonen et al., 2006) and developmental timing (McConkie-Rosell, Spiridigliozi, Sullivan, Dawson, & Lachiewicz, 2002). Nevertheless, research is needed on the longitudinal impact of genetic testing and influence on the social and emotional development of these children, as well as the ambiguity inherent in trying to predict an individual's future health status.

Gene–Environment Interdependence

Continued advancement of the understanding of social and emotional functioning in children with chronic health or disability conditions hinges on the consideration of polygenic effects as well as environmental interdependence, which will ultimately inform molecular genetic research that seeks to ascertain specific candidate genes involved in the characteristics of identified behavioral phenotypes. Increasingly, research suggests that behavioral phenotypes are neither completely established at birth, nor immutable. Rather, they develop and change over time. Thus, behavioral phenotypes arise from both genetic mutations present at birth as well as ongoing reciprocal interactions across multiple factors at varying levels of development (Fidler, Most, & Philofsky, 2009). Fidler and colleagues (2009) provide a rare example of incorporating a developmental approach when examining the behavioral phenotype of Down syndrome. They argued that understanding the development of behavioral phenotypes is imperative to developing time-sensitive early interventions that may ameliorate the development of poorer functional competencies (see Fidler, 2005, for sample interventions). This approach highlights the need for multiple waves of data collection that examine several domains within a given behavioral phenotype rather than focusing on isolated areas of functioning. Developmental processes are hierarchical and interrelationships across different domains of development are mutually influential. To capture the complex developmental processes that produce specific behavioral phenotypes, the next generation of research must address

multiple domains of development and the way in which they affect each other over time.

A potentially promising avenue for future genetic research in ID or CHC is to employ an endophenotypic approach in which the outcomes of interest are no longer heterogeneous disorders but rather heritable intermediate phenotypes that are closer to the immediate product of the susceptibility genes and genetically simpler than the explicit phenotype of the disorder (Gottesman & Gould, 2003). The assumption underlying this approach is that it will be easier to identify genes associated with endophenotypes of the broad disorder than the disorder itself. In order for this approach to be successful, endophenotypes must be associated with illness in the population, heritable, state-independent (manifest in the individual regardless of whether illness is present or not), co-segregated within families, and present in nonaffected family members at a higher rate than the general population (Doyle et al., 2005). Currently, developmental disability endophenotypes are being identified, specifically within autism spectrum disorders (ASD). Possible endophenotype candidates include weak central coherence as evidenced by a detail-focus bias in visuospatial construction and problem solving (Happé, Briskman, & Frith, 2001), executive function deficits specifically with regard to planning (Nydén, Hagberg, Goussé, & Rastam, 2011), and theory of mind (Scheeren & Stauder, 2008). However, these traits have not consistently met criteria for endophenotypes across multiple studies, requiring further verification of those characteristics that are a part of the broader endophenotype of autism. The extent to which these emerging endophenotypes are linked to socioemotional functioning is not yet clear, either. Nonetheless, clarification of endophenotypes for autism and ultimately other chronic conditions may well enhance the identification of susceptibility genes involved in these complex and heterogeneous disorders.

Although evidence supports strong genetic underpinnings for both ID and CHC, the role of environmental factors in the etiology of these conditions is often equal to or even greater (Faja & Dawson, 2010), highlighting the critical need to distill the ways in which genetic and environmental risk factors interact to influence children's socioemotional competence. From a more transactional perspective, the presence of a child with a disabling health condition creates risk under which the family and other contextual factors may either (a) serve to amplify and realize the risk (e.g., a "risk" genotype) or (b) serve a self-righting or protective function. Thus, gene–environment interactions between child genotype(s) and environmental risk

and protective factors may be particularly relevant for children with these conditions. At a minimum, research must continue to map both genetic and environmental risk factors onto specific observed behaviors in these phenotypes as well as to address individual variations across social and emotional competencies.

BEYOND ENDOGENY: CONTEXTUAL FACTORS THAT INFLUENCE SOCIOEMOTIONAL OUTCOMES

Although genetics and endophenotypic approaches hold some degree of promise for uncovering explanatory processes for the variability in social and emotional functioning of children with chronic conditions, there are a number of key contextual influences that have also produced historically important contributions to risk and resilience processes. Chief among these adaptational influences are family, school, and cultural processes.

Family Processes

Families represent the most proximal environmental influence on children's development and in efforts to optimize the understanding of socioemotional competencies for children with chronic conditions, research on families has increased significantly in the two decades prior to the time of this writing. In fact, there have been paradigm shifts in both theoretical and practice models from an individual-(child)-centered approach to one that focuses more on the entire family unit. This shift has been in response to a growing recognition that family mental health and well-being have both direct and indirect impacts on children's socioemotional development and that any attempt to better understand and intervene to promote child competencies must also understand and address those developmental processes that operate at the systemic level of the family. Still, developmental perspectives addressing family processes in these populations have been predominantly narrow in focus, unidimensional in approach, and more concerned with the effect of the chronic condition on parent or family function than on the interplay of chronic condition and family level attributes over time in the prediction of children's socioemotional competence.

Family Stress and Mental Health

Historically, much of the family-focused research has emphasized the negative mental and physical health

outcomes that parents of children with chronic conditions often report. Stress is a key family variable of interest given its association with numerous undesirable outcomes for both parents and children, regardless of the presence of some risk condition. Parents of children with chronic conditions generally report more parenting stress than parents of typically developing and healthy children (B. L. Baker et al., 2003; Hauser-Cram et al., 2001; Kazak, Rourke, & Navsaria, 2009). Among parents of children with disabilities, those who have children with autism spectrum disorders (ASD) typically report the highest levels of stress (Davis & Carter, 2008; Estes et al., 2009).

However, the degree of stress experienced by these parents may vary by type of stress (e.g., general distress, stress specific to the child's chronic condition, daily parenting hassles), with some studies indicating that parents of young children with developmental delays experience similar levels of parenting daily hassles as parents of typically developing children (Crnic et al., 2009), but greater parenting stress related to the impact of the child on the family (B. L. Baker et al., 2003). Nonetheless, little is known about the sources of heightened stress in families of children with chronic conditions and how various stressors influence the parenting experience. Although parenting stress is a construct in which there appears to be some sense of a shared understanding, there has in fact been far too little differentiation between parenting stress and stressed parenting in the developmental literature. With respect to the stresses associated with children who have specific chronic conditions, illness- or disability-specific stresses may well be operative and can perhaps be further differentiated from more general stress contexts experienced by all families.

Although studies consistently find heightened levels of various stresses among parents of children with chronic conditions, these findings are not ubiquitous within either disability or illness, and there can be marked individual variation in the trajectory of experienced stress over the developmental period (Glidden & Schoolcraft, 2003; Pai et al., 2007). For families of children with ID, parental stress appears to peak around the preschool period and decrease over time as a function of reductions in child behavior problems, although stresses not accounted for by the child may actually increase over time (Crnic et al., 2009; Neece et al., 2012). Parents of children with ID may be more likely to have recurrent and new stressors that maintain and even increase stress levels across time. Similarly, for parents of children with CI, stress may be greatest at the time of diagnosis, and moderate over time as families

adjust (Pai et al., 2007) but also increase coincidentally with increases in children's periods of distress (Robinson, Gerardt, Vannatta, & Noll, 2007). Transitions, including school entry and reintegrations (Canter & Roberts, 2012; DuPaul, Power, & Shapiro, 2009; Madan-Swain, Katz, & LaGory, 2004), may be a particularly difficult time for parents of children with chronic conditions as these are often when parents make peer comparisons and realize how far their children are behind other children, or have to help their children cope with challenging social processes. Parents of children with chronic conditions are faced with multiple challenges across their children's lives, including overcoming the disappointments and fears associated with the original diagnoses, securing appropriate medical interventions and school placements, and learning to navigate the complex health and educational systems (DuPaul et al., 2009; Floyd, Singer, Powers, & Costigan, 1996). Effects may vary depending on the type of parental stress and may be different for fathers and mothers, again highlighting the necessity for multidimensional longitudinal studies addressing the experience of these families.

In addition to elevated levels of stress, and perhaps as a function of them, parents of children with chronic conditions show increased rates of depression (B. L. Baker, Blacher, & Olsson, 2005; Singer, 2006; Tluczek, Koscik, Farrell, & Rock, 2005). With respect to disability, the pattern of parental depression is similar to that of parental stress, with parents of children with ASD showing the highest rates of depression, followed by parents of children with other ID diagnoses, and finally by parents of typically developing children (Olsson & Hwang, 2008). For parents of children with a CI such as cystic fibrosis, patterns appear to be somewhat coincidental with reports of stress, because depression is relatively frequent following identification of the illness but decreases over time (Tluczek et al., 2005). Although the risk for psychological distress in parents of children with chronic conditions is apparent, it is far from always realized (Crnic et al., 2009). Indeed, resilience and protective factors operate similarly for parents as for the children with the conditions themselves, although the processes that account for better or worse outcomes are not as yet well understood.

The marital subsystem is frequently considered at risk in families of children with ID or CHC. However, as with many individual parameters of functioning, adverse effects are not ubiquitous. Some reports from parents of children with ID have indicated high levels of marital conflict (Kersh, Hedvat, Hauser-Cram, & Warfield, 2006; Suárez & Baker, 1997), whereas other reports involving longitudinal

assessments over multiple measurement periods have not (Crnic et al., 2009). Kazak et al. (2009) note similar trends for research exploring marital relationships in families of children with CI. Studies do not support marital conflict differences between families with and without a child with CI, but instead have begun to explore the nuances within marital processes that influence and are influenced by CI, with particular attention to those factors that may serve to moderate relations between CI and marital function (Lewandowski & Drotar, 2007).

Along with challenges to mental health and marital quality, parents of children with chronic conditions also experience challenges to their physical health (Eisenhower, Baker, & Blacher, 2009; Eisenhower, Blacher, & Baker, 2013; Olsson & Hwang, 2008), and higher levels of self-reported health problems appear to persist across the life span (Burton, Lethbridge, & Phipps, 2008; Eisenhower et al., 2013). Consistent with findings on mental health outcomes, it is likely that the compromised physical health in parents of children with ID is related to the elevated behavior problems seen in this population, because parents whose children display high levels of behavior problems are the most likely to rate their physical health as poor (Eisenhower et al., 2009, 2013). The relation between having a child with ID and poorer physical health has important implications for the morbidity of parents and serves as one potentially important target for intervention. Nonetheless, the processes by which ID and behavior problems create health problems for parents have yet to be explicated.

Paralleling the research on parents of children with ID or CHC, most studies on siblings have examined whether these siblings are at risk for negative psychological effects, such as diminished self concept (Singhi, Malhi, & Pershad, 2002), poor psychological adjustment (Sharpe & Rossiter, 2002), and increased psychopathology (Bågenholm & Gillberg, 1991; Del Rosario & Keefe, 2003; Hastings, 2007). However, research has found siblings of children with ID to be well-adjusted and generally indistinguishable from their peers (Levy-Wasser & Katz, 2004; Stoneman, 2005). A meta-analysis by Sharpe and Rossiter (2002) found that the difference between siblings of children with ID and comparison siblings in terms of general psychological adjustment was "small at best" ($M_d = -.03$) and insignificant. To the extent that having a sibling with ID negatively affects typically developing siblings, little is known about the processes that might account for or moderate such impacts. Our own research indicates that the negative impact on siblings is better accounted for

by the children's behavior problems than the disability conditions, and that early child behavior problems may lead to increased sibling negative impact over time (Neece, Blacher, & Baker, 2010). High levels of social support may also moderate adverse effects of chronic illness on sibling well-being (Barrera, Chung, & Fleming, 2004).

Parental Stress and Child Development

With respect to children with ID, relations between child intellectual functioning and parenting stress appear to be mediated by child behavior problems such that once behavior problems are accounted for, significant relations between child cognitive functioning and parenting stress disappear (B. L. Baker, Blacher, Crnic, & Edelbrock, 2002; Hauser-Cram et al., 2001; Herring et al., 2006). The same has been found for parental depression where differences in parental depression among parents of children with ID and parents of typically developing children appear to be tied to the differences in child behavior problems, with parents of children with high levels of behavior problems showing the highest levels of depression (B. L. Baker et al., 2005; Olsson & Hwang, 2008). There is strong support for a bidirectional relation between child behavior problems and parental stress, such that more behavior problems are associated with greater parenting stress over time. Furthermore, high parenting stress has been linked to increases in behavior problems in children (B. L. Baker et al., 2003; Neece et al., 2012). Thus, the association between child behavior and parental stress for children with ID appears to be reciprocal in that greater behavior problems lead to increases in parenting stress over time while high parenting stress is linked to increases in behavior problems, indicating that the two variables may be mutually escalating (B. L. Baker et al., 2003; Neece et al., 2012). Additionally, elevated parenting stress is associated with poorer social skills later in development (Neece & Baker, 2008), ADHD diagnoses among children with ID (B. L. Baker et al., 2010; Neece et al., 2011), and greater distress in children with CIs (Robinson et al., 2007), highlighting parental stress and mental health problems as a concern not only for the individual parents' well-being but also for the negative impact that parental mental health problems may have on the children's socioemotional development over time.

Although it seems apparent that parental stress has an impact on child behavior problems and competencies, the processes through which parental stress influences child behavior are not as clearly understood. Studies in this area have begun to identify mediators and investigate these critical developmental processes, highlighting the complex

development processes involved, and identifying targets for future intervention and prevention efforts. Mainstream developmental models capturing complex transactional interrelationships that characterize family processes are becoming more commonplace; however, with limited exceptions (Crnic et al., 2009; Hauser-Cram et al., 2001; Kazak, 1989), few such models have been proposed to understand these processes in families of children with chronic conditions.

Over the decade prior to the time of this writing, we have examined a model for understanding the emergence of child behavior problems and competencies in which delays in child cognitive functioning lead to elevated behavior problems as a function of ongoing family processes and children's emerging self-regulatory capacities, particularly emotion regulation (B. L. Baker et al., 2003; Crnic et al., 2004; Crnic et al., 2009; Gerstein et al., 2011). We proposed that parental distress influences emotional processes in the family, which ultimately influences child regulatory skills and subsequent behavior problems. Children's emotional development is heavily socialized and parents have a primary influence on the development of emotion regulation, especially among young children (Silk, Shaw, Skuban, Oland, & Kovacs, 2006; Thompson, 1994). High levels of parental stress and depression may disrupt the process of socializing emotion regulation (Silk et al., 2006), placing the children at increased risk for emotional and behavioral problems (Osborne, McHugh, Saunders, & Reed, 2008). Thus, children with disability and health conditions may be more likely to experience emotion regulation difficulties not only because of their cognitive limitations but also as a result of their parents' high levels of stress. However, when parents are less stressed, family emotional processes are enhanced because parents are better able to model adaptive emotion-regulation skills, engage in more sensitive and less harsh or intrusive parenting behavior, and provide stable family environments that facilitate secure attachment, authoritative parenting, healthy emotional expression, and strong marital relationships. In turn, these processes promote optimal development of children's regulatory capacities.

Transactional family processes in the context of chronic health and disability are still relatively early in their conceptual and empirical formation, and the need for theoretically grounded, multifaceted, longitudinal research is critical if developmental science is to capture the complexity of family influences on the socioemotional development of these high-risk children. However, the richness of emerging conceptual models is promising. These models consider

multiple levels of influence (e.g., genetic, school, social, and culture) and the ways in which these factors interact with complex systemic family processes over time. In contrast, simple main effect models are no longer sufficient to uncover the dynamic child–family synergies that create growth in socioemotional process over time for children with chronic conditions.

Furthermore, research must move beyond maternal report as a proxy for the meaning of family, and include perspectives from fathers (partners), siblings, grandparents, and extended families, triangulating measures across sources to obtain comprehensive assessments of these processes. More longitudinal and methodologically rigorous approaches to capturing the individual differences among families will be especially informative, employing more personological and process-oriented approaches that identify mechanisms that underlie putative linkages. Finally, although family process models for children at risk have enjoyed a surge in interest over the past several decades, it is unclear whether this increased focus has yielded any benefits for the families themselves. The increased recognition of family challenges and the potential for positive adaptation have not yet resulted in substantial changes in the approach to intervention with families of children with chronic health or disability conditions.

School as a Salient Context

After the family, schools represent the most powerful developmental context of influence for socioemotional functioning, and at some developmental periods schools may exceed family influence. School settings provide a number of similar and differentiated experiences that influence the course of social and emotional development for both typically developing children and children at risk. However, socioemotional processes associated with school contexts likely vary widely for children depending on whether ID or CHC is at issue. There are significant differences between the educational settings for children with ID versus children with CHC, because self-contained educational classrooms are often necessitated for children with ID either full or part day, whereas children with CHC who return to school typically return to the regular classroom setting. After the preschool years, during which children with ID are often enrolled in early intervention programs, the majority of services that children with ID receive are school-based. The range of services that students are able to access through schools, regardless of the focus of their chronic condition, varies based on the

policies and procedures of the region or country in which they reside. Although many researchers have examined the efficacy of school-based programming, this area is still lacking in that inclusive education methods seem to produce optimal outcomes for children with ID, but knowledge of the predictors of individual outcomes remains somewhat limited for most risk groups.

Inclusion in Mainstream Classrooms

The inclusion of children with ID in general education classrooms has been widely advocated (Blacher, Baker, & Eisenhower, 2009; Chiang, Cheung, Hickson, Xiang, & Tsai, 2012; Cummins & Lau, 2003; Dessemontet, Bless, & Morin, 2012; Waldron & McLeskey, 2010). Mainstreaming has been associated with positive academic outcomes including higher academic achievement (Turner, Alborz, & Gayle, 2008) and postsecondary education (Baer, Daviso, Flexer, McMahan Queen, & Meindl, 2011; Chiang et al., 2012; Flexer, Daviso, Baer, McMahan Queen, & Meindl, 2011), as well as improved social competence and reduced behavior problems (Fisher & Meyer, 2002). Although studies have shown that level of ID is an important moderator of such effects, in that children with more severe ID may make less progress in inclusive settings than children with less severe ID (Flexer et al., 2011), there is little existing knowledge about the processes through which inclusive settings produce favorable outcomes and optimize developmental trajectories for these children.

Inclusive education for children with ID has been promoted as the optimal educational model, but education in an inclusive setting guarantees neither increased progress nor positive outcomes. This may be especially the case in relation to children's social functioning. Although an overall trend toward more favorable academic outcomes is apparent, a percentage of children, particularly those with high levels of behavior problems and low social skills, make little to no progress when integrated with typically developing peers (Cummins & Lau, 2003). Those children who do not benefit may require higher levels of support due to increased levels of behavior problems and social deficits, because these children tend to have poorer transitions to school regardless (McIntyre, Blacher, & Baker, 2006). Additionally, many children with ID or CHC are sometimes less accepted by their peers and may face social isolation, bullying, or experience stigma in an integrated setting (Cooney, Jahoda, Gumley, & Knott, 2006; Curtis & Luby, 2008). Teachers in general education classrooms do not always receive children with ID or those with complex medical needs positively and

may have difficulty managing their increased needs while simultaneously overseeing classrooms full of typically developing children (Blacher et al., 2009; Cummins & Lau, 2003; Eisenhower, Baker, & Blacher, 2007). Finally, despite the belief that children with ID will benefit more from inclusive settings, many children with some disability status obtain positive outcomes equally well in more segregated classrooms (Dessemontet et al., 2012). Thus, some approaches deemed to be "best practice" for children with chronic conditions may actually be creating developmental disadvantages, highlighting a need for more personological approaches that explore critical individual differences across high-risk chronic conditions. It may be that integrated settings produce positive social outcomes as a function of the characteristics of the students who tend to thrive in those settings in some combination with facilitative attributes associated with the school settings themselves.

At the level of the individual child, behavior problems, social skills, and intellectual functioning are likely central to decisions about school integration for children with ID, whereas special health care needs and physical characteristics likely add to considerations for children with chronic health conditions (Power, 2006). Specifically, children with lower levels of behavior problems and more functional social skills gain the greatest benefit from mainstream settings, whereas students with more severe deficits in these areas may actually make more progress in specialized school or classroom settings in which their increased support needs can be appropriately met. At the broader system level, lower resource areas in which class sizes are generally larger and budgets are tighter are less ideal for integrating students with chronic conditions, increasing risk for poorer outcomes. In integrated settings, by contrast, many more predictors of academic and social success exist, such as the characteristics of the typically developing students and their willingness to interact with peers who have chronic health conditions or disabilities.

Social Interaction in Integrated Settings

One of the primary benefits of including children who have ID in classrooms with typically developing peers, or reintegrating children who have been absent because of significant CI, is the opportunity for normative social interaction. Ideally, children with ID will gain valuable social skills from interacting with their peers that they would not otherwise develop. However, peers do not readily interact with children who have these conditions and inclusive programming does not necessarily lead to decreased social

deficits (Carter, Hughes, Guth, & Copeland, 2005; DuPaul et al., 2009). Proximity to peers alone does not guarantee increased social exchanges; rather, these interactions must be facilitated by teachers and staff (Carter et al., 2005; Cummins & Lau, 2003; Prevatt, Heffer, & Lowe, 2000). Interventions can promote socially supportive environments as well as teach social interaction and reentry skills to students with chronic conditions (Carter & Hughes, 2007; Madan-Swain et al., 2004) and school settings may be most beneficial for children if multifaceted programs that encourage interactions such as those in which peers are trained to work with students who have chronic conditions are included in the curriculum (Carter & Hughes, 2007).

Not only is it possible for children with ID or CHC to attend schools with typically developing peers and have little to no interaction with them, many of these children are targeted by their peers and become victims of bullying (Pinquart & Teubert, 2012). There are numerous studies documenting that children with ID experience peer victimization at higher rates than their nondisabled peers (Christensen, Fraynt, Neece, & Baker, 2012; Rose, Monda-Amaya, & Espelage, 2011); however, a small minority of investigations have found comparable rates among students with and without disabilities (Woods & Wolke, 2004). Discrepancies are likely the result of ambiguity about the definition of bullying, variations in reporters, how data are collected, disparities in the settings where bullying occurs, and differences in sample characteristics (e.g., demographics, severity of disability, type of disability). Nevertheless, the majority of studies find a prevalence of bullying among students with chronic conditions that is disturbing, with some studies documenting up to 94% of students with disabilities experiencing some form of victimization (Little, 2002). The most robust risk factors for bullying include social and communication deficits (Cappadocia, Weiss, & Pepler, 2012; Christensen et al., 2012) as well as behavior and mental health problems (Cappadocia et al., 2012; Meijer et al., 2000). Didden and colleagues (2009) examined cyberbullying in a sample of adolescents with ID from the Netherlands and found that 4%–9% of students reported bullying or victimization at least once a week; bullying was related to IQ, computer usage, self-esteem, and depressive symptoms. Sentenac and colleagues (2011) contrasted bullying in Ireland and France for children with disabilities and chronic illnesses, and found high rates across both countries although rates were somewhat higher in France. Rates were higher when children were restricted from certain school activities. Other correlates included family history of mental health

problems, being younger, restriction of social activity, and being in special education programs (Cappadocia et al., 2012; Emerson, 2010; Meijer et al., 2000; Sullivan, 2009). The number of factors that contribute is of concern given the extreme negative consequences of bullying that add to the increased social and emotional risks that these children face. While most research on bullying has focused on victimization, there is some evidence to suggest that children with ID may bully others more frequently than their typically developing peers (Sheard, Clegg, Standen, & Cromby, 2001), too. However, the rare conditions under which such inverse bullying processes may occur are unknown and in general research suggests that children with ID or CHC are much more often victims than perpetrators of bullying (Sullivan, 2009).

Although peer relations have dominated research pursuits, student-teacher relationships are also worthy of greater attention for children with either ID or CHC (DuPaul et al., 2009). Emerging evidence suggests that student-teacher relationships are heavily influenced by both behavior problems and social deficits, but are independent of intellectual functioning (Eisenhower et al., 2007; Hamre & Pianta, 2001). Conversely, positive student-teacher relationships are predictive of decreased behavior problems, increased social competence over time, and increased adherence to medical regimens (Blacher et al., 2009; La Greca & Mackey, 2009; Meehan, Hughes, & Cavell, 2003). Although students generally do not have the same teachers year after year, teacher ratings of relationships with the same children remain relatively stable over time (Blacher et al., 2009). Of some concern, however, teachers in general education classrooms consistently rate relationships with students with ID lower than do teachers in special education classrooms even though the children have similar levels of behavior problems and social skills (Blacher et al., 2009). It seems apparent that stigma remains associated with ID, making general education teachers more likely to make judgments about these children based on the global characteristic of "disability" rather than the student's individual strengths and challenges. Given the well-established influence of teacher perceptions and expectations for child performance, the Blacher et al. (2009) finding highlights the possibility that children with ID are being done a disservice by assuming that inclusive settings are always optimal contexts for development. To optimize outcomes for children with chronic conditions, the characteristics of success must be identified to better tailor inclusive settings to meet student needs.

Cultural Perspectives

Genetics, families, and schools each play a central role in understanding the social and emotional consequences of illness and disability, but each must also be considered within specific cultural frames of reference. Indeed, culture plays a critical role in the development of all children, regardless of the presence of chronic illness or disability. Nonetheless, cultural considerations may have particular salience for children with chronic conditions given the overrepresentation of ethnic minority children and families in such conditions and the putative linkages between factors of race, ethnicity, and culture with health disparities (Adler & Rehkopf, 2008). The majority of "cultural" studies have primarily used race and ethnicity as proxies for culture, focusing on differences between broad racial categories and comparing European American versus African American or European American compared with Latino American. However, race and ethnicity generally are crude or even poor indicators of the broad construct of culture (Clay, 2009). Although multiple definitions exist, culture reflects "explicit and implicit patterns of historically derived and selected ideas and their embodiment in institutions, practices, and artifacts" (Markus & Hamedani, 2007, p. 11). In this respect, culture is not defined as a group of people but rather as psychological processes, thereby suggesting that the focus of research should not be on the groups themselves, but, rather, on the patterns observed in the contexts where people reside (Markus & Hamedani, 2007). The patterns observed in beliefs, practices, and artifacts are variable and not uniform across all people of particular races or ethnicities, highlighting the critical importance of within-group research that considers individual differences.

Most studies of "cultural" considerations have focused on racial and ethnic differences in parental well-being, the impact of children on their families, and treatment choices for the children. Socioemotional processes involving the affected children have rarely been the primary focus of study, but given the salience of family process to children's social competence, exploring the influences on parent and family processes is potentially informative. Across these studies, the well-being of minority parents in the United States tends to be lower whereas the impact of the children on their families appears more positive than with Caucasian parents (Blacher & McIntyre, 2006; Devine, Holbein, Psihogios, Amaro, & Holmbeck, 2012; Magaña, Seltzer, & Krauss, 2004). Treatment selections are affected by culture primarily through etiological attributions; more

specifically, beliefs about the causes of disabilities or illnesses influence the types of therapy parents choose for their children and their adherence to recommended treatments (Al Anbar, Dardennes, Prado-Netto, Kaye, & Contejean, 2010; Mandell & Novak, 2005; Ravindran & Myers, 2011). Al Anbar and colleagues (2010) examined a French sample of parents of children with an autism spectrum disorder and found that treatment choice was associated with perception of disease severity and course as well as the parents' sense of personal control. Many parents of ethnic minority backgrounds do not view illness or disability in the same way as their health care providers and may use alternative medicines for their children (Levy, Mandell, Merhar, Ittenbach, & Pinto-Martin, 2003; Mandell & Novak, 2005; Ravindran & Myers, 2011; Yeh, Hough, McCabe, Lau, & Garland, 2004).

Although few, if any, studies of children with ID have studied culture by investigating behavior in the contexts in which people reside (Markus & Hamedani, 2007), several researchers have begun to examine other aspects of culture, such as socioeconomic status and religious beliefs. In general, lower socioeconomic status is related to increased deficits in developmental domains and the higher prevalence of psychopathology in children with ID and this has been consistent across a number of samples from the United Kingdom (Emerson, Hatton, Llewellyn, Blacher, & Graham, 2006), Finland (Koskenvanta, Ilvanainen, & Almqvist, 2007), and Australia (Leonard et al., 2005). Additionally, religious beliefs affect etiological attributions, which have an effect on treatment selection and adherence (Mandell & Novak, 2005; Ravindran & Myers, 2011). For example, if parental religious beliefs are fatalistic in nature, then parents are less likely to engage in interventions for their children (Mandell & Novak, 2005; Ravindran & Myers, 2011). Unfortunately, these studies are few in number and too often have small sample sizes that limit generalizability.

An important direction for future research using a cultural lens to understand the development of children with ID is to consider specific cultural beliefs (Cohen, 2013). For example, *attitudinal familism*, or a belief in the commitment of family members to their family relationships, has been found to be important in understanding distress among parents, particularly Latino American parents, of children with ID. Familism may be associated with decreased parental burden due to increase family support (Almeida, Molnar, Kawachi, & Subramanian, 2009; Magaña, 1999) or increased distress due to caregivers feeling obligated to care for others rather than feeling

positively supported (Losada et al., 2010). Thus, again, the role of specific cultural beliefs are likely to be moderated by individual and contextual variables and are particularly critical in understanding family processes and parenting behavior. Finally, cultural competencies that reflect an understanding of cultural values are important in planning interventions for children with chronic health or disability conditions (Clay, 2007).

As research in disability and chronic illness proceeds, it is important to recognize that individuals are inseparable from their sociocultural backgrounds and developmental processes must be understood in cultural context (Clay, 2009), a notion that is equally applicable to children with ID or CHC. The processes by which these children and their families are influenced by their cultures and, conversely, affect their culture, are understudied but of immense interest in explicating developmental models of culture and health. The evaluation of developmental compromise from cultural perspectives may suggest critical variabilities in which deficits viewed as problematic in one context may be understood as less debilitating in another (Serpell, Mariga, & Harvey, 1993). Finally, because multiple influences operate on the socioemotional development of children with ID and CHC, culture should not be examined separately from other core developmental domains.

INTERVENTIONS FOR SOCIAL AND EMOTIONAL COMPETENCIES

Given the sheer number of children and families who are affected by chronic conditions, the magnitude of the need for interventions to address the risks for socio-emotional competence stresses educational and health care systems. Nonetheless, there have been impressive attempts to design and implement interventions that either directly or indirectly influence the course of children's social and emotional competencies. The targets of intervention diverge between ID and CHC, and will be addressed separately below. But intervention programs not only serve to build skills and ameliorate child and family stress, but they also inform basic developmental conceptualizations of the nature of disorder and the processes and mechanisms that influence its course.

Interventions Targeting the Disability

Interventions for IDD are generally intensive programs that involve a number of service providers from various

fields and target the core developmental domains, such as academic functioning, cognitive abilities, social skills, adaptive behaviors, and language. These interventions are largely behavioral in nature. Specifically, applied behavior analysis (ABA) and derivatives thereof have the strongest empirical support for children with ID, particularly for children with ASD (Grey & Hastings, 2005; Matson et al., 2012). The effectiveness of early intervention has received international recognition resulting in the development of public policies to ensure that children who need these services are identified early and receive services in a timely manner. Overall, it is apparent that children with ID can make substantial progress in core developmental domains, especially through early interventions that are delivered during the preschool years (Dawson et al., 2010; Grey & Hastings, 2005; Guralnick, 2005; Matson et al., 2012; Reichow, 2012). Researchers have also begun to examine underlying neurobiological indicators of progress in early interventions, and to show that the changes observed in behavior can be reflected in the brain (Dawson et al., 2012).

Although it is clear that early intervention is an effective tool for enhancing the competencies of children with ID, the variability in outcomes indicates the limits to existing knowledge of the developmental trajectories of these children (Heyvaert, Maes, Van den Noortgate, Kuppens, & Onghena, 2012; Howlin, Magiati, & Charman, 2009; Warren et al., 2011). Certain child-specific predictors of early intervention outcome have been indicated, including initial language impairment (Ben Itzchak & Zachor, 2011), child age (Granpeesheh, Dixon, Tarbox, Kaplan, & Wilke, 2009), severity of IDD (Howlin et al., 2009), and child health (Eriksson et al., 2013) but child characteristics do not entirely account for the variance in intervention outcomes. Currently, the variability in developmental outcomes leaves families confused and often seeking other treatments, including those that lack empirical support (Matson, Adams, Williams, & Rieske, 2013). The need to identify meaningful predictors of intervention success remains an important focal goal. Predictors that can map developmental trajectories could inform service providers and allow interventions to be better tailored to the needs of the children and families.

In addition to predictors of intervention outcomes, future research must examine the impact of early intervention on the core developmental domains that are not currently targeted in these programs. The emphasis of early intervention is on addressing the disability itself, primarily deficits in communication, practical skills for daily living, cognition, behavior problems, and social skills. However,

research suggests that more distal outcomes, such as the development of behavioral problems and psychopathology, are predicted by difficulties in emotion regulation processes (Gerstein et al., 2011), and these are rarely targeted in behavioral programming. It is possible that these more distal outcomes could be ameliorated or even prevented if early regulatory skills were more often a focus of intervention programming.

As noted elsewhere in this chapter, children and adolescents with ID (and CHC to some degree) are at increased risk for developing comorbid emotional and behavioral problems, which contribute to their status as an underserved population (McCarthy & Boyd, 2002). Comorbid psychopathology contributes to negative long-term individual and familial outcomes and, thus, serves as an important target for intervention (B. L. Baker et al., 2002; B. L. Baker et al., 2010; Blacher, & McIntyre, 2006; Herring et al., 2006; McIntyre, Blacher, & Baker, 2002; Pearson et al., 2000; Seltzer & Krauss, 2001). However, interventions for children with ID and comorbid psychopathology are limited and primarily represent adaptations from existing interventions for typically developing children. Given the increased needs of this population, these interventions have been largely unsuccessful with a few exceptions (Lang, Mahoney, El Zein, Delaune, & Amidon, 2011; Moree & Davis, 2010). Additionally, most studies have taken an individual child-centered approach to treatment of comorbid emotional and behavioral problems in children with ID, with little consideration of family, school, cultural or contextual factors that contribute to and maintain mental health problems in this population.

Interventions for Families

Our own and other longitudinal research with families of children at risk suggests that the relations between parenting stress and problematic child functioning involve mutually escalating cyclic interactions over time whereby elevations in parental stress predict increases in child problems which in turn predicts exacerbation of parental stress (B. L. Baker et al., 2003; Orsmond, Seltzer, Krauss, & Hong, 2003; Neece et al., 2012). The cyclic relationship between children's emotional, behavioral, and social problems and parenting stress highlights both variables as targets for intervention, although parent stress is rarely a direct focus within established intervention programs. There is, however, considerable evidence that behavior problems in youth with ID can be significantly reduced through effective interventions (Heyvaert, Maes, &

Onghena, 2010; McIntyre, 2008), and parent-training interventions targeting child behavior problems have been found to indirectly reduce parental stress posttreatment, although these studies are almost exclusively with cognitively typical children (Eyberg et al., 2001). In research that has applied these parent-training programs to populations of children with ID, early results suggest that these programs may be effective in reducing negative parent-child interactions, parental stress, and child behavior problems (McIntyre, 2008). However, the long-term effects of the intervention on parenting stress may not be as strong as the long-term effects on child behavior problems (Eyberg et al., 2001).

More contemporary research has begun to examine the efficacy of mindfulness interventions for parents of children with ID. Briefly, mindfulness involves purposeful attention without judgment to one's moment-to-moment experience as it is arising to cultivate an awareness of the here and now without rehearsing the future or rehashing the past (Stahl & Goldstein, 2010). Studies indicate that through mindfulness training, the ever-changing nature of experiences may be recognized and, as a result, individuals become increasingly able to tolerate uncomfortable emotions and sensations (Eifert & Heffner, 2003; Levitt, Brown, Orsillo, & Barlow, 2004), experience improved emotional acceptance (Hayes, Strosahl, & Wilson, 1999; Linehan, 1993), and report decreases in the impact and time needed to recover from negative emotional events (Kabat-Zinn, 2009). Such processes are theoretically linked to better emotion regulation capacities overall, which in turn result in lower perceived stress. In the first study using a mindfulness-based intervention with parents of children with developmental disabilities, Singh and colleagues (2007) found reductions in parenting stress that were associated with decreases in child aggression and increases in social skills. Subsequently, a preliminary study examining the efficacy of Mindfulness-Based Stress Reduction (MBSR) for parents of young children with developmental delays found that parents who participated in MBSR reported significantly less stress and depression as well as greater life satisfaction than a waitlist-control group of parents (Neece, 2013). The children whose parents participated in MBSR were reported to have fewer behavior problems following the intervention, specifically in the areas of attention problems and ADHD symptomology. These early findings utilizing MBSR and other mindfulness interventions suggest that such approaches may prove to be especially effective interventions for specific emotion processes that operate directly at the level of parental well-being and indirectly at the level of children's behavioral and emotional competence.

Whether they prove to help maintain long-term well-being remains to be determined.

Interventions for CHC

The primary intervention foci for children with CHC have both similarities and differences from those of children with ID. Although family stress and well-being are at least indirectly addressed much in the same way as in interventions for ID, primary intervention foci for children with CHC have addressed adherence to medical regimens and/or school reentry and reintegration.

With suggestions that adherence to pediatric treatment may approximate 50% (Rapoff, 1999), the need to develop effective programs for adherence represents a major public health goal (LaGreca & Mackey, 2009). Although adherence presents a number of definitional challenges, and no single approach to its measurement has emerged, it is generally considered to be multifaceted in nature. Further, there is potential reciprocity of effect between socioemotional development processes and adherence to pediatric treatment (LaGreca & Mackey, 2009). More positive psychological adjustment has been linked with better treatment adherence (Jacobson et al., 1990), and conflictual family processes that are associated with poorer socioemotional functioning are tied to poorer adherence (Brosbe, Faust, & Gold, 2013).

An array of interventions with varying foci have produced variable findings across methods that intervene directly with children or indirectly through interventions that seek to strengthen other factors associated with better adherence or disease management. Indeed, two meta-analyses produced relatively similar findings of medium sized treatment effects for reasonably controlled interventions aimed at increasing adherence (Graves, Roberts, Rapoff, & Boyer, 2010; Kahana, Drotar, & Frazier, 2008), although Graves et al. (2010) found that the overall medium effect somewhat masked the difference between group versus individually focused interventions. Group-based interventions produced medium effects ($d = .40$), whereas those interventions that were targeted at individual children and families produced effect sizes that were large ($d = .70$). Regardless, it is apparent that interventions aimed at increasing adherence, especially those that include family members and have multiple components, can be effective (LaGreca & Mackey, 2009).

School-based interventions are frequently designed and implemented to address concerns relevant to children with CHC, including issues that involve adherence to

medication and other treatment regimens as well as issues involving returns to school following hospitalizations. Reintegration into school settings for children with CHC can be challenging at any developmental stage, but appears to be especially difficult during the early school years and at critical school transition periods (DuPaul et al., 2009). Power, DuPaul, Shapiro, and Kazak, (2003) have proposed a multisystemic model for school reentry whereby the family, school, and health care system work together to facilitate smooth reentry processes, although much of the intervention research in this area has not fully incorporated such systemic thinking. Furthermore, research findings across known interventions have not been well integrated overall.

A meta-analysis of intervention studies that attempted to increase illness-specific knowledge among teachers and healthy peers as well as create positive attitude change toward a child with CI (Canter & Roberts, 2012) identified a total of 12 studies that met basic inclusion criteria. Analyses examined any changes in the ill children's global self-worth following the intervention, as a secondary effect of the intervention. Increases in teacher or peer knowledge produced larger effect sizes than enhancing positive attitudinal changes, and effects were larger for teachers than healthy peers. Indirect effects on ill children's self-esteem indicated a medium effect for improvements. In general, much like for adherence interventions, data support a degree of effectiveness for interventions, but the processes that account for these effects and the factors that may moderate treatment effectiveness remain to be identified.

SUMMARIZING THE CURRENT STATE OF THE FIELD

What might be concluded from the incredible array of research that has addressed socioemotional consequences of illness and disability? Perhaps the simplest view is that there is no single overarching theory of atypicality that may be appropriately applied to children who experience chronic physical and or developmental conditions during childhood and adolescence. Childhood illness and developmental disability certainly share some features associated with the presence of chronic challenging conditions that create significant stressors and change the nature of developmental processes as well as the contexts in which they occur. And although our review suggests that any number of similarities exist between illness and disability in the risk for social and emotional functioning, there are

many critical differences that suggest that homogeneity in developmental outcomes or in the processes that determine those outcomes cannot be assumed. Where similarities emerge, it is predominantly for those CHC that are marked by CNS involvement (e.g., Pinquart & Teubert, 2012; Yeates et al., 2007), and impairments are more substantial. Yeates et al. (2007) provide an analysis of social-cognitive neuroscience that underlies key aspects of socioemotional functioning for children with brain disorders, and this CNS involvement typically includes some degree of executive or cognitive deficit, bridging the connection to ID and its associated deficits in social and emotional functioning.

It seems apparent that there is tremendous variability in the social and emotional functioning of these children and their families, and in general, the assumptions of uniformly poorer functioning relative to typically developing and healthy peers are not well supported. That is not to say that the risk for adversities associated with IDD or CHC is not genuine or worthy of concern. Paradigmatic shifts to more positive perspectives have been important and informative, but the pendulum should not swing to the extremes at which only the positives in response to the challenges imposed by these conditions are sought. Balanced perspectives seem to more reasonably reflect the nature of current understanding.

It is not just with respect to between-group comparisons that variability in socioemotional functioning is present. Within groups, there is compelling reason to suggest that children with chronic conditions cannot be treated as homogeneous. The pediatric psychology literature is replete with evidence that different illnesses have vastly different linkages with social and emotional functioning, and severity of the illness is often a key moderator (see Roberts & Steele, 2009). Similarly, behavioral phenotypes associated with specific syndromes involving IDD can differ widely across diagnoses, and differentially predict aspects of social and emotional functioning (Dykens & Hodapp, 2007). This within-group variability extends to differences between children with the same types of illnesses (e.g., leukemia), with the same syndromes (e.g., Down syndrome), or within the same categorical grouping (e.g., mild ID).

The absolute functional levels of, as well as the variability apparent in, social skills, emotion regulation, and behavior problems may be linked in complex ways with a variety of determinants, including specific genetic contributions as well as more exogenous family, school, and cultural factors. In many ways, the function of these determinants is much the same as it is for typically developing and healthy

children; that is, family, school, and cultural contexts exert some degree of influence over children's social and emotional functioning in ways that are often predictable and coherent. Family processes are also somewhat unique in that functional attributes of parents and siblings are often measured as outcomes in attempts to understand the ways in which the stress of chronic conditions in children may affect the well-being of family members.

In all, it seems apparent that children with CHC fare somewhat better across the board in comparison to children with IDD, but the severity of the condition somewhat moderates this conclusion. Children with IDD typically show more social deficits, struggle more with emotion regulation, and have higher rates of psychopathology or behavior problems than do either children with CHC or children who are typically developing. Still, the variability apparent across these domains is notable for both groups, suggesting that resilience processes are operative and critical to understanding the levels at which these children and families function. The success of interventions in affecting social and emotion competencies, whether employing direct or indirect mechanisms of change, is likewise suggestive that these developmental processes are malleable and merit specific attention.

Directions for Future Research

Although research has identified multiple critical processes in understanding the socioemotional consequences of illness and disability, efforts to date have only just begun to address the true complexity of the issues involved. The challenges of research with populations of children with chronic conditions are many, and the efforts of developmentalists and clinical or pediatric researchers alike to tackle these challenges have been instrumental in bringing the field to a point at which it is understood that answers will not come easily, nor will they be straightforward when they are found. But it is this very complexity that holds promise for expanding developmental perspectives on risk and resilience, and uncovering new pathways that connect childhood illness and disability to the full range of developmental possibilities and outcomes.

Throughout this chapter we have identified specific areas of interest for the next generation of research that will address socioemotional processes associated with illness and disability. There was some specificity related to individual topical concerns, but also commonalities shared across developmental domains and chronic conditions. In this final section, we highlight several general

directions for research that may set the stage for more sophisticated modeling of the connections between the risks associated with the presence of chronic conditions during childhood and the important social and emotional adaptations in which these children, and their families, engage.

Perhaps the most obvious need is also the simplest; there must be a much more focused effort to study core processes in social and emotional development for children who experience chronic illness and developmental disabilities. There is a basic need to further explicate the consequences of these conditions, especially given that the consequences may be stronger predictors of related outcomes for these children than are the chronic conditions themselves. Much of the available research has focused on studying threats associated with the central disease or cognitive impairment involved; however, the social and emotional functioning of these children significantly influences long-term competencies and may affect the nature of the outcomes that these children will experience (B. L. Baker et al., 2010). Similarly, intervention research that more frequently targets children's social and emotional competencies may not only change the trajectory of these skills over time for high-risk children, but attention to the processes of change may identify alternative pathways for basic research to explore.

Across chronic conditions, and across the functional social and emotional domains of interest, the next generation of research must engage more theoretically informed perspectives derived from basic developmental theory and research, and include more refined cultural frameworks that influence response. To date, the rich developmental modeling that is applied to the study of typically developing children, and to some risk conditions (e.g., high-risk preterm birth) and contexts (e.g., poverty), has not been as frequently applied to understanding the social and emotional functioning of children with chronic health or developmental conditions. There are, of course, notable exceptions (e.g., Guralnick et al., 2006; Hauser-Cram et al., 2001; Yeates et al., 2012), but the vast majority of the research has been more cross-sectional, focusing on specific single-point-in-time assessments of relatively narrow functional attributes without particular consideration of the processes that might drive the connections found. Even basic consideration of the developmental periods at which processes are studied would be informative, and little systematic attention has been paid to the interplay of specific social and emotional skills and the ages at which they are measured.

Cross-sectional designs are informative, but are fundamentally limited in their ability to address the more sophisticated questions that have emerged in the field. At the core of the next generation of research are longitudinal investigations that engage multiple levels of analysis over extended periods that transcend critical developmental transitions affecting social and emotional functioning. Attention to the biological bases of social and emotional behavior will be especially informative, as evidence begins to accrue with regard to the neurobiological underpinnings of socioemotional functioning and the executive skills that support it. These biological bases are especially important for children with developmental and health compromises, as the deficits that underlie a number of the chronic conditions are neurobiological in nature. Genetic approaches, including the identification of novel illness and disability endophenotypes (South, Wolf, & Herlihy, 2009) and behavioral phenotypes (Dykens & Hodapp, 2007), will be informative.

Nonetheless, the field cannot rely on biological or genetic approaches alone to carry the load of explaining the impressive variety of socioemotional response to illness and disability, nor should it. Throughout this chapter, we have detailed the ways in which various contextual and cultural factors contribute to the adaptive expression of social and emotional competencies in children with chronic conditions. But rarely have studies built and tested explanatory models that integrate multiple biological, personal, and cultural-contextual factors over time that could truly address the complex pathways of influence that likely exist, and identify the processes that connect illness and disability to the variety of social and emotional outcomes.

In a sense, the needs that exist represent a call for big science, or large-scale multisite transdisciplinary studies that combine resources to deconstruct the developmental processes that determine the nature and course of socioemotional competence over time in children with chronic conditions. The most critical resources to be shared are the populations of children and families to be studied. Given the specificity of effect that is often tied to type and severity of the condition, it is challenging to amass adequate sample sizes at any one research site. Multisite research offers the opportunities to develop larger sample sizes of specific illnesses or disability types, and the ability to explore the differentiations that capture the diversity of socioemotional function inherent across and within conditions, and from multiple cultural perspectives. These large-scale longitudinal studies must then engage

multiple levels of analysis that examine not only the differentiation by type and severity of the connection between risk condition and social and emotional functioning, but the mediating and moderating factors that combine to identify the processes by which risk results in problematic outcomes, or is left unrealized.

The developmental model first promoted by Yeates et al. (2007), and subsequently refined (Yeates et al., 2012), offers perhaps the best template for this next generation of study. These researchers proposed an integrative model that combines type and severity of brain insult in addition to parenting and family factors as contributors to a process in which social information processing skills (executive functions, social problem solving, and social-affective behavior) influence subsequent social interactive behavior (affiliative, aggressive, and withdrawn), which in turn determine children's social adjustment status. This multilevel model does not attempt to be overly inclusive in accounting for child social adjustment, but combines multiple levels of analysis that draw on putative neurobiological and developmental processes that operate across time to account for the social adjustment of children with chronic brain disorders. Research models that similarly address intricate developmental processes central to socioemotional functioning will extend developmentalists' understanding of the complex processes that link chronic conditions of childhood and children's social and emotional well-being.

In sum, progress in conceptual and empirical approaches to social and emotional functioning for children with chronic health and developmental conditions has been impressive. It is clear that simple unidirectional predictions cannot account for the richness in the range of function apparent within and between chronic conditions, and across developmental periods. Critical questions now remain about the complex ontogenetic processes that contribute to socioemotional competencies and deficits for children with chronic health and developmental conditions, and the factors that serve to mediate and moderate those connections. The identification of these intricate developmental processes will inform innovative prevention and intervention programs that can facilitate resilient social and emotional adaptations in the face of significant risk.

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CHAPTER 9

Developmental Implications of Discrimination

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INTRODUCTION AND THEORETICAL FOUNDATIONS

The human brain and mind are built to categorize. Gordon Allport (1954), a foundational scholar of the science of human prejudice, noted that the earliest developmental tasks of the newborn infant are to differentiate and group sounds, images, contours, and colors. Importantly, these categorization skills also include a social component in which the infant learns to group people through largely implicit processes operating outside conscious control. These basic foundations of social cognition have profound implications for shaping the infant's understanding of the

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world around her and how to respond to social cues in her various environments. For example, discriminating friendly faces from unfriendly faces helps infants build a foundation for positive attachments in life-promoting relationships (Bowlby, 1980). Learning to act upon these recognitions socially—to seek out friendly faces, to reject or avoid unfriendly ones—reinforces the basic perceptual and cognitive acts just enacted by the brain and in the mind, and helps promote the survival of the infant.

What happens, though, when children and adults later learn to group and/or separate people by a set of perceived characteristics (e.g., sounds, images, contours, and colors), attribute social meaning and valence to those groupings,

and act upon them in detrimental and maladaptive ways? This chapter in the *Handbook* presents a theoretical and empirically based treatment of the topic of discrimination as it is experienced interpersonally in childhood and adolescence. To do this, we focus our studies in childhood and adolescence on the product of social perception, cognition, and subsequent action, applied interpersonally. Although the human brain and mind are skilled at categorizing objects and sounds, the tendency to do so with people according to learned stereotypes can perpetuate dangerous social inequalities. As children age and encounter new groups of “others” who are similar or dissimilar with respect to physical features, language, culture, economic stature, or some other perceived attribute, discriminatory social practices with highly detrimental consequences can form. We therefore define this interpersonal construct of discrimination as purposeful and harmful actions toward others because of their membership in a social group. Such discrimination can include subtle, ambiguous, or explicit behaviors such as teasing, exclusion, or physical assault (Brown & Bigler, 2005; Fishbein, 1996). It is important to note that *intent* to discriminate is not part of this working definition; individuals may discriminate against others knowingly and/or unwittingly. Research on the impact of discrimination with children and adolescents therefore focuses on the *perception* of discrimination; whether the perpetrator intended to discriminate or not is not the main focus of this line of developmental research. Rather, how a child may recognize discrimination, understand the acts as discriminatory, and how the child psychologically responds to discrimination are of primary importance in contemporary research. Understanding how children’s perceived discrimination influences development is the central goal of this chapter.

Discrimination can be thought of as a conscious act, a series of acts (e.g., microaggressions: brief and commonplace acts of interpersonal discriminatory hostility, including racist jokes), or an overarching societal characteristic or structure that disproportionately places some groups of children at greater risk for poor developmental outcomes than others. The former two types of discrimination (interpersonal acts) have attracted the most attention in the developmental literature, and serve as a basis for our systematic review of the implications of discrimination on a variety of developmental domains and processes including identity formation, academic achievement, peer relationships, and self-esteem. In the latter case, structural discrimination may include inequalities in law (e.g., immigration deportation policies), public services (e.g., access to health care),

opportunities for education or labor, or systematically held beliefs about the capabilities of a group of individuals (e.g., IQ or *g* factor; see Gould, 1996). At the heart of such acts of discrimination are the social and psychological characteristics of individuals as they manifest within everyday social settings (i.e., person–environment interactions). In other words, we contend that these systematic effects of discrimination trickle down from macro-level systems to affect children’s experiences with peers, schools, and their communities at large. Consequently, we attend in this chapter to the characteristics of everyday social settings that may promote or deter interpersonal discrimination among diverse youth, and focus on linkages among settings’ characteristics and children’s perceptions of discrimination wherever possible. Theory and research examining family socialization practices that may help promote healthy responses to perceived discrimination among diverse youth, and interventions designed to ameliorate the detrimental effects of discrimination on child development are also considered.

Inherent in each of these discriminatory acts or structures is the issue of power: a socially more powerful individual or group (perpetrator) who or which overtly or covertly causes harm to a less socially powerful individual or group (victim). Much of the developmental research on racism and discrimination has employed the word “minority” to indicate a social group of low power. This is important to note, as “minority” therefore does not necessarily indicate minority in number (although it may), but rather indicates a child’s position of power in a given social stratification system (e.g., although females are slightly more common in the general U.S. population than males, oftentimes being female means being of relatively lower social, economic, and/or political power than being male). Such power dynamics exist and are perpetuated in many societies around racial, ethnic, religious, gender, and sexual orientation group memberships. The United States, for example, has a long history of systemic social inequalities based on these social constructions, all of which continue to exist today (Dovidio, 1986). Unfortunately, children’s present-day experiences with discrimination are all too common. Each year, thousands of lawsuits are filed in the United States on behalf of children claiming discrimination on the basis of gender, race, and ethnicity (Office of Civil Rights, U.S. Department of Education, 2000), and it is widely recognized that the majority of discriminatory acts go unreported. Furthermore, research has documented that children hold biases about low-status group memberships early in life (e.g., Bigler & Liben, 2006), and act upon them regularly by adolescence (Horn, 2008).

Revealed by our systematic review, the majority of research on discrimination in childhood and adolescence has been conducted in the United States and European countries. Notably, we were limited in our review by the need to examine articles published in English only. Nevertheless, given the deep history of racial inequality in the United States, it is not surprising that racial discrimination has dominated this literature, though a trend examining the effects of gender, sexuality, and religious discrimination in childhood is emerging as well. We therefore attend to both racism as well as the diversity of discrimination experienced by children in the United States and other countries, not only to highlight important topic areas for research and intervention, but also to illuminate the discriminatory processes and effects that underlie all forms of discrimination, regardless of the individual-level social characteristics of perpetrators or victims involved. As we argue in the conclusion, the field needs to move forward with these critical topics not only to document ways to ameliorate the detrimental effects of discrimination on children and adolescents, but also to develop deeper insights into how social discrimination itself is created and perpetuated within communities and across generations. Only by targeting both sides of discrimination—of perpetrator and victim processes alike—will cycles of discrimination and their detrimental effects on development be quelled.

THEORETICAL FRAMEWORKS: PROVIDING A FOUNDATION FOR UNDERSTANDING DISCRIMINATION'S EFFECT ON CHILDREN'S WELL-BEING

Before examining the effects of perceived discrimination on child development, it is important to understand the current-day thinking regarding how children both learn to be biased socially (and potentially act in discriminatory ways; perpetrator), and how they learn to recognize discrimination and respond to it (victim). We begin with the social underpinnings of theory related to the psychology of perpetrators of discrimination. A broad base of research and theory extending back into the mid-1900s and stemming largely from the discipline of social psychology has attempted to understand (a) the social “in-group” and “out-group” dynamics that play a major role in promoting acts of discrimination, (b) how the human mind appears prone to behaving in such groups, adopting biases and prejudicial beliefs, and acting upon them, and (c) how in-group and out-group attitudes, beliefs, and behaviors inform

the individual’s sense of self (e.g., his or her identities). Much as the growing infant’s mind is built to implicitly categorize objects and sounds in his or her environment, there are also implicit (i.e., operating outside conscious control and awareness) social-cognitive processes involved with building the capacity for acts of discrimination. Here, we review theory from the social and developmental literature to better understand how such discriminatory propensities develop, and shed light on the conditions under which they are prone to be enacted.

Social Bases of In-Group and Out-Group Behavior and Attitudes

One of the foundational scholars of the science of stereotype and prejudice, Allport (1954), characterized stereotyping as the tendency for humans to hold overgeneralized beliefs, or form exceptionless generalizations about people based on social group memberships. Although a strong tradition of study regarding intergroup biases and stereotyping has existed within the adult literature (Abrams, Hogg, & Marques, 2005), the systematic study of these important social processes in childhood and adolescence has only just begun. Some of the earliest studies of young children’s racial group attitudes provided alarming evidence of racial prejudice as early as 3 years of age (K. B. Clark & Clark, 1947, 1950; Doyle & Aboud, 1995). The now-historic “doll studies” conducted by Kenneth B. Clark and his wife Mamie Phipps Clark, the Clarks provided the first empirical evidence of early racial play preferences among White and Black children. According to the “Doll” test, the Clarks found that children, when given the option, systematically preferred to play with White dolls instead of Black dolls, regardless of their own skin color. Kenneth Clark (K. B. Clark & Clark, 1950) also used a projective drawing “Coloring” test, asking children to select from a variety of colors including white, tan, brown, and black, to color outlined boys and girls first “the color you are” and then “the color you like little boys (or girls) to be.” Clark also recorded open-ended qualitative spontaneous talking during the children’s drawing sessions. From these studies, he concluded that Black children as young as 5 years showed both identification with dark skin color and “prejudice” for light skin color. He found that children tended to color themselves “noticeably lighter” in color than they “actually were” (based on his own observations), but that the accuracy of coloring a child’s own skin color tended to increase with age. He also concluded that, when asked which color children like other boys or girls to be, they tended, as with the Doll test, to show systematic

preferences for lighter skin colors, regardless of their own skin color. These light-preference skin-color biases, he also noted, appeared to decrease slightly with age. These early and seminal studies combine constructs of both the personal identification with color (what we describe as racial identity below), as well as the social biases for lighter skin color, which continue to be measured and theorized about in today's developmental literature. These findings were and are considered by many to have been shocking revelations in the social sciences, and powerful for enabling social change (e.g., *Brown v. Board of Education*, Warren, 1954; see Keppel, 2002).

It is now well-documented that children learn at an early age to identify and form social groups, including those based on gender, ethnicity, and race (e.g., Aboud, 2003). Research that has used increasingly specific methods for separating the measurement of in-group and out-group attitudes and social preferences has found that in-group social preferences form before out-group judgment begins. In the early childhood years, in-group favoritism is thought to develop alongside early cognitive skills that allow the child to understand his or her own group identification, and recognize others who belong in the group (Bigler, Spears Brown, & Markell, 2001; Nesdale & Flessner, 2001; Yee & Brown, 1992). By about middle childhood, children are cognitively capable of multidimensional methods of categorization, allowing them to come to understand out-group membership (Aboud, 2008; Bigler & Liben, 1993; A. Clark, Hocevar, & Dembo, 1980). These changing developmental processes have been documented using laboratory-based minimal group paradigms (i.e., creation and assignment of children to in-groups and out-groups that are arbitrary; Tajfel, 1978). Importantly, researchers are now documenting that "preferences" for play with children of in-group members does not necessarily translate to "out-group" biases. In research with three ethnically and racially diverse groups of Portuguese, Dominican, and Cambodian children who were 6 to 12 years old, children reported strong preferences to play both with peers of their own ethnic background, as well as other backgrounds, when given the choice to independently rate groups (not make a forced choice between the three; Marks, Szalacha, Lamarre, Boyd, & García Coll, 2007). Although in-group social preference is not a sufficient condition for out-group bias or prejudice, a growing body of research does indicate that in-group favoritism (or bias) can be linked with social exclusion (Killen, Mulvey, & Hitti, 2013), one of the most common forms of childhood discrimination, and may therefore be a necessary condition for prejudice and discrimination.

Social-Cognitive Theory and Prejudice

A novel theoretical addition to the field of child development extends beyond the in-group out-group processes to include the basic social and cognitive processes at play in forming prejudicial attitudes and behaviors. Rutland, Killen, and Abrams (2010) have developed a platform asserting that "prejudice should be investigated in the context of social-cognitive development and the interplay between morality and group identity" (p. 279). These authors argue that most children and adolescents explicitly espouse moral reasoning that dictates that blatant prejudice and discrimination are wrong. However, as situations arise that are complex—akin to more everyday settings than often are created in laboratory manipulations—in which multiple possible reasons may exist for social exclusion, children and adolescents do exhibit prejudicial behaviors (see Figure 9.1). Combining several relevant theoretical perspectives, these authors stress the importance of how children reason about social exclusions when developing prejudice. Children may, for example, rely on "moral" reasoning for social exclusion, noting that exclusion of a child from a group physical activity is simply wrong. Children may also use "conventional" reasoning, which purports to provide a legitimate reason for excluding a child from joining the activity, such as wanting to maintain group cohesion or functioning. According to Figure 9.1, the type of context—whether complex or simple—matters greatly in children's reasoning around socially excluding another child. When children are faced with open-ended and simple conditions for playing with other children, such as joining

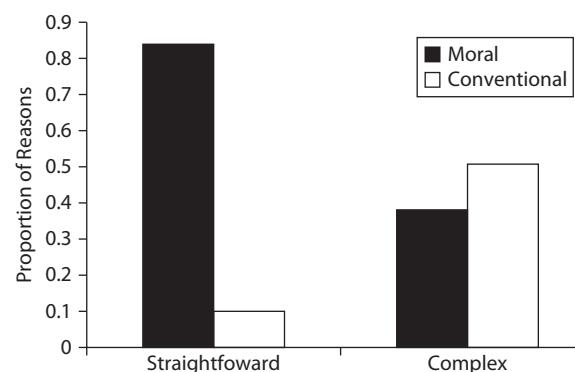


Figure 9.1 Example of context complexity and propensity for prejudice.

Source: From "A New Social-Cognitive Developmental Perspective on Prejudice: The Interplay Between Morality and Group Identity," by A. Rutland, M. Killen, and D. Abrams, 2010, *Perspectives on Psychological Science*, 5, pp. 279–291. Reprinted with permission.

a team, children are less likely to act in prejudicial ways or invoke conventional reasoning. However, when presented with a more complex situation—one in which there are limited spaces to fill on the team—children are more likely to be biased and invoke conventional reasoning justifying their prejudicial choices. These contextualized theoretical viewpoints are a welcome addition to the literature, which has tended to document myriad laboratory-based effects that sometimes appear contradictory: On the one hand, children can espouse egalitarian viewpoints, while on the other they act in prejudicial ways. It follows from the research supporting this theory that *context* characteristics are of central significance in understanding the conditions under which children (and adults) may invoke stereotypes and act in biased or prejudicial ways.

Identity Theory Relevant to Understanding Discrimination

To begin linking an act of discrimination (e.g., social exclusion based on stereotypes) to the well-being of children and adolescents, we focus on the literature regarding identity formation (see also Spencer, Swanson, & Harpalani, Chapter 18, this *Handbook*, this volume). Social Identity Theory (Tajfel & Turner, 1986) has provided a foundation for explaining how claiming membership in a particular social group (e.g., stating “I am a Mexican American”) may inform a person’s sense of self, taking on characteristics of the group’s identity and behaviors (e.g., cultural traditions common among Mexican Americans). Importantly, in situations in which children identify highly with their in-group, stereotype threat (i.e., being at risk of confirming a negative stereotype for one’s self; Steele & Aronson, 1995) is greatest. It is therefore through the processes of threat to a child’s identity as a member of a social group or groups (e.g., girl, Dominican, American, Black, gay) that the child may suffer psychologically when perceiving discrimination based on his or her social group membership. As stated previously, gender, race, and ethnicity are the predominant social groups under which children perceive discrimination. We present the theoretical foundations of ethnic and racial identities here as background for understanding how perceived discrimination may influence a child’s well-being. It should be noted that many (although not all) of the processes examined here can be extended in principle to other role, class, sexual orientation, and other stigmatized group identity threats as well.

Ethnic identity—the personal attitudes toward and feelings of belonging to an ethnic group—plays an integral

part in many aspects of development, including dealing with perceived discrimination among ethnic/racial minority children and adolescents. Ethnic identity reflects not only membership in an ethnic group, but also a complex of changing attitudes and feelings including ethnic pride, the centrality and importance of one’s ethnicity relative to other parts of the self (i.e., centrality), and involvement in one’s ethnic heritage (Nesdale & Mak, 2003; Phinney, 1990; Yip, Seaton, & Sellers, 2006). Past research has established the importance of positive ethnic identity and pride for optimal educational and social development (Phinney, Cantu, & Kurtz, 1997). Among Mexican and Chinese immigrant adolescents, for example, ethnic identity may support the extra motivation needed to attain levels of academic success comparable to those of European American students (Fuligni, Witkow, & Garcia, 2005). Among African American adolescents, a strong sense of ethnic pride may help to diminish the effects of school-based racial discrimination (Wong, Eccles, & Sameroff, 2003). There is also evidence suggesting that ethnic identity exploration (i.e., active and abstract consideration of what it means to be a member of an ethnic group) may promote deeper interethnic group social understanding among adolescents (Karcher & Fischer, 2004), though the association between ethnic identity exploration and interethnic group social processes in childhood is currently being explored less.

Despite a sound foundation of research documenting the importance of a strong ethnic identity for adolescent and adult well-being, strikingly little is known of the development of ethnic identity prior to adolescence. As school-aged children form in-group and out-group social preferences and biases, including those based on ethnicity and race (e.g., Doyle & Aboud, 1995; Katz & Kofkin, 1997), it may be that the strength of pride and salience a child feels about his or her ethnicity plays an important role in developing preadolescent interethnic group social preferences. In the tradition of social identity theory (Tajfel & Turner, 1986), research with children has shown that national identification (i.e., a strong sense of belonging to a national group) is associated with less social distance to in-group members and greater social distance from out-group members (Verkuyten, 2001a). Children also tend to assign more favorable characteristics to members of their own nationality group than to others, whether or not they identify with being members of their nationality group (Bennett, Lyons, Sani, & Barrett, 1998). Among adolescents, the salience and importance one feels toward one’s ethnic group also relates to in-group social preferences (Verkuyten, 1991, 2001b).

Following the seminal work of Erikson (Erikson, 1968), who brought attention to the importance of identity formation in adolescence, ethnic identity development is today considered an essential developmental task among ethnic/racial minority adolescents (Marcia, Waterman, Matteson, Archer, & Orlofsky, 1993; Phinney, 1990). Several models have been developed to provide a framework for understanding the development of ethnic identity prior to adulthood. In Phinney's developmental model, individuals move from childhood, when ethnic identity is largely unexamined by the child, through an identity exploration that culminates in a fully achieved ethnic identity in late adolescence (Phinney, 1989, 1993).

Sociocognitive theories of ethnic identity development have also been proposed; they present the only theoretical models for incorporating preadolescent developmental perspectives into ethnic identity formation (Aboud & Doyle, 1993; Bernal & Knight, 1997). In these models, children acquire the capacity to form ethnic identities during middle childhood when their cognitive abilities become more sophisticated and abstract. There are conflicting findings, however, with regard to the type of cognitive abilities that may support early ethnic identity awareness. Nevertheless, Aboud and Doyle (1993) have demonstrated that "ethnic constancy" (i.e., the knowledge that one cannot change one's race or ethnicity) begins to appear during middle childhood around Age 10, and is important to the formation of in-group and out-group social biases. Further, Bernal and colleagues (Bernal, Knight, Garza, Ocampo, & Cota, 1990), studying preschool and school-aged children using a cognitive developmental framework, showed that, as children become capable of more complex and abstract reasoning skills with age, their understanding of their ethnicity becomes more sophisticated. In this cross-sectional study, 86% of the Mexican American children (6–10 years old) were able to correctly identify themselves ethnically with labels, though only about 10% of the children were able to provide abstract reasons to describe why they selected the labels they did. The use of correct identity labels was correlated with Spanish language use, and children's preferences for in-group ethnic experiences increased with age. In subsequent studies, however, these authors directly measured general cognitive ability and found no association between cognitive stage development and ethnic identity development (Ocampo, Knight, & Bernal, 1997). Despite these inconclusive findings regarding the relation between cognitive development and ethnic identity among Mexican American children, their parents' ethnic socialization practices were a consistent correlate of ethnic identity development.

Racial identity development theory also has contributed an important foundation for ethnic identity research and in-group/out-group research in adolescence (e.g., Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003). Cross (1971, 1991) initially proposed a framework in which individuals explore their racial identities from ignorance to self acceptance. In this framework, individuals remain largely unaware of their racial identities until they encounter racism, which triggers active identity exploration. As with ethnic identity theory, children are not expected to actively explore their racial identities, as they usually have yet to encounter racism and name it as such. Nevertheless, children of color are often socialized at a young age to recognize and understand overt and subtle acts of racism as it pertains to others (Hughes et al., 2006) and they often feel a sense of ethnic and/or racial group pride (Aboud, 2003; Bernal et al., 1990; Cameron, Alvarez, Ruble, & Fuligni, 2001). In spite of this, according to both the prevalent ethnic and racial identity theoretical frameworks, children themselves are most frequently depicted as unaware of their own racial and ethnic identities and therefore are not expected to actively explore them until adolescence or adulthood. This is an area in need of research moving forward: the full integration of childhood social, cognitive, and identity theory and processes as they emerge prior to adolescence.

A mounting body of empirical evidence exists to support these ethnic identity developmental frameworks. A paper by French, Seidman, LaRue, and Aber (2006) reported one of the few longitudinal studies of U.S. ethnic identity during the early and middle adolescent period, including children of African American, European American, and Latino American ethnicities. These authors documented the rise in ethnic group esteem across the course of early and middle adolescence, and found evidence that the exploration of identity can be particularly salient during middle adolescence. Importantly, ethnic group similarities and differences were observed. Exploring the longitudinal data within the Latino American group (i.e., between Caribbeans, Puerto Ricans, Dominicans), ethnic subgroups appeared to have similar levels of identity and pride. However, differences between the larger ethnic groups were observed, with African American and Latino American adolescents starting with lower levels of ethnic group esteem that rose sharply across adolescence, while the European Americans maintained high, stable ethnic group esteem throughout adolescence.

Taken together, the above theory and supporting literature suggest that ethnic/racial identities play important

roles in developing ethnic/racial minority children's overall awareness, exploration, and understanding of interethnic group social experiences. In adolescence, research suggests that Asian American adolescents with predominantly same-ethnic and mixed-ethnic friendships have higher levels of ethnic identity exploration than adolescents with predominantly other-ethnic friendships (Kiang, Peterson, & Thompson, 2011). Importantly, immigrant adolescents with greater levels of ethnic identity were also more likely to report higher perceived discrimination than adolescents with lower levels of ethnic identity. It follows, then, that these relations between self-esteem building ethnic identification processes and awareness of interethnic group biases may be adaptive for immigrant or ethnic/racial minority children who will need to navigate community stereotypes and prejudice as they age.

Integrative and Person-Context Perspectives

We take our next step in the theoretical literature toward understanding how discrimination may influence child and adolescent well-being by deepening attention to contexts and unpacking how the capacity to perceive discrimination is formed. In doing so, we now turn our attention to theory

focused squarely on victims of childhood discrimination. Guiding the field are two seminal theoretical frameworks highlighting the saliency of discrimination and racism for influencing minority youth development in particular. These two theories—the Integrative Model (García Coll et al., 1996) and Perceptions of Discrimination Model (Brown & Bigler, 2005)—together comprise the main foundation of theoretical frameworks specifically developed with and for understanding discrimination's impacts on child and adolescent development.

The first framework presented an integrative and ecological model for the development of minority youth (see Figure 9.2; García Coll et al., 1996). In this model, García Coll and colleagues (1996) placed the treatment and understanding of discrimination in childhood as a central consideration for explaining or predicting minority youth development. Social position variables including race, ethnicity, social class, and gender represent socially constructed groupings to which children may be ascribed by others or identify with themselves. Membership (either ascribed by someone else or personally identified as in the case of ethnic identity) in such groups often places children who fall into the “minority” groups (e.g., by virtue of social power) at risk for developmental problems. This risk

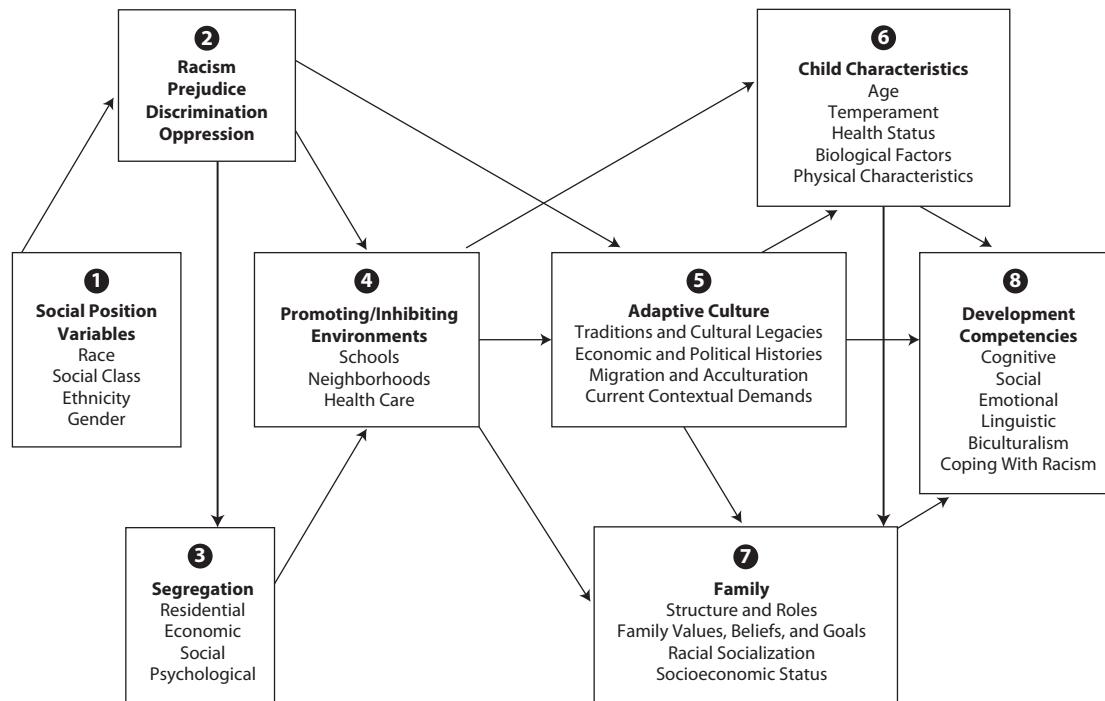


Figure 9.2 Integrative model for the study of minority child development.

Source: From “An Integrative Model for the Study of Developmental Competencies in Minority Children,” by C. García Coll et al., 1996, *Child Development*, 67, pp. 1891–1914.

is attributable to racism, prejudice, discrimination, and oppression which lead to segregation both physically (i.e., neighborhood) and socially (i.e., peer exclusion).

Importantly, these social position and risk processes are filtered through promoting or inhibiting social settings such as schools, family socialization practices, and adaptive culture (e.g., historical traditions and cultural legacies) to explain how individual minority youth build a variety of developmental competencies. According to this framework, then, if child development is to be measured and understood among ethnic, racial, gender, or social class minority youth, understanding children's exposure to, perceptions of, and management of discrimination is of central importance. A discussion of health outcomes, cross-ethnic group academic disparities, or any other developmental phenomena without considering discrimination and the promoting/inhibiting environments in which children live is invalid. In other words, to say that African American children underscore on standardized academic achievement tests when compared to European American children thereby indicating lower academic abilities without measuring, understanding, and/or considering the psychological and social constructs relevant to systematic racial oppression in the United States is invalid and perpetuates misconceptions and biases about the innate academic abilities of African American children.

Of import in this model is the focus on developmental competencies instead of deficits, a focus that has been historically absent in the literature regarding racial and ethnic minority youth (García Coll, 1990; García Coll et al., 1996; McLoyd, 1991). Reflecting the larger society in which developmental scholars operate, numerous scholars have noted that the field of child development research has been slow to recognize the promise, competencies, and resiliency of minority youths, focusing instead on deficit models of development (e.g., the academic achievement gap example above). Researchers continue today to compare ethnic and racial groups of individuals against one another (often to a majority reference group) across a myriad of developmental and health outcomes without attention to the underlying social and psychological processes that may explain documented socially constructed group differences that perpetually favor the majority group (Helms, Jernigan, & Mascher, 2005). Furthermore, considering the substantial social, historical, and economic barriers many racial, religious, and ethnic minority youth continue to face in the United States, it has been argued that there are unique developmental competencies—above and beyond the basic academic, social, and self-care skills

shared by all U.S. children—that minority youth must master in order to thrive. These competencies include developing healthy ethnic/racial identities, as well as bilingual and bicultural competencies (Marks, Godoy, & García Coll, 2014). Such skills are necessary to thrive socially in increasingly diverse societies, and to understand and recognize social discrimination and navigate its detrimental effects.

Related to the idea that ethnic, racial, religious, and language minority youth must actively cultivate developmental competencies (e.g., identities, language skills, bicultural social skills) to thrive, another important theoretical framework has detailed the precise skills and situational factors necessary for children to learn to perceive discrimination. Brown and Bigler (2005; see Figure 9.3) provided a developmental model incorporating the cognitive, individual, and situational factors necessary for children to acquire and hone the essential skill of discrimination perception. Although, as the authors argued, discrimination exerts detrimental effects on children and families regardless of whether or not the discrimination is directly perceived by the children, the ability to perceive discrimination—to recognize an act of discrimination and name it as such—is essential for children to then be able to interpret the social conflict or act accurately and to recover from it. Without accurate perceptions of discrimination, children may suffer in self-image (e.g., dislike their bodies or skin color) or self-esteem (e.g., believe they are less capable in school than they are) and be left without a way to explain or overcome these detrimental psychological experiences. Furthermore, there is a growing body of empirical literature documenting children's and adolescents' abilities to perceive discrimination. Among preschool-aged children, exclusion of others based on social group membership seems to be the most recognizable form of discrimination (Theimer, Killen, & Stangor, 2001), while elementary school children recognize that other forms of discrimination exist. Verkuyten, Kinket, and van der Weilen (1997) reported that 92% of 10-year-olds identified behaviors such as name-calling, an unequal sharing of goods, and social exclusion as forms of discrimination. By adolescence, there is an understanding of both explicit as well as more subtle forms of discrimination (Wong et al., 2003).

In the Brown and Bigler (2005) model, to perceive discrimination, children must first be capable of understanding socially constructed groupings such as race and gender, be able to attribute and understand others' intentions and actions, and be able to make social comparisons and categorizations. Such skills are present among

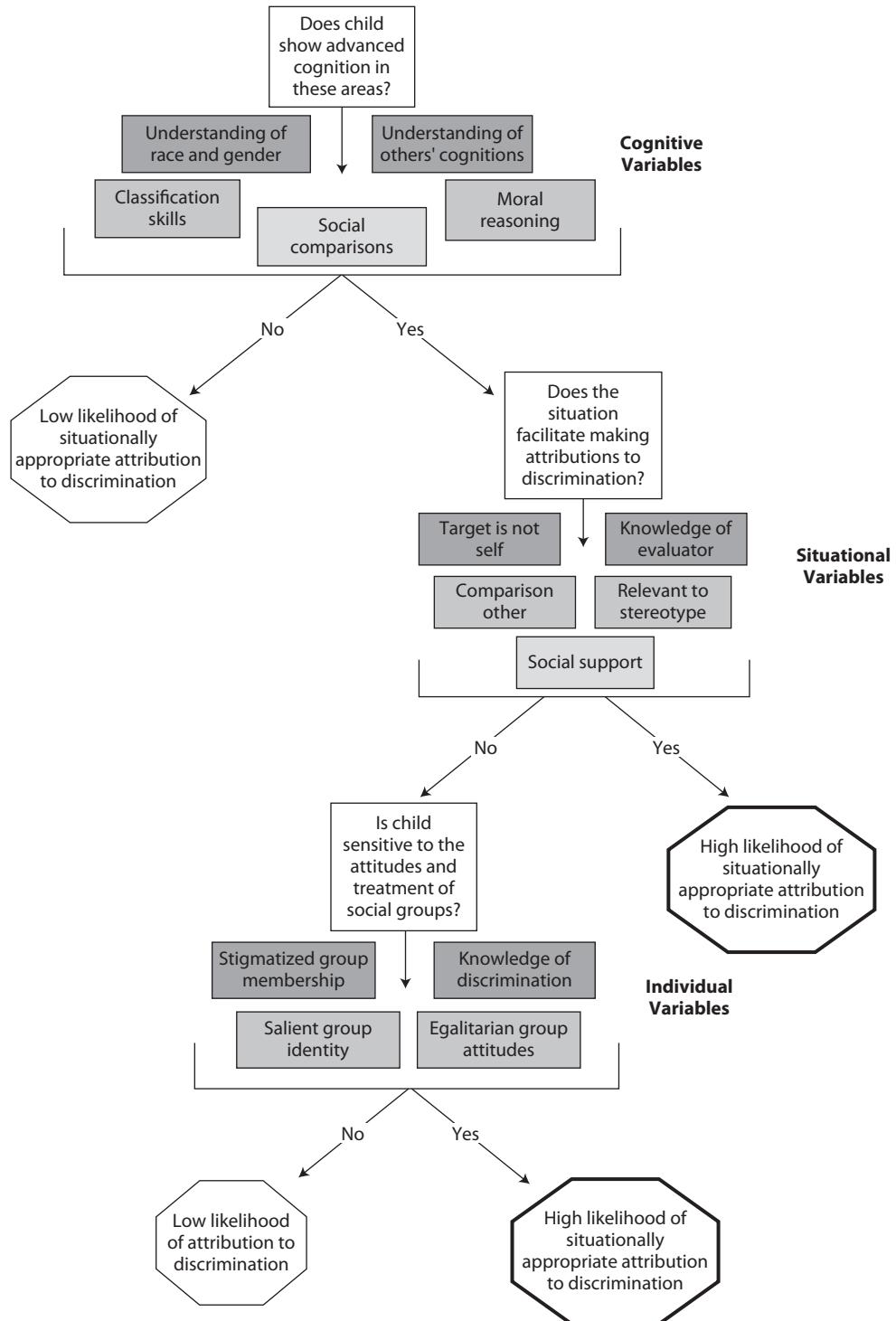


Figure 9.3 Social cognitive model of perceptions of discrimination.

Source: From "Children's Perceptions of Discrimination: A Developmental Model," by C. S. Brown and R. S. Bigler, 2005, *Child Development*, 76(3), pp. 533–553.

children as early as 5 years of age, although the age at which children reliably use such skills is typically later (7–8 years) and is influenced greatly by factors including other cognitive abilities and characteristics of the social environments the child is accustomed to. Next, as with the García Coll et al. (1996) model, these authors also emphasized the importance of context for developing discrimination perception—*situational* factors, including characteristics of the setting, that may make the act likely to be interpreted as discriminatory. These situational variables include characteristics of the perpetrator (e.g., whether the individual is well-intended or biased), and whether the context typically has produced discriminatory acts in the past (e.g., other group members have been victimized, and the context is relevant to stereotypes). A point of divergence, however, between the García Coll and Brown and Bigler models, is that the proximal context (the immediate surroundings at the moment of the discriminatory act) is the focus of the perception of discrimination model. This makes sense given the focus on explaining a child's ability to perceive a specific act as discriminatory; however, it is likely that more distal contexts including race relations in the community at large may also play an important role in the likelihood that children correctly perceive discriminatory acts at another given moment (see "Discrimination in Context," further on).

The third and final level of the model by Brown and Bigler (2005) focused on *individual* factors including identity processes such as in-group affiliation, knowledge of discrimination, and egalitarian beliefs (i.e., children with more egalitarian beliefs more readily perceived discrimination). These psychological factors increase children's abilities to perceive discrimination, and a growing body of empirical literature supports the assertions that, by adolescence, all of the necessary cognitive and individual-level skills in this model are in place to allow youth to perceive discrimination. Simons et al. (2002) showed that African American 10- to 12-year-olds reported experiencing at least one instance of racial discrimination, with verbal insults and racial slurs reported as the most commonly experienced discriminatory behaviors. Wong and colleagues (2003) reported that adolescents perceive discrimination to occur relatively frequently in public as well as educational settings. For example, many African American (32%), Latino (38%), and Caucasian students (13%) reported that they had been discouraged from joining advanced level classes, disciplined wrongly by teachers, or graded unfairly because of their race (Fisher, Wallace, & Fenton, 2000). From a theoretical point of

view, such discrimination perceptual skills are paramount to understanding not only a momentary act of discrimination, but for understanding the larger societal propensities and histories of more systematic discrimination, and their implications for child and adolescent well-being. Clearly, the individual-level factors related to children's abilities to perceive discrimination will be shaped by and responsive to the larger societal messages extant in media, day-to-day interpersonal interactions, and depicted in written, video, and oral histories.

PERCEIVED DISCRIMINATION AND ITS INFLUENCE ON CHILDHOOD AND ADOLESCENCE

As stated in the introduction to this chapter, our primary goal is to examine the full array of implications that discrimination can have on child and adolescent development.

Introduction to the Systematic Review

We undertook a systematic review of the empirical, peer-reviewed social science literature. We did this because, to our knowledge, no such systematic review has focused specifically on the linkages among discrimination and developmental outcomes. To make our review as standardized and rigorous as possible, we followed the guidelines published by Moher, Liberati, Tetzlaff, and Altman (2009) and the Meta-Analysis of Observational Studies in the Epidemiology Group (Stroup et al., 2000) in the design and reporting of our review. We also followed the editorial on literature reviews published in *Psychological Bulletin* (R. J. Cooper, Wears, & Schriger, 2003) detailing guidelines for taxonomy and reporting of results. The methods and coding for this review are as follows.

Search Strategy

Studies were considered for inclusion if they provided quantitative or qualitative data on the association between racism and/or discrimination and mental and physical health of children. All observational studies, cohort, and case-control studies were considered for inclusion. Participants in the included studies were youth ranging in age from 2 to 18 years. Note that we made no date or publication year restrictions on our search. Research studies published in English, but based in any society or country, were included.

In March 2013, we searched the databases ACADEMIC SEARCH COMPLETE, MEDLINE, PsycINFO, and SocINDEX using the Boolean phrase “adolescent or child or youth” and “discrimination or racism” and “development or health or achievement or socioemotional.” The results yielded 18,333 articles. To narrow our search, we excluded dissertations, review articles, and books. We also excluded duplicates from multiple database searching; 7,007 articles remained. In brief, we next looked for articles whose main focus was interpersonal discrimination (or other synonyms, as opposed to sensation/perception stimulus discrimination research) but also mentioned child health (mental or physical health) or whose main focus was child health (mental or physical health) but also mentioned interpersonal discrimination.

Inclusion/Exclusion Coding

Two rounds of coding were conducted to identify relevant articles. Two doctoral-level graduate students reviewed the 7,007 article abstracts using the following inclusion/exclusion criteria: Exclusion criteria: (a) Non-peer-reviewed studies; (b) studies not written in English; (c) studies with only adult subjects (Ages 18+). Inclusion criteria: (a) articles that provided quantitative or qualitative data on the association between racism or discrimination and child/adolescent development, mental health, physical health, well-being, socioemotional functioning, and/or academic achievement, or on children’s perceptions of discrimination and racism; (b) youth 17 years and younger; (c) peer-reviewed articles. In the first round of coding, the

two graduate students reviewed 500 of the 7,007 article abstracts for interrater reliability. Agreement was excellent, with only two discrepancies (Cohen’s kappa = .996). The lead author then resolved the discrepancies with the graduate reviewers. Each graduate student then independently reviewed 3,253 article abstracts each. Using the inclusion/exclusion criteria, 481 out of 7,007 articles (6.8%) were included after this step. In the second round of coding, the same two graduate students acquired PDFs of the 481 full-text articles identified as meeting inclusion criteria, in order to conduct full-text reviews. Both students reviewed 100 of the 481 articles using the same inclusion/exclusion criteria so that interrater reliability could be assessed. Agreement was still excellent, with eight discrepancies (Cohen’s kappa = .84). The lead author again resolved the discrepancies along with the graduate reviewers. Using the inclusion/exclusion criteria above, 179 of 481 articles (37%) remained for final inclusion in this review.

Coding for Outcomes

In order to systematically examine methodology and outcomes in the remaining 179 articles, an Excel spreadsheet was created to code each of the 179 articles using the following categories: APA citation, inclusion criteria, procedure, type of data collected, measures (focusing on the measures used for perceived discrimination/racism), sample size (including age, gender, ethnicity/race), household income, analyses used, and outcome measured (racial socialization, mental health, physical health, well-being, socioemotional functioning, academic achievement, and

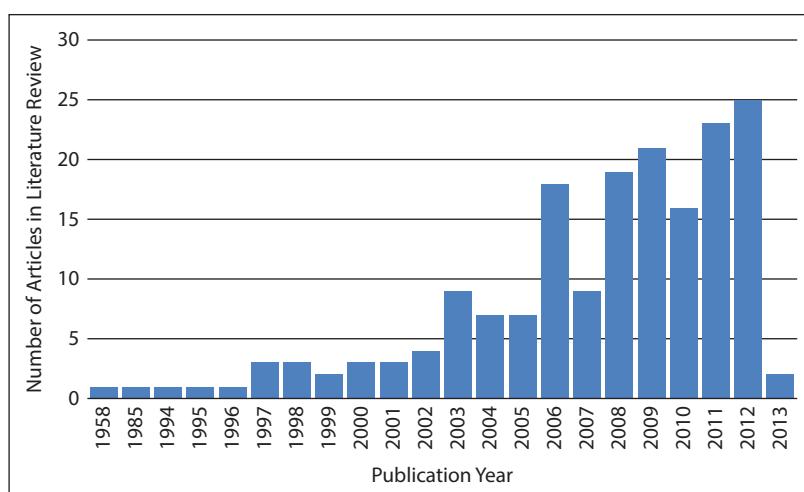


Figure 9.4 Number of empirical, peer-reviewed journal articles published on discrimination and its effects on child or adolescent development, by year of publication.

children's perceptions of discrimination/racism). Data from this final spreadsheet constituted the basis for this chapter's review.

We were struck as we began examining this final subset of empirical, peer-reviewed literature, at how newly emerging this body of knowledge was (see Figure 9.4). Plotting the number of articles that fitted our search criteria, we found 179 articles directly linking discrimination to child or adolescent developmental outcomes, with approximately 93% of the articles on children aged 17 and younger published after the year 2000. The next section of the chapter represents a comprehensive review of this literature, organized first by developmental process areas that are important correlates of perceived discrimination in development, and next by developmental outcome domain. In each section, we pay close attention to the diversity of findings, whenever possible, with respect to type of discrimination (e.g., gender versus racial versus religious), country/society in which the research was conducted, and important potential mediators or moderators (i.e., explanatory processes or important contexts such as gender) that may change the way discrimination influences development.

LINKING DISCRIMINATION WITH CHILD AND ADOLESCENT DEVELOPMENT: RESULTS OF A SYSTEMATIC REVIEW

The deleterious effects of perceived discrimination on child and adolescent development are currently being established, and a close look at the literature reveals that a developmental perspective on discrimination's impacts is comparatively new. Children's perceptions and understanding of discrimination, as well as the development of racial discrimination abilities (i.e., being able to effectively and efficiently categorize individuals of different racial/ethnic backgrounds) have been some of the most prominent areas of interest in the early developmental ethnic/racial discrimination literature. Within the 20 years prior to the time of this writing, there has been a distinct shift in this research base. Researchers have been progressively moving away from discovering the "why" and "how" discriminatory acts occur and are now moving toward understanding the multitude of developmental outcomes and consequences that can arise from perceived discrimination. As an example, in their study of perceived discrimination and early substance abuse among Native American children and adolescents, Whitbeck, Hoyt, McMorris, Chen, and Stubben (2001)

reported that almost half of the adolescents had been insulted because they were Native Americans. One-fourth had felt disrespected at a place of business due to ethnicity, 49% had heard a racial slur directed at them, and 14% had been threatened physically. Notably, more than half of the children reported that their teachers seemed surprised when they did well in school, while 25% felt their teachers did not expect them to do well on their schoolwork. Finally, 20% felt other children excluded them due to their ethnicity, and 31% felt that other children treated them unfairly because of their ethnicity. Clearly, these children and adolescents did not just perceive discriminatory acts—they were able to detail the many ways these acts influenced their lives. From disadvantage in stores and in the school context to strained peer relations, perceived discrimination has far-reaching consequences for minority youth development.

This review on the widespread influence of discrimination focuses on physical health, well-being, socio-emotional functioning, academic achievement, and mental health domains. Each of these areas can be drastically influenced by perceptions of discrimination on their own, although it is highly likely that, if one area of development is considerably affected, one or more of the other domains will also be affected. For example, if perceptions of discrimination are creating significant mental health issues for a child, such as problems with depression and anxiety, chances are high that the child will also be struggling in areas of socioemotional functioning, well-being, or perhaps academic achievement as well. For ease of presentation, we organize our review by developmental domain areas, while at the same time noting the considerable amount of overlap among developmental outcomes in studies that offer evidence across domains. As these outcome domains are described with respect to discrimination, we also offer insights into the potential processes linking discrimination to developmental outcomes across a variety of emerging mediators and/or moderators of the discrimination-outcome linkages.

Physical Health

Although physical health outcomes of perceived discrimination are not as widely discussed or researched as the psychological and social developmental domains we cover, we begin our review by highlighting this compelling area of emergent research. Physical consequences can and do arise from racism and discrimination, and these consequences can be severe. In looking at the correlates of physical outcomes of discrimination, it can often be

difficult to pinpoint perceived racism or discrimination as the direct cause of physical harm, health disadvantage, or discomfort. Unlike measures of depression, self-esteem, or well-being, there are no physical health surveys currently in use designed specifically to assess the physical effects of perceived discrimination. Instead, researchers must often use retrospective reports of physical symptoms or health behaviors that appear to co-occur with perceptions of discrimination. Despite these current methodological limitations, several areas of physical health appear to be affected by discrimination in childhood.

Smoking and Substance Use Behaviors

Early smoking initiation and other negative substance use behaviors have frequently been linked to discrimination—a troublesome finding considering the long-term consequences of substance use and abuse in adolescence and adulthood. In a study of U.S. adolescents, Wiehe, Aalsma, Liu, and Fortenberry (2010) demonstrated that participants who had dropped out of high school were more likely to report histories of discrimination and cigarette smoking. Unsurprisingly, gender differences were also uncovered in this research. Males who reported discrimination were 2 times more likely to smoke than males who did not report discrimination in any settings, while the odds of smoking among females due to perceived discrimination was consistently lower than that among males. Additionally, males who reported experiencing discrimination in stores and in interactions with police were more likely to smoke—an association not observed among females. These findings offer a glimpse into just one of the numerous areas where seemingly unassociated physical consequences can be associated with acts of discrimination. In addition, they allow for the observation of just one of the many occurrences in which gender plays a role in moderating the influence of discrimination.

The connection between discrimination and its associated physical correlates is by no means country-bound. Similar relationships between smoking and discrimination have been documented in several countries outside of the United States. In their assessment of middle-school-aged children in Jujuy, Argentina, Alderete and colleagues (2012) identified perceived discrimination as one of the precursors of early smoking. The authors found that having experienced racial insults was associated with current smoking, and that this relationship was moderated by participant ethnicity (Amazonian or indigenous). Amazonian participants who were 13–14 years old and had experienced a racial insult in the 9th grade were almost

4 times more likely to be smoking at 15 years of age in the 10th grade, when compared to Amazonian participants who had never experienced any racial insults. In contrast, indigenous participants who were exposed to a racial insult at 13–14 years old were only 80% more likely to be smoking at 15 in the 10th grade, as compared to indigenous members of the same group who did not report being exposed to racial insult(s).

Perceived discrimination has been shown to be directly associated with smoking behaviors in early and late adolescents, but there are also indirect ways in which racism and discrimination have been shown to influence early smoking initiation and later smoking behaviors. Increases in perceived discrimination are not only associated with increased risk for smoking, but are also associated with increased risk for association with friends who smoke (Fagan, Brook, Rubenstein, Zhang, & Brook, 2009). When considering the well-established body of literature that has documented that children can learn to both identify and form social groups at a very young age (e.g., Aboud, 2003), these findings offer insight into the development of social groups later in life by those who are influenced by discrimination and discriminatory acts. In the face of discrimination (both shared and unshared), certain friendship groups and associations are being formed based on mutual substance use behaviors, which not only serve to reinforce engaging in these behaviors that can be extremely damaging to overall physical health, but also limit the other shared “factors” that typically affect the formation of social groups (e.g., gender, age, race). In measuring perceptions of discrimination and substance use in African American parents and their children, Gibbons, Gerrard, Cleveland, Wills, and Brody (2004) demonstrated that children’s perceptions of discrimination were correlated with the children’s own and their friends’ substance use. In other words, children who perceived more discrimination not only tended to have higher substance use themselves, but were also more likely to have friends with the risky behavior as well. These results suggested that the effects of discrimination can be far-reaching—extending beyond immediate health risk behaviors into peer and friendship contexts as well. Discrimination can be directly related to the individuals’ substance use and smoking behaviors, but as shown, perceived discrimination can also be indirectly related to friends’ substance use and smoking behaviors, as well as the number of associations individuals make with friends who engage in these unhealthy behaviors.

As noted earlier, boys and older youth appear to be at the greatest risk for negative substance use outcomes

(Alderete et al., 2012), perhaps because males tend to perceive more discrimination than females (Oxman-Martinez et al., 2012; Umaña-Taylor & Updegraff, 2006). This gender difference in discrimination perception persists across countries and cultures; Oxman-Martinez et al. (2012) established that, in a sample of children who had newly immigrated to Canada, boys were more likely to report discrimination than were girls. Nevertheless, although the risks of perceiving discrimination may not be as high for females, those who do perceive discrimination face some of the same health challenges as males, which is important to consider in light of the substantial literature showing that many, if not most, substance use behaviors are typically more common in males than females (e.g., Greenfield, Manwani, & Nargiso, 2003). With regard to early smoking behaviors, females who reported higher levels of perceived discrimination were more likely to also report having ever smoked in their lives (Guthrie, Young, Williams, Boyd, & Kintner, 2002). Further, for every 1-point increase in perceived discrimination, there was a 37% increased likelihood of smoking—a very large effect. Lorenzo-Blanco, Unger, Ritt-Olson, Soto, and Baezconde-Garbanati (2011) found similar results: The odds of past-30-day smoking increased as girls reported higher levels of discrimination.

Physical Health Correlates

The indirect discrimination-to-physical outcomes “routes” demonstrate that the consequences of discrimination are not just far-reaching, but that they can take any number of paths to a final physical result. In a study looking at the physical health correlates of discrimination, Chambers, Tuli, Fraser, and Mutunhu (2004) aimed to uncover the relationship between internalized racism and both body fat distribution and insulin resistance in adolescent youths of African descent. Participants in this study were recruited via their mothers at a well-known hospital in Barbados. Correlational results indicated that internalized racism was positively associated with waist circumference for girls, but not for boys, although the correlation was weak-to-moderate. For the sample as a whole, internalized racism was positively correlated with hostility such that children who internalized racism more also tended to be more hostile. The relationships between internalized racism and physical outcomes remained significant for girls, even when controlling for age and birth weight. Girls who reported a high level of internalized racism also had significantly higher body mass indexes (BMIs), waist circumferences, and insulin resistance as compared to girls

who reported a low level of internalized racism. Further, even when controlling for hostility and lifestyle behaviors (in addition to birth weight and age), girls who reported high levels of internalized racism were over 3 times more likely to show early insulin resistance than girls who reported low levels of internalized racism. Again, these relationships were not found to be statistically significant for boys. The attempt by Chambers et al. (2004) to link two seemingly unrelated variables such as internalized racism, BMI, and insulin resistance is both unique and impactful. While causation can by no means be inferred from these findings, they can be used to attempt to further the case that the effects of discrimination are more far-reaching, more pervasive, and more omnipresent than most perpetrators or even victims may realize.

In addition to affecting BMI and levels of insulin resistance, perceived racism has been shown to relate to resting blood pressure rates for Black adolescents (R. Clark & Gochett, 2006), when other personality factors, like trait anger, are taken into account. High levels of trait anger tend to dispose individuals to find a wide variety of situations bothersome or frustrating, and increase the tendency to respond to emotionally charged situations with a higher level of state anger (Spielberger et al., 1985). Perceptions of racism have been shown to be moderately and positively related to trait anger—the more adolescents perceive racism, the more likely they are to report elevated trait anger (R. Clark & Gochett, 2006). A critical question, the answer to which cannot necessarily be inferred from these findings, surrounds the directionality of these associations. Does an increased level of trait anger predispose certain individuals to perceive more discriminatory acts than would be perceived by individuals with lower levels of trait anger? Or does the experience of perceiving racism encourage individuals to react with more anger in certain discriminatory situations? Either way, it is important to consider that discrimination and racism can relate to the way children and adolescents react to prejudice in both the present and the future. These reactions do not necessarily have to be in the realm of emotional reactivity—they can be body-focused and well out of the range of conscious control. R. Clark and Gochett (2006) demonstrated significant interactions between perceived racism and trait anger in predicting both systolic and diastolic blood pressures. Follow-up analyses indicated that perceived racism was marginally (nonsignificant at a $p < .10$) negatively associated with systolic blood pressure for individuals who were low in trait anger, such that for these individuals, increases in perceived racism were associated with decreases in

systolic blood pressure. The interaction was the same for diastolic blood pressure; for individuals low in trait anger, there was a negative, marginally significant (nonsignificant at a $p < .10$), correlation between perceived discrimination and diastolic blood pressure. Neither of these interactions were significant for individuals who were high in trait anger. These findings may suggest that adolescents who tend to be less angry show a physiological arousal pattern in response to discrimination. For adolescents with greater trait anger, however, such physiological arousal patterns were not documented. These findings are in keeping with a body of literature that suggests that some amount of dynamic physiological reactivity to salient stressors may be adaptive for individuals under duress. It may be that low trait anger therefore provides the adolescent more physiological room to adapt to the pressures of discrimination, though more research in this area is needed to truly unpack these emergent findings.

Fuller-Rowell, Evans, and Ong (2012) also looked at the associations between perceptions of discrimination and changes in blood pressure, this time among rural-poor U.S. adolescents. Among these youth, greater perceived discrimination was associated with higher levels of allostatic load, a combined variable created by the authors that included measurements of systolic and diastolic blood pressure, BMI, and overnight cortisol, epinephrine, and norepinephrine levels. Unlike the previous study, these findings pointed to a more long-term accrual of detrimental health effects of perceived discrimination itself. Additionally, the significant, positive correlation between poverty and allostatic load (higher levels of poverty were related to higher levels of allostatic load) was mediated by perceptions of discrimination; 13% of the effect of poverty on allostatic load was explained by perceived discrimination. Given the myriad findings linking poverty to poor health among children, these findings call on us to question how much of poverty's influence on physical health disadvantage among poor children may be attributed to perceived discrimination. Clearly, new research is warranted in this critical area.

Well-Being

We next turn our attention to the influence of discrimination and racism on children's well-being. Conceptualized differently from physical health, a child or adolescent's well-being can be understood as a range of different psychological factors including, but not limited to, self-esteem, feelings of self-worth, overall life satisfaction, stress levels,

and feelings of trust and confidence. Well-being factors such as these provide a foundation for leading healthy, happy lives, supporting children's longevity and promoting achievement in school and work domains. Unfortunately, perceived discrimination or racism can affect an individual's well-being by directly influencing any or all of these areas. Additionally, as other domains of development are influenced by perceived discrimination, overall well-being also tends to suffer.

Self-Esteem

Global self-esteem takes a drastic hit in the face of perceived discrimination—studies have shown that, when attempting to create an explanatory model conceptualizing the components of self-esteem, as much as 15% of the variance in personal self-esteem can be explained by both personal and group discrimination (Armenta & Hunt, 2009). The crippling blow that can be dealt to a child or adolescent's self-esteem via discrimination is crucial to consider in light of both general identity and ethnic identity development theories. It has been demonstrated repeatedly that the development of strong ethnic identity is essential for both adolescent and adult well-being; however, solid ethnic identity cannot be built on a shaky foundation of weakened self-esteem. Furthermore, while males tend to be at greater risk for many of the negative developmental consequences of racism and discrimination, females' self-esteem appears to be at the greatest risk in the face of perceived discrimination (Behnke, Plunkett, Sands, & Bámaca-Colbert, 2011; Umaña-Taylor & Updegraff, 2006). As perceptions of societal discrimination increase, global self-esteem tends to decrease (Behnke et al., 2011). Notably, for females this decrease is much more pronounced—it is steep, and occurs more rapidly than it does for males (Umaña-Taylor & Updegraff, 2006). However, while girls' self-esteem generally faces the most significant consequences in light of perceived discrimination, there are other factors that can exacerbate an otherwise negligible role of perceived discrimination on male self-esteem. Umaña-Taylor and Updegraff (2006) also discovered a significant three-way interaction between sex, acculturation, and discrimination in predicting self-esteem, such that, when boys reported low enculturation, there was a significant negative association between discrimination and self-esteem. For girls, the negative association existed for those who reported both high and low enculturation. Enculturation—or engagement with the culture-of-origin—can also be understood as strong cultural socialization at home. It appears that,

for both girls and boys who are more deeply socialized with their family's culture-of-origin at home, awareness of discrimination takes its toll on self-esteem. These findings point to an important role of ethnic identity in moderating the influence of discrimination on child and adolescent development, which we discuss in more depth below.

This negative relationship between self-esteem and perceived discrimination has also been shown to persist in countries outside the United States. In a study of Dutch and Surinamese adolescents in the Netherlands, Verkuyten and Thijs (2006) determined that, for both groups of individuals, "ethnic victimization" (e.g., ethnicity-based discrimination) was negatively related to ethnic self-esteem and also negatively related to global self-worth. In other words, increases in ethnic victimization were associated with decreases in both ethnic self-esteem and global self-worth. It is interesting to note, however, that ethnic self-esteem mediated the relationship between ethnic discrimination and feeling of global self-worth. Adolescents, both Dutch native and Surinamese, who reported higher levels of ethnic self-esteem tended to report less severe drops in global self-worth in the face of higher levels of ethnic discrimination. These findings suggest a buffering role of ethnic pride in the wake of perceived discrimination, which is crucial when considering the best routes to use to both support and protect the self-worth and self-esteem of children and adolescents worldwide. It has been well-established that these subjective senses of self diminish in the face of chronic discrimination regardless of immigration status or country of origin (Finland—Jasinskaja-Lahti & Liebkind, 2001; Greece—Motti-Stefanidi & Asendorpf, 2012; Netherlands—Verkuyten & Brug, 2002); however, if researchers are able to identify processes, such as ethnic self-esteem, that help protect these areas so often targeted by discriminatory events, this decline can potentially be slowed or prevented completely. Clearly, across numerous countries and ethnic regions, perceived discrimination is associated with lower levels of self-esteem or self-worth. Future studies using longitudinal designs will help document the extent to which perceived discrimination may detrimentally affect the self in childhood and adolescence, another area of cross-cultural research that is sorely needed.

Stress

Stress affects development in myriad ways. Through physiological mechanisms such as interrupted sleep and high cortisol, it can negatively influence physical health. Through interpersonal processes, it can exacerbate mental health problems. In the discrimination and racism literature,

"stress" itself can be directly attributed to discrimination—yielding its own form of daily stress that children and adolescents must learn to navigate. In using perceived discrimination stress to predict self-esteem levels over time, Edwards and Romero (2008) found that, in a sample of U.S. adolescents of Mexican descent, discrimination stress was moderately negatively associated with self-esteem. As youth reported more discrimination stress, their self-reported self-esteem levels also tended to decrease. Previously mentioned studies have linked the actual acts of discrimination with sharp decreases in self-esteem, particularly for female adolescents. Nevertheless, Edwards and Romero (2008) have established that it is not only the acts themselves that can be detrimental to the well-being and development of youth. The stress surrounding the expectation for discrimination, or in navigating the emotional path left in its wake, can play an equally damaging role. Stress is neither bound nor stagnant; it can freely move to influence other areas of emotional, mental, and physical well-being. Furthermore, while the stress of discrimination can elicit negative changes in child and adolescent well-being, others have shown that the perception of discrimination can lead to increases in other forms of stress (physical, behavioral, emotional; Szalacha, Erkut, García Coll, Alarcón, et al., 2003; Szalacha, Erkut, García Coll, Fields, et al., 2003). The study of perceived discrimination as a source of stress itself adds some robustness to the literature.

It is of paramount importance that we attempt to understand measurable, stress-related physical changes that can occur in the face of discrimination when considering that the effects of stress can have such a wide variety of negative influences on the developing mind and body. Stress can easily be measured via self-report, however. Zeiders, Doane, and Roosa (2012) were interested in determining the underlying physiological correlates of stress. In measuring salivary cortisol levels (a hormone that is often released in times of heightened stress) in Mexican American adolescents in response to perceived discrimination in their daily lives, the authors were able to ascertain that discrimination was significantly correlated with cortisol wakening response, such that increased perceptions of discrimination were associated with increased cortisol wakening responses (i.e., cortisol levels upon wakening). Zeiders et al. (2012) also determined that discrimination was associated with increased daily life stress, which was self-reported by participants. In these studies, children and adolescents were not simply reporting perceptions of discrimination, but also reporting on (or having directly measured) their stress reactions to perceived discrimination.

When aiming to determine the stress impact of discrimination, it is imperative to consider both the context in which the discriminatory acts have taken place (i.e., in school, at home, in the neighborhood) and the status of the perpetrator (i.e., peer, friend, teacher). Aroian (2012) was interested in revealing the themes underlying discrimination's influence on Muslim American adolescents in the United States. Several focus groups were conducted with adolescent males and females who self-identified as Muslim or Muslim American. Contrary to expectations, the most potent perpetrators of discriminatory acts were not always class peers. These students reported that teachers were salient perpetrators of discrimination; coming from an adult in a position of power in these adolescents' lives, it is understandable why adolescents would find such discrimination to be particularly disturbing. Albertini (2004) also examined correlates of racial mistrust among immigrant minority 10- to 12-year-old children and found that between 35% and 50% reported perceptions of racial mistrust toward both their White teachers and Whites in general. These perceptions measured at moderate-to-high levels, with clear implications for negatively influencing early adolescents' well-being.

Ethnic and Racial Identification

In light of the aforementioned findings suggesting that individuals who face discrimination tend to seek support and refuge in stronger ethnic or racial identifications (Brittian et al., 2013), Galliher, Jones, and Dahl (2011) found moderation effects of ethnic identification on the association between perceived discrimination and self-esteem. Aligning with many of the previous studies showing that perceived discrimination is negatively associated with self-esteem, Galliher et al. (2011) found yet more evidence of this persistent relationship—males who reported higher discrimination also tended to report lower self-esteem. However, an interesting interaction was also found between perceived discrimination and the Native Americans' scores on the Orthogonal Cultural Identification scale, which was used to measure participant identification with multiple cultures, with respect to effects on self-esteem. When males reported a low Native American identification, there was a weak relationship between perceived discrimination and self-esteem; however, for males with a high identification, this relationship was not significant. A similar relationship was seen for Navajo girls; those who reported more affirmation and belonging to their Navajo identity tended to display a weaker association between perceptions of discrimination and self-esteem than girls who

reported less affirmation and belonging to their Navajo identity. For males at the lowest levels of Native American identification, a negative relationship was observed between perceived discrimination and social functioning over time: Higher perceived discrimination co-occurred with poorer social functioning. Yet, at the highest levels of Native American identification, a positive relationship was seen between perceptions of discrimination and social functioning over time, indicating a protective role of ethnic identity for buffering the negative social ramifications of discrimination. Additionally, a strong, positive relationship was seen between perceptions of discrimination and substance use frequency among participants who had a high White American identification, but the relationship was not significant among individuals who had a low White American identification. Perhaps most interestingly, for girls, identification moderated the relationship between perceived discrimination and self-esteem differently. A high level of White American identification was associated with a positive relationship between discrimination experiences and self-esteem, but for individuals with a low level of White American identification, the relationship was inverted. This study thus highlights the important role ethnic identity plays not only in buffering detrimental effects of discrimination on social functioning, but also highlights the importance of context and gender identities in these relationships.

Socioemotional Outcomes

At present, there is a strong literature supporting the assertion that perceptions of discrimination can greatly influence socioemotional functioning. Like most other developmental outcomes influenced by discrimination, socioemotional functioning can be immediately influenced by discriminatory events, or it can be affected over time. Gibbons and colleagues (2012) discovered that increased perceptions of discrimination were significantly, negatively associated with decreases in the socioemotional area of self-control, and positively associated with increases in substance use over time. The results of a directional model indicated that early discrimination was associated with low self-control by the ages of 10 or 11, and that changes in discrimination were thereafter associated with corresponding changes in self-control. Further analyses also indicated that discrimination had significant paths promoting higher levels of anger and substance use, and a direct negative path to self-control. There was also an indirect effect of discrimination on substance use through both self-control

and anger during a single time point in the study. Similar longitudinal effects have been observed in other cultural samples as well. For example, in looking at the effects of perceived discrimination on self-esteem among Turkish and Moroccan minority adolescents living in the Netherlands, Verkuyten (1998) found that, as levels of reported personal discrimination increased, there were subsequent decreases in social competence and personal self-esteem reported. Such longitudinal studies add fascinating and compelling evidence about the potency of discrimination's many causal, negative effects on socioemotional development.

Prosocial Behavior

With respect to socioemotional development, there are two particular subthemes of note in discrimination research. The first of these themes centers on findings related to prosocial behavior, or the propensity for children and adolescents to act in socially beneficial, collaborative, or altruistic ways. This area of development is one that suffers greatly under the effects of discrimination. For example, Brittan and colleagues (2013) found that in the face of discrimination, individuals' prosocial behaviors declined greatly. Compliance ("When people ask me to help, I don't hesitate"), Emotional ("Emotional situations make me want to help others who are in need"), and Altruistic ("I feel that if I help someone, they should help me in the future") prosocial behaviors decreased over time in association with increases in perceived discrimination. Interestingly, there was also a positive correlation between perceived discrimination and public prosocial behavior ("I can help others best when people are watching me"), indicating that more perceived discrimination was associated with higher endorsement of this prosocial attribute. Individuals who reported more perceived discrimination tended, over time, to find these prosocial behaviors less like them, but also tended to increase public displays of prosocial behavior (Brittan et al., 2013). One way to interpret these results is to suggest that, as children and adolescents face sustained or increased levels of discrimination over time, they tend to (consciously or unconsciously) engage less in these prosocial behaviors in reaction to the chronic negativity that they consistently perceive. However, increases in overt, public displays of prosocial behaviors along with increased levels of discrimination over time could suggest a need for positive recognition in the face of such negativity. Grossman and Liang (2008) found similar results in a study demonstrating that discrimination distress was significantly and negatively associated with cooperation,

while Romero and Roberts (1998) found that perceived discrimination was significantly associated with attitudes toward others, such that increases in perceived discrimination were associated with decreases in overall positive attitudes toward others. Taken together, this collection of studies points to the detrimental effects of discrimination on children and adolescents' willingness to cooperate with, attend to, and engage in prosocial behaviors in their communities. The full implications of this pattern of findings has yet to be established. Whether such loss of prosocial behavior translates into further marginalized identity or hostility toward others is largely left to be documented in future studies.

Coping Strategies

Another theme in the socioemotional literature centers on the types of coping strategies individuals use in response to perceived discrimination. Coping strategies can often determine the qualities and successes of the socioemotional outcomes of the challenging event that the child or adolescent needs to cope with (Scott, 2003a). While there is no single best coping strategy, it is important to recognize that two individuals may respond to the same discriminatory event in vastly different ways—and therefore "cope" with the event differently. Scott (2003a) showed that some African American adolescents are more likely to report seeking social support as a coping strategy in the wake of discrimination, whereas others are more likely to use self-reliance and/or problem-solving strategies when faced with perceptions of discrimination. Scott (2003b) also uncovered a moderate correlation between perceptions of discrimination and externalizing coping strategies, indicating that, as perceived discrimination increased, so did externalizing coping strategies. In general, research supports the notion that coping strategies that involve social support-seeking and problem-solving promote healthier recoveries from psychological threat than more avoidant or emotion-focused strategies (Levesque, 2011). Further analyses by Scott (2003b) showed that participants who experienced high levels of racial socialization reported marginally higher support-seeking coping strategies and significantly greater use of self-reliance or problem-solving coping strategies to deal with the effects of perceived discrimination as compared to participants who reported lower levels of racial socialization. These findings seem to indicate that the process of racial socialization can help individuals learn to cope in more effective ways (and learn self-reliance and problem-solving skills) when faced with discriminatory events.

Academic Achievement Outcomes

Numerous studies have demonstrated the significant negative associations among perceived discrimination and academic outcomes including GPA, academic motivation, academic goals, and perceived academic efficacy (Alfaro, Umaña-Taylor, Gonzales-Backen, Bámaca, & Zeiders, 2009; Smalls, White, Chavous, & Sellers, 2007; Tabbah, Miranda, & Wheaton, 2012; Wong et al., 2003). These effects hold true both for males and females, but as previously mentioned, males are generally at greater risk for more negative outcomes in most developmental domains. Smalls et al. (2007) found that racial discrimination was a predictor of lower academic persistence, and more frequent negative school behaviors. The academic achievement domain seems to be particularly sensitive to the effects of discrimination—not necessarily because the effects of discrimination are more detrimental in this developmental domain (although the school has been cited as the most common site for experiencing any form of discrimination; Yeh et al., 2003) as compared to any other. Rather, the spread, reach, and sheer pervasiveness of, for example, decreased academic persistence is tremendous. For instance, racial discrimination has been found to be only marginally predictive of lower levels of academic curiosity (Smalls et al., 2007). While this particular variable only reached marginal significance (nonsignificant at a $p < .06$), it is important to consider the rather serious implications of this association. Conceptualized as a precursor of academic persistence, academic curiosity is often the spark that encourages children and adolescents to be passionate about school and learning, and the fuel that drives their desire to seek out higher education later on in life.

The results of school-based peer discrimination can make themselves immediately apparent in the classroom; however, it is crucial to recognize that peers are not the only perpetrators of school-based discrimination, and that the results of discrimination often extend far beyond the walls of the classroom. In studying the self-concept of Arab American adolescents, Tabbah et al. (2012) revealed that 50.8% of the students reported either experiencing or knowing of some form of discrimination. Discrimination was associated with decreases in scholastic competence and decreases in classmate support. Discrimination also predicted scholastic competence (Tabbah et al., 2012), which further supports the case that school-based discrimination can play a drastic role in the academic achievement outcomes of children and youth in its wake.

Teacher Discrimination

Teachers and other students can both play equally contributory roles in perpetuating and perpetrating discrimination in the classroom, although some students report feeling more helpless in the face of teacher discrimination as compared to peer discrimination (Aroian, 2012; Thomas, Caldwell, Faison, & Jackson, 2009). Teacher discrimination can also influence the subjective sense of how well students feel that they are doing in school, regardless of their actual calculated grades. Some students, in the face of discrimination from their teachers, have reported that they are doing more poorly in school (whether or not that is actually the case) than those students who do not report teacher discrimination (Thomas et al., 2009). Aroian (2012) found that Muslim youth often cope with the discrimination they face from both teachers and peers by doing nothing, both out of fear of retribution and thoughts of futility. The youth felt that they had “no options” regarding responses to the discriminatory acts against them. These themes are particularly salient when considering that it is likely much more difficult to respond to teacher-perpetrated discrimination than to peer-perpetrated discrimination. In a similar qualitative analysis, Baker, Varma, and Tanaka (2009) uncovered analogous themes in reports by Canadian youths of frequent racism perpetrated by individuals in positions of power, with name-calling and threats/actual physical violence being the most common forms of racism experienced.

Berkel and colleagues (2009) reported that African American adolescent males in particular felt it was more difficult for them to succeed academically because of the negative, discriminatory messages received from and attitudes held by many of their teachers in school. They felt they were treated as both less capable and less intelligent than their White peers. The youth felt that they were quickly written off and rarely called on in class because their teachers assumed that they would not be able to answer their questions. Further discussion revealed that mothers played a significant role in socializing their children against discriminatory events both within and outside of school, particularly regarding African American adolescent males’ school achievement, which is essential information when considering ways in which the effects of discrimination within the school context can be attenuated. In their study of perceived discrimination against children of Mexican immigrants at school, Stone and Han (2005) highlighted the influence that teacher discrimination can

have on students' future educational attainment and academic drive. They also uncovered a significant difference between males and females in their expectations of discrimination. Females were 35% less likely to report that they expected discrimination in the future, despite educational attainments comparable to those of males, suggesting that females felt more confident that succeeding educationally would help mitigate future discrimination. Considering the earlier-discussed relations between students' perceptions of discrimination and academic curiosity, subjective feelings of success, and academic drive, these findings paint a rather stark picture for the future educational attainments of male students, in particular. If some male students are more likely to report that they expect discrimination in the future, despite their educational attainment, there is then less incentive to strive for higher education—the same prejudice will have to be faced no matter how successful or unsuccessful they are in the academic realm. Female students, however, may perceive that discrimination toward them is dependent upon the level of education they achieve, so striving for higher education could potentially lessen perceptions of discrimination in the future.

School quality and school interracial harmony can both play roles in the perception of discrimination (Stone & Han, 2005). As reported by Stone and Han (2005), individuals who perceived poor school quality are more likely to report experiencing discrimination by teachers than individuals who perceived better school quality—alluding to the possibility that the physical school context can play a role in both the act of and perception of discrimination. As further reported by Stone and Han (2005), individuals who perceived school interracial harmony were less likely to expect future discrimination, despite educational attainment, than individuals who perceived no school interracial harmony. In each of these cases, the physical and metaphysical school environment(s) played a direct role in both the immediate perception and future expectation of discrimination.

Finally, Stone and Han (2005) were able to demonstrate that both students' length of stay in the United States and self-esteem levels played a role in their expectations and perceptions of discrimination by teachers. Participants who had been in the United States for between 5 and 9 years were 54% less likely to experience discrimination by teachers than individuals who had been in the United States for less time. Individuals who reported higher self-esteem during the onset of the study were 66% more likely to report experiencing discrimination by teachers in the second wave

of the study as compared to individuals who reported lower levels of self-esteem. Interestingly, Stone and Han (2005) also showed that students who reported that they did not prefer "the American way" of life (i.e., the American way of living) were 39% more likely to report that they expected discrimination in the future, despite educational attainment similar to that of individuals who reported preferring "the American way."

In addition to determining the perpetrator of the discrimination, ascertaining the context in which the discriminatory act has taken place is crucial to understanding the actual consequences of the event. Brown and Chu (2012) found that, for children at predominantly White and moderately diverse schools, increased perceptions of teacher discrimination explained more negative academic attitudes. It was further shown that ethnic identity moderated this relationship, such that the negative relationship between perceptions of teacher discrimination and academic attitudes at predominantly White and moderately diverse schools was only significant for children who had less positive ethnic identities. The type of school (public, religious, or private institution) can also influence students' perceptions of school-based discrimination. In one study of African American adolescents in public schools, perceptions of discrimination were significantly associated with school importance, such that increases in perceived discrimination were associated with decreases in school importance. For African American adolescents in Catholic schools, perceptions of discrimination were associated with self-concept of ability, grades, and school engagement, such that increases in perceptions of discrimination were associated with decreases in self-concept of ability and a significant increase in school engagement. Finally, for White adolescents in Catholic schools, perceptions of discrimination were associated with school engagement, such that increases in perceptions of discrimination were associated with decreases in school engagement (Taylor, Casten, Flickinger, Roberts, & Fulmore, 1994).

Peer Discrimination

The negative relationship between perceptions of peer discrimination and academic attitudes can be moderated by both school composition and ethnic identity (Brown & Chu, 2012). For children who attended moderately diverse schools and had a less positive ethnic identity, peer discrimination was significantly and negatively associated with poorer academic attitudes. It is important to note that perceptions of peer discrimination were associated

with less school belonging for everyone at every type of school, except that children at predominantly Latino schools reported very positive ethnic identities.

Finally, the findings by Brown and Chu (2012) indicated that children who reported less perception of community discrimination also tended to report greater feelings of school belonging than children who reported more community discrimination. There was, however, a negative association between teacher discrimination and school belonging that was also moderated by both ethnic identity and school belonging. For children who attended predominantly White and moderately diverse schools, perceptions of teacher discrimination were significantly and negatively associated with school belonging, but only for children who reported less positive ethnic identities.

Classroom Discrimination

In their study of the influences of school racial discrimination and racial identity on academic engagement outcomes among African American adolescents, Chavous, Rivas-Drake, Smalls, Griffin, and Cogburn (2008) showed that peer and classroom discrimination could have very different outcomes, even for the same individuals. Among girls, classroom discrimination and peer discrimination at Age 13 were both negatively related to academic importance, such that increases in classroom and peer discrimination were associated with decreases in academic importance. Classroom discrimination at Age 17 was related to decreases in GPA, academic importance, and academic self-concept while peer discrimination was significantly related to decreases in academic importance and academic self-concept at Age 17. For boys, however, classroom discrimination at Age 13 was negatively correlated with all academic outcomes: GPA, academic importance, and academic self-concept. More peer discrimination at 13 was also associated with lower academic importance attitudes for boys at Age 17. Additionally, 17-year-old boys' classroom discrimination was negatively related to both academic importance and self-concept, and peer discrimination at Age 17 was strongly and negatively related to school importance.

The Role of Cultural Values

Berkel et al. (2010) uncovered several more academic correlates of perceived discrimination. There was a relation between perceived discrimination and academic self-efficacy and grades, such that increased perceptions of discrimination were related to decreased feelings of academic self-efficacy, as well as lower grades. Contrary

to the authors' hypothesis that Mexican American values would serve as a protective factor (i.e., moderating the relation between discrimination and negative mental health and academic outcomes), Mexican American values were not found to moderate the relation. However, support was found for the authors' second hypothesis that Mexican American values would serve as a risk reducer (i.e., mediating the relation between discrimination and negative mental health and/or academic outcomes). Mexican American values mediated the relation between discrimination and adolescent outcomes. Discrimination, mental health, and academic outcomes were all also associated with increases in Mexican American values. Mexican American values in turn were predictive of improvements in internalizing and externalizing symptoms and academic self-efficacy.

Indirect Effects of Perceived Discrimination

Perceived discrimination can have both direct and indirect consequences on academic achievement. Indeed, often when researchers ascertain that there are no direct effects of discrimination on academic achievement, they look for secondary, or indirect effects, and this leads to significant findings. Benner and Graham (2011) found that, although there were no direct effects of discrimination on academic outcomes in their study, there were indirect effects of discrimination on academic outcome through both school climate, and the number of total absences reported by participants. Results also indicated that change in discrimination over time was associated with students' perceptions of their own school climate—higher levels of perceived discrimination were associated with lower perceptions of school climate. In turn, school climate was predictive of students' GPA and total absences. This is just one example of the complex web that can be woven both by and through discrimination: Even when there appears to be no direct influence of discrimination on academic outcomes (or any other realm of development) there can be several less apparent, or less readily measurable outcomes that are secondary and even tertiary effects of increased levels of perceived discrimination.

Engagement, Alienation, and Goals

Higher levels of perceived discrimination can also be predictive of greater feelings of alienation, lower levels of classroom engagement, and poor grades over time (Benner & Kim, 2009). Kiang, Supple, Stein, and Gonzales (2011) found similar associations between discrimination and academic outcomes; discrimination was significantly

negatively associated with education goals, educational expectations, school centrality, and school connectedness, such that increases in discrimination were associated with decreases in educational goals and expectations, school centrality, and school connectedness.

“Defense” Mechanisms

Although few would argue that perceiving discrimination is a positive experience for the victims of these actions, several researchers have found correlations between perceived discrimination and purported protective factors. Seaton (2009) demonstrated that, in a sample of African American adolescents, although individual and cultural racism were both associated with a host of negative outcomes (see Seaton, 2009), each was also significantly associated with race centrality. Increases in individual and cultural racism were both associated with increases in race centrality. This relation was also observed by Stevenson and Arrington (2009), who found that the racism experience was associated with increases not only in race centrality, but in private regard, nationalism, cultural pride, legacy, and racial/ethnic socialization. It is important to note that most of these correlations were moderate-to-strong in strength. These connections may suggest that, as youth perceive more discrimination, they tend to assimilate the source of this discrimination (i.e., their racial/ethnic identity) as part of their own self-concept as a sort of defense mechanism (Seaton, 2009; Stevenson & Arrington, 2009; Stevenson, McNeil, Herrero-Taylor, & Davis, 2005). As suggested by the literature stressing the important impact of a healthy, positive ethnic identity on both educational and social development (e.g., Phinney et al., 1997), increased perceptions of discrimination may serve to accelerate the development of a positive ethnic identity because, when this self is challenged, it may then become a more centralized part of one's ethnicity relative to other parts of one's identity (Phinney, 1990; Yip et al., 2006).

In addition to the aforementioned relations between perceived discrimination and protective factors, Stevenson et al. (2005) demonstrated that individuals who were more alert to racism and aware of its presence in their everyday lives also tended to have stronger coping skills and strategies, stronger ethnic/racial pride, and a more salient cultural legacy.

It has also been shown that, contrary to initial belief, there may be a positive association between discrimination and self-image. One might assume that an individual's self-image would decrease in the face of perceived discrimination but the opposite appears to be true. Perceived

discrimination has been shown to be uncorrelated with adolescents' racial identities. In addition, a positive correlation has been found between perceived discrimination and self-image, indicating that, as adolescents reported more experiences with discrimination, they also tended to report a better self-image (Berkel et al., 2009). In addition to causing a boost in self-image, perceptions of discrimination have also been shown to positively affect self-pride. In facing frequent discriminatory events, some youth feel as if they are being “truly socialized” into their own ethnic/racial group and are really beginning to understand what it means to be members of marginalized groups (Berkel et al., 2009).

Additionally, some studies have shown that individuals who are members of ethnic/racial minority groups have a psychological well-being “advantage” over individuals who are members of a majority group, even when controlling for the effects of perceived discrimination/racism (Astell-Burt, Maynard, Lenguerrand, & Harding, 2012). Unfortunately, discriminatory events are rarely ever one-time occurrences; members of ethnic/racial minority groups tend to experience discrimination throughout their lives. However, this “repeated” discrimination effect may also give members of ethnic/racial minority groups a psychological advantage in the face of discrimination relative to members of a majority group who have not experienced such events before (Astell-Burt et al., 2012).

Mental Health Outcomes

The developmental domains of physical health, well-being, socioemotional functioning, and academic achievement have all been shown to be influenced by perceptions of discrimination. It does appear, however, that the domain of mental health is affected most profoundly. Depression, anxiety, internalizing and externalizing problem behaviors, attention-deficit hyperactivity disorder (ADHD), conduct disorder (CD), and antisocial behaviors are just a few of the many mental health consequences that have been found to be predicted by or correlated with perceived discrimination (Almeida, Johnson, Corliss, Molnar, & Azrael, 2009; Behnke et al., 2011; Coker et al., 2009; Gaylord-Harden & Cunningham, 2009; Oppedal, Røysamb, & Heyerdahl, 2005; Simons et al., 2002; Smokowski, Bacallao, & Buchanan, 2009; Smokowski, Chapman, & Bacallao, 2007; Tynes, Umaña-Taylor, Rose, Lin, & Anderson, 2012).

These consequences are far from transitory; longitudinal analyses have shown that most, if not all, of these behaviors become increasingly linked with perceived discrimination

over time (Benner & Kim, 2009; Kim, Wang, Deng, Alvarez, & Li, 2011; Seaton, Caldwell, Sellers, & Jackson, 2008). Gibbons and colleagues (2007), using data from the *Family and Community Health Study* (FACHS; see Cutrona, Russell, Hessling, Brown, & Murray, 2000), established that the effects of perceived discrimination persisted over time. As part of the FACHS, adolescents and their families were interviewed and filled out survey questionnaires on three separate occasions. Discrimination measured at the first time point was significantly related to conduct disorder symptoms at both the first and second time points, such that increases in perceived discrimination were associated with increases in conduct disorder symptoms at time points 1 and 2. Simons, Chen, Stewart, and Brody (2003) found similar results in a study of African American youths—that increases in discrimination as measured at the first time point were associated with increases in affiliations with deviant peers, justified anger, depression/hopelessness, and delinquency at the first time point, as well as delinquency at the second time point.

These detrimental effects are also far-reaching; they cross myriad racial/ethnic groupings, and are present both within and outside of the classroom, school, or neighborhood. These effects are seen both within and outside of the United States; in looking at predictors of mental health in Portuguese adolescents from immigrant families, it was seen that, as adolescents reported more perceived discrimination, they also tended to report more mental health problems (Neto, 1999). In their assessment of the mental health of Somali adolescent refugees, Ellis, MacDonald, Lincoln, and Cabral (2008) and Ellis et al. (2010) uncovered moderate-to-strong correlations between perceived discrimination and symptoms of posttraumatic stress disorder (PTSD), depression, postwar daily life hassles, and acculturative hassles. Increases in discrimination were associated with increases in PTSD symptoms and both daily life and acculturative hassles. In their study of acculturative stress in Arab American adolescents, Ahmed, Kia-Keating, and Tsai (2011) discovered several correlations between perceived discrimination and mental health outcomes; the associations were all moderate and moderate-to-strong. Adolescents who reported more perceived racism also reported more acculturative stress, more depressive symptoms, more anxiety, and more internalizing and externalizing symptoms. As part of a baseline study about working conditions in Salvador, Brazil, Santana, Almeida-Filho, Roberts, and Cooper (2007) conducted in-home interviews to determine the effects of discrimination on the daily lives of adolescents. The researchers determined that, after

adjusting for age, sex, and socioeconomic status (SES), adolescents who reported perceiving discrimination in their lives were 97% more likely to also report symptoms of major depression, and 69% more likely to report feeling unhappy than individuals who did not report discrimination (Santana et al., 2007). Finally, Oppedal (2011) aimed to determine the role of social support in the association between perceived discrimination and mental health among young immigrants in Norway. He discovered that perceived discrimination was indeed related to internalizing symptoms for all Turkish, Somali, Vietnamese, and Sri Lankan adolescents and preadolescents, such that increases in perceptions of discrimination were associated with increases in reported internalizing mental health symptoms.

Depression

Although it is clear that many areas of mental health and functioning are influenced by the perception of discrimination, depression and depressive symptoms seem to be the most frequently measured and often the most strongly associated outcome (Burton, Marshal, Chisolm, Sucato, & Friedman, 2013; Coker et al., 2009; Dabbagh, Johnson, King, & Blizard, 2012; Delgado, Updegraff, Roosa, & Umaña-Taylor, 2011; Simons et al., 2002). Benner and Kim (2009) not only found that depressive symptoms were correlated with perceived discrimination among Chinese American adolescents, but, further supporting the notion that adolescents tend to perceive more discrimination as they age, they found that perceptions of discrimination increased from their first to their second wave of data collection.

Additionally, perceptions of discrimination may have different mental health outcomes for males and females, particularly in the realm of depression and depressive symptomology (Umaña-Taylor & Updegraff, 2006). In their study of the changes in ethnic identity undergone by Latino adolescents, Umaña-Taylor and Updegraff (2006) discovered a three-way interaction between gender, acculturation, and discrimination in predicting depression, such that, when boys reported low enculturation, there was a negative association between discrimination and depression. For girls, the negative association between discrimination and reported depressive symptomology existed across the board—for those who reported high enculturation, and for those who reported low enculturation.

In looking at the outcome measures of depressive, ADHD, ODD, and CD symptoms, Coker et al. (2009) discovered that children who reported perceived ethnic/racial discrimination were at the highest risk for experiencing

depressive symptoms—children who perceived discrimination were almost 3 times more likely to report symptoms of depression than youths who did not perceive discrimination. Potochnick and Perreira (2010) found that first-generation immigrant Latino youth who had *ever* experienced discrimination in their lives were almost 8 times more likely to report symptoms of depression than immigrant adolescents who had never experienced any discrimination. In their study of the relation between perceived discrimination and depressive symptoms among Turkish-Dutch and Moroccan-Dutch individuals in the Netherlands, van Dijk, Agyemang, de Wit, and Hosper (2010) presented more conservative but still significant numbers. Individuals who reported experiencing personal discrimination were 3.2 times more likely to report depressive symptoms than individuals who did not report experiencing personal discrimination. Consequently, this association was stronger for Moroccan-Dutch individuals (5.32 times more likely) than it was for Turkish-Dutch individuals (2.76 times more likely). Overall, Moroccan-Dutch individuals were 2.8 times more likely to experience depressive symptoms than Turkish-Dutch individuals, although this relationship was dependent on the extent to which they experienced school-based discrimination. Similarly, Grossman and Liang (2008) found that discrimination distress was positively associated with depressive symptoms, such that increases in discrimination distress were associated with increases in depressive symptoms. Simons et al. (2003) found that, in addition to being correlated with increases in anger, aggression, and delinquency, increases in perceived discrimination were also associated with increases in reported depression/hopelessness for both male and female African American adolescents.

Externalizing Problems

Although any and all mental health issues are problematic, externalizing behaviors, like those associated with conduct disorder, oppositional defiant disorder, other anti-social behaviors, and ADHD often make themselves more apparent to those surrounding the individual, and perhaps warrant the most immediate attention. These behaviors are captured both via individual self-report and parent report; for example, Szalacha, Erkut, García Coll, Alarcón, et al. (2003) found that the parents of children who reported having been discriminated against reported significantly higher levels of behavioral maladjustment in their children. Rivera and colleagues (2010) found that participants who reported perceived discrimination were more than 15 times more likely to engage in antisocial behaviors

than individuals who did not report discrimination. Anti-social behaviors are generally viewed as symptoms of oppositional-defiant disorder (ODD) or conduct disorder (CD) and include, but are not limited to, aggression toward people or animals, destruction of property, deceitfulness or theft, and/or serious violation of rules (American Psychiatric Association, 2000).

Roberts and colleagues (2012) found that increases in perceived discrimination were associated with moderate-to-strong increases in negative affect over time, affiliations with deviant peers, and engaging in risky sexual behaviors (i.e., having unprotected sex, having sex with multiple partners). Negative affect was found to mediate the effects of discrimination on deviant affiliations at two of the study's four time points. Discrimination was also found to have an indirect effect on risky sexual behaviors through deviant affiliations and through negative affect at three of the four time points. Further, according to Coker et al. (2009), children who felt that they had been discriminated against in the past were more than 2 times more likely to report symptoms of conduct disorder, 60% more likely to report symptoms of ADHD, and 80% more likely to report symptoms of oppositional defiant disorder (ODD) than children who did not report any perceived discrimination. Smokowski et al., (2007) found that perceived discrimination was positively correlated with Achenbach's Youth Self Report (YSR) social problems scores, total behavior problems, and other externalizing problem scores (perceived discrimination was also associated with total internalizing problem scores on the YSR).

Aggression

Brook, Rosenberg, Brook, Balka, and Meade (2004) and Brook, Brook, Balka, and Rosenberg (2006) also uncovered a relation between discrimination and aggressive behavior in their studies of the correlates of aggression in both African American and Puerto Rican children and adolescents. Brook et al. (2004) discovered that both the experience of discrimination and low levels of ethnic identification (as assessed via combining levels of ethnic identity affirmation and belonging) were positively and moderately associated with child aggression. Ethnic identification and discrimination explained aggression in the presence of all other study variables, indicating that an increase in discrimination and low ethnic identification predicted child aggression. However, when controlling for the mother-child relationship and the child's personality and behavior attributes, this relation was no longer significant. This change in significance may indicate that

there are other factors, such as the children's own unique personality and behavior styles, and the parenting styles their caregivers had employed, that play important roles in the impact of perceived discrimination on aggressive behavior (Brook et al., 2004).

Similar relations were observed by Brook and colleagues (2006) and Simons and colleagues (2006) with adolescent cohorts; perceived discrimination was positively associated with rebellious adolescent behavior and violent delinquency. However, Brook et al. (2006) were also able to ascertain that ethnic identity achievement, ethnic identity affirmation and ethnic belonging were negatively associated with rebellious adolescent behavior. Increases in discrimination were associated with increases in rebellious behavior in adolescents, whereas increases in affirmation and belonging as well as ethnic identity achievement were associated with decreases in rebellious behavior (Brook et al., 2006). Ethnic identification and discrimination both explained rebellious behavior in the presence of all other predictor variables, indicating that an increase in discrimination predicted rebellious adolescent behavior. However, when controlling for school environment or the children's personality and behavior attributes, this relation was no longer significant.

In addition to aggressive tendencies, Simons et al. (2006) demonstrated that discrimination was associated with both anger and hostility in a sample of African American adolescent males and females. However, the results also indicated that supportive parenting had a moderating effect on the relation between discrimination and violent delinquency. The deleterious effects of discrimination were less for males who also reported high levels of supportive parenting. On the other hand, anger and hostile view of relationships increased the effect of higher levels of discrimination on violent delinquency.

Violence

Although exposure to drugs and violence are often attributable to "third" factors, Surko, Ciro, Blackwood, Nembhard, and Peake (2008) uncovered relations between perceived discrimination and such exposures. Early adolescents reporting racism were more likely to have witnessed violence, and were more likely to have been victims of violence than adolescents who did not report racism. The experience of racism was also associated with most risk indicators for most middle adolescents (related to drug use and violence), and was associated with a substantially higher risk for having been threatened with weapons, having been victims of violence, having been touched

uncomfortably, and having used drugs in the prior month. Late adolescents reporting racism were more likely to report environmental risks such as having been threatened by weapons, having been victims of violence, having been touched uncomfortably, and being able to access guns. It is also important to note that females, but not males, who experienced racism were more likely to also report being touched uncomfortably, being offered drugs, and trying drugs other than tobacco, alcohol, or marijuana. Males, but not females, who experienced racism were more likely to have had sex and to have used drugs in the month prior to the onset of the study.

Negative Affect

Vera and colleagues (2011) have also demonstrated the link between perceived discrimination and negative affect. In their examination of culturally relevant stressors, coping, and ethnic identity in urban, ethnic minority adolescents, a moderately strong positive correlation was found between negative affect and perceived discrimination such that, as levels of perceived discrimination increased, so did assessed levels of negative affect. However, the results also indicated that a coping style that was considered "avoidant" moderated the relation between urban hassles/perceived discrimination and negative affect, such that individuals who used avoidant coping did not experience the deleterious relation between urban hassles/perceived discrimination and negative affect.

Intelligence

Although not typically considered to be in the mental health domain, perceptions of discrimination have also been shown to adversely affect children's performance on tests of nonverbal intelligence (Appel, 2012). Although these effects may be transient, Appel (2012) uncovered that political propaganda in Austria that displayed images and text that discriminated against immigrant populations had a deleterious effect on adolescents' performance on nonverbal intelligence tests. Adolescents who self-identified as being from immigrant backgrounds like those addressed in the anti-immigrant political propaganda performed worse on a test of nonverbal intelligence after exposure to the propaganda than when they were tested before exposure. No such decrease in intellectual performance was shown for immigrant-background participants who were exposed to neutral pamphlets. The intelligence scores of nonimmigrants remained stable before and after both the neutral and anti-immigrant conditions. Closer analyses also revealed a moderating effect of ethnic identity; the

anti-immigrant propaganda significantly affected only the intelligence scores of immigrant-background adolescents who reported low ethnic identity (i.e., 1 standard deviation below the sample average). The intellectual performance of immigrant-background adolescents who reported high ethnic identity (1 standard deviation above the sample average) was unaffected by exposure to discriminatory propaganda.

Sexual Orientation Discrimination

In light of these findings, however, it is important to recognize that these substantial mental health consequences do not only arise for children and adolescents who are victims of racial and/or ethnic discrimination; youth who face discrimination based on their sexual orientation status face equally negative consequences (Almeida et al., 2009; Burton et al., 2013). Youth who are victims of discrimination based on their sexual orientation may even face unique mental health challenges that are not faced by victims of racial/ethnic discrimination.

In the expansive literature describing both victims and perpetrators of racial/ethnic discrimination, self-harm and suicide ideation are rarely viewed as common consequences of discrimination whereas in the literature describing victims of sexual orientation-based discrimination, self-harm and suicidal ideation are two of the most frequently measured outcomes (Burton et al., 2013). Heterosexual youth who report sexual-orientation-based victimization also tend to report depressive symptoms; however, the strength of this association is considerably stronger for non-heterosexual youth. Additionally, unlike heterosexual youth, there also appears to be a moderately strong relation between victimization and suicidality for nonheterosexual youth (Burton et al., 2013).

EXAMINING THE DISCRIMINATION-OUTCOME LINKS IN CHILDHOOD AND ADOLESCENCE: ROLES OF MEDIATORS AND MODERATORS

With a wide variety of effects of discrimination observed, we also observed numerous types of potential mediators and/or moderators of these effects. Mediators and moderators can be thought of as underlying or third psychological processes or child characteristics that may attenuate or change the way discrimination influences development. Such mechanisms are key not only to understanding how discrimination influences development, but also for intervening upon or preventing the influence of discrimination on development. Not all of the following factors

are relevant to intervention. Take child age, or gender, for example. Neither are malleable from the point of view of intervention or prevention. They can, however, be key considerations when designing treatments that are developmentally appropriate, and when tailoring preventive efforts to meet the unique needs of females or males. Other mediators/moderators identified here, such as coping skills, may be worth considering when designing direct intervention efforts moving forward.

Child Age

In aiming to recognize the implications of perceived discrimination on child and adolescent development, there are several relevant individual-level child characteristics that need to be taken into consideration as potential mediators and/or moderators. Firstly, child age can play an important role in tempering the relation between perceived discrimination and adverse development outcomes. Both longitudinal and cross-age cohort studies have consistently demonstrated that the associations among perceived discrimination and the developmental and educational domains of mental and physical health, socioemotional functioning, well-being, and academic achievement strengthen with age (Augoustinos & Rosewarne, 2011; Delgado et al., 2011; Seaton, Cadwell, Sellers, & Jackson, 2010). Looking to determine the correlates of risky behavior among siblings, Delgado and colleagues (2011) found that the correlation between perceived discrimination and risky behavior was much weaker for younger siblings than it was for older siblings. For younger children, there was a weak-to-moderate positive correlation between perceived discrimination and risky behavior, such that, as children's perceptions of discrimination increased, so did the intensity and number of the children's risky behaviors. For older siblings, this correlation was much more robust. Using perceived discrimination to explain life satisfaction, Seaton and colleagues (2010) found an interaction between age and perceived discrimination in explaining individual life satisfaction; older adolescents reported greater decreases in life satisfaction in the presence of higher levels of perceived discrimination than younger adolescents. In general, older children and adolescents tended to report more perceptions of discrimination than younger children and adolescents (Romero & Roberts, 1998).

It has also been documented that older children and adolescents are more likely than younger children to cite discrimination as the reason for the differential treatment of others (Bigler, Arthur, Hughes, & Patterson, 2008).

In their study of children's reasoning about the lack of diversity in past and present U.S. presidents, Bigler et al. (2008) demonstrated that 9- to 10-year-olds were almost 3 times more likely to attribute the lack of African American presidents to institutional and personal discrimination than both 5- to 6-year-olds and 7- to 8-year-olds. As would be expected, compared with racial majority children, ethnic/racial minority children were also more likely to attribute discrimination in both ambiguous and nonambiguous situations in which there may have been differential treatment of European American children and children of their race (Brown, 2006). Further, this relation has been shown to be moderated by theory of mind capabilities—it appears that these abilities are needed in order for children to make discrimination designations when they are not directly involved (i.e., they are neither victims nor perpetrators; Brown, 2006).

This is not to say, however, that younger children are completely immune to the adverse effects of perceived discrimination. Coker and colleagues (2009) demonstrated that children as young as 11 years (and likely even younger, as well) may be at risk for a host of negative developmental outcomes in the face of perceived discrimination. Drawing their data from a cohort of fifth-grade students taking part in the Healthy Passages Study (see Windle et al., 2004), they found that children who reported perceptions of discrimination were almost 3 times more likely to report symptoms of depression than children who did not report perceptions of ethnic/racial discrimination (Coker et al., 2009).

From this collection of findings, it does seem that interventions and particular attention need to be paid to ameliorating the more severe consequences of discrimination as experienced in adolescence. Furthermore, young children are learning to understand and deal with discrimination in their own ways; it may be that teaching healthy coping strategies and promoting positive ethnic/racial socialization at earlier ages may be particularly effective at providing a basis for adolescent resiliency later. If these age-related findings are considered along with cognitive theories of the ways in which children and adolescents develop in social and cognitive domains, it seems clear that both early preventive approaches in childhood and targeted intervention strategies during the adolescent years are needed.

Gender

Whereas age appears to be a central characteristic in children in determining the implications of discrimination, gender has also been shown to significantly moderate the

relation between perceived discrimination and the aforementioned developmental domains. Females not only tend to perceive more discrimination than males, but the association between perceived discrimination and negative developmental consequences (with the exception of self-esteem) is often weaker (or nonexistent) for females than it is for males (Alfaro et al., 2009; Almeida et al., 2009; Behnke et al., 2011; Benner & Graham, 2011; Seaton et al., 2010). As noted above, adolescents' perceptions of discrimination increase over time; however, research indicates that this increase may occur at a slower rate for females than for males (Benner & Graham, 2011). In determining predictors of academic motivation, Alfaro and colleagues (2009) found that perceived discrimination explained academic motivation for males, while this relation was not significant for females.

Not only are gender group differences common in the literature on discrimination and child development, gender itself may help to explain particular ways in which the negative effects of discrimination affect mental health functioning. For example, when perceived discrimination was entered into a model as a mediator instead of as a predictor, Almeida et al. (2009) found that perceived discrimination mediated the relation between lesbian, gay, bisexual, and transgender (LGBT) status and self-harm for males, but not for females. In other words, in the face of higher levels of perceived discrimination, the relation between LGBT status and self-harm was strongest for males. A similar pattern of effects were found for the relation between LGBT status and suicidal ideation, which was also mediated by perceived discrimination for males, but not for females. Shrake and Rhee (2004) obtained similar results in their study of predictors of problem behaviors among Korean American adolescents—perceived discrimination was associated with gender, such that, in general, girls experienced less racial discrimination than boys.

Acculturation

Cultural orientation is another important individual-level child factor to consider when examining the developmental consequences of discrimination in childhood and adolescence. Considering discrimination events in Western cultural societies, several researchers have demonstrated that the stronger an individual's non-Western cultural orientation is, the stronger the relation between perceived discrimination and negative outcomes (Deng, Kim, Vaughan, & Li, 2010). Put another way, when immigrant children identify strongly with their family's culture of

origin, the detrimental effects of perceived discrimination are strongest. It is interesting to consider the possibility that acculturation may negatively influence some developmental domains, such as academic achievement or future aspirations (i.e., the “immigrant paradox”; García Coll & Marks, 2011; C. Suárez-Orozco, Rhodes, & Milburn, 2009), but may also be a positive, protective factor in other domains. In looking solely at the association between chronic daily discrimination and delinquent behavior, Deng and colleagues (2010) uncovered interaction between discriminatory victimization and Western cultural orientation in predicting delinquent behaviors over time. The relationship between perceived discrimination and delinquency was significant for Chinese American adolescents who reported high levels of Chinese cultural orientation, but not for adolescents who reported low levels of American orientation. Additionally, there was a similar interaction found between Western cultural orientation and daily perceived discrimination; when youth reported low levels of Western cultural orientation, the relation between chronic daily discrimination and delinquent behavior was significant. This association was not significant for youth who reported high levels of Western cultural orientation.

In the same study, Deng et al. (2010) found the same interaction between discriminatory victimization and cultural orientation in predicting delinquency—the positive relationship between discriminatory victimization and delinquent behavior was only significant for individuals who reported a low Western cultural orientation. In the face of high levels of discriminatory victimization, the association between discrimination and delinquency was not significant for Chinese American adolescents who reported high levels of Western cultural orientation. Ellis et al. (2010) also found interaction between discrimination and American acculturation in explaining depressive symptoms among Somali adolescent refugees, such that, for adolescents who reported a high level of American acculturation, the relation between perceived discrimination and depressive symptoms was weaker than for individuals who reported a low level of American acculturation.

In their analysis of discriminatory events experienced by Chinese American adolescents, Benner and Kim (2009) used a longitudinal design and found that respondents who were considered low in American cultural orientation were at greater risk of reporting higher levels of perceived discrimination at the first time point than individuals who were considered high in American cultural orientation at the first time point. Additionally, respondents low in American cultural orientation were more likely to report more

frequent depressive symptoms and feelings of alienation. Brittan et al. (2013) found similar results in their study of the mediating role of Mexican American values on the negative relationships between perceived discrimination and prosocial tendencies. Their results indicated that there were correlations between adolescents’ perceptions of discrimination and Mexican American values over time, such that increased perceptions of discrimination at the first time point were associated with increased endorsement of Mexican American values at the second time point. Taken together, these findings are consistent with the intergroup and social prejudice theories reviewed previously. It makes sense that, in order for discrimination to have detrimental effects, children or adolescents must first identify with the threatened label or social group (i.e., be high in their culture-of-origin orientation). Once identification occurs, identity threat and psychological distress are likely to follow. These results also provide support for previous studies documenting the need for individuals who face discrimination to seek support and refuge in stronger ethnic/racial identification (Brittan et al., 2013). In further support of this proposition, Romero and Roberts (1998) and Umaña-Taylor and Updegraff (2006) found that perceived discrimination was associated with ethnic identity affirmation and ethnic identity exploration, such that increases in perceived discrimination were associated with increases in both ethnic identity affirmation and ethnic identity exploration. Umaña-Taylor and Guimond (2012) similarly found that discrimination was associated with ethnic identity exploration, affirmation, and resolution over time, although they observed some cross-gender differences. For females, increases in discrimination were associated with increased exploration and resolution, but decreased affirmation. For males, increases in discrimination were also associated with increases in exploration and decreases in affirmation, but remained uncorrelated with ethnic identity resolution.

Ethnic/Racial Identities

In addition to acculturation, ethnic identity is another important factor to consider when assessing the relationship between perceived discrimination and developmental outcomes. Self-esteem has been shown to be related to perceived discrimination, such that increases in perceptions of discrimination were associated with decreases in self-esteem (Cogburn, Chavous, & Griffin, 2011; DuBois, Burk-Braton, Swenson, Tevendale, & Hardesty, 2002; Fisher et al., 2000; Galliher et al., 2011; Umaña-Taylor &

Updegraff, 2006). However, ethnic identity, and more particularly ethnic identity affirmation and ethnic identity achievement, have been shown to moderate this relationship (Greene, Way, & Pahl, 2006). In identifying the trajectories of perceived adult and peer discrimination in Black, Latino, and Asian American adolescents, Greene et al. (2006) discovered that, for adolescents who were low in ethnic identity affirmation, perceptions of discrimination by peers led to a greater decline in self-esteem than for adolescents higher in ethnic affirmation. Ethnic identity achievement had the opposite moderating effect: For adolescents who were high in ethnic identity achievement, perceptions of discrimination from peers led to a greater declines in self-esteem than for adolescents lower in ethnic identity achievement. Ethnicity, in addition to ethnic identity, can also play an important role in determining developmental outcomes of discrimination. Seaton et al. (2008) found that perceived discrimination was, as expected, associated with increased depressive symptomology, decreased self-esteem, and decreased life satisfaction. There was also a significant interaction between ethnicity and perceived discrimination that explained both depression and self-esteem. Both African American and Caribbean Black youth reported high levels of depressive symptoms in relation to high levels of perceived discrimination. However, Caribbean Black youth reported a greater decrease in self-esteem in relation to high levels of discrimination than African American youth.

Similarly, race centrality (i.e., the degree to which people consider their own race as part of their identity and self-concept; Sellers, Smith, Shelton, Rowley, & Chavous, 1998), and has been shown to partially or fully attenuate the relation between perceived discrimination and developmental consequences. Chavous and colleagues (2008) demonstrated that racial centrality mediated the relation between racial discrimination and GPA, such that, for boys who were higher in racial centrality, the negative relationship between racial discrimination and GPA was weakened relative to that for boys who were lower in racial centrality. A similar attenuating effect of racial centrality was evident in the negative relation between racial discrimination and school importance, such that there was a weaker negative relation between racial discrimination and lower school importance for boys who were higher in racial centrality. Similar results were seen for girls. In sum, girls who were from higher SES backgrounds were more vulnerable to the effects of both peer and classroom discrimination on self-concepts. As for males, racial centrality served as

a protective factor in the negative relation between peer discrimination and school importance.

Family Factors

As mentioned earlier, there are several variables that can attenuate the relation between perceived discrimination and mental health outcomes. Family factors such as support, socialization, and family cohesion can also play a regulating role. In their study of adjustment in a cohort of Chinese American adolescents, Juang and Alvarez (2010) found that perceived discrimination was moderately correlated with loneliness, anxiety, and somatization, such that youth who tended to report higher levels of perceived discrimination also tended to report higher levels of loneliness, and more frequently endorsed symptoms of anxiety and somatization. Two interactions were found in determining predictors of these mental health outcomes. The interactions between perceived discrimination and family cohesion in explaining both loneliness and symptoms of anxiety were significant. For individuals who reported higher family cohesion, the relation between perceived discrimination and loneliness, and between perceived discrimination and anxiety symptoms, were significantly weaker than they were for individuals who reported lower family cohesion. In their study of discrimination stress in transracially adopted children, Leslie, Smith, and Hrapczynski (2013) found that individuals who experienced greater discrimination in the past year also tended to experience more depressive symptoms, higher levels of perceived stress, and lower levels of well-being at the time of the second assessment, but this relation was mediated by high levels of parental socialization.

Public and Private Regard

Public and private regard can also both moderate the relation between perceived discrimination and developmental outcomes. Public regard refers to the way individuals make judgments about how the rest of the world views members of their own ethnic/racial group and/or the group as whole. Private regard concerns individual feelings about being members of specific racial/ethnic groups (i.e., how African American individuals feels about being Black or African American; Ho & Sidanius, 2009). Rivas-Drake, Hughes, and Way (2008) have demonstrated that the buffering effects of public and private regard can indeed be different for individuals from different racial/ethnic groups. Whereas increases in peer discrimination were associated

with strong decreases in self-esteem, and strong increases in depressive symptoms, increases in peer discrimination were also strongly associated with decreases in public regard. Additionally, two important three-way interactions were found between ethnicity, peer discrimination, and private regard and between ethnicity, peer discrimination, and public regard. Having a more positive private regard was associated with fewer reported depressive symptoms among African American youth who reported more perceived discrimination; this buffering effect of private regard was not evident with Chinese American youth. Having a more positive public regard was associated with fewer reported depressive symptoms among Chinese American youth who reported more perceived discrimination; this buffering effect of public regard was not shown for African American youth.

Coping Profiles

Seaton (2009) took these analyses a step further and determined that public regard was correlated with both collective/institutional racism and cultural racism, such that increases in collective/institutional and cultural racism were associated with decreases in public regard. Collective racism involves members of a dominant group denying members of a minority group(s) rights and/or privileges (Essed, 1991), while institutional racism refers to the unequal access to goods and services resulting in inequality for minority group members (Jones, 1997). Cultural racism concerns the degrading of minority groups' beliefs and practices by a majority group (Jones, 1997). In assessing participants' experiences with perceived individual, collective/institutional, and cultural racism, individual coping styles were assessed and then categorized into one of three categories: Buffering/Defensive type, Idealized type, and Alienated type based on a cluster analysis by Chavous et al. (2008). Individuals who displayed a Buffering/Defensive coping profile had high levels of race centrality and private regard and low levels public regard, indicating that, whereas they believed others viewed members of their own ethnic/racial group negatively, they believed that their race/ethnicity was important to their identities and positive feelings about being members of their group. The Idealized individuals were high in all areas; unlike the Buffering/Defensive individuals, they believed that people viewed their own racial/ethnic groups in a positive manner. Members of the Alienated group were the opposite—they were low in all areas. In addition to endorsing the beliefs that people negatively viewed their

own racial/ethnic group, they also felt less positive about their groups and felt their race/ethnicity was unimportant to their overall identity.

In using these profiles, Seaton (2009) found a significant interaction between coping types and racism when explaining depressive symptoms, such that high levels of individual racism were associated with greater depressive symptoms for individuals with Alienated coping profiles; the relation was nonexistent for individuals who had Buffering/Defensive profiles. In addition, higher levels of individualized racism were associated with higher levels of depressive symptoms for Alienated youth; the relation was not significant for individuals with Idealized profiles.

THE FUTURE OF RESEARCH ON DISCRIMINATION'S INFLUENCE ON CHILD AND ADOLESCENT DEVELOPMENT

Although there has been a surge of research productivity exploring the effects of discrimination on child and adolescent development, there is a growing sense of urgency and importance for moving this field forward. This forward movement is extremely promising, and at the heart of most researchers' efforts is the desire to help children and adolescents live long, healthy, and happy lives—regardless of their social position of power or their status as "minority" group members. Having summarized the theoretical foundations of this area of scholarship, and presented the results of a systematic review of this nascent literature, we end this chapter with several thoughts intended to help propel this exciting and important line of work forward. The first set of considerations we offer are practical ones: how to think about measurement strategies when conducting research on discrimination as it relates to child development outcomes. The second set of considerations focus on the importance of social contexts and everyday settings (e.g., families and schools) as they may inform children's abilities to respond to discrimination in healing and healthy ways. We believe these two areas represent important areas for future research and intervention efforts alike.

From Theory to Measurement: Capturing Discrimination in Childhood and Adolescence

In order to capture children's perceptions of discrimination and the effects of discrimination on development, numerous measurement strategies have been employed in empirical research. These typically include questionnaire-style

measures (for older children and adolescents who can read and write) and interview questions (for children and adolescents of a wide range of ages), including structured and open-ended questions. The literature also relies heavily on self-report measures, which may not capture the full picture of discrimination in children's experiences or environments. It is important to note that there are many experimental procedures used in the social psychology literature to study stereotypes and prejudice. Here, we are concerned with the current methodological approaches used by researchers attempting to assess the link between discrimination and some developmental processes or outcomes. Of particular interest for assessing the state of the field's understanding of discrimination and its influence on children and adolescents is understanding (a) the constructs and content of measures typically used to assess discrimination among children and adolescents, and (b) how such measures do (or do not) correspond with the predominant theoretical frameworks noted above. As the subfield of developmental psychology dealing specifically with the effects of discrimination on child and adolescent well-being is still emerging, measurement of discrimination and documentation regarding how well these methods may apply to theoretical views (i.e., their validity) is in a nascent stage as well.

Because being able to perceive discrimination is, as defined and presented in the Brown and Bigler (2005) model above, a multifaceted and context-dependent psychological skill with varied cognitive and social components, the measurement of discrimination and its implications for development is itself complex. Because research linking child and adolescent perceptions of discrimination to child developmental outcomes is quite new, it is very common for researchers to self-design and/or tailor their own measures of discrimination—either questionnaires or interviews—sculpting them for the ethnic, racial, cultural, language, and/or religious groups of interest. This is likely due, in part, to the fact that a relatively limited number of previously validated measures have been designed for and with children. Importantly, though, researchers need to use a combination of methods, mixing qualitative interview strategies and questionnaire-type methods, to provide as complete, developmentally appropriate, and nuanced a picture as possible of discrimination in childhood.

Questionnaire-Based Approaches

On paper, most researchers assess discrimination by asking how frequently individuals have perceived discriminatory behaviors occurring either in the past year

(Landrine & Klonoff, 1996) or on a day-to-day basis (Kessler, Mickelson, & Williams, 1999; Williams, Yu, Jackson, & Anderson, 1997). A wide variety of measures have been adopted from the adult literature, largely for use in adolescence. For example, one of the more commonly used measures, the Schedule of Racist Events, has been used and adapted for studies involving adolescents (e.g., Berkel et al., 2009, 2010; Brittian et al., 2013; Brody et al., 2006; Brody, Kogan, & Chen, 2012; Gibbons et al., 2004, 2012). Originally developed for and validated on an adult sample of African Americans, this measure asks respondents to rate how many times a variety of racist events have occurred over the past year and across the lifetime, and how stressful these events were. A sample question is, "How many times have you been treated unfairly by people you thought were your friends because you are Black?" The measure taps multiple contexts for unfair treatment, including schools, workplaces, and even larger "institutions."

A limited number of researchers have endeavored to assess not only the frequency and source of the perceived discrimination, but have also aimed to measure both the stressfulness (Utsey & Ponterotto, 1996) and intensity of these events (Harrell, 1997). For children aged 5–13, for example, Rivera and colleagues (2010) have modified a version of the Hispanic Stress Index as a measure of discrimination. For tapping an individual's simultaneous recognition of and upset by discrimination in his or her life at large (i.e., not attributed to personal experiences, but to observations of society), the Index of Race-Related Stress (Utsey & Ponterotto, 1996) has also been adapted for use in adolescence (e.g., Seaton, 2009). Originally validated and designed with adults (two groups comprised of "Blacks" and "Non-Blacks"), this measure asks the respondent to rate (0 = the event never happened to me, to 4 = the event happened and I was extremely upset by it) items such as "You notice that crimes committed by White people tend to be romanticized, whereas the same crime committed by a Black person is portrayed as savagery, and the Black person who committed it, as an animal."

Linking more to contexts of discrimination, some studies also measure how often discrimination is performed by peers as opposed to adults or teachers (Way, 1997; Wong et al., 2003). For example, Rivas-Drake and colleagues (2008) employed an 18-item binary checklist to measure peer ethnic discrimination in the school context among 10- to 11-year-olds. One of the few measures developed with and for adolescents initially, the Adolescent Discrimination Distress Index, asks questions about perceived discrimination in institutional, educational, and peer domains,

and measures how upsetting those instances of discrimination were (Fisher et al., 2000). This measure is also unique in that it was developed with a multiethnic sample of African American, Hispanic, East-Asian, South-Asian, and Non-Hispanic White public high school adolescents in the United States. It has since been used and adapted by numerous researchers for use in a variety of ethnic and racial adolescent samples (e.g., Benner & Graham, 2011; Grossman & Liang, 2008; Harris-Britt, Valrie, Kurtz-Costes, & Rowley, 2007). The Racism Life Experience Scale (Harrel, 1997) is another frequently used measure. This questionnaire targets racism-related socialization, coping, knowledge, and experience. As with the Index of Race Related Stress, this measure was developed with adults and also captures the frequency and associated distress surrounding race-related discrimination; it too has been adapted for use with adolescents (e.g., Lambert, Herman, Bynum, & Ialongo, 2009; Neblett, Chavous, Nguyen, & Sellers, 2009; Seaton, Yip, Morgan-Lopez, & Sellers, 2012).

Qualitative and Mixed-Methods Approaches

Researchers interested in studying perceptions of discrimination in childhood have a slightly more complex task at hand than those studying it during adolescence. This is due, in large part, to the still-forming social-cognitive and individual-level skills essential for perceiving discrimination during the earlier childhood years (Brown & Bigler, 2005). Additionally, young children may be unable or unwilling to read or write in questionnaire format. It is more common, then, that researchers focusing on the earliest evidence of perceived discrimination rely on interviewing techniques, gathering both qualitative and quantitative data regarding discrimination. Researchers, for example, may combine both quantitative questions with picture and storytelling tasks to elicit perceptions, attitudes, and understanding of discrimination in early childhood. Augoustinos and Rosewarne (2001) used a subset of quantitative items from a foundational measure of childhood prejudice called the Preschool Racial Attitude Measure (PRAM; Williams, Best, & Boswell, 1975), in conjunction with pictorial stimuli and rating scales, to tap into British children's prejudicial beliefs, stereotype knowledge, and racial prejudice in early childhood (5–9 years). Although we noted above a deep and rich history of using experimental approaches (including implicit measurement strategies) to measure intergroup social prejudice and biases in childhood, such methods and measures are currently less common in the literature linking discrimination to childhood developmental outcomes.

In sum, although a wide variety of measurement strategies are currently employed in the developmental literature on discrimination, there are a few areas in need of growth and attention. The first is that the plethora of individually tailored and self-designed scales limits researchers' abilities to validate the constructs captured in different studies, contexts, ethnic/racial groups, age ranges, and other meaningful participant characteristics. There is also a tendency to simply describe the effects of "discrimination" broadly in research results, without acknowledging or describing nuanced differences associated with the use of different measures. For example, a researcher employing a perception of discrimination measure focused on self-related discrimination may be speaking to a meaningfully different developmental process (i.e., social identity) linking perceived discrimination with a health outcome, than a researcher using a measure capturing racism at large in the community (i.e., empathy). In the former case, it is plausible that self-perceived discrimination might undermine some salient aspect of self-identity, thereby causing psychological distress. In the latter case, a measure tapping empathy when others are discriminated against may not show the same type of association with psychological distress. When researchers employ, tailor, or create any given measure of discrimination it is imperative to understand what psychological mechanism and/or construct(s) is tapped by the instrument, in order to interpret and understand fully the "effects" of discrimination in childhood. Nevertheless, researchers oftentimes do not speak with this level of precision regarding the type of construct they have measured and how their results may or may not support theorized processes at play linking perceived discrimination to aspects of the self. Put another way, many researchers measuring discrimination in the hope of linking perceived discrimination to developmental outcomes do so without explaining the underlying theories tapped by the measures they use. In this way, the current literature on the implications of discrimination for child and adolescent development risks describing discrimination "effects" without advancing theories regarding the ways in which these effects occur.

Moving forward, greater attention to theory and construct specificity and detail in measurement strategy will be necessary if we are to unpack (and perhaps ameliorate) the many processes linking perceptions of discrimination to child and adolescent developmental outcomes. For example, combining quantitative and qualitative methods may help contextualize the experiences of discrimination at various points throughout development, providing

bases for updating the field's theoretical understanding of the contexts of discrimination in childhood. Although many researchers have tailored questionnaires to target experiences of discrimination in a variety of settings, relatively little is known about characteristics of the settings themselves as they are directly measured and linked with child and adolescent perceived discrimination and psychological outcomes. Along these lines, widening the toolset to include implicit measures (i.e., measures that tap a construct outside of explicit control) may be a very useful technique for use with ages (e.g., middle childhood) and social groups that are particularly prone to respond in socially desirable ways. For example, if children are socialized to downplay, ignore, or even accept discrimination, these youth may be less likely to report perceiving or being distressed by discrimination than youth who have been socialized to recognize discrimination and name it as such. In this case, differences observed in the frequency of discrimination perceptions or distress caused by discrimination would be attributed to socialization, not to actual experienced or perceived discrimination itself. Some researchers have successfully employed implicit measures in this way (e.g., Brown, 2006), although mixing implicit and explicit measures is far from common. It is interesting that, although the field began using projective tests and implicit measures (e.g., the Clark studies noted above), researchers currently rely heavily on questionnaire-based approaches. It may be time to find a middle ground. Combining implicit with explicit measures, and incorporating quasi-experimental manipulations in naturalistic settings may help draw a deeper picture of the connections among socialization, beliefs, attitudes, and experiences with discrimination in childhood development. Advancing the methodology used to study discrimination in childhood and adolescence may, in turn, promote updates to extant theories and bases for new ones needed to help understand and intervene on behalf of children and adolescents suffering from discrimination.

Discrimination in Context: Considering Everyday Settings

The future of the study of discrimination's influence on child and adolescent development must include a deeper understanding of the everyday social settings in which children experience discrimination. Do the abilities to recognize discriminatory acts in one context (e.g., peer group play at school) translate to the abilities to recognize discrimination in another context (e.g., at the supermarket)?

How can measures be modified to test such hypotheses? Drawing on Bronfenbrenner's (1979, 1986) ecological theory, it is widely accepted wisdom that children's development is influenced by the many groups and institutions with which children interact, including their families, neighborhoods, and schools. Such ecocultural perspectives highlight the importance of the interconnection between nested contexts—how circumstances in one context (e.g., immigrant families) can moderate the influence of another context (e.g., neighborhood schools) on developmental processes. Consequently, individual differences within the same context (e.g., school) are expected as a function of how each individual interacts with the context. Weisner (1996, 2002) and others (C. R. Cooper & Denner, 1998; Gallimore, Weisner, Bernheimer, Guthrie, & Nihira, 1993) have used ecocultural frameworks to examine the adaptation of ethnic/racial minority families and students in the United States. In particular, daily family routines can inform researchers about how a particular family's culturally guided practices at home influence and interact with other ecological niches in demanding and supporting, and, in turn, responding and adapting, to children's own developmental pathways.

As the study of discrimination effects on child development itself evolves, we suggest borrowing from the well-formed line of research by Hughes and colleagues (2006) who have established the central importance of racial family socialization practices for helping prepare Black and African American children for perceiving and responding to racial discrimination. We suggest expanding these lessons beyond racial discrimination to socialize children to understand other forms of discrimination at home, to perceive it and deal with its effects. Research looking at the generalizability of discrimination socialization across contexts (e.g., home and school) and its transportability across contexts as an effective tool is needed.

Schools and Peers

Schools are a major context of influence on ethnic/racial minority youth development (García Coll et al., 1996; C. Suárez-Orozco & Suárez-Orozco, 2001). Specifically, the percentage of minority children, and the percentage of children eligible for federally subsidized lunches at the schools they attend, and whether they attend inner-city, suburban, public, or independent schools have been associated with academic performance among minority children and immigrant youth (Perez, 2001; Portes & Rumbaut, 2001). Schools are highly segregated environments in the United States (Frankenberg, Lee, & Orfield, 2003),

and, as such, do not equally provide the resources critical to children's development. For example, segregation by language skills into particular classrooms can provide a good learning environment for an ESL student, yet it might isolate him or her from mainstream peers and inhibit the acquisition of important cultural capital. In turn, ethnic enclaves are important sources of support for recently arrived immigrant families, even as they differ in their knowledge and the nature of interactions with more mainstream institutions such as schools. Schools and the ethnic enclaves can be simultaneously inhibiting and promoting contexts for a child, depending on the developmental process being ascertained. Thus, for example, an ethnic enclave that on the one hand has not developed the tools to support communication between immigrant families and schools might on the other hand be a cultural safe haven for a child who feels out of place in a mainstream institution (García Coll & Magnuson, 1998; García Coll et al., 1996).

Furthermore, interactions with other students, teachers, and administrators in schools work to shape students' motivations and aspirations to learn. For instance, many researchers have concluded that immigrant children enter the United States with very positive attitudes toward school (Fuligni, 1997; Kao & Tienda, 1995; Portes & Zhou, 1993; C. Suárez-Orozco & Suárez-Orozco, 1995, 2001). On the other hand, some children have more negative attitudes toward school. Phrases like "oppositional" or "adversarial identities" are used to describe the adaptations of some children of immigrants and other children of color toward schooling, especially during adolescence (Ogbu & Simons, 1998; Portes, 1996; C. Suárez-Orozco & Suárez-Orozco, 2001). Nevertheless, from our review of the literature above, it is clear that school environments—including interactions among teachers, students, and peers—exert strong influences on children's academic achievement and outcomes when discrimination is experienced in the school setting. We are at a critical point for deepening our understanding of how multiple settings (e.g., the meso and exosystems) interact with one another to promote or hinder child development among youth exposed to discrimination.

Immigration as a Context and the Role of Social Mirroring

Another area of growth for the scholars of discrimination in childhood is the experience of discrimination specifically in immigration contexts. The number of foreign-born and first-generation U.S. residents has reached the highest level in U.S. history (U.S. Census Bureau, 2002), with international migration and refugee patterns on the rise as well.

Because these new waves of immigration are unparalleled both in size and diversity (ethnicity, language, and cultural origins), there are profound implications for the study of immigration and its influence on child developmental and social processes. This increasing diversification is not one just of skin color, but includes a growing population of children who are multilingual and must learn to form healthy bicultural identities (LaFromboise, Coleman, & Gerton, 1993), managing home and school environments with different cultural practices. How immigrant children and adolescents experience discrimination as migrants or "newcomers"—separate from or in addition to their experiences as minorities in other U.S.-ascribed ethnic or racial groups—is an area of research that is warranted. C. Suárez-Orozco and Suárez-Orozco (2001) depict the many nuances of culture, language, race, and socialization that shape the ethnic identities among children of immigrants. According to that study's description of second-generation Latino youth development, children become aware of the social stratification of race in the United States at an early age. Children are also influenced by their parents' dual frames of reference (i.e., culture of origin and mainstream American culture) to interpret and understand all aspects of their life, including education, socialization with peers, community resources, and their identity. Importantly, C. Suárez-Orozco and Suárez-Orozco (2001) note that the type of ethnic identity development a child goes through is influenced by the family's adaptation (i.e., acculturation) to the United States. In this and other qualitative accounts of immigrant child development (e.g., Portes & Rumbaut, 2001), socialization with peers provides early influence on identity development.

C. Suárez-Orozco and Suárez-Orozco (2001) also have discussed social mirroring theory to explain the toll that repeated and systematically held discriminatory behaviors and beliefs by society at large may have on adolescent self-image and psychological functioning among immigrant youth. The theory, which has its roots deep in anthropological philosophy, has been depicted as the basis for social cognition, such as pretend role-playing, in early childhood. As constructed by Whitehead: "'Social mirror theory' holds that we cannot have mirrors in the mind without mirrors in society. . . . Introspection depends on public performance, for we can discover our own 'subjective depths' by interpreting the 'meaningful objectifications' expressed by others" (Whitehead, 2001, p. 18). It follows from this theory, then, that minority children and adolescents are often faced with negative stereotypes and images about their social group(s) from individuals, other social

groups, and media, which will then be incorporated into the children's own identities and behaviors. Adolescents who belong—either through ascribed or personally identified affiliation—to negatively stereotyped and marginalized social groups (groups placed in a position of low power, for example, Muslim adolescents in post-9-11 U.S. society; Aroian, 2012) therefore suffer increased rates of psychological distress when compared to nonmarginalized youth. Muslim youth and young adults living in the United States who wear traditional dress, for example, are more likely to perceive discrimination than those wearing nontraditional dress (Sirin & Katsiaficas, 2011). Such findings speak to the potency of public perceptions of dress and religiosity for projecting negative social mirroring images and acts of discrimination.

Such negative social-contextual cues and messages, which can emanate from many settings at macro- and microsystem ecological levels, have been documented by children and adolescents in schools and their communities, for example:

“Most Americans think that we are lazy, gangsters, drug addicts that only come to take their jobs away” (14-year-old Mexican boy).

“Most Americans think that we are bad like all Latinos” (12-year-old Central American boy).

“Most Americans think that we don’t exist” (12-year-old Mexican boy). (M. Suárez-Orozco & Suárez-Orozco, 2000, p. 27)

In our own research with mixed-ethnic and mixed-racial second-generation immigrant adolescents, we also saw qualitative evidence of the power of social mirroring for shaping ethnic identities (Marks, Patton, & García Coll, 2011). When asked why a student provided the low rating of “pride” in the cultural immigrant group she selected, one student told us:

I don’t know because when I was little there were a lot of Chinese jokes and I’d feel like “Oh being Chinese, they make fun of Chinese and so they are not as good as Americans.” It could be kind of like racist and so I’d feel like oh I am not as good as Americans.

Although the research base examining the unique psychological and social experiences of immigrant children and adolescents is rapidly growing, more comprehensive examination of threats to well-being—by virtue of being an immigrant and all of the associated biases, prejudices, and stereotypes—is of critical importance. The United

States has seen unprecedented diversity among its child population in the past few decades, alongside sometimes extreme and polarizing political rhetoric about how to handle America’s borders. How immigrant children understand themselves, their friendships, and their life prospects within this additional level of social stratification in the United States requires new attention.

Final Thoughts

Although we advocate understanding more fully the potentially facilitating and inhibiting influences of everyday settings on the abilities of youth to manage the detrimental consequences of discrimination, we also recognize that children co-construct their own realities. Children do not solely react to their interacting contexts. As Modell (2000) notes, the socio-historical context of development does not have a unique and solely unidirectional influence on children, rather the processes of immigration and their adaptations also change the contexts of schools, neighborhoods and communities. It is likely, then, that discrimination’s influences on child development are not only built from social perceptions, biases, and prejudices from perpetrator to victim, but that there may be victim-related implications for perpetuating discrimination as well. Take, for example, the growing literature on bullying and bullying’s effects on child well-being. It is well recognized that a meaningful portion of victims of bullying (approximately 10%) later become bullies themselves (e.g., Perren & Alsaker, 2006). It is this group—the “bully-victim” group—that is at *greatest risk* for myriad, and severe, behavioral and mental health problems throughout the life course (e.g., both internalizing *and* externalizing problems, along with peer/relational issues as well; O’Brennan, Bradshaw, & Sawyer, 2009). As is the case with cycles of abuse in general—whether bullying, emotional abuse, or discrimination—understanding how discrimination is perpetuated across generations and lifetimes is of great importance. Whether and how victims of discrimination may be prone to becoming perpetrators later, and if so, the unique psychological problems this may incur, has been largely unexamined in the developmental literature. Examining such cycles (which would require longitudinal research—a methodology scant in this area of the literature), in combination with the growing body of literature on mediators and moderators of effects of discrimination on child development, may have profound implications for intervention development. A systematic review of interventions for young children aimed at reducing stereotype and

prejudice (Aboud et al., 2012) revealed very inconclusive and mixed effects. It seems that, if a positive influence is to be made in this vital area of child development, new research into processes, settings, and perpetrator–victim cycles of discrimination are warranted.

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CHAPTER 10

Race, Class, and Ethnicity in Young Adulthood

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Scholars have long regarded full-time employment, marriage, parenthood, independent residential status, and completion of education as hallmarks of adulthood in Western industrialized societies. The transition to adulthood is a bridging period that links childhood experiences to adulthood. It often affords youth increasing autonomy and experiences in new contexts—experiences that may include status and role transitions or advances toward milestones associated with adult status. It is resoundingly clear from an extensive complement of studies that the transition to adulthood in the United States and Western European countries has become less standardized and more prolonged since the 1960s, with new pathways emerging and greater variability in the timing and sequencing of traditional markers of adulthood (Fussell & Furstenberg, 2005; Fussell & Gauthier, 2005; Mouw, 2005; Shanahan, 2000).

In particular, the post-1960s era brought an increase in the median age of marriage and first childbirth, a delay in departure from the natal household, a steep rise in the proportion of young people obtaining higher education after high school, and an increase in the diversity of young people's living arrangements (e.g., nonfamily households,

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college dormitories, or other group quarters), school attendance, marital status, and parenthood status. Scholars have linked these demographic changes to myriad factors, including the widespread democratization of education in the 1960s, increased demands and economic returns for high levels of education and training with declines in manufacturing and industrial jobs, invention of the birth control pill, and less stringent standards of sexual morality (Arnett, 2004; Furstenberg, 2008; Fussell & Furstenberg, 2005; Shanahan, 2000).

Study of the transition to adulthood has a long history in the fields of sociology and demography dating back to the 1960s (Hogan & Astone, 1986), and by the 1990s, was a thriving area of research in life course studies (Shanahan, 2000). It has been enriched by a strong international focus, with sociologists and demographers addressing issues such as how transitions to adulthood pertaining to school, work, and family life vary across Western industrialized countries, the role of institutions, policies, and cultural factors in these cross-national differences (e.g., Cook & Furstenberg, 2002; Fussell & Gauthier, 2005; Gauthier & Furstenberg, 2005), the nature of the transition to adulthood in Asian

countries (e.g., Yeung, Alipio, & Furstenberg, 2013), and the relation between youth migration and transitions to adulthood in developing countries (Juarez, LeGrand, Lloyd, Singh, & Hertrich, 2013).

Since 2000, increasing numbers of scholars in developmental science have turned their attention to the transition to adulthood as an area of study, prompted by Arnett's (2000) highly cited article in *American Psychologist* and the intense focus in the popular media on delays in the transition to adulthood. Arnett, a developmental psychologist, posited that the delay and wide variability in the timing and sequencing of traditional markers of adulthood have given rise to a shift in the criteria for what constitutes adulthood. Specifically, he asserted that traditional demographic markers or roles no longer hold sway among young adults in the United States and other Western industrialized societies as prominent signifiers of adult status, having been replaced by a "psychologized" conception of adulthood that emphasizes individualistic indicators of maturity (e.g., making independent decisions, accepting responsibility for oneself).

Arnett concluded that the late teens and early twenties (roughly the ages of 18–25) have become a distinct developmental period in the life course of individuals in Western industrialized societies—one that he termed "emerging adulthood." Psychological hallmarks of this period in Arnett's conception include the subjective perception of "in-betweenness" (the feeling that one has left adolescence but has not completely entered early adulthood), self-focus, and independent explorations of identity in the area of love, work, and worldviews. It is a time when youth expand their range of personal experiences in anticipation of making the more enduring choices of adulthood. Arnett points out that emerging adulthood is not a universal developmental period, but rather "exists only in cultures that allow young people a prolonged period of independent role exploration during the late teens and twenties" (Arnett, 2000, p. 478). He notes that within some highly industrialized countries, members of minority cultures and youth from working- and lower-class backgrounds may experience a truncated period of emerging adulthood or no emerging adulthood at all because of cultural beliefs or opportunity structures that restrict identity exploration.

The concept of emerging adulthood stands out for its deep resonance among scholars in developmental science. This is reflected in part by biennial meetings on the topic that draw developmentalists from North America, Europe, and other locations, the establishment of the Society for the Study of Emerging Adulthood in 2003, and the launching

of an international journal devoted to research on the topic, *Emerging Adulthood*, in 2013. Nonetheless, the concept is not without controversy. Drawing on demographic data from Canada and Britain, Côté and Bynner (Bynner, 2005; Côté, 2006; Côté & Bynner, 2008) pointed out that the prolonged transition to adulthood, the bedrock of Arnett's emerging adulthood model, is fundamentally a product of social and economic conditions that have made it increasingly difficult for young people to gain entry-level, full-time jobs and to make other transitions that historically have marked the transition to adulthood. Data show that contemporary youth in these countries, like youth in the United States, face more challenges in the labor market than earlier cohorts of youth, including an increasing wage gap with older workers, earnings instability, more temporary jobs, fewer job benefits, more instability in employment, and rapid growth of part-time jobs. These challenges appear to be exacerbated by a diminishing of social norms and increasing social anomie in secular institutions and communities that in earlier decades provided structures that guided youth into adult roles.

Viewed against this backdrop, contend Côté and Bynner, Arnett's model of emerging adulthood "overestimates the extent to which young people can exercise choices that are free of constraints" and "mistakes the coping mechanisms among young people, as they agentically struggle against structural obstacles and normative ambiguities, for freely chosen options to delay their entry into adulthood" (Côté & Bynner, 2008, p. 263). Examples of such coping mechanisms include investment in a wider range of competencies and experiences through part-time jobs and seasonal work that may enhance one's employability and building protective mechanisms of peer group solidarity.

Several considerations have prompted scholars to question the legitimacy of defining emerging adulthood as a distinct developmental period. First, they have noted that psychosocial differences between adolescents and emerging adults seem overdrawn in Arnett's model when juxtaposed with findings from empirical studies. Research to date has not found reliable differences between adolescents and emerging adults in the level and progression of identity exploration. It provides no compelling evidence that exploration of identity is uniquely salient during the targeted age period, that identity exploration is normative during this period, or that identity exploration constitutes the typical pathway through which a clear and coherent sense of self is achieved (Côté, 2006; Kroger, 2007; Meeus, Iedema, Helsen, & Vollebergh, 1999; van Hoof, 1999).

Second, critics have asserted that in his attempt to distinguish emerging adulthood as a developmental period, Arnett oversimplifies the transition from adolescence to adulthood, disregarding the fact that the transition is domain-specific, variable, and reversible and that “the search for identity is a process of recurring moratoria and achievements extending over the entire life span” (Henry & Kloep, 2007a, p. 75). Third, scholars are skeptical about designating emerging adulthood as a “developmental stage” because fundamental conceptual and theoretical questions are unresolved—questions such as, in what ways are those who do not go through the stage of emerging adulthood deficient developmentally and what unique psychosocial competencies versus vulnerabilities accrue as a consequence of passing through versus skipping this stage? Offering their view of stage criteria, Côté and Bynner (2008) asserted that “a developmental stage must add something to development beyond simple change; if a set of experiences does not have predictable value-added consequences other than amorphous change over time, it cannot be considered developmental” (p. 253).

A related concern centers on the fact that Arnett’s model of emerging adulthood is culture-specific and is highly limited in its generalizability (e.g., Henry & Kloep, 2010). Henry and Kloep (2007a) argued that Arnett’s model advances neither knowledge nor understanding of human development, but rather is “merely a description limited to a certain age cohort in certain societies at a certain historical time with particular socioeconomic conditions” (p. 76). They cautioned against elevating to the status of theory a model applicable to a very narrow swath of the human population, noting that “We are now in danger of having a psychology of the affluent middle classes in Western societies, with other groups being seen as deviating from that norm” (p. 76). Henry and Kloep (2007a, 2007b) called for going beyond descriptions and abandoning age stage theories altogether in favor of investigating processes and mechanisms of developmental change. In response, Arnett (2007) pointed out that his model gives recognition of the fact that human development occurs within a historical and cultural context and that emerging adulthood as a period of development appears to be proliferating as economically developing societies enter the global economy.

Questions about the cultural-specificity of Arnett’s model are particularly relevant to the central foci of our chapter—how social class, race, and ethnicity shape the transition to adulthood in the United States and other Western industrialized countries. Arnett suggested that, because of educational and occupational barriers, working-class,

low-income, and ethnic minority youth may be less likely to experience the ages of 18–25 as a period of independent exploration of life options. Following Côté and Bynner’s line of reasoning, what unique psychosocial vulnerabilities or competencies accrue among socioeconomically disadvantaged youth who skip this stage as compared with their counterparts who pass through it? Stigma, discrimination, limitations in the opportunity structure, and excessive stress may indeed circumscribe independent exploration of identity issues and life options in socioeconomically disadvantaged young adults. However, there is a paucity of research that examines these presumptions and even less that illuminates the consequences of constrained opportunities for identity exploration among individuals from these or any other groups (Hart, Atkins, & Ford, 1998; Phillips & Pittman, 2003). Because of the more circumscribed nature of the terms “emerging adulthood” and “emerging adults” as Arnett has defined them, we use the terms “early adulthood,” “transition to adulthood,” “youth,” and “young adults” in this chapter.

Several tenets and concepts of life course theory inform this chapter, one of which is that the developmental antecedents and consequences of life transitions and circumstances vary according to their timing and ordering in the life course (Elder & Shanahan, 2006). Elder and Shanahan asserted that the timing and ordering of role and status transitions relative to age is important partly because (a) social timetables, age norms, and age-graded experiences and sanctions influence individuals, and (b) persons in different developmental stages bring different life histories and personal resources to social roles, and hence, experience these social roles differently.

A second tenet of life course theory central to our chapter underscores the interdependence of significant others in regulating and shaping the timing and ordering of life trajectories (Elder & Shanahan, 2006). It is through this network of shared relationships, both those that are nurturing and protective, as well those that are harsh and adversative, that social and contextual influences are expressed. One aspect of these shared relationships that is particularly important for both economically disadvantaged youth and minority youth is the social capital that can accrue within these relationships. The concept of social capital captures valuable resources such as information and assistance that relationships can provide (Lin, 2001). Because social location limits access to these resources (Bourdieu, 1986; Stanton-Salazar, 1997), particularly resources needed as youth transition to post-secondary education and the labor force, we highlight studies that

examine the role social capital plays as youth make these transitions.

The life course concept of cumulative advantage/disadvantage (Dannefer, 2003; Elder, 1998; Elder & Shanahan, 2006) is also highly relevant to our discussion, because as other scholars have emphasized, youth enter late adolescence and early adulthood with a history of cumulative advantage or disadvantage with different capacities and differential access to resources. Adult transitions are embedded in this complicated web of factors, with the added complication that each transition influences the probability of others occurring (Bozick & DeLuca, 2005; Furstenberg, 2008; Fussell & Furstenberg, 2005). Cumulative advantage/disadvantage refers to the “systemic tendency for inter-individual divergence in a given characteristic (e.g., money, health, or status) with the passage of time” (Dannefer, 2003, p. S327), and resonates with popular adages such as “success breeds success” and “the rich get richer—the poor get poorer.” Dannefer (2003) pointed out that “divergence is not a simple extrapolation from the members’ respective positions at the point of origin; it results from the interaction of a complex of forces” (p. S327). In his view, the concept of cumulative advantage/disadvantage does not deny the importance of agency or individual action, but “demonstrates the power of structural realities within which human agency must operate” (p. S328). Much of the work discussed in this chapter underscores how these structural realities impinge on the adult transitions of youth from low-income and disadvantaged ethnic minority backgrounds.

A “social genome model” developed and tested by scholars at the Brookings Center on Children and Families provided an illustration of cumulative advantage/disadvantage over the life course of Americans (Sawhill, Winship, & Grannis, 2012). Analyzing data from the National Longitudinal Survey of Youth and using widely accepted benchmarks of success for each life stage, they found that children born advantaged retained a large advantage at the end of the next stage (i.e., early childhood), with the same pattern prevailing in subsequent stages. In middle childhood, adolescence, and adulthood, those who succeeded in the previous stage were much more likely to succeed in the following stage than those who did not. Importantly, success at each stage varied by race, ethnicity, and family income.

Another exemplar of cumulative advantage processes particularly relevant to our focus on socioeconomic disadvantage is the lasting effects of the Perry Preschool Project. Conducted in Ypsilanti, Michigan, between 1962

and 1967, the Perry Preschool Project (Berrueta-Clement, Schweinhart, Barnett, Epstein, & Weikart, 1984; Schweinhart et al., 1993) was an intensive early childhood education program that provided daily high-quality center-based care and weekly home visits for 2 years to low-socioeconomic status (SES) families. The program randomly assigned 58 families to the treatment group and an additional 65 families to a control group and followed them both from when the children were in the program all the way through mid-adulthood. At the age of 27, program children had higher educational attainment than control children (71% versus 54% completed high school). They also had higher earnings (29% versus 7%, earning more than \$2,000 monthly), received less public welfare as adults and averaged fewer arrests for criminal activity. Because children participated in the program for only 2 years, the lasting program effects likely represent a process of cumulative advantage. The gains in academic skills and social behaviors that the program induced during early childhood likely translated into more successful school experiences, and ultimately, into positive outcomes across multiple domains in early adulthood. Heckman and colleagues frequently referred to the notion that “skill begets skill” (Heckman & Masterov, 2007, p. 447), and argued that these cumulative processes are a primary reason that investment in early childhood programs are likely to produce greater returns than investments later in the life course (Heckman, 2006).

We cite these exemplars of cumulative advantage/disadvantage in this introduction because the concept functions more as a heuristic for our chapter, due to the relative paucity of relevant studies explicitly focused on the transition to adulthood. It is well-documented that social class, race, and ethnic differences in academic skills and experiences promotive of these skills (e.g., school readiness skills, home-based cognitive stimulation, language use, differential access to educational resources), for example, begin very early in life and accumulate through the early and middle childhood years (Arnold & Doctoroff, 2003; Aronson, 2008a; Rouse, Brooks-Gunn, & McLanahan, 2005). Nonetheless, relatively few studies provide evidence of cumulative advantage/disadvantage by empirically linking these very early differences to class, race, and ethnic differences in educational attainment during early adulthood.

Although child and adolescent experiences undoubtedly have consequences for subsequent development, transitions to adulthood also provide opportunities for discontinuities in development. During the transitions, youth experience new levels of autonomy and enter new contexts that

afford different developmental assets and impose different constraints. These changes have the potential to produce dramatic shifts in one's developmental trajectory. Often referred to by life course theorists as "turning points" (Elder & Shanahan, 2006), these changes highlight malleability in development. Although many turning points emphasized in research represent positive changes (e.g., desisting from criminal behavior), it is important to recognize that features of the transition to adulthood, such as the decrease in structure imposed by institutions and growing awareness of one's status in society, may increase the likelihood that the transition to adulthood becomes a negative turning point for some youth, especially those from disadvantaged backgrounds (Schulenberg, Sameroff, & Cicchetti, 2004). Our chapter presents evidence of both continuity and discontinuity as economically disadvantaged and ethnic minority youth transition from adolescence to early adulthood.

While life course theory provides the primary framing for this chapter, insights from other theoretical models also enhance our discussion. The theoretical work on risk and resilience is especially pertinent to understanding how social location, both in terms of economic disadvantage and race/ethnicity, influences development in the transition to adulthood and how certain contextual factors can promote positive outcomes (Masten, 2001). Resilience researchers distinguish between factors that promote positive outcomes for all youth (promotive factors), and factors that promote positive outcomes only for youth who face risk (protective factors) (Sameroff, 1999, 2010). Thus, from an empirical point of view, a promotive factor will likely have a direct effect on an outcome, while the effect of a protective factor will be seen in its interactions with risk factors. Luthar and colleagues (Luthar, Sawyer, & Brown, 2007; Luthar, Crossman, & Small, Chapter 7, this *Handbook*, this volume) have drawn attention to the need to focus on specific processes that promote positive adaptation within populations, regardless of whether or not the factor is promotive in other populations. Although these types of examinations are not sufficient for determining whether a factor is promotive or protective, they do provide important information about how to promote positive development within a specific at-risk population. Although not always explicitly conceptualized as analyses of promotive factors, much of the research reviewed in this chapter, particularly the research on social capital, in essence examines promotive factors among economically disadvantaged or ethnic minority youths.

Our discussion is also shaped by developmental contextualism theory, which highlights the importance of studying youth from diverse backgrounds and emphasizes the multitude of developmental trajectories that youth may take. Furthermore, developmental contextualism recognizes that relations between individuals and their contexts are the critical forces that shape development (Lerner & Castellino, 2002; Lerner & Kauffman, 1985). These principles undergird our discussion of how the social class, race, and ethnicity of youth shape their transitions to adulthood.

The chapter focuses on four domains of functioning pertinent to the transition to adulthood—conceptions of adulthood, mental health, paid employment, and educational attainment. A section of the chapter is devoted to each domain. Links among these domains are briefly noted throughout the chapter, but more refined analyses of how one domain of functioning influences other domains over time in a cascading fashion are not possible. Tests of cascade models predicting outcomes during early adulthood have not given attention to race, ethnicity, or social class or examined how cascade models vary by social location (e.g., Masten, Desjardins, McCormick, Kuo, & Long, 2010). At the beginning of each section, we provide brief overviews of research assessing direct relations between markers of social location and the domain of interest. However, in keeping with developmental contextualism, we focus most of our discussion on studies that illuminate processes that link social location to the development of youth (mediational processes) and examine sources of variation in developmental pathways among economically disadvantaged and ethnic minority youth, with special attention to the positive end of the risk dimension (i.e., promotive factors). We also highlight protective factors, that is, factors and processes that mitigate the negative effects of economic advantage and ethnic minority status on the functioning of youth during the transition to adulthood, but our discussion is limited by the rarity of such investigations (Burt & Paysnick, 2012). Each major section of the chapter concludes with a summary and discussion of important questions and issues that merit future research attention.

The chapter draws heavily on research based on American samples. We incorporate research findings from youth in Canada and Western European countries, but acknowledge the highly selective and modest nature of this synthesis. This is due in large measure to limitations resulting from our background as American researchers who reside in the United States, in combination with the fact that myriad aspects of transitions to adulthood are country-specific, reflecting institutional, cultural, and

social factors unique to respective countries or geographic regions (Cook & Furstenberg, 2002; Douglass, 2007; Walter, 2006).

CONCEPTIONS OF ADULTHOOD

Conceptions of adulthood encompass beliefs about criteria for adult status, beliefs about the optimal timing of transitions that signify adult status, perceptions of one's own status relative to adulthood, and the basis on which individuals perceive themselves as adults. We highlight key findings about each of these issues in relation to ethnicity and social class and review major studies of how experiences during childhood and adolescence shape adult identity. Many of the findings comport with developmental contextualism and the emphasis in life course theory on the developmental consequences of the timing of life transitions.

Social class and ethnicity may influence young adults' conceptions of adulthood through several pathways, including differential economic resources, differences in the timing of adult transitions, and differences in values. Economically disadvantaged individuals may be less likely than more affluent individuals to subscribe to the idea that certain transitions or personal characteristics are what makes one an adult if economic disadvantage increases the difficulty of making certain adult transitions or attaining particular individualistic criteria of adulthood (M. K. Johnson, Berg, & Sirotzki, 2007a). Consider income in relation to the transition to independent living arrangements. Cross-national survey data from the European Community Household Panel study indicate that in the Nordic cluster (Denmark, Finland, and the Netherlands) and the Southern cluster (Greece, Ireland, Italy, Portugal, Spain), young people's own incomes are significantly related to the probability of leaving home to live on their own. In the Northern cluster (Austria, Belgium, France, Germany, and Britain), parents' income is positively related to their adult children's probability of leaving home to live on their own, indicating that parents with more money may be using some of that money to purchase independence for their children (Iacovou, 2011).

In keeping with this general pattern, data from Britain indicate that middle-class youth experience the most protected and privileged pathways to independent living (e.g., affluent parents sometimes buy accommodations for their children's use while the children are in college, and upon graduation, children may continue to live in the property

to save toward a deposit for a house of their own), whereas those from working-class backgrounds often experience the most challenging pathways, reflected in part by an established link between social disadvantage and shared housing among young people in Britain (Heath, 2008).

In the United States, low-income youth and groups of young adults with higher rates of poverty (e.g., African Americans, Latino Americans) tend to have lower rates of residential independence and higher rates of residence in their parents' home than more affluent youths (Cohen, Kasen, Chen, Hartmark, & Gordon, 2003; Hallquist, Cuthbertson, Killeya-Jones, Halpern, & Harris, 2011; Jekielek & Brown, 2005). The racial gap in residential independence has been especially pronounced among males for several decades (Halperin, 1998), and the economic recession in the United States beginning in late 2007 appears to have exacerbated this disparity. In 2011, 30% of African American men aged 25–34 lived in their parents' homes, compared with 11% of European American men (15%). Comparable figures for African American women and European American women were 11% and 9%, respectively (Mather, 2011).

Differences in the timing and sequencing of adult transitions may be another source of ethnic and social class differences in conceptions of adulthood. In the United States and numerous European countries, both ethnic and social class differences exist in the timing and sequencing of transitions that have traditionally signified adult status (e.g., Dennison, 2004; M. K. Johnson et al., 2007a; McCulloch, 2001; UNICEF, 2001). In Britain, for example, Caribbean, Pakistani, and Bangladeshi women have higher teenage birth rates than White women, and young women from lower-class backgrounds are much more likely to become teenage mothers than those from middle- and upper-class families (Dennison, 2004).

In the United States, African Americans and Latino Americans become parents at earlier ages and are more likely to become parents prior to marriage than European Americans and Asian Americans, whereas Asian Americans, compared with non-Hispanic Whites, African Americans, and Hispanics, attend school for longer periods of time and the age at which they leave home, marry, and become parents is higher (Cohen et al., 2003; M. K. Johnson et al., 2007a). American youth from poor families, compared with their counterparts from non-poor families, are more likely to make early family role transitions (e.g., cohabitation, marriage) (Booth, Rustenbach, & McHale, 2008; Cohen et al., 2003), more likely to leave the parental home before the age of 18, but less likely to do so

after the age of 18, and less likely to experience repeated home leaving (Berzin & De Marco, 2010; De Marco & Berzin, 2008). They are also likely to become parents at earlier ages and prior to marriage than youth from more economically advantaged backgrounds (Berzin & De Marco, 2010; Booth et al., 2008; Hamilton, Martin, & Ventura, 2010; M. K. Johnson et al., 2007a; Pew Research Center, 2009).

Research that examines several role transitions jointly further underscores differences in the timing of adult transitions as a function of family income and other markers of social class. Osgood, Ruth, Eccles, Jacobs, and Barber (2005) classified American youth in a predominantly European American, middle- and working-class sample on the basis of the transitions they had made in five role domains by the age of 24: romantic relationships, residence, parenthood, employment, and education. The social class of the natal families of youth (family income, fathers' and mothers' education) was a strong predictor of the paths of youth through the transition to adulthood. Youth who came from families with considerably lower income and education were more likely to be "fast starters" (those who occupied the greatest number of adult roles), more likely to be "parents without careers" (those with extensive commitments in the realm of family and relationships, but limited involvement in employment), and more likely to be "slow starters" (those who had made the fewest transitions to adult roles). Conversely, they were less likely to be "educated partners" (nonparents with higher levels of education, living with romantic partners), or "educated singles" (non-parents with higher levels of education, not living with romantic partners).

Cultural values may be another source of ethnic differences in the conceptions of adulthood that youth hold. Salient among these include the value of *familismo* among Latino Americans, the emphasis on communalism among African Americans, and the collectivistic orientation of Asian Americans and British Asians. *Familismo*, a cultural value frequently shared across Latino American families, emphasizes family unity and loyalty, prioritizing family over individual needs, and reliance on the family for instrumental and emotional support (Calzada, Fernandez, & Cortes, 2010; Cauce & Domenech Rodríguez, 2002; Halgunseth, Ispa, & Rudy, 2006). Communalism among African Americans reflects a commitment to social connectedness whereby social bonds transcend individual privileges and mutual aid is viewed as a moral code (Allen & Boykin, 1992). The collectivistic orientation of Asian Americans and British Asians is reflected in the strong importance on self-sacrifice for the sake of others

and on the well-being of the family and the group, even at the expense of the individual (Brannen & Nilsen, 2002; Fuligni & Pedersen, 2002; Fuligni, Tseng, & Lam, 1999; Phinney, Ong, & Madden, 2000). These values may orient members of these ethnic minority groups to endorse more strongly than members of majority groups criteria for adulthood that reflect obligations and duties to others—that is, completing socially recognized role transitions (e.g., marriage), fulfilling domestic and family roles (e.g., providing financially for family), and interdependence (rather than independence) (Arnett, 2003).

Beliefs About Criteria for Adult Status

Scholarly interest in the beliefs of youth about criteria for adult status is predicated largely on Arnett's assertions that young adults accord more importance to individualistic indicators of maturity than role transitions as criteria for adult status and that this pattern is a psychological response to social change and an important marker of what distinguishes emerging adulthood from adulthood. His work showed that not only do role transitions have little salience in young people's conceptions of the meaning of adulthood (Arnett, 1997, 2001, 2003), but also that their actual role transitions are largely unrelated to their endorsement of corresponding role transitions as criteria for adulthood. For example, youth in their 20s who were employed full-time were no more likely than those who were employed part-time or not employed at all to endorse full-time employment as a criteria for adult status (Arnett, 1997).

Critics have pointed out the absence of empirical research assessing differences in the criteria current versus earlier cohorts of young adults use as criteria for adulthood. Without knowing how young adults living in earlier times in industrial societies would rank role transitions in relation to psychological criteria, they argue, responses from current cohorts cannot be used to make statements about social change (Shanahan, Porfeli, Mortimer, & Erickson, 2005). Skepticism about Arnett's findings and interpretations is based on several additional issues pertaining to research methodology, including reliance on convenience samples, failure to examine individualistic criteria and role transitions simultaneously in a multivariate framework in favor of a univariate data analytic strategy (Shanahan et al., 2005), and use of close-ended survey instruments with a truncated (yes/no) response scheme (Andrew, Eggerling-Boeck, Sandefur, & Smith, 2007). These factors, critics suggest, may have resulted in an

overly simplistic depiction of young people's subjective conceptions of adulthood.

Although the data are not altogether consistent, overall, neither social class nor race/ethnicity appears to have robust, consistent effects on the beliefs of youth about the criteria for adult status. Furstenberg and colleagues' (Furstenberg, Kennedy, McLoyd, Rumbaut, & Settersten, 2003, 2004) analyses of responses from a nationally representative sample of about 1,400 Americans aged 18 to 89 who participated in the 2002 General Social Survey yielded virtually no differences by social class in the importance that respondents attached to various milestones (leaving home, finishing school, getting a full-time job, becoming financially independent from one's parents, being able to support a family, marrying, and becoming a parent) as a criterion of adult status. Ratings also differed little by developmental period (young adults, middle-aged adults, older adults), although older adults placed more importance on marriage and childbearing. Across all ages, the most important milestones were completing school, getting a full-time job, financial independence, and being able to support a family, with 95% of respondents indicating that these markers were at least "somewhat important." Nearly half did not believe it was necessary to marry or to have children to be considered an adult.

Other investigations of American youth, as well as European youth, have reported social class differences in the criteria for adulthood, but caution is warranted because these investigations tend to be less rigorous methodologically than Furstenberg et al.'s (2003) study. Some of the methodological limitations are noted above. Certain role transitions (i.e., completing school), as well as several individualistic characteristics such as ability to support children and family, socioemotional maturity, and norm compliance have been found to be more salient criteria of adulthood among youth from lower SES backgrounds than among youth from higher SES backgrounds (Arnett, 2003; Aronson, 2008b), but these differences were not found in other research with American youth (Arnett, 1997). However, studies of Austrian and Dutch youth have also reported that role transitions (e.g., starting a family, getting a job) are more salient as criteria of adulthood among lower-class youth than middle-class and upper-class youth (Plug, Zeijl, & Du Bois-Reymond, 2003; Sirsch, Dreher, Mayr, & Willinger, 2009).

Very little research has examined ethnic differences in beliefs about criteria for adult status and the findings are conflicting. In Furstenberg et al.'s (2003) study of respondents in the 2002 General Social Survey sample, ratings varied little by race/ethnicity. Arnett's (2003) investigation

of an economically diverse sample of African American, Latino American, Asian American and European American 18- to 29-year-olds indicated that, although ethnic groups do not differ in their endorsement of independence as a criterion for adulthood, ethnic minorities were more likely than European Americans to endorse role transitions and fulfillment of domestic and family roles as criteria for adulthood, even with controls for socioeconomic status, marital status, parenthood status, and other demographic variables. For example, 50% of Latino Americans, 43% of African Americans, and 35% of Asian Americans endorsed "become employed full-time" as a criterion of adulthood, compared with only 19% of European Americans. Even among ethnic minorities, though, role transitions ranked lower in importance as criteria for adulthood status than independence, norm compliance, and fulfillment of domestic and family roles.

Beliefs About Optimal Timing of Adult Transitions

Social class appears more consequential for the ideas youth hold about the optimal timing of adult transitions than their beliefs about the criteria for adult status. Findings from research assessing beliefs about the appropriate or optimal timing of adult transitions comport with earlier entry of low-SES youth into adult roles. In the 2002 General Social Survey, mentioned previously, participants (only those indicating that a particular transition was at least "somewhat important" for adult status) indicated the age by which various "adult" transitions should occur: leaving home, finishing school, getting a full-time job, becoming financially independent from one's parents, being able to support a family, marrying, and becoming a parent (Furstenberg et al., 2003). The most consistent and marked differences in responses were related to social class (responses differed little by race/ethnicity, age, or urban versus rural residence). Less educated and less affluent respondents—those who did not attend college and those in the bottom third of the socioeconomic distribution—were more likely to subscribe to an earlier timetable for all of the transitions. The differences were most pronounced among young adults (as compared with middle-age adults and older adults).

Furstenberg et al. (2003) concluded that "These social class differences in age norms for adult transitions probably stem from the reality that young people with more limited means do not have the luxury of investing in schooling and experimenting in the labor market. They feel they must become economically self-sufficient at an earlier age than youth whose families can afford to help them out

financially while they complete their education and find a good job" (pp. 10–11). The findings appear to be consistent with Arnett's (2000) speculation that youth from lower-class backgrounds may experience a truncated period of exploration before making the more enduring choices of adulthood.

Subjective Adult Identity

Identity theory suggests that commitment to particular roles influences the salience of roles for one's identity, which then influences role performance. It defines identities as internalized sets of role expectations, and links identity to the larger social structure through roles and role performance (Macmillan, 2007). The consequences of embracing an adult identity (i.e., feeling that one has reached adulthood) have not been well-documented, but scholars speculate that an adult identity can be a resource for carrying out adult responsibilities (M. K. Johnson et al., 2007a). Consistent with this speculation, a study of young adults in Belgium found evidence that a stronger sense of adulthood buffered the negative effects of perceived instability in life on work engagement and job burnout (Luyckx, Witte, & Goossens, 2011).

Arnett (2000) does not distinguish analytically between abstract, general conceptions of adulthood and the criteria or standards that youth apply when assessing whether *they* have reached adulthood (i.e., subjective adult identity) (Andrew et al., 2007; Shanahan et al., 2005). This distinction is seen as highly significant on the grounds that the meaning of adult roles varies by whether an individual has acquired that role (Benson & Furstenberg, 2007; Shanahan et al. 2005). Arnett's studies assessed subjective adult identity of youth in relation to demographic factors such as ethnicity and age (Arnett, 2001, 2003), but not in relation to their transition experiences. Arguably, role transitions may have little salience in abstract conceptions of the meaning of adulthood, but nonetheless exert strong influence on the subjective adult identity of youth.

Indeed, there is strong evidence that certain role transitions increase the odds that young people will perceive themselves as adults (Benson & Furstenberg, 2007; Molgat, 2007; Reitzle, 2006; Shanahan et al., 2005). Benson and Furstenberg's (2007) longitudinal study of an American sample composed of predominantly racial minorities from working poor and working-class families found that subjective adult identity changes in response to role transitions. Youth who did not define themselves as adults at Age 19 were more likely to alter their identity and define themselves as fully adult at Age 21 if they had moved out

on their own, become parents, or assumed more financial responsibilities. Transition reversals (e.g., moving back in with one's parents), conversely, reduced the odds of perceiving oneself as an adult at Age 21. Moreover, the effects of some role transitions depended on whether they occurred simultaneously with other roles. Becoming employed full-time increased the odds of acquiring an adult identity, but only if accompanied by establishing an independent household.

Studies of youth from other countries also report evidence of the importance of role transitions in subjective identity. In research with German youth, subjective adult identity was positively correlated with more role transitions (e.g., financial independence, cohabitation, parenthood), controlling for age, education, and other factors (Reitzle, 2006). Molgat's (2007) qualitative interviews with 25–29 year olds residing in Quebec, Canada, echo and extend these findings. Transitions such as finishing school, leaving home, having a "real job," and entering into financial obligations were central to their self-perceptions as adults, but they also perceived themselves as adults because they had met individualistic criteria such as autonomy, financial independence, and responsibility. The emphasis on both role transitions and internal, psychological facets of the transition to adulthood as contributors to the perceptions of youth of being an adult parallels themes in qualitative research focused on conceptions of adulthood (Andrew et al., 2007). It is noteworthy that advancing age per se, at least during the 20s, does not appear sufficient to increase the probability that youth will perceive themselves as adults (Plug et al., 2003).

The documented link between role transitions and subjective adult identity is in line with evidence that young people from less advantaged socioeconomic backgrounds (less highly educated parents, lower family incomes, single-parent homes) are more likely than same-age peers from more privileged backgrounds to define themselves as adults partly because they have experienced more adult role transitions (M. K. Johnson et al., 2007a). Similar findings have been reported in research with German youth (Reitzle, 2006). In terms of ethnicity, contrasts within-study and across-studies indicate that African American and Latino American youth are more likely than their European American and Asian American counterparts to view themselves as adults (Arnett, 2003; Benson & Furstenberg, 2007; M. K. Johnson et al., 2007a; M. K. Johnson & Mollborn, 2009). Similar to findings for social class differences in subjective adult identity, these ethnic differences diminish when role transitions are controlled.

A corresponding pattern of ethnic differences exists in young people's perceptions of their relative age (i.e., how old they feel compared with others of their chronological age; M. K. Johnson, Berg, & Sirotski, 2007b).

Although studies suggest that ethnic minorities in the United States experience earlier role transitions and are more likely than European Americans to endorse role transitions and fulfillment of domestic and family roles as criteria for adulthood (Arnett, 2003; East, 1998; M. K. Johnson et al., 2007a), little evidence has been found in support of the hypothesis that ethnicity moderates the effect of role transitions on subjective adult identity (M. K. Johnson et al., 2007a). This is surprising. If African American youth endorse full-time employment as a criterion of adulthood more strongly than European American youth, for example, it might be expected that the transition to full-time employment would have a stronger effect on the subjective identity of African American youth than European American youth.

It is socioeconomic background, not race/ethnicity, that moderates the relation between role transitions and adult identity among American youth, with the (positive) relation between role transitions and adult identity being much stronger among young adults from advantaged socioeconomic backgrounds than those from disadvantaged backgrounds (M. K. Johnson et al., 2007a). The nature of this moderation effect is contrary to what the researchers predicted, given their assumption that role transitions are more salient to lower-SES youth than middle-SES youth because the former experience many role transitions earlier. Rather, the moderation effect suggests that role transitions are more psychologically meaningful to privileged youth. It is plausible that privileged youth have had fewer opportunities than those from lower socioeconomic backgrounds to behave in ways that foster feelings of being an adult prior to the role transitions examined in the study. However, Reitzle's (2006) study of German youth found the opposite pattern of moderation. Subjective adult identity and accumulated role transitions were positively related among non-college-bound youth, but unrelated among college-bound youth.

Experiences During Childhood and Adolescence as Precursors of Subjective Age and Adult Identity

Life course and identity theorists argue that many of the roles that shape identity are age-graded and that this engenders social expectations and internalized expectations about the appropriate timing of roles (Macmillan, 2007). In keeping with this framework, scholars have posited

that violating age norms for childhood and adolescence challenges one's identity as a child or adolescent and accelerates subjective aging (i.e., individual's subjective sense of their own age; M. K. Johnson et al., 2007b; M. K. Johnson & Mollborn, 2009). M. K. Johnson and Mollborn (2009) hypothesized that various forms of hardship experienced during childhood and adolescence (i.e., economic poverty; exposure to violence as a witness or victim; living in a single-parent family or experiencing a family disruption that resulted in family structures other than married, biological-parent families) accelerate subjective aging and increase self-identification as an adult (i.e., feeling like an adult all or most of the time versus less frequently) among American youth aged 18 to 22 through three types of mediating experiences that violate age norms: (1) transitioning into adult roles earlier than one's age peers, (2) heavy household and paid-work responsibilities during adolescence, and (3) perceiving one's life expectancy as severely curtailed.

They found that each form of hardship increased either subjective age or feeling like an adult. Hardships had a cumulative effect on adult identity—as they compounded, the predicted probability of feeling adult increased substantially. Contrary to expectations, neither intensive paid work (20 or more hours/week during the school year) during adolescence nor anticipating a shorter life span functioned as mediators. Transitioning into adult roles earlier than one's age peers was the only variable that either fully or partially mediated effects of hardship on subjective aging and adult identity.

M. K. Johnson and Mollborn's (2009) study represented an age-graded approach to perceived developmental status seen primarily in sociological research. Psychosocial characteristics or maturation as criteria for adulthood represented another approach to perceived developmental status, one seen largely in developmental research (Arnett, 2000). Benson and Elder (2011) brought these two approaches together in a study of four identity profiles based on subjective age (how often respondents think of themselves as adults; how old youth feel compared with others their age; how fast youth perceived they grew up relative to same-age peers) and psychosocial maturation (self-reports of independence, confidence, and considerateness in early adulthood).

Using a longitudinal sample of young American adults aged 18–22 in the National Longitudinal Study of Health, Benson and Elder (2011) identified two *concordant* profiles—"early adults," that is, those with older subjective ages and higher levels of psychosocial maturity,

and “late adults,” that is, those with younger subjective ages and lower levels of psychosocial maturity. “Early adults” tended to come from the most disadvantaged backgrounds (lower income, single-parent households), with African American youth being the most likely and Asian American youth the least likely to have this type of identity. Race/ethnic differences in “early adult” identity, unlike race/ethnic differences in the other three profiles, were completely explained by adolescent influences (discussed below). “Late adults” tended to be Asian American and individuals who grew up in more advantaged family contexts (i.e., higher income, two-parent families). Benson and Elder (2011) also identified two *discordant* profiles—“pseudo-adults,” that is, those with older subjective ages and lower levels of psychosocial maturity, and “anticipatory adults,” that is, those with younger subjective ages and higher levels of psychosocial maturity. “Pseudo-adults” tended to come from nonintact families, whereas “anticipatory adults” tended to be African American, and to come from intact, two-parent family types.

Experiences during adolescence distinguished the adult identities. Both “early adults” and “pseudo-adults” tended to experience earlier pubertal development, but the latter group as adolescents tended to have lower self-esteem, higher levels of maladaptive and delinquent behavior, and parental relationships marked by a lack of closeness and blurred parent–adolescent generational boundaries as compared with other youth. Both “anticipatory” and “late adults” tended to experience later pubertal development and closer relations with their parents during adolescence than other youth in the sample. However, youth in the anticipatory group were distinct from those in the late group in that they had higher self-esteem and were more likely to take on household responsibilities during adolescence. In addition, compared with those with other profiles, “anticipatory adults” were more subject to generational boundaries as reflected by low levels of peer-like communication with parents. These patterns of relations suggest that a supportive, structured family environment, high self-esteem, and higher levels of responsibilities during adolescence may buffer youth against the potentially adverse effects of delayed pubertal maturation. In contrast, delayed pubertal maturation, coupled with low self-esteem, and a paucity of outlets to develop and practice responsibility appears to lead to late adult identities.

Identity Profiles and Subsequent Attainment

In a follow-up study, Benson, Johnson, and Elder (2012) examined these four identity profiles in young adults aged

18–22 in relation to educational and work attainment at Age 25–29, controlling for adolescent characteristics (i.e., self-esteem), school and work roles at Age 18–22, and a host of status variables (e.g., family income, parental educational attainment, race/ethnicity, family structure, gender, chronological age). By their mid- to late 20s, “late adults” had attained higher levels of educational attainment than youth in the other three profile groups. “Early adults” achieved higher earnings at Age 25–29 than youth in the other three profile groups, even with controls for educational and work patterns at Age 18–22.

“Pseudo-adults,” in general, were faring worse than those with other identity profiles even with controls for prior educational and work patterns. In addition to earning less than early adults, they reported lower subjective attainment and were less likely to hold career-type jobs than anticipatory and early adults, a pattern suggestive of limited psychosocial resources that hindered their ability to make plans and choices associated with successful school-to-work transitions (Benson et al., 2012). “Late adults” reported lower subjective attainment and were less likely to hold career-type jobs than “anticipatory” and “early adults.” In addition, anticipatory adults (younger subjective ages but greater psychosocial maturity), compared with late adults, completed fewer years of postsecondary education, but began their progression toward careers earlier and reported higher levels of subjective attainment.

This study provided two important insights about the significance of psychosocial maturity and subjective age for subsequent educational and work attainment during early adulthood. First, whereas older subjective age among adolescents was associated with self-reported problem behavior (e.g., substance use, antisocial behavior, failure to obey parents) (Galambos, Kolaric, Sears, & Maggs, 1999), the evidence from Benson et al.’s (2012) study suggested that solely having an older subjective age during early adulthood does not deter subsequent attainment; rather, the pivotal issue was *whether an older subjective age was accompanied by high levels of psychosocial maturity*. Second, the findings suggested that lower psychosocial maturity was less consequential when it was accompanied by younger, rather than older, subjective ages. Benson et al. (2012) speculated that the resulting concordant profile may have long-term advantages, noting that “Maintaining a younger identity and taking a slower path to adulthood may facilitate attainment by allowing for key developmental investments and accumulation of experience that will serve young people well” (p. 1756).

Benson et al.'s (2012) study provided an excellent example of the kinds of research needed to advance understanding of when having an older subjective age or adult identity is detrimental and when it is beneficial. Scholars have suggested that some of the adolescent problem behaviors associated with having older subjective ages (e.g., substance use, greater involvement with opposite-sex peers) (e.g., Arbeau, Galambos, & Jansson, 2007) can be thought of as adult behaviors assumed too early (M. K. Johnson & Mollborn, 2009). This perspective, combined with evidence that socioeconomically disadvantaged youth are more likely than their advantaged counterparts to define themselves as adults (M. K. Johnson et al., 2007a), has prompted questions about whether subjective age is one of the mechanisms by which disadvantages from childhood and adolescence are reproduced or maintained into adulthood (M. K. Johnson & Mollborn, 2009). At the same time, it is conceivable that older subjective ages, under certain conditions and in the presence of other psychological characteristics such as initiative and sense of responsibility, may facilitate upward mobility.

In a similar vein, Burton (2007) has discussed the assets and liabilities of childhood adultification in poor families in the United States, a process that may mediate the link between hardships and adult identity/older subjective age. Childhood adultification is distinguished by processes in which youth are prematurely and often inappropriately exposed to adult knowledge and assume extensive adult roles and responsibilities within their family networks. Ethnographic data suggested that this process might engender a high level of independence and a strong sense of agency, on the one hand, but interfere with educational attainment and establishment and maintenance of adult intimate relationships. It is unclear what conditions tip the balance in favor of positive adaptation rather than problematic outcomes. These are intriguing questions that warrant study within longitudinal samples of low-income and ethnic minority youth.

Summary and Future Directions

Evidence from American and European convenience samples indicate that lower-class youth attach more importance to role transitions as criteria for adult status than do youth with higher socioeconomic status, but these social class differences have not been found consistently in small convenience samples and were not evident in research with a nationally representative sample of Americans. Studies are needed that carefully attend to methodological issues

(e.g., sampling procedures, prompts, response categories) that may be sources of these discrepancies. It is noteworthy that extant studies provide no support for the notion that restricted economic resources known to increase the difficulty of making certain adult transitions (e.g., residential independence) diminishes espousal of these transitions as criteria for adult status. However, there is compelling evidence that economically disadvantaged youth subscribe to an earlier timetable for role and status transitions that signify adult status.

It remains unclear whether ethnic minority youth are more likely than majority youth to endorse role transitions and fulfillment of domestic and family roles as criteria for adulthood. Findings based on U.S. samples are sparse and conflicting and, to our knowledge, examination of this issue has not been undertaken with European youth. The value of future studies of ethnic differences in the beliefs of youth about the criteria for adult status would be greatly enhanced by the inclusion of direct measures of cultural values and greater methodological rigor in general.

Subjective adult identity is fluid, changing in response to role transitions. Residential independence, becoming a parent, and assuming more financial responsibilities increase the odds that youth will define themselves as adults, whereas transition reversals reduce the odds. The effects of some role transitions on adult identity depend on whether they occur simultaneously with other roles. African American, Latino American, and lower-SES youth are more likely than European American, Asian American, and higher-SES youth to perceive themselves as adults and these differences are partly mediated by differences in the number and timing of role transitions. However, further research is needed to clarify whether race, ethnicity, and social class moderate the effect of role transitions on subjective adult identity. There is a paucity of work in this area and the sparse findings pertaining to social class as a moderator of the link between role transitions and adult identity among American youth are contrary to theory-based expectations and inconsistent with findings based on German youth.

Transitioning into adult roles earlier than one's age peers appears to be a key pathway through which various forms of hardship during childhood and adolescence accelerate subjective aging and increase the tendency to feel like an adult. More longitudinal research with ethnically and economically diverse samples is needed to better understand the processes through which experiences during childhood and adolescence affect subjective aging and subjective adult identity. The psychological and behavioral

consequences of embracing an adult identity have not been well-documented. Likewise, we know very little about the conditions and circumstances under which older subjective age, earlier adult identity, or a particular age-related identity profile during late adolescence and early adulthood forecast levels of adaptive versus maladaptive functioning in later adulthood. These are among the most compelling questions for future study.

MENTAL HEALTH

Data from the United States reveal countervailing age trends in psychosocial functioning during the transition to adulthood. Between the ages of 18 and 26, mental health (measured as a composite of self-efficacy, self-esteem, and social support) steadily increases, accompanied by steady decreases in depressive affect, anxiety, risk taking, and physical aggression (Schulenberg & Zarrett, 2006)—a trend that has been replicated in longitudinal research conducted in other countries (Galambos & Krahn, 2008; Merikangas et al., 2003). Also, several psychiatric disorders such as clinical depression manifest and increase during this period (Schulenberg & Zarrett, 2006). Explanations for these age trends have emphasized changes in person-context matches that may result from personal, contextual, and social role changes common during the transition to adulthood. With the waning presence of institutional structure and support and easing of role requirements at the end of high school, for example, there is greater potential for individuals to choose activities and paths that reflect personal desires, goals, competencies, and other characteristics. Greater opportunity for self-selection of post-high-school contexts and roles, and hence, greater person–context matches, may improve psychological well-being. For other individuals, the decline in institutional structure, accompanied by attendant changes in social context (e.g., leaving home for college and a subsequent reduction in familial contact and support), can overwhelm coping resources, eroding the person–context match, and setting the stage for psychological maladjustment (Schulenberg & Zarrett, 2006).

Against this backdrop, we review findings from studies of the effects of family-of-origin SES and race/ethnicity on mental health functioning during the transition to adulthood. Disparities exist in mental health across social locations, but the body of research documenting factors and processes that account for these differences is not extensive. Extant studies tend to point to adversities

during childhood and adolescence and early timing of adult transitions as mediators of social class differences, and to a combination of chronic stressors and proximal or concurrent factors operating during the transition to adulthood as mediators of race/ethnic differences. Studies also indicate that family-related adversities (e.g., family violence, low family cohesion, parent-child conflict) and psychological/behavioral problems (e.g., anxiety, depression, delinquency) during childhood and adolescence account for variation in mental health functioning among low-income and ethnic minority young adults (Reinherz, Paradis, Giaconia, Stashwick, & Fitzmaurice, 2003; Wynn, Fite, & Pardini, 2011).

Family-of-Origin SES

Data from community-based and nationally representative samples from the United States and Britain indicate that mental health problems (depressive symptoms, anxiety, psychological distress) are overrepresented among young adults who grew up in lower socioeconomic status families (Costello, Swendsen, Rose, & Dierker, 2008; Harley & Mortimer, 2000; Power & Manor, 1992; Wickrama, Merten, & Elder, 2005). This relation is less likely to be found when the range in socioeconomic levels is highly truncated and the focus is on clinical depression, rather than depressive symptoms (Reinherz, Giaconia, Hauf, Wasserman, & Silverman, 1999). However, investigations of adults that encompass, but do not distinguish young adults, have documented family of origin SES as a risk factor for clinical depression (e.g., Gilman, Kawachi, Fitzmaurice, & Buka, 2002).

A more complicated picture emerges when family-of-origin SES is examined in relation to trajectories of depressive symptoms across the transition to adulthood. Lower SES origin and family-of-origin poverty status have a variable influence on depressive symptoms. In their analysis of data from the American-based National Longitudinal Study of Adolescent Health tracking self-reported depressed mood from Ages 12 to 25, Costello et al. (2008) found that youth from low-SES backgrounds had a greater risk of membership in stable low, early high declining, and late escalating depressed mood trajectory groups than in the no depressed mood group.

In Frye and Liem's (2011) study of an ethnically diverse community sample of American youth, family poverty status in the senior year of high school (Age 18), independent of maternal education, predicted membership in two trajectories of depressive symptoms during a

subsequent 4-year period: (1) higher levels of depressive symptoms that declined steeply and (2) moderate levels that increased steeply (both classes as compared with the low stable symptom class). Their post hoc analyses found no evidence that differential access to employment or postsecondary education influenced the trajectory of depressive symptoms *within* low-income young adults in the sample, leading them to suggest that increasing depressive symptoms among poor youth during the transition to adulthood may be more than structural. Galambos, Barker, and Krahn (2006) identified yet another class-related trajectory in their study of Canadian youth. Between the ages of 18 and 25, depressive symptoms declined less rapidly among those whose parents had lower levels of education, perhaps suggesting that limited socioeconomic resources restricted opportunities to increase person–context match.

Evidence that family-of-origin SES and family-of-origin poverty status are linked to both increasing and decreasing depressive symptoms during the transition to adulthood bears resemblance to the aforementioned countervailing age trends found in U.S. national panel data (Schulenberg & Zarrett, 2006). For some individuals from low-SES family backgrounds, early adulthood may precipitate a decline in depressive symptoms because it is “their first chance to break out of that environment and seek out new opportunities for themselves” (Frye & Liem, 2011, p. 584), perhaps resulting in an improved person–context matches. For others, it may engender increased depressive mood due to stressors engendered by more and earlier adult transitions, less social and institutional support, and fewer skills and competencies that ease adjustment to adult role transitions.

Family-of-Origin SES, Mental Health, and Young Adult Status Attainment

As individuals move through early adulthood, completing school and settling into occupational roles and employment patterns, their achieved social class (i.e., their current occupation, employment status, educational attainment, poverty status) assumes greater potency than their socioeconomic status of origin as a predictor of mental health (Power & Manor, 1992). Clinical depression during young adulthood (Age 26) is more strongly linked to one’s adult socioeconomic status than to childhood socioeconomic status (Poulton et al., 2002), and family-of-origin no longer predicts depressive symptoms among young adults when their present achieved SES is taken into account (Mossakowski, 2008). In Miech, Caspi, Moffitt, Wright, and Silva’s (1999) prospective longitudinal study of the

Dunedin, New Zealand, birth cohort, low parental SES had no significant effect on mental disorders at Age 21, net of the effect of educational attainment and past history of mental disorder of the youth at Age 15. Proximal experiences in adulthood appeared to better account for the association between low SES and depression than did socioeconomic status-of-origin. This is not surprising given that young adults’ achieved SES, as compared to their socioeconomic status of origin, reflects a greater accumulation of class-linked experiences that have implications for mental health, encompassing current or proximal experiences as well as those that transpired during prior developmental periods when SES was based on parental characteristics.

Generally, socioeconomic status differences in mental health have been attributed to either social causation or social selection. A social causation perspective espouses the view that social class differences in mental health are due to stressors and adversities that stem from restricted economic resources and low social status and, conversely, to more favorable conditions that high-status individuals experience. These disadvantages and advantages may be experienced during childhood and/or adulthood. In contrast, a social selection perspective maintains that individuals with preexisting mental health disorders drift down the social scale, while those with better mental health functioning move up the scale (Power, Stansfeld, Matthews, Manor, & Hope, 2002). This perspective also posits an intergenerational link whereby traits and dispositions of future parents lead to variations in socioeconomic status, variations in parents’ relationships with their children, and ultimately variations in children’s development through the endowments and dispositions that parents pass on to their children (Conger, Conger, & Martin, 2010). Proponents of social selection argue that individual-level psychological and cognitive traits are major contributors to low socioeconomic status and that failures to take these characteristics into account results in an overestimation of the environmental effects of stressors and adversities associated with low socioeconomic status (Mayer, 1997; Rowe & Rodgers, 1997).

Meich et al.’s (1999) longitudinal study of selection and causation in the New Zealand birth cohort suggests disorder-specific relations with SES. They found evidence of social selection for externalizing disorders (antisocial behavior, attention deficit disorder), but not for anxiety or depression. By the time adolescents with externalizing disorders reached early adulthood, they appeared to be selected into the lower socioeconomic strata through

restricted educational attainment. Because the study did not replicate the association between SES and depression among adolescents found in other research (e.g., American Psychological Association, 2013; Goodman, Slap, & Guang, 2003), it may not provide an adequate test of SES selection effects for depression.

Data from Britain and the United States suggest that both social causation and social selection processes operate to produce socioeconomic disparities in mental health among young adults. Power and Manor (1992) used data available from birth to early adulthood in the 1958 British birth cohort to estimate the contribution of social selection and social causation on depressive symptoms among 23-year-olds. The odds of poor psychological health (e.g., depressive mood, anxiety, irritability, seeking professional help between the ages of 16 and 23 for a psychological problem) were significantly greater in young adults from lower social classes than those from higher social classes. Health selection was evident (i.e., characteristics and circumstances that existed at birth, including father's occupational class), but inequalities in psychological distress were largely due to an accumulation of diverse factors from birth onward (e.g., unemployment since leaving school) rather than to health selection.

Likewise, Wickrama, Conger, Lorenz, and Jung (2008) found evidence consistent with both social causation and social selection in their longitudinal study of American youth from Iowa. The measure of social status attainment among young adults (Age 25) was a cumulative index encompassing a wide range of variables (educational attainment, full-time employment or full-time college student status, satisfying work situation, independent residence, stable intimate relationship). Consistent with a social causation perspective, early family adversity (e.g., negative life events) predicted an increase in depressive symptoms during adolescence and the early assumption of adult roles during adolescence, which in turn predicted growth in depressive symptoms during the transition to adulthood. Both initial levels of depressive symptoms and growth in depressive symptoms during the adult transition predicted lower social status attainment at Age 25, supporting the social selection hypothesis that earlier personal characteristics predict later socioeconomic circumstances. Depressive symptoms during adolescence and the transition to adulthood presumably diminished young adult social status attainment by interfering in the acquisition of competencies necessary for educational, occupational, and relationship attainment. Lower levels of competence perhaps reduced the amount of social support youth received

and decreased expectations of success in the respective domains of attainment.

Taken as a whole, the study provided evidence of cumulative disadvantage in that adversity in the family of origin was "amplified across the life-course by successively contingent adverse circumstances involving life-transition difficulties and poor mental health" (Wickrama et al., 2008, p. 468), leading the investigators to conclude that many youth from poor families are caught in a self-perpetuating cycle.

Early Timing and Sequencing of Transitions as a Mediator of SES Differences

As discussed in the introduction to this chapter, the timing and temporal ordering of role and status transitions are central analytic constructs in the life course perspective. Although transitions occur at virtually all phases of the life course, Pearlin, Schieman, Fazio, and Meersman (2005) pointed out that certain transitions, such as teenage transition into parenthood, school dropout, and premature entry into the labor force, are especially critical because they lead to consequences that are difficult to reverse or alleviate. The life course penalties of early transitions arise not merely from failure to follow socially valued patterns, they assert, but also from restricted access to vital opportunity structures.

Off-time and out-of-sequence transitions may create demands and conditions that interfere with the achievement and enactment of other roles and statuses such as maintaining stable employment that provides ample financial support. Although this is not inevitable, these kinds of transitions increase the risk of lower occupational and educational attainment that, in turn, place individuals at greater risk for exposure to enduring and myriad occupational, financial, and attendant stressors that can compromise psychological health. In keeping with the notion of cumulative disadvantage, Pearlin et al. (2005) underscore that such transitions occur disproportionately among those of lower socioeconomic status, a link well-established in the research literature (e.g., Booth et al., 2008; Wickrama et al., 2005). It bears mentioning, however, that many early childbearers recover economically in later life (and appear indistinguishable from older childbearers) if they continue their education, control fertility, and marry. Less is known about their psychological health over the longer run (Coley & Chase-Lansdale, 1998; Furstenberg, 2003; Furstenberg, Brooks-Gunn, & Chase-Lansdale, 1989).

Tests of early timing of transition events as a mediator of social class disparities in young adults' mental health

functioning affirm Pearlin et al.'s observations. Harley and Mortimer (2000) found a social class (family-of-origin) gradient in depressive affect among American youth 4 years after high school (Age 22) in their panel study of adolescents followed since ninth grade (Age 12). Neither timing nor sequencing of three family-related transitions (i.e., independence from the parental home, marriage/cohabitation, parenthood) alone accounted for the social class effect. Rather, the social class effect was mediated by early timing of transition events in combination with a pile-up of transitions, that is, a higher number of transitions occurring in a single year. The findings suggested that young adults from lower socioeconomic backgrounds might be at greater risk of experiencing dysphoria as a consequence of assuming new responsibilities and attendant stressors without sufficient time to adapt to them.

In Wickrama et al.'s (2008) longitudinal analysis of American youth from Iowa, early timing of transitional events during adolescence explained variation in the slope of depressive symptoms during the transition to adulthood. Early timing was indexed by several events: sexual intercourse by 14 years of age, and pregnancy, cohabitation, marriage, parenthood, or leaving the parental home by 17 years of age. Lower parental education predicted early timing of transitional events, partly through increasing the occurrence of negative life events experienced by parents or the family (e.g., getting laid off, taking wage cuts, moving to worse residences or neighborhoods, death of family members). Early timing of transition events, in turn, predicted growth in depressive symptoms during the transition to adulthood (roughly the ages of 18–24). In a similar vein, Wickrama et al.'s (2005) longitudinal analyses of Add Health data from a nationally representative sample of American youth indicated that family poverty and lower maternal education increased the risk of early timing of transition events (i.e., sexual intercourse before Age 16 and pregnancy, marriage or cohabitation, leaving home, or full-time employment at or before Age 19), which in turn predicted a growth in depressive symptoms among youth in late adolescence and early adulthood.

A discordant note comes from Booth et al.'s (2008) study of early family transitions as predictors of changes in depressive symptoms from adolescence to early adulthood (Ages 17–23). Analysis of data from the Add Health Study indicated that individuals who made early family transitions (i.e., cohabitation, marriage, parenthood) generally were no more likely to experience increases in

depressive symptoms than individuals who made no family transitions, even without controls for family background and risk and protective variables (e.g., school attachment). For example, women who became parents were no more likely to experience changes in depressive symptoms than women who did not transition to parenthood, regardless of whether births were inside or outside unions.

Differences in foci and samples may partly explain the discrepancy between Booth et al.'s (2008) findings and those of other studies showing elevated mental health problems among youth who made early status and role transitions. Booth et al. focused solely on family transitions, whereas other studies focused on a broader range of transitions (e.g., full-time employment, leaving the parental home, sexual intercourse, pregnancy irrespective of the outcome of the pregnancy) that collectively could have greater implications for mental health functioning than family transitions alone. Relatedly, whereas Booth et al. examined each transition separately, Wickrama et al. (2005, 2008) created a cumulative risk index by summing across multiple early transitions. Inclusionary criteria for the samples may also have been a factor. For the analysis of each transition, Booth et al. eliminated from the sample individuals who were close in age to those who typically make the transition (for example, in the analysis of the transition to marriage and parenthood, 23- to 25-year-olds were eliminated) so that, for comparison purposes, those making early transitions were in the same age range as those who did not. The resulting sample included individuals whose average age of making family transitions was below national averages. This procedure may have introduced biases that resulted in an underestimation of the effects of early family role transitions. In other investigations, early timing was defined with reference to national normative ages, but the age ranges of the youth were more truncated than was the case in Booth et al.'s original sample and chronological age was not confounded with the age of early transitions.

Booth et al.'s (2008) findings are especially important to the extent that they prompt more careful study of early family formation in context and clarification of the contexts within which early family transitions represent positive choices. As Booth et al. pointed out, the option to treat early adulthood as a time of exploration is not open to all individuals given their personal, social, and economic resources. In these circumstances, the consequences for mental health of early family transitions may be less negative or more benign than in more economically and socially advantaged contexts.

Race and Ethnicity

There is considerable evidence that during the transition to adulthood, African Americans have higher levels of depressive symptoms and greater increases in depressive symptoms than European Americans (or an increasing trajectory reverse that of European Americans), even when social class (Brown, Meadows, & Elder, 2007; Costello et al., 2008; Gore & Aseltine, 2003; Jager, 2011) and family-of-origin poverty status (Frye & Liem, 2011; Turner, Taylor, & Gundy, 2004; Walsemann, Gee, & Geronimus, 2009; Wickrama et al., 2005) are controlled. Latino ethnicity is also a risk factor for depressive symptoms during early adulthood, controlling for parent education and duration of poverty (Brown et al., 2007; Costello et al., 2008; Mossakowski, 2008; Walsemann et al., 2009; Wickrama et al., 2005). In Gore and Aseltine's (2003) study following an ethnically diverse, urban sample of young adults over a 2-year period, average levels of depressed mood increased among African Americans and Latino Americans, whereas they decreased among European Americans and Asian Americans, independent of socioeconomic background factors. Costello et al.'s (2008) longitudinal analysis tracking self-reported depressed mood from Ages 12 to 25 (based on data from the National Longitudinal Study of Adolescent Health) indicated that African Americans had a greater likelihood of membership in depressed mood trajectory groups than membership in the no depressed mood group. Similarly, being African American predicted membership in the increasing depressive symptom class in Frey and Liem's (2011) longitudinal study conducted over a 4-year period following high school, even with controls for family poverty.

It is notable that persons of African descent living in Britain are also at increased risk of poorer mental health. In the 2011–2012 Subjective Well-Being Annual Population Survey of individuals aged 16 and over residing in Britain, those who identified as Black/African/Caribbean/Black British reported the lowest average rating of happiness and life satisfaction of all the ethnic groups represented in the survey (White, Indian, Pakistani, Bangladeshi, Chinese, Arab, etc.) (Office for National Statistics, 2012b). Ethnic group comparisons within age or developmental groups were not conducted, but it is likely that the pattern for young adults parallels that found in the general population.

Mediating Influence of Stressors

Chronic poverty has been found to mediate race and ethnic differences in depressive symptoms among Americans

during the transition to adulthood. In Mossakowski's (2008) longitudinal study based on data from the NLSY, duration of poverty across a 13-year period accounted for the higher levels of depressive symptoms among African American and Latino American young adults, as compared with European American young adults. The depressive effect of poverty duration was very robust, as it was independent of family background (parental education and occupation), present poverty status, and other indicators of present SES (education, occupation, net worth, not a homeowner).

Mossakowski's (2008) findings raise questions about whether Frey and Liem (2011) found race effects on depressive symptoms even after controlling for family poverty because they measured family poverty at a single time point, rather than assessing the duration of family poverty. A measure of poverty duration, rather than current poverty status, would likely yield a more valid estimate of the unique contribution of race to depressive symptoms, given (a) the vast differences between African Americans and European Americans in the duration of childhood poverty, (b) much larger race differences in the duration of childhood poverty than annual poverty rates, and (c) the more detrimental effects of persistent childhood poverty, as compared with transitory or short-term poverty, on developmental outcomes and contexts of development (Duncan & Brooks-Gunn, 1997; Duncan, Brooks-Gunn, & Klebanov, 1994; Duncan & Rodgers, 1988).

Longitudinal research suggests that African Americans experience higher levels of depressive symptoms during early adulthood than European Americans (controlling for poverty and socioeconomic status) partly because of their greater exposure to social stress (i.e., stressful life events, chronic strain related to employment, neighborhood and living conditions, interpersonal relations) (Brown et al., 2007; Taylor & Turner, 2002; Turner et al., 2004)—a factor highly associated with poverty. Evidence that African American status predicts membership in an increasing depression class, but not a high stable depression class (Frye & Liem, 2011) suggests that transitions to adulthood engender a surfeit of social stresses for African Americans that elevate their risk for mental health problems.

Jager's (2011) longitudinal study of race differences in depressive affect is unique in that it focused on social roles and attendant stressors particularly pertinent to early adulthood (i.e., living arrangements, college/work status, single-parenthood). Race differences in the growth of depressive affect (spanning Ages 13 to 22) were not explained by the distribution of early adult social roles,

though they were reduced when family SES was controlled. Race moderated the relation between growth in depressive affect and “challenging” social roles (i.e., living with parent/relatives, under/unemployment, being a single parent), with the relation being stronger for African Americans than European Americans. Race was unrelated to growth in depressive affect among those not experiencing challenging social roles. However, as the number of challenging social roles increased—under/unemployment in particular—the risk (relative to European American youth) of elevated growth among African American youth increased. After controlling for family SES, though, race was unrelated to differences in vulnerability to challenging social roles.

There is increasing empirical study of racial discrimination as a stressor among youth. African American youth are more likely to report experiences with discrimination than European American youth and youth from other ethnic minority backgrounds. Several studies have documented links between experiences of interpersonal racism and problematic functioning among African American youth (mostly adolescents, rather than young adults), including lower self-esteem, increased depressive symptomatology, psychological distress, anxiety, and lower life satisfaction (for a review, see Cooper, McLoyd, Wood, & Hardaway, 2008). It is conceivable that experiences of interpersonal racism partly explain why African American young adults experience more depressive symptoms than their European American counterparts. As African American young adults extend their focus beyond familiar neighborhoods and school settings and enter new educational and employment venues in search of adult employment and educational opportunities, it is plausible that they are exposed to more or new sources of racism, that racism is experienced as more pernicious, and/or that they gain new understandings of the barriers that racism poses, leading to increases in depressed mood (Frye & Liem, 2011).

However, while there is research linking experiences of interpersonal racism and psychological distress among African Americans during the transition to adulthood, these experiences have not been found to mediate racial/ethnic differences in depression among young adults (Taylor & Turner, 2002). In their study of African Americans and European Americans, differences in lifetime adversity (assessed retrospectively when respondents were 19–21 years old using yes/no checklist) and exposure to more general forms of chronic social stressors, but not experiences of interpersonal racism, accounted for race differences in depressive symptomatology. Experiences of interpersonal racism have been linked to poorer physical and mental

health among ethnic minority groups in Britain as well, though these studies focus on individuals in the general population rather than young adults specifically (e.g., Bhui et al., 2005; Karlsen & Nazroo, 2002).

Mediating Influence of Social and Institutional Support

Less supportive relationships subsequent to the high school years appear to be important mediators of race/ethnic differences in depressive mood trajectories. Peer and familial relationships typically improve during early adulthood. This pattern generally held across all of the race/ethnic groups in Gore and Aseltine’s (2003) community sample. However, race/ethnic disparities existed in the degree of change in the quality of these relationships and these differences partially accounted for differences between the trajectories of depressive mood among African American and Latino American youth (depression increased across time) and the trajectories of depressive mood among European American and Asian American youth (depression decreased across time). The inclusion of several control variables (e.g., parental education, standard of living, living with parent or other living arrangements) had only a trivial effect on these race/ethnic disparities. Following the transition from high school, the relationships of European American youth with their parents improved (more support, less conflict), while those of Latino American youth did not. Peer support mediated the race difference in depression trajectories, with African American youth reporting lower levels of peer support after high school than European American youth.

Finally, poorer prospects for educational advancement, specifically lower rates of enrollment in 4-year colleges among African American and Latino American youth, has been documented as a mediator of differences in depressed mood between members of these groups and European Americans. Only 20% of the African Americans and 15% of the Latino Americans in Gore and Aseltine’s (2003) sample were enrolled in a 4-year college at Time 2 of the study, compared with 46% of European Americans and 68% of Asian Americans. Not only did relatively more African American and Latino American youth lack the institutional and psychological support that 4-year colleges provide, a larger percentage of them, relative to European American youths, were non-students who were not working (14%, 16%, 5% of African Americans, Latino Americans, and European Americans, respectively), a status highly promotive of depressive symptoms (Dooley, Prause, & Ham-Rawbottom, 2000; Galambos & Krahm, 2008; Power & Manor, 1992).

Summary and Future Directions

During the transition to adulthood, youth from lower socioeconomic backgrounds experience more mental health problems and their depressive symptoms decline less rapidly compared with their middle-class counterparts. Socioeconomically disadvantaged youth show divergent trajectories in depressive symptoms across the transition to adulthood, but very little is known about the factors and processes that account for these divergent trajectories. Findings from multiple longitudinal studies indicate that early timing of transition events mediates social class disparities in young adults' mental health functioning, but there is evidence pertaining to early family transitions in particular that contradicts this pattern. This is a particularly fertile area for further research. Studies are needed to better understand individual and contextual factors that influence the mental health consequences of early family transitions and early transition events.

Scholars have employed various strategies to estimate the unique contributions of stressors and adversities to psychological and mental health outcomes in offspring over and above family-of-origin SES and parental characteristics. Existing studies based on biologically related individuals suggest that both social selection and social causation processes contribute to the social class differences in mental health. However, critics dismiss such investigations on the grounds that they completely confound genetic and environmental effects and argue that behavioral genetic studies provide the only valid tests of environmental influences (Rowe & Rodgers, 1997)—positions that have been challenged (Huston, McLoyd, & García Coll, 1997). Resolution of this controversy does not seem close at hand. There is still considerable distance to travel toward truly integrative research that incorporates strong assessment of genetic and biological constructs with a sophisticated view and appraisal of the environment at both the individual and social structural levels.

More work is needed to understand the unique effects of out-of-sequence transitions on mental health during and subsequent to early adulthood, though this is challenging because timing and sequencing of certain roles are highly confounded (e.g., parenthood, marriage). Extant longitudinal research examining the ordering of social roles across the life course suggests that the type of role sequencing patterns that are conducive to positive mental health depends on social location and cohort status (Jackson, 2004). This work, while not focused on young adults or the transition

to adulthood, underscores the importance of taking into account cultural and economic context in future inquiries.

Future study of the effects of early timing of transitions should attempt to address selection effects by taking into account the antecedents of early timing of transitions. Besides socioeconomic disadvantage, several circumstances and characteristics during adolescence increase the odds of early family transitions for women, including poor relationships with mothers (increases odds of early cohabitation), poor vocabulary skills, low school attachment, high levels of delinquency (increases odds of early cohabitation and early parenthood) (Booth et al., 2008), negative life events, and depressive symptoms (Wickrama et al., 2008).

During early adulthood, African American and Latino American youth have elevated depressive symptoms and experience increases in depressive symptoms, compared with European American and Asian American youth. Mental health risks appear to be particularly acute among African Americans during this period, though longitudinal research indicates that by middle age, race differences (and differences between Latino Americans and European Americans) in depressive symptoms are eliminated (Walseman et al., 2009). In general, there are relatively few studies that examine mediators of race/ethnic disparities in mental health among young adults, and most focus on chronic adversities and proximal variables. This makes it difficult to gauge if these mediating variables account for race/ethnic disparities in depressive mood above and beyond the influence of childhood experiences and prior psychological characteristics.

Factors that partially account for higher depressive symptomatology among African Americans and Latino Americans as compared with European Americans during early adulthood include increased exposure to social stresses, chronic poverty, less supportive family and peer relationships, and poorer prospects for educational advancement and employment. In essence, the ethnic/racial disparity in depressive symptoms seems to reflect growing adversity among African American and Latino American youth as they seek to negotiate new contexts and new demands as social and institutional supports diminish. Unemployment in combination with no or lower levels of involvement in post-secondary schooling—a status customarily labeled “NEET” (not in education, employment, or training) in Britain (Bynner & Parsons, 2002)—appears particularly conducive to depressive mood. Youth in these circumstances are less involved than others in instrumental activities that foster human and social capital,

the consequences of which can accumulate over time and have rippling effects across multiple domains of functioning. In addition to increased focus on experiences during childhood and adolescence as potential mediators of race/ethnic differences in mental health functioning, more systematic attention needs to be given to trajectories of functioning across a wide range of adult roles and transitions (e.g., independent residential status, financial independence, romantic involvement) as mediators (Cohen et al., 2003), in light of research documenting links between these factors and psychological well-being (e.g., Galambos & Krahn, 2008).

Further study is needed to understand why social relations are not as positive for African American and Latino American youth, compared with European American youth, and the significance of gender in this pattern. It is notable that there is no evidence that early timing of transition events mediates the link between race/ethnicity and depressive symptoms. Although African Americans and Latino Americans make certain transitions earlier than their European American counterparts, these differences are driven largely by social class and family income differences and appear to play little if any role in elevated depressive mood among the two groups (Wickrama et al., 2005). However, too few studies have examined this issue to warrant a firm conclusion.

Scholars have hypothesized that racial/ethnic discrimination is among the social stresses that account for racial/ethnic differences in mental health among young adults. Quantitative research has found no support for this hypothesis but further study is warranted because available research is very sparse. Although there is evidence of racial/ethnic disparities in the mental health of individuals living in Britain and studies have linked experiences of interpersonal racism to poorer physical and mental health among ethnic minority groups in Britain, little attention has been devoted to the study of these issues among young adults as a targeted group. In general, our review suggests that issues pertaining to the psychological functioning of young adults from racial and ethnic minority groups have received less scholarly attention in Britain and other European countries than in the United States.

Vigorous study of sources of within-group (race, ethnicity, low-SES) variation in mental health functioning and patterns of developmental transitions across the transition to adulthood needs to proceed alongside further study of race, ethnic, and social class differences and the factors and processes that mediate these between-group differences. Variables that best explain within-group differences

may be different than those that best explain differences between youth from different racial, ethnic, and social class backgrounds. Work is also needed to determine under what conditions and for what psychological outcomes ethnic minority youth are affected more strongly by low SES than are majority youth, and how gender intersects with these statuses. In studies of race/ethnic differences in young adult outcomes, SES typically is controlled rather than examined as a moderator of the strength of race/ethnic differences. It is essential to develop a knowledge base about identity development and the existence, nature, contextual correlates, and consequences of identity exploration among low-income and ethnic minority youth. Research examining patterns of growth in dimensions of racial identity across the transition to adulthood among African Americans may be a harbinger of programmatic efforts in this area (Hurd, Sellers, Cogburn, Butler-Barnes, & Zimmerman, 2013). Increasing focus on identify processes among European youth also holds promise for expanding knowledge about identity processes in ethnic minority and low SES youths (e.g., Schwartz, 2012; Seiffge-Krenke & Haid, 2012). Knowledge about the predictors and consequences of constrained opportunities for exploration of identity issues and pathways to successful resolution of identity issues in these populations is critical to the advancement and longer-term viability of the field of “emerging adulthood.”

TRANSITIONS TO EMPLOYMENT

Employment is a central role of adulthood, and work experiences in early adulthood have influences throughout the life course (Shanahan, 2000). In current American society, youth often combine schooling and work roles before moving into an “employment-only” role (Bozick, 2007), an issue discussed in more detail in the next section of the chapter focusing on transitions to higher education. Data indicate that 77% of 25-year-olds in America who were not in school reported working (Bureau of Labor Statistics, 2013). However, these employment rates vary both by race/ethnicity and educational attainment. In 2005, only 68% of African American youth reported being employed, as compared with 79% of European American youth and 77% of Latino American youth. Importantly, there appears to be a narrowing of the employment gap between African American and European American youth at higher levels of education. In 2005, among high school dropouts, only 43% of African American youth were employed, compared with

66% of their European American counterparts. However, the racial disparity is reversed among those with a 4-year college degree. Among 25-year olds with a Bachelor's degree, 94% of African Americans reported employment compared with only 91% of Whites. However, the employment rate for Latino Americans with a Bachelor's degree lagged behind at 88%.

Although race differences in employment rates vary by education, there are race disparities in earnings across educational levels. Earnings is an important employment indicator because it shows differentials that go above and beyond whether or not individuals are employable and taps into a quality indicator, namely how much the jobs pay. The National Center for Educational Statistics examined earnings among young adults aged 25–34 who were employed full-time throughout 2010. The mean earnings of European Americans was \$40,000, while average earnings totaled only \$31,600 for African Americans and \$30,000 for Latino Americans. Moreover, earning differences across race/ethnic groups persist at all education levels. For example, on average, employed European American young adults who have less than a high school degree earn \$25,000, while their African American counterparts earned only \$20,300 on average. Employed Latino American young adults with less than a high school degree earned even less, with the average being \$19,900. Among full-time employed young adults with at least a Bachelor's degree, differences of similar magnitude exist, with European American young adults earning \$49,500, compared with \$41,000 and \$44,100 for African American and Latino American young adults, respectively.

In Europe, there is considerable variation in youth unemployment disparities by ethnic minority status. Overall, youth unemployment rates are quite high, but there is variation across countries; furthermore, there is variation in the proportion of youth who are members of ethnic minority groups. Although statistics available on ethnic minority groups vary across country, statistics on the percentages of foreign-born residents exemplify these differences. For example, in 2004, Finland's foreign population accounted for only 2% of the total population, compared with 8.48% for Germany and approximately 8% for Spain (Morch, Jensen, Stokholm, & Hansen, 2008). Within each country, the composition of ethnic minority groups varies as well. For example, most foreign-born Germans are of Turkish descent, while Portugal has a large proportion of Ukrainians. Foreigners and ethnic minority youth in Europe often have higher unemployment rates than native and majority-group youth and are often overrepresented in

low-wage sectors of the labor market (Morch et al., 2008). However, there is marked variation within foreign and ethnic minority youth. For example, in Norway, Eastern European immigrants, have higher employment rates than immigrants from the Middle East and Africa (Fangen & Paasche, 2013). In the United Kingdom, in 2005, Indian adults had an unemployment rate of 6.4%, while Black Caribbeans and Black Africans had rates around 11%. Faring worst were adults from Pakistani and Bangladeshi backgrounds who had unemployment rates of 12.8% and 19.4%, respectively (Kahenec, Zaiceva, & Zimmerman, 2010).

Striking disparities in youth unemployment exist in London, the most ethnically diverse area of Britain (Office for National Statistics, 2012a). In 2012, overall rates of unemployment among youth between the ages of 16 and 24 were high, with an average of 25.4%. However, the unemployment rate of White youth was only 19.4%. Youth of Indian (24.4%) and mixed (26.8%) backgrounds had higher rates, but were close to the overall average. Most troubling are the unemployment rates of Bangladeshi (37.6%), Pakistani (44%), and Black/African/Caribbean youth (44.3%). Overall, these rates highlight the significant ethnic disparities in youth employment and the need to examine rates by specific ethnic groups to understand the patterns within a given country (Office for National Statistics, 2012c).

Work with U.S. samples has assessed the relation between family income during childhood and employment during early adulthood. Using data from the longitudinal, nationally representative Panel Study of Income Dynamics, Duncan, Zirol-Guest, and Kalil (2010) examined family income during different developmental periods as predictors of annual hours worked and annual earnings throughout individuals' late 20s and early 30s. They found that, when entered in the same model, family income in early childhood (Ages 0–5) was predictive of both hours worked and earnings, whereas middle-childhood family income (Ages 6–10) and late-childhood family income (Ages 11–15) were not. These results highlighted the importance of early life experience to employment outcomes in early adulthood. Interestingly, most of the association between early childhood income and adult earnings operated through hours worked. Youth whose families reported more income during early childhood were able to work more hours in early adulthood which produced earning differentials, but they were not earning significantly more per hour. Further research is needed to understand the processes through which childhood family

income at different developmental periods influences multiple aspects of employment throughout the transition to adulthood, and how these aspects are interrelated (Duncan et al., 2010).

A critical question is what underlies these disparities across race/ethnicity and socioeconomic status. One perspective highlights the importance of childhood and adolescent experiences to successful transitions and how these experiences are stratified by race and social class. Another body of research focuses on how concurrent factors during the transition to employment enhance or limit individuals' success. In the next sections, we review findings from both of these perspectives and discuss the intersections between these two bodies of work. We begin with a discussion of contextual factors that influence employment outcomes during early adulthood. This is followed by a discussion of adolescent attributes and how they interact with contextual factors to influence employment outcomes. The section concludes with a discussion of proximal factors related to social location that influence the employment prospects of low-income and ethnic minority youth.

Child and Adolescent Predictors of Employment During the Transition to Adulthood

Throughout childhood and adolescence, youth are developing skills, attitudes, and behaviors that have lasting consequences for multiple facets of their adult life, including their career success. These attributes are shaped through interactions across a number of contexts, including home and school. However, a wealth of research has shown that children and adolescents' contextual experiences are shaped by both their family socioeconomic status and their race/ethnicity (Evans, 2004; Hardaway & McLoyd, 2009; McLoyd et al., 2009). In the following sections, we discuss research pertaining to contextual experiences as well as individual attributes as processes through which social location during childhood and adolescence influence employment in early adulthood.

Developmental Contexts

In this section we discuss the family and school as institutional contexts that influence employment outcomes during early adulthood. We also include adolescent employment as an important context, on the grounds that experiences of adolescent employment or unemployment are shaped in part by societal opportunity structures that result in socially structured experiences reflecting

membership in ethnic minority groups and socioeconomic status.

Family. The family is an important context for many aspects of development and this includes the occupational development of youth (Porfeli, Wang, & Hartung, 2008). Race/ethnicity and socioeconomic status shape parents' own occupational success and their parenting, both of which have the potential to influence the transition to employment of youth. For example, in their sample of inner-city males, DiRago and Vaillant (2007) found that low family socioeconomic status during adolescence predicted low occupational status at Age 25. Protective environmental factors, operationalized as positive relations with parents and positive home environments, predicted higher occupational status, but the study did not cast light on how socioeconomic status and the family context operated in conjunction with one another to influence occupational outcomes. That is, because moderation was not examined, it is unclear whether these positive aspects of the family environment represented protective factors for socioeconomically disadvantaged youth, or were promotive factors that were important for occupational success for youth of all backgrounds.

Parallel work in Britain has focused on the concept of NEET, a term we mentioned previously that refers to youth who are not in education, employment, or training. Using longitudinal birth cohort data, Bynner and Parsons (2002) showed that youth who received free lunch benefits and youth whose families resided in an inner-city neighborhood, both at Age 10, were more likely to spend at least 6 months in NEET during the 2 years immediately following the end of formal schooling (Ages 16–18). However, the influence of family poverty, as indicated by free lunch status, was concentrated among girls, while the influence of neighborhood disadvantage, as indicated by residing in an inner-city neighborhood was concentrated among boys (Bynner & Parsons, 2002). Importantly, these relations were maintained even when educational qualifications at Age 16 were included in the statistical models, indicating that educational achievement is not the sole mechanism linking earlier disadvantage to NEET status. While the concept of NEET is useful to our discussion of transitions to employment, Roberts (2011) pointed out that there are many youth who are not in NEET but are also not gaining the skills and experiences needed to have a productive career. For example, many youth he interviewed were not in school and were working in retail jobs with little room for advancement. Further conceptualization of the

many pathways socioeconomically disadvantaged youth experience is an important direction for future work.

Additionally, there is a need for more examinations of the pathways through which social class influence the transition to employment of youth. Although there is a dearth of research that examines how families influence actual employment outcomes in the transition to adulthood, there is evidence that family economics influence the attitudes and beliefs of youth about their own occupational futures. For example, research indicates that adolescents are more optimistic about their economic and occupational futures if their parents are employed (Quane & Rankin, 1998), if they perceive their families as experiencing less financial strain (Flanagan, 1990; Larson, 1984; McLoyd & Jozefowicz, 1996), and if they perceive their parents as having more favorable work experiences (Neblett & Cortina, 2006). Future work needs to examine whether these occupation-related attitudes influence actual occupational outcomes as youth transition to adulthood.

School. Although there is a well-established process by which family socioeconomic origins influence adult employment outcomes through educational attainment (Sewell & Hauser, 1975), there have been relatively few studies that link aspects of the school context to employment-related outcomes. A “college for all” mentality prevails in the United States, a side effect being that secondary schools do not actively prepare youth for the transition to careers (Rosenbaum, 2001). This is especially problematic for youth from economically disadvantaged families because they have fewer financial sources for post-secondary schooling than their economically advantaged counterparts.

Research on alternate school models suggests that emphasizing careers during high school may benefit youth as they negotiate the transition to adulthood. Some of the most promising evidence comes from a rigorous, longitudinal random assignment evaluation of Career Academies (Kemple, 2008). Career Academies are high schools that focus curricula around both academic and technical themes, and provide work-based learning activities through partnerships with local employers. Youth who were assigned to the Career Academies treatment group had higher earnings across the first 8 years after high school and were averaging more hours worked per week (Kemple, 2008). These findings were concentrated among minority men, who are typically the most disadvantaged group of youth in the transition to employment (Edelman, Holzer, & Offner, 2006). Importantly, educational attainment was

not lower for students who attended Career Academies, as compared with students in the control group, indicating that the increases in employment-related outcomes did not come at the expense of educational attainment (Kemple, 2008).

Many countries have vocational training models that provide youth with practical job skills and experience. For example, in Germany, youth are tracked at the end of elementary school (approximately 4th grade in the American system) into different types of training. Two of these tracks, *Hauptshulen* and *Realschulen*, focus on providing schooling in combination with vocational preparation. Importantly, these tracks provide adolescents with apprenticeships, which allow youth to gain real employment experience and begin to make connections in the labor market (Cook & Furstenberg, 2002). An advantage of the German system is that youth from these tracks leave secondary schooling with job skills and experience. Because of the lack of attention paid to vocational training in the United States, students who do not attend college have to start gaining these skills and experiences on their own, and have few qualifications for employment beyond the low-wage service sector (Rosenbaum, 2001). Additionally, scholars have argued that vocational training provides youth with the opportunity to be mentored in a meaningful way (Hamilton & Hamilton, 2004).

However, there are downsides to the German system as well. In particular, tracking youth from such an early age is likely to intensify reproduction of existing social class and ethnic disparities. For example, youth from Turkish families are less likely to obtain apprenticeships and are more likely to receive training for menial jobs than youth from German families (Cook & Furstenberg, 2002). Other European countries, such as Sweden, provide vocational training to youth during high school, but the decision to enter this track is made at the start of high school, much later than in German system. This may provide opportunities for more mobility for youth from disadvantaged social locations (Cook & Furstenberg, 2002).

Adolescent Employment. For many youth, employment begins during the adolescent years. These early employment experiences shape later occupational outcomes, particularly for youth from socioeconomically disadvantaged families. While national studies tend to find small or nonexistent relations between adolescent employment and employment in early adulthood (Light, 1999), studies that focus on youth from economically disadvantaged families point to employment during adolescence as

an experience that promotes positive outcomes during the transition to adulthood. For example, Staff and Mortimer (2008) used detailed, longitudinal data to examine how patterns of employment during high school predicted wages during the transition to adulthood and early adulthood. Adolescent employment experience predicted higher wages in adulthood for youth whose parents did not attend college. Among this group of youth, intense adolescent employment (i.e., working more than 20 hours per week), predicted higher wages when youth were in their early 20s, but this relation faded by Age 31. In part, this fade-out occurred because the high levels of employment reduced the educational attainment of youth. However, low-SES youth who had steady, low-intensity work throughout adolescence had higher wages in their 20s and 30s than low-SES youth who had less steady work or no work during adolescence. Moreover, multiple studies have shown that stable, low-intensity adolescent employment is related to an increased likelihood of college attendance and completion for youth from socioeconomically disadvantaged backgrounds (Leventhal, Gruber, & Brooks-Gunn, 2001; Staff & Mortimer, 2008).

Adolescent employment may matter more or differently in the long term for youth from socioeconomically disadvantaged families than more advantaged youth for several reasons. First, youth from low-SES families are more likely to be living in economically depressed areas, where jobs are difficult to obtain. Consequently, youth who are successful at securing and maintaining jobs may already have higher levels of work-related skills and personal characteristics such as autonomy (Purtell & McLoyd, 2013). Second, low-SES youth are more likely to be working so they can contribute earnings to the family or to save for college (Entwistle, Alexander, & Olson, 2000; D. S. Johnson & Lino, 2000; Lerman, 2000). In contrast, more affluent youth often spend their earnings on leisure purchases and activities (D. S. Johnson & Lino, 2000). These differential spending patterns may indicate that the meaning of work experience and the importance given to it varies by socioeconomic backgrounds. Lastly, because low-SES youth are less likely to attend college than high-SES youth, their connections and experiences on the job, more than those of high SES youth, may directly connect them to future employment (Ruhm, 1997).

African American and Latino American youth are less likely to be employed during adolescence than European American youth regardless of socioeconomic background (Gardecki, 2001; Lerman, 2000). Furthermore, Entwistle and colleagues (2000) documented that, among

low-income youth in Baltimore, African American youth put more effort into finding jobs, but were less likely to secure employment and were more likely to experience spells of unemployment than European American youth in the sample. Other longitudinal research, using an elaborate sibling fixed-effect methodology that compared outcomes between brothers in the same family, found that employment during adolescence predicted earnings in early adulthood. However, this relation did not hold for poor, African American males (Foster, 1995). Follow-up analyses suggested that a primary reason for this was that African American males did not work as much as other youth, and this may have prevented them from accruing the skills, experience, and connections that other youth in the sample developed (Foster, 1995). Taken together, these studies suggest that the challenges ethnic minority youth face in the adolescent labor market may further disadvantage them when they seek employment during the transition to adulthood.

Individual Attributes as Predictors

Research indicates that adolescents' cognitive and behavioral skills, as well as their occupational aspirations and expectations, forecast employment outcomes in early adulthood.

Skills and Behaviors. Caspi, Wright, Moffitt, and Silva's (1998) analysis of data from a birth cohort in New Zealand showed that reading scores and delinquency during adolescence were independent predictors of the employment status of youth between the ages of 15 and 21 (compulsory education ends at the age of 15 in New Zealand), above and beyond their educational attainment during that time period. These analyses also showed that parents' occupational status significantly predicted unemployment of youth, but the researchers did not test for mediation so it is unclear whether any of the personal characteristics mediated the relations between family socioeconomic status and unemployment during the transition to adulthood. Similarly, DiRago and Valliant (2007) did not test for mediation in their longitudinal study but did find that IQ during middle school predicted occupational status at the age of 25; however, this relation dissipated once educational attainment was included in the model. Other research has examined social skills as a predictor of employment success. In their long-term examination of a sample of youth in poverty, Collins and van Dulmen (2006) found social competence to be a strong predictor of work success during the transition to adulthood.

Aspirations and Expectations. Aspirations and expectations have long been studied as potential mediators through which social class is replicated across generations, a focus also evident in the research literature on educational attainment (see the “Educational Attainment” section). In their formative work on status attainment, Sewell and Hauser (1975) found that much of the relation between parental income and occupational status among males in the transition to adulthood was mediated through adolescent occupational aspirations and plans for the future. Ashby and Schoon (2010) used British birth cohort data to test an elaborate model of processes linking family social class and income to young adult (Age 34) earnings and social status. Their results showed that family income directly influenced adolescents’ ambition value (i.e., the importance they placed on being challenged in a job and moving up and getting ahead; career aspirations; educational performance). Income also influenced these adolescent characteristics indirectly through parents’ education aspirations for their children. In turn, each of these adolescent characteristics predicted later earnings and social standing, although some relations only held for males or females (Ashby & Schoon, 2010). Longitudinal analyses of this nature provide important insights into the processes through which family socioeconomic status operates to influence occupational outcomes during the transition to adulthood and beyond.

Other longitudinal work with the British Cohort Study has shown that the importance of occupational aspirations for future success varies by the social class of youth (Yates, Harris, Sabates, & Staff, 2011). In particular, having misaligned aspirations, where youth aspire to a career that requires more education than they expect to receive, and having uncertain expectations, where youth report not knowing what they want to be, at the age of 16 were both predictive of a higher likelihood of not being employed or enrolled in school or training (NEET) for at least 6 months between the ages of 16 and 18. Interestingly, when these ambitions were interacted with social classes, results indicated that the relations between misaligned and uncertain expectations and NEET were stronger for youth from lower socioeconomic backgrounds. This moderating effect was only found for boys, although the authors suspected that teenage pregnancy, which is very predictive of NEET among girls, may be confounding the effect of socioeconomic status. These results suggest that higher SES-youth in the United Kingdom may have additional resources to prevent them from falling into NEET status, even when they have misaligned or uncertain

aspirations, that low-SES youth cannot access (Yates et al., 2011).

Interactions Between Contexts and Individual Attributes

Longitudinal models that examine the interplay between socioeconomic status, contextual experiences, and individual characteristics are necessary to fully examine the processes through which family socioeconomic status affects transitions to employment of youth. Although some longitudinal studies included these constructs in their models simultaneously, they often did not directly test mediating and moderating influences (Caspi et al., 1998; DiRago & Vaillant, 2007; Wiesner, Vondracek, Capaldi, & Porfeli, 2003), and hence, provide no information about protective processes or the processes through which social location influences developmental outcomes. A notable exception is research using a British birth cohort sample. In addition to the study described above (Ashby & Schoon, 2010), Schoon and colleagues (2002) created a developmental-contextual model to examine how parent social class influenced an individual characteristic (i.e., academic attainment) and a contextual characteristic (i.e., cumulative risk). They extended this model to examine how academic attainment and cumulative risk were related at multiple time points throughout childhood and adolescence and how they each predicted social position (a measure that taps into occupational status) at the age of 30 or 33.

Their results clearly showed that: (a) parental social class predicted the cumulative risk and academic attainment of youth; (b) cumulative risk and academic attainment were correlated throughout childhood and adolescence; (c) cumulative risk at one time in childhood predicted the academic attainment of youth at the next time point; and (d) while academic attainment was a stronger predictor of social position in adulthood, some of that relation reflected the fact that risk indirectly influenced social position through academic attainment. Because they used two different birth cohorts (i.e., 1958, 1970), the authors were also able to document an increase across historical time in the importance of cumulative risk during adolescence to social position in adulthood (Schoon et al., 2002). By examining the influence of contextual risks and individual development at multiple times, these results showed one way in which disadvantage could accrue over time. Research from a resilience perspective has shown that both individual attributes (childhood IQ) and contextual characteristics (parenting support) predict work success at Age 30 (Masten et al., 2004). Interestingly, these influences

dissipated once competencies at Age 20 were included in the model.

Although the requisites for this type of research are high, more studies of this complexity are needed to document the processes that link social location of youth to childhood and adolescent characteristics and experiences and the transition to employment. Not only will they fill a gap in current research, but a more nuanced understanding of these processes can provide information about potential targets for future policies and programs seeking to enhance the outcomes of disadvantaged youth during the transition to adulthood. Next, we turn to examinations of how social location shapes processes during the transition to adulthood and their consequences for employment-related outcomes.

Proximal, Social Location Influences During the Transition to Adulthood

Although childhood and adolescent experiences certainly explain some of the influence of both race/ethnicity and socioeconomic status during the transition to employment, these social locations are associated with differential outcomes during the transition to adulthood above and beyond the influence of earlier experiences. For example, when Kmec and Furstenberg (2002) examined a sample of urban youth in Philadelphia in adolescence and later during the transition to adulthood, they found that minority men were more likely to be “off track” in terms of employment than minority women and both European American men and women. A finding of particular importance was that the inclusion of adolescent experiences and skills in their regression analysis did not reduce the discrepancies between minority men and the other youth in the sample. In short, the African American and Puerto Rican men were doing worse than might have been expected from their status in early adolescence. They were having greater difficulty than the other race/gender groups sustaining their status from early to later adolescence or translating their early educational attainment into further schooling or labor market experiences. These results suggested that processes driven by social location occur during the transitions to employment that contribute to the increased employment difficulties that ethnic minority men encounter during the transition to adulthood.

MacLeod’s seminal ethnographic work (1987, 2008) with two groups of males living in an urban neighborhood exemplifies the employment-related struggles that male youth from low-SES families face during the transition

to adulthood. The work documented how race, social class, and life events shaped aspirations and high school behaviors and attitudes. Seven years later, MacLeod reinterviewed these men to examine how they were faring, and whether their aspirations were actualized. Disheartening as they were, the follow-ups illuminated a number of pivotal processes that occur during the transition to employment. One group, labeled the “Brothers” because members were primarily African American, although on the “right track” academically in high school and strongly committed to the Protestant work ethic, were floundering as adults. They struggled to maintain steady employment, and primarily held jobs in the service sector that had minimal opportunities for advancement and increases in earnings. The other group, labeled “Hallway Hangers,” were primarily European American. Compared with the “Brothers,” they had higher levels of family stress during childhood and markedly lower levels of engagement in academics during high school. They too were struggling to maintain employment, but were also more engaged than the “Brothers” in detrimental behaviors such as drug use and crime. As discussed further on, the interviews with these young men pointed to both social capital and cultural capital as critical factors in their journey toward employment.

Social Capital

Social capital can be described as relationships and networks that are capable of transmitting valuable resources (e.g., information and assistance) (Lin, 2001). Networks of people have stores of resources at their disposal, and these resources are exchanged through social interactions (Ream, 2005). Social capital that inheres in relationships can be used to generate other forms of capital, including human and cultural capital (Ream, 2005). Social stratification is inherent in social capital, such that networks comprised of middle class and wealthy individuals typically have access to more valuable resources than do networks comprising working class and poor individuals (Bourdieu, 1986; Stanton-Salazar, 1997).

Multiple qualitative studies (Blustein et al., 2002; MacLeod, 2008; Newman 1999) have documented that knowing adults with connections to specific employment opportunities is the most common route to obtaining a job for low-SES young adults. For example, in her ethnographic study of young fast food workers in Harlem, Newman (1999) noted that youth who had employed family members or family members who were well connected within the community often utilized these connections to

obtain jobs. Although personal connections are advantageous at all levels of the labor market, they are particularly useful in the low-wage service market where there is often a large supply of workers who are qualified for the jobs in question (Newman, 1999). The importance of these connections is magnified even further for young workers, who are competing with older, more experienced job applicants.

Research in Britain has documented similar processes for young adults from disadvantaged neighborhoods. In their in-depth study of these processes, MacDonald, Shildrick, Webster, and Simpson (2005) found that these young adults relied on family members, friends, and neighbors for connections to jobs, but the jobs that these networks provided were often in the service industry and routine factory production industry. Consequently, the jobs had little room for mobility and were harder to maintain employment in because the large pool of adults trying to secure these jobs made employees highly replaceable. A critical insight that this work points to is the paradox of “the weakness of strong ties” (MacDonald et al., 2005, p. 884). When young adults reside in neighborhoods with diminished employment opportunities, strong ties to the neighborhood and community may actually be detrimental to their employment prospects, as the ties do not provide needed opportunities, and importantly, may actually limit young adults from forming connections outside the neighborhood that would potentially be more conducive to employment mobility (MacDonald et al., 2005). As will be discussed in the section of our chapter focusing on barriers to building social capital, a similar point has been made about the ways in which low-SES parents’ social capital and networks may limit the educational attainment of youth (Fasang, Mangino, & Brückner, 2010; Horvat, Weininger, & Lareau, 2003; D. H. Kim & Schneider, 2005).

The occupational success of the young men in MacLeod’s (2008) study was also heavily influenced by their social capital. Almost all of the men found jobs through people they knew, whether it was office jobs such as computer work, or blue-collar jobs such as roofing. Even the young men who were able to obtain educational credentials beyond their high school degree were still dependent on personal connections to obtain jobs. Another important theme that emerged from MacLeod’s work concerned the race disparity in social capital as it related to jobs. Although all of the “Brothers” had earned high school degrees, they struggled to obtain employment, in large part because they lacked connections to adults who could help them get hired. Although they had positive

adult figures in their life, these individuals were often not in position to help them get jobs. In short, the “Brothers” were not rewarded for their academic commitment with additional social capital related to employment. In contrast, several of the European American members of the “Hallway Hangers” were able to use their personal connections to obtain employment in spite of their academic and behavioral problems during adolescence and the transition to adulthood. This research exemplified one of the key challenges that African American men face when trying to break into the job market.

Detailed research in high schools and community colleges has shown that these institutions often have no direct connections to employers in the community (Rosenbaum, 2001; Rosenbaum, Deil-Amen, & Person, 2007). Establishing these connections is an important step toward linking employers to youth who are trying to make the transition to employment. Youth who work hard and do well in school, but are from families and neighborhoods where connections to employment are weaker, stand to benefit from these potential pathways to jobs. A more extensive discussion of the functional importance of social capital is presented in the section on transitions to higher education. Many of the processes discussed there have implications for the employment experiences and occupational attainment of low-income and ethnic minority young adults.

Cultural Capital

In MacLeod’s (1987, 2008) work, a key characteristic that differentiated the African American men who were successful in their jobs and those who were not was their ability to “fit in” with their bosses, coworkers, and in some cases, customers. Fitting in encompassed many things, including acting professionally, dressing a certain way, and communicating in ways that made others feel at ease. Cultural capital, originally proposed by Bourdieu (1977), is a resource that is defined by a dominant group that enables them to maintain their status in society. It encompasses linguistic styles such as ways of speaking, and outward cultural styles such as how one dresses (Dumais, 2002). In employment settings in the United States and other countries, cultural capital is primarily determined by middle-class, nonminority groups. Given the widespread racial and class segregation in the United States, it is not surprising that youth from ethnic minority and low-SES groups possess less cultural capital than European American, middle-class youth and that this can hurt them in the world of work. For example, they may know relatively little about appropriate dress and

self-presentation for job interviews. In MacLeod's work, the African American men who were most successful modified the way they spoke and dressed at work. Although this was advantageous to them in terms of employment, it sometimes led to problems in their social life as some of the young men were accused by friends and family of "acting White." Some of the men were able to successfully navigate the cultures of their workplace, family, and community by becoming "bicultural."

In a seminal study of Chicago employers, W. J. Wilson (1996) found that employers often held negative stereotypes about African American men. Many of these stereotypes were related to cultural capital. For example, employers reported that African American men "use street talk" instead of proper grammar and that this hurt them in job interviews (W. J. Wilson, 1996). In addition, they often observed that African American men lacked "soft skills" such as dependability and the desire to work hard. Although employers consistently reported negative opinions about the employability of African American men, they were much more favorable in their perceptions of African American women and their job-related skills and attitudes. As the low-wage job market continues to become more service-based, as opposed to labor-based, the importance of communication and customer relation skills increases (MacLeod, 2008) and individuals who have limited cultural capital and soft skills are likely to struggle when looking for jobs. Indeed, quantitative data indicates that African American males are much less likely than either European American men or African American women to be employed in "noncollege jobs" that involve interacting with customers (Holzer, 1996). Although much less studied, Hispanic males and females are also underrepresented in these types of jobs, perhaps due in part to language barriers (Holzer, 1996).

Discrimination

Other factors that shape the transition to employment are discriminatory hiring practices. While employers' unfavorable perceptions of young African American men appear to be based partly on their experiences with prior employees, they may unfairly disadvantage the job prospects of new workers looking for jobs. Many employers report utilizing tactics to deliberately exclude African American men from the process. These tactics include not calling applicants who reside in certain neighborhoods and placing advertisements only in suburban newspapers (Neckerman & Kirschenman, 1991; W. J. Wilson, 1996). In their study of low-skill employment in a poor neighborhood in Brooklyn,

Kasinitz and Rosenberg (1996) found that employers held similarly negative views about hiring African American men and were biased against hiring individuals from the local neighborhood, believing that such individuals were less reliable and more likely to engage in criminal activity. Thus, minority men from impoverished neighborhoods may experience multiple barriers when trying to enter the job market.

Another line of research has utilized audit studies to document how race shapes hiring processes (Bertrand & Mullainathan; 2004; Pager, 2007; Turner, Fix, & Struyk, 1991). In these studies, resumes are created with matched levels of education, experience, and other characteristics related to hiring—the only difference is whether the name on the resume sounds like the name of a European American or an African American person. The matched resumes are sent out as responses to the same job advertisement and responses from the employer, such as requests for interviews are tracked. In Bertrand and Mullainathan's (2004) audit study, the "White" resumes had a 50% higher callback rate than the "African American" resumes. On average, there was 1 request for an interview for every 10 "White" resumes, but only 1 request for every 15 "African American" resumes. Furthermore, living in a wealthy neighborhood provided an increase in the likelihood of callbacks for both groups of resumes. This again indicated that both socioeconomic status, as measured by neighborhood location, and race/ethnicity influenced the process of job attainment in adulthood.

Other audit studies have found that resumes with "White" names also receive more callbacks than resumes with Latino-sounding names (Kenney & Wissoker, 1994). Audit studies have also examined how race and educational prestige, in terms of the college at which one earned a bachelor's degree, influences one's early success on the job market (Gaddis, 2014). Results indicated that in terms of callbacks, resumes of African American youth who attended highly prestigious universities, such as Harvard, were about as successful as the resumes of European American youth who attended much less prestigious universities. Although education can help reduce race disparities in employment, this research suggested that education does not create a completely equal opportunity structure (Gaddis, 2014).

Audit studies often find low rates of callbacks across all of the resumes submitted, regardless of the names on the resumes. This is likely due in part to the fact that many employers hire people they know or are recommended by someone they know, reiterating the importance of social

capital in the transition to employment (DiTomaso, 2012; Gaddis, 2013; Kasinitz & Rosenberg, 1996; MacLeod, 2008). DiTomaso (2012) has explored the ways in which employed European American adults make it more difficult for minority adults to obtain job success, without holding discriminatory views. The insights from her interviews with adults in various types of jobs and social classes illuminated the role of social capital in reproducing racial employment disparities. European American adults are more likely to be in employment roles that have power and a say in hiring practices, and they are more likely to hire relatives, friends, or other members of their social networks. Because of this preference, African American adults have much lower odds of being hired, even though it is not directly related to their race, a process DiTomaso refers to as “in-group favoritism.” Her work made a compelling case that future research needs to focus on these processes to better understand why racial inequality is so persistent in the United States and other countries such as Britain.

Discrimination in hiring is *not* unique to the United States. For example, Fangen and Paasche (2013) summarize evidence indicating that very similar processes occur in Norway. Audit studies have shown that ethnic minority youth struggle to obtain job interviews when their names indicate that they are probably members of a minority group. Furthermore, qualitative research revealed that when ethnic minority youth received interviews, they were frequently told that they were not good fits for the jobs they applied for, even when they were highly qualified. It is unclear if these interview issues are due to cultural capital challenges or further discriminatory hiring practices, but either way, they present a serious employment challenge for ethnic minority youth. It is important to note that different ethnic minority groups within Norway reported different experiences with labor market discrimination. African-origin youth commonly reported discrimination while some youth from Asian backgrounds recognized that their minority group fared better in the labor market. Youth from other areas of Europe, such as Bosnia, recognized that their relative similarity to nonminority adults was advantageous to them in their job searches (Fangen & Paasche, 2013).

These labor market disadvantages, whether due to lower levels of social or cultural capital or experiences with discrimination, have lasting consequences. Early career experiences, such as time spent looking for jobs and the accumulation of job experiences, contribute to racial earnings gaps later in the life course, above and

beyond educational and early cognitive skill differences (Tomaskovic-Devey, Thomas, & Johnson, 2005). Early job market struggles inhibit the growth of human capital, most notably, skills that are needed in one’s specific field, and this contributes to racial inequalities in earnings later across adulthood. Understanding the processes that shape the transition to employment can also provide important insights into how careers and earnings unfold later in life.

Role Conflicts

Other life roles influence one’s ability to successfully navigate the transition to adult employment and these roles are also shaped by social location. For example, as discussed in more detail in the next section of the chapter on educational attainment, low-SES youth are more likely to be enrolled in higher education while transitioning to employment (National Center for Educational Statistics, 2010). Balancing schoolwork and employment is difficult and employers are not always able or willing to adjust work schedules to accommodate employees who have school demands (Newman, 1999). Furthermore, young adults from low-SES families are more likely to be using their earnings to contribute to family finances or to pay for their education than youth from more affluent families. Because their earnings are used for necessities as opposed to luxuries, young adults from low-SES families may be more likely to continue to work at jobs that have unfavorable work conditions. In particular, ethnographic work indicates that they may be more likely to stay in jobs where they experience harassment (McLaughlin, Uggen, & Blackstone, 2008). Future work is needed to further elucidate how social location influences experiences on the job, and employees’ tolerance of varying working conditions.

For young adults with children, particularly women, securing childcare is another challenge to maintaining consistent employment. As noted previously, African American, Latina American, and low-income women are more likely than middle-class European American women to have children during their late teens and early 20s (Martinez, Daniels, & Chandra, 2012; Mathews & Hamilton, 2009). In their longitudinal, mixed-methods work with low-income mothers—many who were in their 20s—Lowe and Weisner (2006) found that lack of childcare was a significant barrier to employment for many women. Even with state subsidies, women often found that childcare was too expensive to afford on their current wages. As an alternative, many working mothers relied on informal childcare, often from family members

and friends. These arrangements were sometimes unreliable, interfering with their ability to maintain their work schedules. These challenges increased the likelihood of job loss and “rapid job cycling,” where women frequently entered and exited employment. This rapid job cycling was associated with problematic job transitions, such as being fired and stagnant wage growth (Yoshikawa et al., 2006). Demographic research in Africa has documented detrimental effects of early childbearing on young women’s ability to obtain employment; however, further research is needed to elucidate how these processes unfold in developing economies (World Bank, 2009). Taken as a whole, these findings highlighted the consequences that motherhood can have for women’s transition to employment and their ability to maintain employment and achieve growth in their wages.

Although concern over challenges to the transition to employment have largely centered on African American and Latino American men (see Edelman et al., 2006), there is a need to study these processes in ethnic minority women as well. Evidence exists that African American women’s attachment to work values, including extrinsic, intrinsic, and social rewards, decreases throughout the young adult years at a rate significantly steeper than that of African American men or European American men and women (M. K. Johnson, 2002). Explanations for this disparity center on experiences distinctive to African American women. Specifically, M. K. Johnson (2002) noted that African American women were more likely than women in other demographic groups to be socialized to both family and worker roles, but subsequently have to contend with both gender and racial discrimination in the labor market. It is this confluence of factors, Johnson speculates, that prompts decreases in the value of work. Clearly, these important ideas warrant further examination. More generally, employment experiences among ethnic minority and low-SES women during early adulthood are a fertile area for future study.

Summary and Future Directions

It is clear that both race/ethnicity and socioeconomic status are linked to processes that lead to challenging transitions to employment in early adulthood. Although some scholars have concluded that socioeconomic constructs largely account for race and ethnic differences in the transition (Shanahan, 2000), we believe that race/ethnicity and socioeconomic status are both linked to processes that influence employment outcomes, although we recognize

that, in many cases, the processes associated with both overlap. Furthermore, it is clear from existing research that race/ethnicity, socioeconomic background, and gender all interact to influence the transition to employment. Quantitative and qualitative research suggests that African American men from economically disadvantaged backgrounds face the most challenges when trying to secure employment in early adulthood (Edelman et al., 2006; Kmec & Furstenberg, 2002; W. J. Wilson, 1996).

It is also apparent that these disparities are grounded in early experiences, during both childhood and adolescence. In particular, socioeconomic disadvantage shapes the contextual experiences of youth and their skills, behaviors, and aspirations. Although there is still much to be explored concerning the linkages between socioeconomic disadvantage, contexts, individual-level characteristics and later employment outcomes, it is clear that increasing the academic skills and social competence of socioeconomically disadvantaged youth, increasing their cultural and social capital, and reducing discrimination in hiring would improve the ability of socioeconomically disadvantaged youth to secure and maintain employment as they exit school and enter adulthood (Ashby & Schoon, 2010; DiRago & Vaillant, 2007). Evidence about how individual attributes interact with social and cultural capital across contexts and reliable findings about the characteristics of institutions that foster social and cultural capital among socioeconomically disadvantaged youth could inform the design of interventions to test the effects of policies and programs on the employment status, transitions, and experiences of at-risk young adults.

EDUCATIONAL ATTAINMENT

Our discussion of postsecondary educational attainment in relation to social class, race, and ethnicity begins with a demographic overview. Detailed attention is given to the demographics of postsecondary educational attainment in the United States. Against this backdrop, we examine interpersonal and institutional operating during middle-school and high-school that appear to influence post-secondary educational attainment among low-income and disadvantaged ethnic minority youth. We discuss race/ethnic disparities in resources that undermine educational attainment among low-income and disadvantaged ethnic minority youth, as well as factors promotive of educational attainment in these groups. We then turn to a brief discussion of concurrent or proximal factors related

to social location that shape experiences within the college context. Social capital is a central theme throughout the discussions of parental, extrafamilial, and institutional factors. Because social capital appears to be pivotal in the educational and occupation trajectories of low-income and racial and ethnic minority youth, we present a discussion of barriers to building social capital. Our discussion centers on research conducted with American youth, but we bring in research based on European youth selectively to illustrate cross-national generalization of certain findings. We conclude with a discussion of limitations in the current research literature and important areas for future research.

Demographics of Postsecondary Education

We focus on several indicators of postsecondary educational attainment, including timing of enrollment, college participation rates (i.e., the percentage of 18- to 24-year-olds enrolled in 2- or 4-year institutions), college persistence, and college graduation rates. Timing of enrollment—that is, whether high school completers enroll immediately or delay enrollment, is an important variable because those who delay are much less likely to attain a bachelor's degree in 6 years than those who begin immediately after high school completion (Bozick & DeLuca, 2005).

Socioeconomic Status

In the United States, as in Britain, lower social class is a strong predictor of lower levels of attainment in postsecondary education. In Britain, young people from manual social classes are underrepresented in higher education and this gap has increased over the past four decades (Connor, 2001; Summerfield & Gill, 2005). In the United States, youth from low-SES families, compared with youth from more economically advantaged families, are more likely to delay enrollment (controlling for race, gender, financial resources, academic achievement and preparation, etc.), less likely to enroll immediately (i.e., enrollment in the fall immediately after completing high school) or within 8 years of graduating from high school (Aud et al., 2013; Rowan-Kenyon, 2007), more likely to drop out (Walpole, 2003), less likely to return after dropping out, and less likely to attain a postsecondary degree (Diemer & Li, 2011). Analysis by quartiles of family income indicates that in 2010, the college participation rate among American youth was approximately 47% for those from the bottom quartile, compared with 82% for those from families with

income in the top quartile. In the same year, among 18- to 24-year-olds, about 11% from the bottom quartile of family income had completed bachelor's degrees by age 24, compared with 79% from families with income in the top quartile. The increase in bachelor's degree completion rates between 1970 and 2010 has occurred almost entirely among students from the top half of the family income distribution (Mortenson, Stocker, & Brunt, 2012).

Longitudinal research has provided estimates of the independent effects of parental economic resources available during adolescence on the educational outcomes of youth. Teachman, Paasch, Day, and Carver (1997) found that children who spent 4 years of their adolescence living in families below the poverty line were about 60% less likely to attend college (conditioned on high school graduation). With controls for welfare receipt, race, IQ, parental education, and other factors, the number of years spent below the poverty line was no longer significant. However, the difference in average income-to-needs ratio for the 4-year period remained statistically significant, with adolescents in families with lower income-to-needs ratios being less likely to attend college and obtaining fewer years of schooling.

Researchers have sought to identify distinctive roles of parental economic assets—not just income—in accounting for the educational attainment of youth. Y. Kim and Sherraden's (2011) investigation—based on a sample drawn from the Child and Young Adult data supplement to the National Longitudinal Study of Youth 1979—indicated that both family income and parental economic assets during the period when youth moved from 5th/6th grade (aged 10) to 9th/10th grade (aged 13) were associated with college attendance and college degree attainment. However, liquid assets (e.g., bank accounts, CDs) during this period were more important for college attendance (i.e., they accounted for the effects of income on college attendance), while stable income and more solid types of assets (e.g., values of residential and non-residential properties) were more important for college degree attainment. These relationships did not change substantially when noneconomic characteristics of parents and children were taken into account (e.g., race, child's cognitive ability, parental involvement in education).

Although low-income students' enrollment in college after high school represents a degree of success in overcoming obstacles, they are less likely to persist through graduation and "often enroll in institutions positioned lower in the stratified higher education system, instead of enrolling in institutions which have been found to

positively influence aspirations and persistence" (Walpole, 2003). They are overrepresented in 2-year colleges, as are African American, Latino American, and first-generation college youth. Community colleges are an especially important source of postsecondary opportunity for these students because of their affordability, physical accessibility (their geographic distribution increases the likelihood that youth can find a school within commuting distance of home and jobs), and open admissions policies, compared with 4-year institutions (Costello, 2012). Students who begin their higher education at 2-year colleges are much less likely to earn bachelor's degrees than are their counterparts who begin at 4-year institutions (National Science Board, 2002).

Race and Ethnicity

Although many racial and ethnic differences in postsecondary educational attainment among American youth have narrowed over the past three decades, for virtually all indicators, racial and ethnic differences continue to favor Asian Americans and European Americans, as compared with African Americans and Latino Americans. In 2010, the immediate college enrollment rate was 88% and 70% for Asian/Pacific Islander and European American high school completers, as compared with 66% and 60%, for African American and Latino Americans, respectively (U.S. Department of Education, 2012). Conversely, African Americans and Latino Americans were more likely to delay enrollment than Asian/Pacific Islanders and European Americans (Rowan-Kenyon, 2007).

Delayers, compared with on-time enrollees, had weaker academic credentials, came from families with fewer socioeconomic resources, and were more likely to attend non-4-year institutions (community colleges, technical/vocational colleges, junior colleges) and to transition to other roles such as spouse or parent before entering college (Bozick & DeLuca, 2005; James, 2012). Even after controlling for these differences, students who delay postsecondary enrollment have lower odds of bachelor degree completion. Scholars have speculated that the delayed enrollment effect may be due to lower levels of social integration resulting from reduced contact with students and faculty, fewer institutional supports, and more negative experiences as a consequence of being off-time with respect to their birth cohort's age-grade progression through the education system (Bozick & DeLuca, 2005).

Racial/ethnic disparities in college participation rates and college graduation rates parallel rates of immediate college enrollment. In 2008, the college participation

rates for Asians/Pacific Islanders and European Americans were 58% and 44%, respectively, while rates for African Americans and Latino Americans were 32% and 26%, respectively (Aud, Fox, & KewalRamani, 2010). There are different measures of graduation rates, but the most common is the proportion of first-time, full-time bachelor's degree-seeking students who graduate within 6 years. Based on this measure, Asian Americans have the highest graduation rate (69% in 2010), followed by non-Hispanic Whites (62%), Latino Americans (51%), Native Americans (40%), and African Americans (40%) (College Board Advocacy and Policy Center, 2013). In 2012, the percentage of 25- to 29-year olds with bachelor's degrees or higher stood at 60% for Asians/Pacific Islanders, 40% for European Americans, 23% for African Americans, and 15% for Latino Americans (educational attainment rates) (Aud et al., 2013). For most racial/ethnic groups, the college participation rate is higher for females than males, a trend that began in the 1990s. In 2008, the gender gap was largest for African Americans (African American undergraduate fall enrollment was 64% female; comparable figures for Latino American and non-Hispanic White undergraduate fall enrollment were 58% and 55%, respectively) (Aud et al., 2010).

In Britain, ethnic minorities are *more* likely than Whites to progress to higher education. Nonetheless, compared with White British students, on average, they have lower entry qualifications, are more likely to come into higher education from further education colleges (not dissimilar to continuing education in the United States), less likely to take the traditional "A" level route (academic, rather than vocational route), and exhibit lower levels of degree performance. However, these overall differences mask divergences between groups of ethnic minority students. In general, Black (Black Caribbean, Black African) students exhibit the most disadvantaged profile, with Indian and Chinese students exhibiting the most advantaged profiles. Compared with other ethnic minority students in Britain, Black students are older on entry, more likely to have vocational entry qualifications, and more likely to leave early from degree courses (Connor, Tyers, Modood, & Hillage, 2004).

In Belgium, Moroccan and Turkish youth (mostly Belgium citizens—local-born children of migrant parents who entered Belgium post-1950 in response to recruitment of foreign labor) are underrepresented in university education and overrepresented in vocational training. Italian youth in Belgium (mostly Belgium citizens whose descendants came to Belgium during a wave of immigration in the

1920s and a second wave in the 1960s) are less disadvantaged than Moroccan and Turkish youth in terms of university education, but are still at a disadvantage compared with their nonminority peers (Phalet, Deboosere, & Bastiaenssen, 2007).

Antecedents of Educational Attainment Among Low-Income and Ethnic Minority Youth

This section presents an examination of parental and peer factors operating during middle school and high school that appear to influence education attainment among low-income and disadvantaged ethnic minority youth during the transition to adulthood. Attention is also given to the role of mentoring relationships, relationships with institutional agents such as school personnel, and school structures. It is reasonable to assume that many of the factors and processes discussed below mediate social class, racial, and ethnic differences in educational attainment during the transition to adulthood. However, longitudinal studies that directly test these presumed processes are surprisingly sparse. A vast research literature exists on contributors to postsecondary education outcomes, but researchers often control for social class differences and racial/ethnic differences rather than assess how these differences may shape the experiences and outcomes of youth (Walpole, 2003).

Parental Factors

Research examining linkages between parental factors and educational attainment among low-income and ethnic minority youth coalesces around two types of parental factors—parents' educational expectancies for the child and their involvement in the child's schooling. We discuss each of these factors in turn.

Educational Expectancies. In keeping with the Eccles et al. (1983) expectancy-value model, numerous longitudinal studies based on U.S. and British samples point to the educational expectations of parents and youth during middle school and high school as important variables in the mediated chain of constructs that influence postsecondary educational outcomes among low-income and disadvantaged ethnic minority youth (Cardoza, 1991; Charles, Roscigno, & Torres, 2007; Chowdry, Crawford, & Goodman, 2009; Connor et al., 2004; Horn & Chen, 1998; Y. Kim & Sherraden, 2011; Rowan-Kenyon, 2007; Sandefur, Meier, & Campbell, 2006; Wood, Kurtz-Costes, & Copping, 2011; Zarate & Gallimore, 2005). The

longitudinal relationships between expectations and postsecondary educational outcomes are highly robust, as they typically hold with controls for financial resources, academic achievement of youth, and various demographic and background characteristics.

Parental expectations are an important source of variation in educational attainment within low-income and ethnic minority youth and a mediator of social class disparity in educational attainment. Low-SES parents are less likely than higher-SES parents to expect their children to attain bachelor's or advanced degrees. They are also less likely to tie their definition of success to 4 years of college attendance (Gutman, Schoon, & Sabates, 2012; Walpole, 2003). Research based on data from the Longitudinal Study of Young People in England shows that socioeconomic differences in college plans of youth, uncertainty regarding their aspirations for postsecondary education (responding "don't know" when asked whether they want to continue school after compulsory education), and college enrollment are partly mediated through parents' educational expectations (Gutman et al., 2012).

Early parental expectations are strong correlates of college attendance of youth because they reflect commitments that parents will follow through later on in the children's schooling. In Charles et al.'s (2007) study following an ethnically diverse national sample of youth, parents' expectations at 8th grade (Age 13) about how far the children will go in school was positively related to various investments in children's education 4 years later (12th grade). These investments included involvement in high school programs (discussing school courses, activities, etc.), amount of money saved for college, and knowledge about grants, loans, and scholarships for college attendance. Controlling for prior student achievement, all of these investments were significant predictors of both 2-year and 4-year college attendance 2 years later (with the exception that amount of money saved was unrelated to 2-year college attendance).

Parental expectations were closely aligned with subsequent college enrollment of male youth in Zarate and Gallimore's (2005) 15-year study of low-SES Latino American families (primarily Mexican Americans). In this study, the last interview was conducted 1 year after high school, when the majority of the participants were 19 years old. Throughout their children's schooling (kindergarten through 10th grade), parents of boys who eventually attended college consistently had higher expectations for boys' college attendance than boys who did not enroll in college. It was only in high school, however, that parents' expectations of girls distinguished between those who later

went to college and those who did not. Zarate and Gal-limore speculated that girls' college-enrollment outcomes might be less influenced by parental expectations because of acculturation, citing evidence that acculturated girls relied less on family than on school agents for emotional support.

In Diemer and Li's (2011) study of postsecondary persistence among low-income youth, mothers' expectations about how far their children would go in school indirectly affected postsecondary persistence (i.e., progress toward degree) 3 and 5 years later by fostering educational expectancies of youth for success in college. Expectancies of youth also mediated the effects of contextual support (i.e., how frequently youth discussed their future plans with their family and friends) on postsecondary persistence, but maternal expectations played a more significant role in expectancies of youth than contextual support. Wood et al.'s (2011) examination of on-time postsecondary educational progress among African American youth indicated that parents' expectations (when youth were in Grade 11, aged about 17) about how far their children would go in school were positively related to adolescents' educational aspirations and expectations, controlling for SES and academic achievement. Relations between parents' expectations and the aspirations and expectations of youth were mediated by the perceptions youth held of their parents' expectations. For boys, Grade 11 educational expectations and utility values each uniquely predicted college attendance one year after high school graduation.

Maternal expectations for educational attainment of youth also predict the timing of college enrollment. The odds of youth enrolling in college immediately after high school graduation, rather than delaying enrollment, are higher when mothers' educational expectations are higher during the child's senior year (aged 18), controlling for background factors, financial resources, academic achievement and preparation, and other factors. In addition, when mothers had no postsecondary expectations for the children, rather than expectations for graduate school attendance, high school completers were substantially more likely not to enroll within 8 years of high school graduation than to delay enrollment (Rowan-Kenyon, 2007).

Educational expectations of youth have been found to be associated with parents' economic assets (Y. Kim & Sherraden, 2011). There is growing interest in child developmental accounts (CDAs) as a strategy to encourage families to invest in a savings account specifically for their children's future postsecondary education. In addition

to their instrumental function, CDAs are hypothesized to increase educational expectations among low- and moderate-income parents and their children (Y. Kim & Sherraden, 2011). Destin and Oyserman (2009) designed an experiment to investigate the notion that children from families with fewer economic assets lower their expectations for college because they perceive it to be cost-prohibitive, and as a consequence, engage in less effort in school. The researchers experimentally primed low-income seventh-grade Latino American students to view college as closed (expensive) or open (college can be paid for with need-based financial aid). As predicted, students in the open condition, compared with those in the closed condition, had higher academic goals (as indicated by the grade they thought they would get in math and English classes). Among girls, those in the open condition, compared with those in the closed condition, planned to spend more time reading/studying and doing homework. In a follow-up experiment with low-income African American 12-year-olds, planned effort was higher in the open condition than in the control condition where children were not given any college information (controlling for student GPA).

Parental Involvement. A number of studies have found that parental involvement in school is related to children's school success, including college attendance (Sandefur et al., 2006). Parents' involvement in parent teacher associations (PTAs) is associated with greater educational attainment for children (Erickson, McDonald, & Elder, 2009). Parents' contact with school regarding high school and postsecondary planning increased the likelihood that students would see their school counselors about college information (Bryan, Holcomb-McCoy, Moore-Thomas, & Day-Vines, 2009). Parents who discussed education-related issues with their children and who initiated contact with the school about volunteering and academic matters increased the chance that their children would enroll in 2- or 4-year colleges, controlling for other forms of capital (financial, cultural, and human capital) (Perna & Titus, 2005; Sandefur et al., 2006). The relation of parents' education and income to postsecondary education outcomes decreased when social capital variables were taken into account, which suggested that parents' income and education was indirectly related to children's educational outcomes through social capital. Interestingly, in terms of magnitude of effects, the effects of some aspects of social capital on educational outcomes rivaled those of the parents' income and education (Sandefur et al., 2006).

Social capital variables also play a role in the timing of college enrollment. One study showed that students who delayed first-time college enrollment experienced considerably less parental involvement in their education during high school. These students also had weaker network support, in that they had fewer financial aid contacts, their parents were less connected to other parents, they had less positive student-teacher relationships, and they received less support from their high schools. Of the social capital variables examined, parental involvement in the children's education and high levels of school support increased the likelihood of enrolling in college immediately (Rowan-Kenyon, 2007).

Part of parental involvement includes parents' skill at garnering resources for their children. D. H. Kim and Schneider (2005) use the term "aligned action" to describe "goal-specific action through which parents channel information and resources outside the family and appropriate them for the purpose of helping their children achieve their goals" (p. 1184). They found that parental participation in programs designed to inform them about postsecondary education and financial aid programs increased the likelihood that their children would enroll in 4-year versus 2-year colleges. Other work has shown that the help parents provided to students and visits parents made to school were associated with better track placement (Ream & Palardy, 2008).

In addition to parents' direct involvement with their children and schools, the support parents receive from their networks also appears to promote positive outcomes among youth. In a longitudinal investigation of teenage mothers and their offspring, Furstenberg and Hughes (1995) found that social capital during adolescence predicted socioeconomic outcomes (i.e., college enrollment, labor force participation) in early adulthood, even when family human capital and the adolescents' early academic achievement and behavior were taken into account. Although this study focused on various aspects of social capital, the support mothers received from their social networks stood out as being related to each of the young adult outcomes. In addition to mothers' social support, parent-child activities, mothers' attendance at the children's schools, and the number of the children's friends the mothers reported knowing were uniquely associated with college enrollment.

Friendships

There is a surprising dearth of longitudinal research examining whether and how adolescent friendships during high

school influence the decisions of ethnic minority and low-income youth to go to college and their persistence once enrolled. The few extant studies generally report positive associations, but for reasons discussed below, the findings warrant caution. Horn and Chen (1998) identified eighth graders (12-year-olds) in the National Educational Longitudinal Study (NELS) who were at moderate or high risk of educational failure (i.e., they had two or more of the following risks—low SES, single-parent family, older sibling dropped out of high school, changed school two or more times from first to eighth grade, and average grades of C or lower from sixth to eighth grade, repeated an earlier grade from 1st to 8th grade). These students, compared with low-risk students, were more likely to be African American or Latino American and had less educated parents.

Two measures of peer engagement were assessed 2 years later, both based on reports from the focal students: (1) how important they thought their friends considered attending classes, studying, getting good grades, finishing high school, and continuing education past high school, and (2) how many of the students' friends had plans to attend 4-year colleges. The findings indicated positive effects of peer engagement on postsecondary and college enrollment, even with controls for parental school involvement, parents' educational expectations, students' school engagement, and college preparation activities. Compared with students whose friends did not have college plans, students who reported that most or all of their high school friends had plans for enrolling in 4-year colleges were far more likely to enroll in 4-year colleges themselves within 2 years of high school graduation. In addition, the importance that friends reportedly attached to learning activities such as studying and getting good grades increased the likelihood that the focal students would enroll in some form of postsecondary education (from short-term vocational programs to bachelor's degree programs), but not whether they would enroll in 4-year colleges. However, these peer factors were unrelated to students' persistence in postsecondary education (i.e., enrollment in postsecondary education full-time within a year after high school graduation and continuous attendance).

Sokatch (2006), also using data from the NELS but employing less restrictive sample selection criteria, reported similar findings. In his study of a sample of low-income African American and Latino American youth who attended public urban high schools, the best predictors of enrolling in 4-year colleges at least half-time in the fall following high school graduation were having more

friends who planned to go to 4-year colleges and having friends who wished to go to college after high school. This relation held with controls for academic achievement, financial aid information, parenting behavior, maternal school involvement, and students' perceptions of whether their mothers wished them to enroll in college immediately after high school.

In qualitative interviews with African American and Latino American college students about how peers in high school influenced their preparation for, decisions about, and adjustment to postsecondary education, many credited their friends for getting them to consider college as an option. They described their friends as advocates and monitors of academic engagement, as sources of academic and social support that were critical in keeping them on track academically, and as college advisors (e.g., introducing them to programs that sponsor student visits to college campuses and universities around the country, encouraging involvement in college preparatory programs, helping with applications to college; Holland, 2011). In addition, friendships with majority-group peers might allow ethnic minority youth to garner cultural and social capital that enhances education attainment of ethnic minority youth. Baysu and de Valk (2012) investigated the educational trajectories of Turkish and Moroccan second-generation ethnic minority youth living in four Western European countries (Sweden, Belgium, Austria, Germany). Across school systems, having more majority group friends (i.e., friends of Swedish/Belgian/Austrian/German origin) was associated with increased chances that the Turkish and Moroccan youth followed academic trajectories that ended with university attendance, net of school-level ethnic segregation. Having friends who left school without a diploma was associated with being in nonacademic trajectories (e.g., vocational).

Although studies of this genre are a needed counterweight to the emphasis in the research literature on the negative influences of young peers and friends, they do not provide compelling evidence of positive peer/friend influences, largely because they fail to address selection issues. Linkages between the behavior/attitudes of youth and that of their friends may reflect *influence* whereby friends socialize each other through modeling, support, reinforcement, and other processes, but they also may reflect *selection* whereby individuals interested in postsecondary education, for example, seek out peers with similar values (Crosnoe, Cavanaugh, & Elder, 2003). Both processes may occur within the same dyadic relationships, but efforts to parcel out the relative importance of these

two processes suggest that selection may be stronger in explaining associations between friends' behavior (e.g., Matsueda & Anderson, 1998). Without controlling for selection, overestimation of effects is likely.

One strategy to control selection effects in quantitative studies involves estimating cross-lagged models that measure the association between behavior/attitudes of youth and friends' behavior across three or more time-points (Matsueda & Anderson, 1998). Another is to examine the longitudinal association between behavior/attitudes of youth and friends' behavior at one time point, controlling for earlier behavior/attitudes (e.g., Crosnoe et al., 2003). Studies seeking to determine whether and how adolescent friendships during high school influence the decisions of ethnic minority and low-income youth to go to college and their persistence once enrolled have not used either of these strategies. A second limitation of these studies, and one that precludes use of the aforementioned strategies, is reliance on youths' perceptions of their friends in the absence of data directly from friends. This is problematic because adolescents tend to overestimate the extent to which their friends are similar to them (Crosnoe et al., 2003). Research that overcomes this limitation and employs sophisticated strategies to control selection effects will advance this area of study.

A longitudinal investigation by Cherng, Calarco, and Kao (2013), using data from the National Longitudinal Study of Adolescent Health, represents an important step in this direction. Direct measures of the characteristics and resources of both adolescents and their same-sex best friends permitted Cherng et al. to control several variables that might influence friend selection (e.g., GPA). They found that having a best friend with a college-educated mother significantly increased the likelihood of college completion, but having a best friend whose parents were high income did not. The effect held even after controlling for adolescents' family resources and for other factors (e.g., adolescents' and friends' academic achievement and expectations, parental expectations, school characteristics) that might influence both friend selection and educational attainment. Importantly, adolescents of different racial/ethnic backgrounds, socioeconomic statuses, and achievement levels appeared to benefit similarly from having best friends with a college-educated mother, and the benefits were evident regardless of whether friendships were reciprocated. Cherng et al.'s findings suggest that adolescent friendships can be an important source of social capital by providing access to college-educated adult role models, some of whom may adopt a direct mentoring role.

Mentoring Relationships

Mentoring relationships that develop outside of school naturally or through formal programs are also associated with positive education-related outcomes. An analysis of youth participating in the Big Brothers/Big Sisters of America program found that time spent with mentors and mentees' trust in the mentors were positively associated with increases in grade point average over time. Time spent with mentors was also associated with increases in time spent on homework (Gaddis, 2012). A study that used data from the National Longitudinal Study of Adolescent Health examined the effects of having natural mentors during adolescence and on outcomes from the ages of 18 to 26. After controlling for earlier levels of functioning, youth who reported having mentors were more likely to have finished high school and attended college. Moreover youth who did not attend college were more likely to work 10 or more hours a week if they reported having mentors (DuBois & Silverthorn, 2005).

Organized youth programs can put young people in contact with institutional agents. Research shows that youth involvement in extracurricular activities is associated with greater educational attainment (Erickson et al., 2009), and one of the mechanisms underlying this link may be the social capital youth develop through relationships with institutional agents. Involvement in extracurricular activities and organized youth programs can expose youth to adults who provide guidance and resources. Jarrett, Sullivan, and Watkins (2005) found that adults participating in organized youth programs provided youth with resources, including information, assistance, exposure to adult worlds, support, and encouragement. Youth also build relationships with institutional agents through programs designed to prepare them for work or college. Hemmings (2007) studied a program in which youth advocates, who were recent college graduates, help set up low-income high school students with internships in order to prepare them for the world of work. The youth advocates went beyond the stated goals of the program by helping youth build social and cultural capital that help in navigating college and middle-class society. They tried to help students develop a cultural repertoire that would enable them to be facile in disparate environments. In addition to addressing students' individual needs, they took students on college campus visits, helped them with college applications, and exposed youth to middle-class social networks. Youth advocates acted as bridges to resources and services to which the participants in the program would not normally have access.

Similarly, "I Have a Dream" programs that provide comprehensive and individualized support to help low-income youth graduate from high school and guarantee college scholarships to those who do graduate have been successful in large part because of the relationships students establish with program staff. Studies of these programs indicate that program staff provided students with various resources, including tutoring, tuition for private schools, and emotional support. Participants in two "I Have a Dream" programs graduated from high school at almost twice the rate of a control group of students who were a year older. Participants in the program also attended college at higher rates than similar students not in "I Have a Dream" programs (Kahne & Bailey, 1999).

Natural mentors can provide multiple forms of capital that keep motivated low-income students on track academically and help them get back on track if they digress. Abelev (2009) conducted life-history interviews with 50 adults (mostly African American) who were first-generation college students. Half were currently enrolled in universities and the other half were middle-class professionals already established in their careers. In discussing factors that contributed to their educational attainment and socioeconomic advancement, over half of the respondents mentioned a mentor who helped them transfer from low-performing public schools to high-performing public schools (typically magnet or charter schools) or private schools. The mentors often paid for the tuition, or arranged to have the fees waived for the students (direct financial assistance was the second most often mentioned factor/resource). A third type of resource that mentors provided was a customized education plan to ensure that "at-risk" behaviors such as teen pregnancies did not derail the educational trajectories of youth. In instances where adolescents gave birth, these plans helped them fulfill their family responsibilities while continuing to advance educationally. The mentors were also important sources of cultural capital, helping youth learn middle-class "habitus" (Bourdieu, 1977), including how to successfully navigate and maneuver within various "mainstream" social contexts.

Relationships With Institutional Agents

Along with the social capital that comes from parents, important nonparental adults—termed institutional agents—can also be key sources of social capital for young people. Institutional agents are "individuals who have the capacity and commitment to transmit directly, or negotiate the transmission of, institutional resources and opportunities" (Stanton-Salazar, 1997, p. 6). Institutional agents

help youth navigate institutions by providing knowledge, teaching skills, and helping socialize youth around the norms of mainstream institutions. Institutional agents are not merely supporters and role models—they actually pass on resources and provide children with access to various opportunities (Stanton-Salazar & Dornbusch, 1995). Institutional agents can also act as bridges to important people, networks, and opportunities (Stanton-Salazar, 1997). School counselors, coaches, program staff, and mentors can act as institutional agents (DuBois & Silverthorn, 2005).

School personnel are some of the most important institutional agents for low-income youth. Erickson et al. (2009) found that having teacher mentors rather than other types of mentors was most strongly related to educational attainment. Youth with more parental resources were more likely to have mentors, especially teacher mentors, but teacher mentors increased the probability of attending college more for youth with fewer resources than for youth with more resources. On the other hand, naming relatives as mentors seemed to be more beneficial for youth with more resources. Youth who named relatives as mentors were more likely to attend college. This increase in probability was greater for youth with more resources compared with youth with fewer resources. The findings suggested that relatives as mentors have complementary effects, increasing the likelihood of college attendance more for youth who are advantaged, whereas teachers as mentors have compensatory effects, increasing the likelihood of college attendance more for youth who are more disadvantaged (Erickson et al., 2009).

González, Stoner, and Jovel's (2003) qualitative study contrasted the prior school experiences of Latina American students who were in community colleges with those who were in 4-year colleges. Almost all of the students in 4-year colleges participated in gifted and talented education programs in which teachers encouraged them and were invested in their school success. Many of the students described getting glowing recommendations for college from their teachers. Moreover, participating in the gifted and talented education programs opened the door to other college preparatory programs that provided SAT-taking skills, college visits, and help with college essays. For these students, social capital accumulated throughout their K–12 education. On the other hand, a group of students who attended community college described mostly negative school experiences. They explained how tracking, English as a second language placement, and unsupportive school personnel essentially thwarted their chances of attending 4-year colleges. Access to institutional agents and social

capital seemed to differentially shape the trajectories of these two groups of students.

School counselors can also be institutional agents and critical sources of social capital. For low-income students, in particular, school counselors may be one of the most important resources for information about college, especially because low-income parents may lack knowledge about the college application process. African American students and low-SES students are more likely to go to their school counselors for information about college than non–African American students and high-SES students (Bryan et al., 2009). Contact with school counselors for college information by Age 16 increases the odds that low-income high school students would apply to two or more colleges (Bryan, Moore-Thomas, Day-Vines, & Holcomb-McCoy, 2011).

School Structures

High school graduates from low-income, African American, and Latino American families enter 4-year institutions at lower rates than those from higher-income, European American and Asian American families partly because of financial barriers, but also because, on average, they are less qualified academically. For example, the U.S. National Center for Education Statistics constructed a 4-year college qualification index based on high school grade point average, senior class rank, aptitude test scores from the National Educational Longitudinal Study, SAT or ACT scores, and a measure of curricular rigor. On this index, 86% of high school graduates in 1992 from families with high incomes were at least minimally academically qualified for admission to 4-year institutions, as compared with 68% of those from middle-income and 53% of those from low-income families. The proportion of college-qualified students was also directly related to their parents' educational attainments (National Science Board, 2002).

Score gaps among demographic groups in performance on the U.S. National Assessment of Educational Progress (NAEP), a congressionally mandated program, narrowed between 1990 and 2009, but remain substantial. In 2009, at Ages 10, 14, and 18, European and Asian American students scored significantly higher than their African American and Latino American counterparts (National Science Foundation, 2012). In 2005, at Age 18, a higher percentage of Asian American students (35%) scored at or above “proficient” on the NAEP mathematics assessment measures than did European American (29%), Latino American (8%), and African American (6%) students (Aud et al., 2010).

These demographic disparities parallel numerous inequalities in education. For example, U.S. national data collected from public high school teachers in 2007–2008 indicated that the racial/ethnic concentration of schools was related to teacher qualifications and teacher experience, both indicators of teacher quality (Aud et al., 2010). In schools with at least half African American enrollment, 25% of mathematics teachers had neither majored in mathematics in college nor been certified to teach mathematics—a rate that was almost 3 times higher than the rate for schools with at least half European American enrollment (8%). Schools that were more than half African American and schools that were at least half Latino American had a larger percentage of new teachers (i.e., less than 3 years of experience) than schools with at least half European American enrollment (13%, 15%, 10%, respectively; though it should be noted that in schools that were 50% or more Asian American, 16% of the teachers had less than 3 years of experience) (Aud et al., 2010).

Another challenge facing low-income and disadvantaged racial/ethnic minority youth is the lack of advanced placement classes. These classes provide opportunities for higher learning and enable students to begin earning college credits. Research has shown that low-income and disadvantaged ethnic minority students are less likely to attend schools that offer a wide variety of advanced placement classes and that within the schools that do offer them, low-income and ethnic minority students are disproportionately underrepresented in them (Solorzano & Ornelas, 2002).

The resources high schools dedicate to postsecondary planning and the extent to which school personnel are active in promoting college attendance shape college enrollment and college choice. As noted previously, these resources are particularly important for low-income and disadvantaged ethnic minority students who come from families without college-going histories. These students are especially dependent on teachers, counselors, and other nonfamilial adults to help them make educational plans and decisions (Roderick, Coca, & Nagaoka, 2011). Nonetheless, this is another domain in which low-SES and ethnic minority youth are at a disadvantage. Relying on data from the National Educational Longitudinal Study, Hill (2008) used surveys from school administrators to characterize school practices related to college attendance. Schools were grouped into three types of college-linking strategies. *Traditional schools* encouraged college visits and assisted students with college applications, but were limited in their outreach to parents. *Clearinghouse schools*

devoted substantial resources to college planning, assisted students with college applications, and conducted outreach to college representatives but little to parents. *Brokerizing schools* exemplified all of these characteristics, but also conducted considerable outreach to parents. Hill found that, controlling for student characteristics, students in brokering schools were more likely to enroll in college and in 4-year colleges rather than 2-year colleges. Brokering schools were less likely to serve minority and low-SES student populations, a factor that may partly explain why the vast majority of high-achieving, low-income students do not apply to highly selective colleges (Hoxby & Avery, 2013).

In a study of the 2005 high school graduates of the Chicago Public School System, which serves a predominantly low-income ethnic minority population, Roderick et al. (2011) demonstrated that urban students who aspire to 4-year degrees are more likely to plan to attend, apply to, be accepted into, and enroll in 4-year colleges that match their qualifications if they attend high schools where (a) a strong history of 4-year college-going exists, (b) teachers report high expectations and strong supports for college attendance, and (c) a high percentage of students complete the college financial aid application. Because the financial aid application is complex and requires technical support, its completion is a good indicator of the extent to which the schools are organizing students and providing concrete support around college application.

Poor schools appear to be an important contributor to the pre-college disparity in educational attainment between Black Caribbean students and White British students. Research based on national longitudinal data indicates that family-level socioeconomic variables do not account for the racial gap. Nor do parental and student attitudes (e.g., academic self-concept, educational aspirations), educational expectations, or achievement-related behaviors (e.g., parental supervision, parental involvement), as Black Caribbean students and their parents on average are *more* advantaged on these measures than White British students (Strand, 2007, 2011).

Proximal, Social Location Influences Within the College Context

Just as social location differences are reflected in the demographics of postsecondary education, they are also mirrored in the college experience itself. In addition to juggling increasing independence with the academic and

social demands in the college environment, the transition to college of low-income and racial/ethnic minority youth may be complicated by negative stigma, social class bias, and discriminatory treatment (Huynh & Fuligni, 2012). Low-income and racial/ethnic minority youth may experience feelings of isolation, alienation, and marginality, especially if norms in the college context (e.g., independence) are incongruent with norms in their natal family and community (e.g., interdependence) (Connor et al., 2004; Garcia, Hallahan, & Rosenthal, 2007; Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012; Stuber, 2011). Such experiences can undermine psychological adjustment, academic performance, and academic persistence (Connor et al., 2004; Huynh & Fuligni, 2012; Stephens et al., 2012), although some research indicates that perceived discrimination during college is associated with enhanced academic motivation among African American students (Levin, Van Laar, & Foote, 2006). The latter finding has been interpreted as a challenge response (coping resources outweigh task requirements) in distinction to a threat response (task requirements outweigh coping resources) and consistent with the notion that awareness of racism and structural barriers, in combination with connection to other African American students, are important elements of achievement strategies among African American students (Levin et al., 2006). It has also been pointed out that African Americans' ability to attribute negative experiences and outcomes to external causes enables them to maintain high academic commitment and motivation in the face of perceived discrimination (Levin et al., 2006; Oliver, Rodriguez, & Mickelson, 1985).

For low-income and working-class students in the United States and Britain, college attendance often means high-intensity employment and living off-campus. Compared with students from higher-income families, students from low-income families are more likely to work to earn money to support themselves while in college and are more likely to live at home during the first year of college (Bozick, 2007; Connor & Dewson, 2001; Heath, 2008; Walpole, 2003). Similarly, among those attending college in Britain, Black (Black Caribbean and Black African) students spend more time working than White and Indian students (Connor et al., 2004). These economic strategies can put students at a disadvantage in terms of persistence; accrual of human, social, and cultural capital; and post-college earnings (Bozick, 2007; Humphrey, 2006). Students who work more than 20 hours per week are more likely to drop out during or at the end of the first year of

college, controlling for socio-demographic characteristics, academic preparation, and a host of other background factors. This relation is attenuated when students live on campus, but intensified when students live at home. Students with the fewest economic resources tend to live at home and work at high levels of intensity, further impeding their ability to persist (Bozick, 2007).

In addition to making it difficult to keep up with course work, working can hamper involvement in student activities (Humphrey, 2006; Walpole, 2003). Longitudinal data from Walpole's (2003) national study of college students attending 4-year institutions indicated that low-SES students spent less time than their higher-SES counterparts engaging in activities that provided opportunities to accumulate social and cultural capital especially useful for educational attainment (e.g., visiting faculty members at home occasionally or frequently; spending time in study clubs or groups). They also spent less time studying than their higher-SES counterparts. Low-SES students appear to be less able than advantaged students to convert whatever social and cultural capital they accumulate during college to economic capital upon leaving college. Walpole (2003) found that, 9 years after entering college, students from low-SES backgrounds had lower levels of income, lower rates of graduate school attendance, and lower educational attainment than their peers from high-SES backgrounds. Low-SES students converted their capital into membership in the workforce at higher rates, but secured lower-paying positions than their high-SES peers.

Barriers to Building Social Capital

Several barriers preclude the accumulation of social capital by poor and working-class minority adolescents, including trust, race- and class-based stigma, economic constraints, and structural constraints. Understanding these barriers is a precondition to overcoming them in order to transmit the kinds of social capital that will facilitate educational attainment among socioeconomically disadvantaged youth.

Trust

One of the ways that social capital is created is through trusting relationships (Coleman, 1988). Abada and Tenkorang (2009) found that having trusting relationships with family members, neighbors, and people at work was particularly important in predicting enrollment in postsecondary education for Black youth in Canada, as compared with

other children of immigrants. Having trusting relationships helped explain the disparities in educational outcomes between Blacks and other groups. Similarly, Gaddis (2012) found that the level of trust between mentees and mentors is positively related to better grades for mentees.

Trust established in these types of relationships can provide a foundation for information and resources instrumental in promoting academic achievement and the pursuit of postsecondary education. For poor and working-class youth, differences in race and class and accompanying social distance, may make establishing trusting relationships with institutional agents particularly difficult. Youth may encounter mistreatment and experience alienation when they reach out for help (Kahne & Bailey, 1999). Minority students perceive more barriers to developing genuine and trusting relationships with school personnel, with the most frequently cited barrier being the authority/status of school personnel (Markward, McMillan, & Markward, 2003).

Stigma

Awareness and internalization of stigma associated with poverty or low-income may also act as a barrier that impedes youth from forming relationships with institutional agents. Research shows that individuals become aware of socioeconomic status and endorse stereotypes about the poor very early in childhood (Chafel, 1997; Weinger, 1998). Internalized class stigma can affect the way people behave and perform under pressure (Croizet & Claire, 1998) and can shape the way they interact with individuals who are of higher status. In their experiment examining cross-class interactions among college students, Garcia et al. (2007) found that low-income college students were less expressive (i.e., more difficult to read) when interacting with high-income peers. They concluded that, because lower-class status is stigmatized, low-income individuals attempted to conceal their class identity in these interactions by being less expressive. In a companion study, students who reported being from blue-collar backgrounds reported that they would change their behavior more when interacting with wealthy individuals than when interacting with working-class individuals. The findings from both of these studies imply that social class stigma is salient when lower-class individuals are interacting with individuals from higher-class backgrounds (Garcia et al., 2007). Awareness of stigma (whether conscious or subconscious) may make initiating cross-class relationships with institutional agents difficult for lower-class individuals and perhaps may make these interactions more stressful. Lack

of expressivity on the part of lower-class individuals may make it more difficult for a shared understanding to be reached during these interactions. Stigma may keep youth from accessing or tapping into resources and networks.

Furthermore, biases, stereotypes, and stigma likely shape who institutional agents choose to sponsor. Youth are valued differently based on race, class, culture, and language. Latino American students in one study described more negative than positive experiences with teachers and counselors. School personnel had low expectations and provided little encouragement to pursue postsecondary education (González et al., 2003). Likewise, a study of Aboriginal and Anglo-Australian girls living in public housing in Glebe, Australia, described how school personnel stigmatized them based on their neighborhood. As a result, these girls did not feel encouraged in their educational pursuits and turned to relationships with friends, instead of school-based institutional agents, for help dealing with problems at home or for assistance with meeting everyday needs (Bottrell, 2009). Young, ethnic minority Britons from working-class backgrounds also describe similar experiences as barriers to completing higher education (Basit, 2012).

Gaining access to high-status or privileged social capital may require certain types of cultural capital, as institutional agents may recruit mentees who display middle-class cultural capital (Stanton-Salazar, 1997; Stanton-Salazar & Dornbusch, 1995). In addition to issues of stigma and discrimination, low-SES youth may have fewer opportunities to build relationships with institutional agents because of financial constraints. As mentioned earlier in the chapter, low-income students work more during college and are more likely to live at home, instead of on campus, than other students. These circumstances increase the likelihood that low-income students will leave school during their first year of college (Bozick, 2007) and spend less time than more economically advantaged students in activities that potentially build social capital (e.g., attending social events at faculty members' home, participating in student clubs and groups) (Walpole, 2003).

Structural Constraints and Network Composition

Broader systems of social stratification influence how networks are formed and who is included and excluded (Hampton & Duncan, 2011; Stanton-Salazar, 1997, 2011). Social networks tend to be largely homogeneous in terms of demographic characteristics such as race and class (McPherson, Smith-Lovin, & Cook, 2001). Factors such as homophily in social networks and neighborhoods, as

well as racial and economic segregation in neighborhoods, schools, and other contexts, may act as barriers that block access to networks that would open up educational opportunities for minority youth and youth from poor and working-class backgrounds (Quillian & Redd, 2008). Exclusion inherent in some social networks likely contributes to inequality in educational opportunities (Stanton-Salazar, 1997).

Racial and economic segregation are structural constraints that influence the contexts in which children are developing and the resources available to them within these contexts. Poor and working-class youth lack access to high-status institutional agents and networks, in part because of where they live (Coll et al., 1996; Quillian & Redd, 2008). Neighborhoods that have greater proportions of residents with higher levels of income and education are associated with better educational achievement and attainment outcomes among youth, even accounting for school-level variables (Ainsworth, 2002; K. Wilson, 2001). Goldsmith (2009) examined the long-term effects of school and neighborhood racial segregation during high school on educational attainment at Age 26. After accounting for early student and family characteristics, the concentration of African American and Latino American students in a school was associated with less educational attainment by Age 26. This research suggests that students with similar characteristics and backgrounds have different odds of educational attainment depending on the racial and ethnic makeup of their schools. Goldsmith hypothesized that part of the reason for this disparity is that African Americans and Latino Americans in segregated neighborhoods and schools have limited access to high-status networks that provide information and resources important for accruing high levels of education.

Other work has shown that human and social capital at the school level, as measured by the number of parents who contact the school about academic matters, average family income, average parental education, and average parental educational expectations within the school, is positively associated with college enrollment (Perna & Titus, 2005). African American and Latino American families not only had less family income, parental education, and math coursework than European American and Asian American families, but the African American and Latino American youth were much more likely to be in schools with the lowest average family income and parental education (Perna & Titus, 2005).

Several studies have reported that the networks of poor and working-class youth consist of individuals with

lower levels of human capital (e.g., education, income, and occupational prestige) and less middle-class social capital (Ream & Palardy, 2008). In terms of human capital, Haddad, Chen, and Greenberger (2011) found that the nonparental adults who were important in the lives of Latino American youth had lower levels of education than those of Asian American or European American youth. Important nonparental adults in the lives of Asian American youth had higher occupational prestige than the nonparental adults named by European American and Latino American youth. A similar pattern was shown among Mexican-origin high school students where the networks of high-SES students had an overall higher SES, based on the combined status of the members of the network (Stanton-Salazar & Dornbusch, 1995). The networks of poor and working-class youth and their parents also tended to include fewer school personnel and professionals (Horvat et al., 2003; Stanton-Salazar & Dornbusch, 1995).

Horvat et al.'s (2003) qualitative study of parents of elementary school students indicated that the networks of poor and working-class parents were distinctly less adept at navigating the school environment than those of middle-class parents. The networks of poor and working-class parents were comprised mostly of family members, whereas the networks of middle-class families were comprised of a wider array of adults, including other parents, school personnel, and extracurricular activity leaders. Middle-class parents had larger networks, in part because their children participated in organized activities at greater rates than other children; parents were able to meet other adults who were affiliated with the organized activities in which their children participated. Parental networks enabled middle-class parents to band together to address problems at school, advocate for their children individually and collectively, and secure special services and resources for their children. Although the networks of working-class parents were helpful in many other areas (e.g., childcare, transportation, emotional support), network members tended not to be useful when it came to school-related matters (Horvat et al., 2003).

Thus, although low-SES parents have social capital, the status of the network members is generally what makes some aspects of social capital more valuable than others. To illustrate this point, Portes and Landolt (1996) stated that "there is considerable social capital in the ghetto areas but the assets obtainable through it seldom allow participants to rise above their poverty" (p. 20). D. H. Kim and Schneider (2005) made a similar point when discussing network closure (i.e., when members of a network know

each other; Coleman, 1988). They explain that “network closure among parents with limited education and few social resources could result in a network that provides few resources for helping students gain access to information necessary for college applications” (p. 1183). Illustrating this point, findings from an empirical study suggested that social closure in parental networks may only promote high school graduation in low-poverty schools and that it may in fact be detrimental to high school graduation in high-poverty schools (Fasang et al., 2010).

Networks that are dense with individuals with high levels of education, high-paying jobs, elite careers, or wealth are likely better able to provide information, resources, and opportunities than networks comprised of poor and working-class individuals. As a result, working-class and minority youth may be more dependent on nonfamilial sources of social capital (e.g., institutional agents) for education-related issues and opportunities. In middle-class families, parents can often act as institutional agents (Stanton-Salazar & Dornbusch, 1995). However, in poor and working-class families, parents and other family members may be incapable of acting as institutional agents because they lack power and influence and do not have personal experience successfully navigating educational institutions (Stanton-Salazar, 1997).

Even when parents lack middle-class social capital, they may still be able to connect children with institutional agents (Stanton-Salazar & Dornbusch, 1995). Wuthnow (2002) referred to connections made between people of different social classes as “status-bridging social capital.” Through status-bridging social capital, people with less influence acquire resources through their social ties to individuals with higher status. Indeed, connections with high-status individuals or individuals in elite careers may help compensate for the shortcomings and lack of resources within low-income parents’ networks. For example, Jarrett (1995) reviewed existing qualitative studies of poor African American families, focusing on family factors related to upward mobility. Parents of socially mobile children were effective at developing networks of adults, including friends and relatives who provided support and resources to children. Sometimes these adults were middle class and could provide exposure to mainstream institutions and resources not available in the neighborhood. Another strategy used by parents of upwardly mobile children was building strategic alliances with mobility-enhancing institutions and organizations that underscore the values parents want to instill in their children. One way parents built these alliances was by making sure their children

were actively involved in church and school. These parents sought out programs and activities that help their children develop skills and build relationships. Parents of socially mobile children also encouraged adult-sponsored development, whereby children develop skills and competencies under the guidance of adults.

Summary and Future Directions

Parental expectations during middle school and high school are an important source of variation in postsecondary educational attainment among low-income and ethnic minority youth and there is a modest amount of evidence that they mediate social class disparity in the college plans and college enrollment of youth. Parental expectations influence educational attainment because they forecast the investments that parents will make in their children’s education and because they shape children’s educational aspirations and expectations. Parental involvement is also highly related to enrollment of youth in postsecondary education. In general, the link between parental expectations/involvement and educational attainment of youth is quite robust, as it holds after taking account of academic achievement of youth and various economic and demographic factors.

Further research is needed to assess the effects of educational aspirations and expectations on specific achievement-related behaviors in low-income and ethnic minority youth during high school and to determine whether the strength of these relations varies significantly by race, ethnicity, and race/gender subgroups. Research conducted two decades prior to the time of this writing indicated that the extent to which students believed that there were *negative* employment consequences of poor school performance was a better predictor of students’ academic achievement and engagement than the extent to which they believed that there were *positive* employment consequences of school success. African American and Latino American youth, as compared with Asian American youth, were overly optimistic that they could get a “good” job without getting a good education (Steinberg, Dornbusch, & Brown, 1992). During the past two decades, these beliefs may well have shifted and the ethnic/race differences may have dissipated, in response to increased demands and economic returns for high levels of education and training and continued declines in manufacturing and industrial jobs. Given increasing globalization and the major structural changes that have occurred in the U.S. economy during this period, there is merit in reassessing

these beliefs in relation to social location, and documenting the extent to which beliefs mediate and moderate links among achievement-related behaviors, parental educational expectations, and postsecondary educational attainment

There is a dearth of longitudinal research examining whether and how adolescent friendships during high school influence the decisions of ethnic minority and low-income youth to go to college and their persistence once enrolled. The few extant studies report positive effects of adolescent friendships on college-going, but these findings warrant caution because of potential selection bias. Studies are needed that use sophisticated strategies to control selection effects, as they would provide more valid estimates of the unique contribution of friendships to the postsecondary education outcomes of low-income and ethnic minority youth. Some research suggests that, in comparison with European American students in middle and high school, African American and Latino American students are more influenced by their peers and less by their parents in matters of academic achievement (Ogbu, 2003; Steinberg et al., 1992). Knowing whether this race/ethnic disparity exists with respect to college plans and college enrollment, in conjunction with knowledge about the educational plans of the mentees' friends, could be useful to high school counselors and mentors in shaping the messages they transmit to mentees.

Although researchers have made substantial strides in understanding the link between social capital and educational outcomes, there are several notable limitations that need to be addressed in future work. One of the main limitations is that most studies rely on secondary analysis of indicators that were not intended to measure social capital (Dika & Singh, 2002; Furstenberg, 2005). As a result, there are major discrepancies between how social capital is discussed theoretically and how it is assessed empirically. Theoretically informed, well-validated measures of social capital are needed to replace these crude, proxy indicators, as are systematic studies specifically designed to understand social capital (Dika & Singh, 2002). Measures of social capital should assess the status of network members, quality of relationships between network members, and the resources that are transmitted in these relationships.

In addition to measurement problems and the lack of in-depth studies, there is a paucity of research focusing on social capital during the transition to adulthood. Most studies have investigated the role of social capital during childhood and adolescence. Future studies that explore how parents use their networks to garner resources for

their children during the transition to adulthood would be valuable. Some noteworthy research has been conducted on the role of social capital among first-generation college students. More work examining how noncollege youth access, accumulate, and utilize social capital would be valuable. Likewise, more work should be directed toward understanding the role of race and discrimination in the ability of ethnic minority youth to access and convert social capital (Parcel & Dufur, 2001). How young adults acquire and use their own social capital through relationships with institutional agents is another important area for future research.

Few studies have focused on mentoring relationships during the transition to adulthood, and questions remain about what characteristics predict having a mentor and what characteristics of mentoring help connect young adults to jobs and educational opportunities. As with mentors, same-age peers may play a role in promoting or enhancing opportunities during the transition to adulthood. Thus attention should be paid to the extent to which friends transmit information and resources, as well as young adults' involvement in social and professional organizations as a source of social capital. Social capital studies focusing on the transition to adulthood need to expand the range of outcomes that are assessed. Examining how social capital affects the employment opportunities, labor force participation, and occupational prestige of youth is particularly important.

The gender gap in educational achievement, college participation, and college graduation rates among African Americans is alarming. The gap is substantially larger than what exists among other racial/ethnic groups and has increased markedly since the mid-1970s. This pattern has crucial implications for individual-level mental health functioning, economic well-being, family formation and stability, and performance of paternal roles. It also exacts a high societal cost linked to myriad social problems resulting from low educational attainment. Undoubtedly, the causes of this gender gap and the racial disparity in the gender gap are multifaceted. In light of these considerations, there is a clear need to document processes that promote postsecondary attainment among highly vulnerable groups, mediate differences among race/gender groups in educational outcomes, and processes that mitigate these disparities.

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CHAPTER 11

Socioemotional Development in Changing Families

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INTRODUCTION

Since the latter part of the 20th century, dramatic changes have taken place to the structure of the family, such that the traditional nuclear family headed by a heterosexual married couple is now in the minority. A number of factors have contributed to the diversity of family forms in which children are reared today; the increasing numbers of women employed outside the home, women’s enhanced educational and career opportunities, the introduction of the contraceptive pill, the rise of the women’s and gay liberation movements, greater involvement of fathers in the day-to-day lives of their children, and the advent of assisted reproductive technologies are just some of the factors that have increased the complexity of contemporary family life. As a result, a growing number of children are being raised by cohabiting, rather than married, parents, by single parents, by stepparents, and by same-sex parents,

with many children moving in and out of different family structures as they grow up. More remarkably, it is now possible for a child to have up to five “parents” instead of the usual two; these may include an egg donor, a sperm donor, a surrogate mother who hosts the pregnancy, and the two social parents whom the child knows as mom and dad, or mom and mom in the case of lesbian mothers and dad and dad when the parents are gay fathers.

In spite of the rise in the numbers of these nontraditional family forms, the nuclear family is still generally considered the optimal environment in which to rear children, and remains the gold standard against which all other family types are assessed. This view is rooted in the theories of children’s socioemotional development that were in vogue in the early 1970s, including psychoanalytic theory, social learning theory, and, to a lesser extent, attachment theory. Central to psychoanalytic theory was the belief that a mother and a father were necessary for boys and

girls to identify with the parent of the same gender as themselves, and thus to achieve healthy psychological functioning (Freud, 1925). An underlying assumption of classic social learning theory was also that mothers and fathers were influential in children's development and well-being, by providing role models for their daughters and sons (Bandura, 1977). Whereas attachment theory, at that time, stressed the importance of the child's relationship with one parent (the mother, with the father playing an essential supporting role) (Bowlby, 1969), this view was challenged by Rutter (1972), who showed that children could form attachments to more than one parent, and that the primary parent need not be the mother; this position was later accepted by Bowlby (Bowlby, 1988).

Contemporary theories have drawn from a developmental systems approach (Lerner, 2006; Lerner, Lewin-Bizan, & Warren, 2011), whereby bidirectional relations between individuals, the family, and the wider social world, including historical time and place, are viewed as influences on child development. This perspective places less emphasis on the presence of two married opposite-sex parents in the family home and instead focuses on the quality of family relationships, including parenting processes such as warmth and control, child effects on parenting such as temperament, and wider social and cultural influences (Lamb, 2012). Thus, there has been a shift in thinking, such that family processes are coming to be viewed as more important than family structure for children's psychological well-being, although it is acknowledged that each may influence the other.

Research on children's socioemotional development has also been enhanced by a life-span perspective, which views development as a process from conception onward (Freund & Lamb, 2010). This approach has been used to good effect in relation to nontraditional families by Hetherington and Stanley-Hagan (2002) who conceptualized divorce, single-parenthood, and remarriage as a series of transitions, each of which may affect parenting and child adjustment and may have a greater impact in the years immediately following a transition or when a family transition coincides with a developmental transition. In the present chapter, we examine the impact of changing family contexts on socioemotional development from infancy to early adulthood, where such data are available, with particular attention to the developmental stages that are of greatest relevance to the different family types.

Studies of the socioemotional development of children in changing family contexts are not simply of interest in their own right, but also provide "natural experiments,"

whereby factors that usually go together can be examined independently (Rutter, 2007). Thus, studies of emerging family forms can shed light on the influence of the number, gender, sexual orientation, and genetic relatedness of parents on child development (Golombok, 2000, 2005). This chapter examines the nontraditional family contexts in which children are being raised at the beginning of the 21st century: families headed by single parents, step-parents, cohabiting parents, parents whose children have been born through assisted reproductive technologies, and same-sex parents. The specific issues and concerns raised by each family type are outlined, followed by a discussion of the empirical findings on parenting and child adjustment, with particular attention to the relative importance of family structure and family processes for children's socioemotional development. Each section ends with a short conclusion. The general conclusion revisits the contribution that research on changing family contexts has made to our theoretical understanding of family influences on children's socioemotional development.

SINGLE-PARENT FAMILIES

Since the 1970s there has been a striking increase in the numbers of single-parent families. In the United States in 2008 (U.S. Census Bureau, 2012a) and the United Kingdom in 2007 (Lloyd & Lacey, 2012), around 30% of households with children were headed by single parents. This compares with less than 10% at the beginning of the 1970s. However, there is considerable variation from one country to another, with data reported by the U.S. Census Bureau (2012a) showing that the proportion of single-parent families in Japan, today, is similar to that of the United States and United Kingdom in the early 1970s.

Although often viewed as a homogenous group, single-parent families are formed in a number of ways, each with different implications for children. Parental divorce or separation is the most common reason for children to be raised by a single parent, who is usually their mother. However, there has also been a rise in the number of mothers who have been single from the time of the child's birth. Whereas the large majority of these mothers had unplanned pregnancies, a small but growing number of women have actively chosen to become single mothers. The studies that follow have focused almost entirely on families headed by single mothers, rather than single fathers. However, the limited body of research on single-father families is also discussed.

Divorced Single Mothers

Each year, around 5% of U.S. marriages end in divorce (U.S. Census Bureau, 2012b). Divorce statistics do not give the whole picture, however, as there are no official registries of relationship breakdown among cohabiting couples, and thus of the number of children affected by the separation of cohabiting parents (Amato, 2000). The numerous studies of the psychological consequences of divorce for children have consistently shown that children whose parents divorce are more likely to exhibit emotional and behavioral problems, and are less likely to perform well at school, than are children in intact families (for reviews see Amato, 2000, 2001, 2005; Amato & Keith, 1991; Coleman & Glenn, 2009; Hetherington & Stanley-Hagan, 1999; Pryor & Rodgers, 2001; Rodgers & Pryor, 1998). For example, a landmark study that followed 4-year-old children from the time of their parents' divorce was conducted in the United States (Hetherington, Cox, & Cox, 1982; Hetherington, 1988). These children were compared with children whose parents were happily married, and also with children whose parents remained together in spite of marital problems. The children's behavior was assessed over a period of 6 years. In the first year, children from divorced families showed higher levels of conduct problems both at home and at school than did children from two-parent families, and higher even than those whose parents were in conflict but remained together. By the end of the second year, children's difficulties had declined, although the sons of divorced parents still showed higher levels of conduct problems than did boys from harmonious two-parent homes (Hetherington, Cox, & Cox, 1982). A similar pattern of findings was found at 6 years following the divorce. Compared with children in nondivorced families, daughters whose mothers had not remarried remained well-adjusted. Sons also exhibited more positive adjustment, but still showed a tendency toward increased rates of conduct problems (Hetherington, 1988).

As the majority of studies of single-parent families have focused on families formed by divorce, the question is raised of whether having only one parent is, in itself, psychologically harmful for children, or whether other aspects of single-parenthood are implicated. One such factor that has consistently been shown to be related to children's adjustment problems is conflict between parents (Amato, 2000, 2005; Pryor & Rodgers, 2001; Rodgers & Pryor, 1998). Interestingly, longitudinal studies have shown that children can develop psychological problems years before their parents' divorce, sometimes even before the

parents have considered separation (Cherlin et al., 1991), suggesting that the psychological problems shown by children in single-parent families may not simply result from the absence of a parent, but instead may arise from hostility between parents beginning before the divorce took place.

The financial hardship that commonly accompanies the transition into a single-parent family following divorce is another key factor associated with children's psychological problems (Amato, 2000, 2005; Hetherington & Stanley-Hagan, 2002; Pryor & Rodgers, 2001; Rodgers & Pryor, 1998). From their detailed examination of four large, nationally representative samples in the United States, McLanahan and Sandefur (1994) concluded that the lower income and sudden drop in income that results from single-parenthood is the most important factor in the underachievement of young people from single-parent homes. They found that adolescents who had lived apart from one parent during some period of their childhood were twice as likely to drop out of high school, twice as likely to have a child before the age of 20, and one and a half times more likely to be out of work in their late teens or early 20s than were those from comparable backgrounds who grew up with two parents at home. Similar findings arose from an earlier study of 16,000 children born in the United Kingdom in 1 week in March 1958 (Elliot & Vaitilingam, 2008; Ferri, 1976). A comparison of children in single-parent families and children in two-parent families around the time of their 11th birthday showed that those in single-parent families were more likely to show emotional and behavioral problems, as well as poorer academic achievement. However, the difficulties experienced by children in single-parent families were explained almost entirely by the low income associated with single-parenthood, rather than the absence of a parent. When family income was controlled for, children with single parents did not differ from children with two parents in the family home. From their review of more than 200 studies, Rodgers and Pryor (1998) concluded that the low socioeconomic status of single-parent families is largely responsible for the lower educational achievement of children whose parents have divorced. In addition to the direct effects of low income, the financial hardship experienced by many single-parent families following divorce often necessitates a move to a poorer neighborhood and a change of school, each of which is associated with negative outcomes for children (Amato, 2000, 2005).

It is not only financial support, but also social and emotional support that are often lacking for single mothers. As

Hetherington and Stanley-Hagan (2002) pointed out, it is not unusual for mothers to feel anxious, depressed, lonely, and lacking in confidence when they divorce. At the same time, children become more demanding, less compliant, more aggressive, and more withdrawn. For newly single mothers, the demands of looking after difficult children while in a poor emotional state can impair their ability to function as effective parents. They may be less affectionate, less communicative, less consistent, more irritable, and more punitive in disciplining their children than before, which may exacerbate their children's difficulties (Hetherington & Clingempeel, 1992). A number of studies have demonstrated a link between parental depression, poor parenting, and negative child outcomes in single-parent families following divorce (Amato, 2000; Dunn et al., 1998; Hetherington & Stanley-Hagan, 2002), with improvement in mothers' emotional well-being associated with improvement in children's adjustment. Hetherington and Stanley-Hagan (2002) found that, 2 years following divorce, three-quarters of divorced women reported that they were happier in their new situation than they had been in their final year of marriage, and most felt that it was easier to raise their children alone than with a disengaged, undermining, or acrimonious husband.

Although negative effects of divorce for children's functioning have consistently been reported, the differences found between children in divorced and intact families have been relatively small (Amato, 2000, 2001, 2005; Amato & Keith, 1991). Not all children whose parents divorce develop problems, and some show improved functioning. Of those who do exhibit problems, some experience short-term distress (which may last from a few months to 2–3 years), whereas others face long-term difficulties (Amato, 2001; Hetherington, 1989). Whether or not children develop problems, and how quickly they recover, depends on a number of factors, the most significant of which appears to be the effect of divorce on the relationship between parents (Amato, 2000, 2001, 2005; Amato & Keith, 1991; Coleman & Glenn, 2009; Hetherington & Stanley-Hagan, 1999; Rodgers & Pryor, 1998). When couples remain in conflict after divorce, children are more likely to continue to have problems, especially if they are drawn into their parents' disputes. If parents are able to cooperate over parenting, children are more able to cope. The quality of the relationship between children and their parents postdivorce has also been found to be influential—with a warm and supportive relationship with at least one parent acting as a protective factor for the child—and there is growing evidence for the importance of a positive

relationship with the noncustodial father (Amato, 2000; Amato & Gilbreth, 1999).

Whether or not the gender of the child, or the age at which the child makes the transition into a single-parent family, makes a difference to the impact of divorce on children remains inconclusive (Amato, 2000, 2001; Amato & Keith, 1991; Hetherington & Stanley-Hagan, 1999; Rodgers & Pryor, 1998). Although boys seem to be more vulnerable than girls, it has been suggested that girls may show distress in different ways. In terms of children's age at divorce, adolescence is often considered to be an especially difficult time. However, few studies have identified a clear link between children's age at divorce and psychological outcomes (Amato, 2000).

An important question is whether the difficulties experienced by children in single-parent families following divorce result from selection effects rather than the divorce itself. Individuals with psychological problems may be more likely to marry each other and to have children with psychological problems, transmitted through inheritance or poor parenting. The parents' psychological problems may also contribute to marital breakdown. Thus, the difficulties shown by their children may not be directly related to divorce. Amato (2000) concluded from his review that the negative outcomes for children whose parents had divorced had resulted largely from marital breakdown rather than selection effects, and to the extent that pre-existing factors were involved, the divorce had exacerbated these difficulties.

Unmarried Single Mothers

In addition to the increasing number of children raised by divorced single mothers, there has been a sharp rise in the number of children raised by unmarried single mothers. Today, around 20% of babies in the United States (McLanahan, 2012) and 15% of babies in the United Kingdom (Kiernan, 2006) are born into single-mother families. Before the 1970s, the proportion of children born to single mothers was less than 5%. Currently, in the United States, the rates are highest for children born to African American mothers. However, there has been an increase in single-mother families across many ethnic-racial groups. In the United Kingdom, the large majority of unmarried single mothers are White, although a higher proportion of Black Caribbean mothers are single at the time of the birth, as compared with mothers from other ethnic groups (Kiernan & Mensah, 2010). Rather than race or ethnicity, the factor most associated with the rise in single unmarried

mothers is social disadvantage. Whereas college-educated women continue to have children in the context of marriage, women who have not received an education beyond secondary school are much more likely to have children as single unmarried mothers (Kiernan, 2006; McLanahan, 2012). Although single at the time of birth, many unmarried mothers experience transitions in and out of cohabiting relationships, rather than remaining stably single (Kiernan & Mensah, 2010; McLanahan, 2012).

An influential study of the consequences of unmarried single-motherhood for children is the Fragile Families and Child Wellbeing Study (FFCWS), a longitudinal investigation of approximately 5,000 children born between 1998 and 2000 in the United States. The study recruited participants in medium to large cities, and included an oversample of births to single as well as cohabiting unmarried mothers (Reichman, Teitler, & McLanahan, 2001). In-depth data were obtained on children's cognitive development and behavioral problems. More negative cognitive and mental health outcomes were found for children born to single unmarried mothers than to married parents, even after differences in parental resources were adjusted for (Waldfogel, Craigie, & Brooks-Gunn, 2010). The more negative cognitive outcomes appeared to have resulted from a high level of family instability rather than single-motherhood in itself. However, growing up with a single unmarried mother seemed to have mattered more than family instability for children's emotional and behavioral problems. As with single-mother families formed by divorce, economic hardship, parental mental health problems, and poor parenting quality were associated with more negative outcomes for children of unmarried single mothers. Again, selection effects may have also been operating in this study, such that the preexisting characteristics of parents might have led to poorer outcomes for children of unmarried single mothers (Waldfogel et al., 2010).

The Millennium Cohort Study (MCS) in the UK (Hansen et al., 2008), a longitudinal investigation of a nationally representative sample of approximately 18,000 children born at the turn of the century, also provided data on children of unmarried single mothers. The study oversampled disadvantaged families, and 15% of the children had been born to unmarried single mothers. In a comparison between children born to single mothers, cohabiting mothers, and married mothers over the first 5 years of life, children born to single mothers who did not marry the child's biological father and children born into cohabiting families where the parents had separated showed the highest rates of externalizing and internalizing problems

(Kiernan & Mensah, 2010). The single mothers also experienced the highest levels of economic disadvantage and poorest mental health. After taking account of whether the family lived in poverty or the mother was depressed, no significant differences were found across family types for children's internalizing problems. However, although reduced, higher levels of externalizing problems remained for the children of single unmarried mothers.

Single Mothers by Choice

The term "single mother by choice" refers to a woman who has actively chosen to parent a child without a partner. Such women are generally, but not always, well-educated and financially secure, and in their late 30s or early 40s when they become mothers (Bock, 2000; Jadv, Badger, Morrisette, & Golombok, 2009; Murray & Golombok, 2005a). The different routes to single-motherhood by choice include sexual intercourse with a man who will not act as a father to the child, donor insemination (DI) at a fertility clinic, self-insemination with a known or anonymous donor, and adoption (Bock, 2000; Hertz, 2006; Jadv, Badger, et al., 2009; Weinraub, Horvath, & Gringlas, 2002). Although women opt for different routes according to their circumstances and beliefs, donor insemination at a clinic appears to be the most popular method, with donor insemination favored over adoption by those who wish to experience pregnancy and have a genetically related child (Hertz, 2006; Jadv, Badger, et al., 2009). Contrary to the notion of "choice," the majority of women who decide to go it alone as mothers do so not from choice, but because they do not have a current partner and feel that time is running out for them to have a child (Hertz, 2006; Jadv, Badger, et al., 2009; Murray & Golombok, 2005a).

Concerns about single mothers by choice stem from studies of single-mother families created by divorce or unplanned pregnancy, which show that children are at risk for psychological problems. However, as discussed above, the adverse outcomes for children in these single-parent families appear to be largely associated with parental conflict, socioeconomic disadvantage, maternal depression, and lack of social support, none of which is characteristic of families formed by single mothers by choice. Children of single mothers by choice are not exposed to parental conflict or separation from a father with whom they share their daily lives. Neither do they generally experience the economic disadvantage, lack of social support, or maternal psychological problems that commonly accompany marital breakdown or unplanned parenthood (Hertz, 2006;

Jadva, Freeman, Kramer, & Golombok, 2009; Murray & Golombok, 2005a). Nevertheless, they grow up without a father from the start and, perhaps more significantly, do not know his identity. This makes them distinct from most other children of single mothers, whose fathers may be absent but whose identity is known.

There is, as yet, little research on the development and well-being of children raised by single mothers by choice. The two controlled studies that exist have focused on single-mother families created by donor insemination. In one, a comparison was conducted between 27 single heterosexual mother families and 50 married heterosexual parent families, all with 6- to 12-month-old infants (Murray & Golombok, 2005a). There were no differences between the two family types, either in terms of maternal psychological well-being and adaptation to motherhood, or in expressed warmth and bonding between mother and infant. However, single mothers showed lower levels of interaction with and lower levels of sensitive responding to their infants than did married mothers, possibly because the presence of a partner allowed the married mothers more time with their babies. When followed up at the child's second birthday, the single mothers showed greater pleasure and less anger toward their children, and their children showed fewer emotional and behavioral problems (Murray & Golombok, 2005b). Nevertheless, at Age 2, the children of single mothers were too young to understand the meaning of their nontraditional family structure.

In a study of older children conceived by donor insemination, 30 single heterosexual and lesbian mother families were compared with 50 two-parent heterosexual and lesbian mother families (Chan, Raboy, & Patterson, 1998). The average age of the children was 7 years. The children were found to be well-adjusted, with no differences between children of single and partnered mothers in externalizing or internalizing problems, social competence, or adaptive functioning. Instead, behavioral problems were associated with greater parenting stress, greater interparental conflict, and less interparental love, irrespective of family type.

A key question regarding children born to single mothers by donor insemination is how they will feel about not knowing the identity of their biological fathers. How best to respond to children's questions about their fathers is a major concern of single mothers by choice (Jadva, Badger, et al., 2009; Mattes, 1997). Single mothers are more likely than heterosexual parents to be open with their children about their use of donor insemination, not least because they have to explain the absence of fathers to their children

(Murray & Golombok, 2005a, 2005b; Jadva, Freeman, et al., 2009). In a study of 35 single mothers with children aged between 4 and 8 years, mothers reported that their children began to ask about their fathers from Age 2 to 3 onward (Zadeh, personal communication, June 8, 2013). The extent to which children of single mothers by choice will feel the need to know the identity of, have information about, or even form a relationship with, their donors as they grow older is, as yet, unknown. However, a small study of adolescents with identity-release donors in the United States found that those from single-mother families were more likely than their counterparts from two-parent families to plan to request the identity of their donors when they reached Age 18 (Scheib, Riordan, & Rubin, 2005). Jadva, Freeman, Kramer, and Golombok (2010) found that the majority of adolescents who searched for, and made contact with, their donors through the Donor Sibling Registry, a website designed to help donor-conceived people find their donors and donor siblings (half-siblings born from the same donor but living in different families), were from single-mother homes. This suggests that finding out about their donors was more important to adolescents from single-mother families than to those with two parents. However, the large majority searched because they were curious about their donors, and not because they wanted father-child relationships (Jadva et al., 2010). Interestingly, studies have found that the majority of single mothers believe it is important for children to have male role models to compensate for the absence of fathers, and most ensure that their children have male figures in their lives (Jadva, Badger, et al., 2009; Murray & Golombok, 2005a). Whether or not this makes a difference to the development and well-being of children of single mothers by choice remains to be seen. However, as highlighted by Lamb (2012), there is no empirical evidence from other family types to suggest that male role models in the home enhance the adjustment of children and adolescents.

Single Fathers

Although far less common than single-mother families, single-father families are increasing in number. Around 8% of households with children in the United States are headed by a single father, up from 1% in 1960 (Pew Research Center, 2013). Single-father families are most likely to be formed following parental separation or divorce, or, less commonly, when the mothers have died (Weinraub et al., 2002). Although it is unusual for fathers to be awarded sole custody of the children following divorce, this is becoming

more widespread, often because the mothers are unable to care for the children, themselves. There are also a small but growing number of unmarried single-father families. In addition, single fathers by choice are beginning to emerge. Like their female counterparts, these men actively choose to parent alone. The most common route is through adoption. Although inconceivable just a few years prior to the time of this writing, single men are also beginning to have children through surrogacy and egg donation.

There has been little research on the quality of parenting shown by single fathers or on the consequences of single-fatherhood for children's psychological adjustment. As Biblarz and Stacey (2010) pointed out in their review of existing studies, comparisons between single father and single mother families have been confounded by the very different processes that select men and women into single parenthood. Studies have shown that single-father households are more likely to have been recently formed through children switching custody arrangements due to difficulties in their relationships with their mothers or their new partners. Moreover, children in this situation are more likely to be boys, to be older, and to have behavioral problems. Single mothers are more likely to lack social support, to be younger, and to be economically disadvantaged. The few existing studies of single fathers have shown that most are committed and competent parents. However, where differences have been identified, single mothers have tended to show more positive parenting than have single fathers, in terms of closeness, involvement, communication, supervision and control, and their children have shown more positive outcomes in terms of behavior and achievement (Biblarz & Stacey, 2010). The different pathways to single-parenthood for men and women are likely to have influenced these findings, but the extent to which they have done so is unclear.

Conclusions

Although children in single-parent families formed by divorce are more likely to show poorer outcomes in terms of psychological well-being and academic achievement than are their counterparts in two-parent families, their difficulties appear to be largely associated with aspects of the divorce, rather than single-parenthood in itself. Several factors have been shown to be involved, including parental conflict, financial hardship, maternal depression, and poor parenting, all of which may interact with and exacerbate each other. Although some children are adversely affected by divorce, most recover over time, especially where

divorce improves family relationships. Similar processes appear to be at play in families headed by unmarried single mothers. The elevated levels of behavioral and emotional difficulties, and poorer cognitive development, of children raised by single mothers from birth appear to be largely associated with socioeconomic disadvantage, mothers' mental health problems, and poor parenting, with each adversely influencing the other. Studies of single mothers by choice provide an opportunity for researchers to examine the impact of single-parenthood on children in the absence of these risk factors, and will be informative in the future in addressing the question of whether being raised by single mothers *per se* has negative consequences for children. However, a potential risk factor for this latter group of children is not knowing the identity of their fathers.

STEPFAMILIES

Stepfamilies are a common family form in many Western societies. Around half of the adults younger than 30 years old in the U.S. Survey of Income and Program Participation (SIPP) in 2009 reported having at least one step-relative (Pew Research Center, 2011). Data from the SIPP also revealed that approximately 10% of children under 18 years old were living with a biological parent and a married or cohabiting stepparent, with the majority living with their biological mother and stepfather (Kreider & Ellis, 2011).

Stepfamilies vary considerably in terms of prior family context, producing a diversity of immediate and wider family networks. Stepfamilies may form when divorced or bereaved parents remarry; they may also be formed when divorced or bereaved parents cohabit with new partners. Just as the shadow of separation and divorce may continue to extend over stepfamily living, the legacy left by bereavement cannot be ignored. However, widows and widowers are often in a better financial position than are divorcees, and extended family are more likely to rally to support the remaining parents and the children after bereavement than after divorce (McGoldrick & Carter, 2011). Surprisingly little work has empirically investigated how the legacy of bereavement affects children's developmental outcomes in stepfamilies, and the evidence reviewed in this chapter concentrates on stepfamilies formed after parental separation.

Stepfamily membership can span multiple households. Sometimes children will live in a stepfamily with their parent and stepparent and, at other times, they will be

visitors to their nonresident parent and partner's household. In addition, Stewart, Manning, and Smock (2003) indicated that over half of the residential stepparents in their sample also had children living elsewhere. Sometimes more than one set of children is involved in a stepfamily. Simple stepfamilies are formed when only one of the repartnering adults has children from a prior relationship. In complex, or blended, stepfamilies, both partners are parents to children from preceding unions and both become stepparents in the new stepfamily formations. Children in these families become stepsiblings to each other. Complex stepfamilies may also arise when children are born (or adopted) within stepfamilies, making children within the stepfamilies half-siblings to each other.

Stepfather Stepfamilies

Much of the knowledge concerning the socioemotional well-being of children in stepfamilies has derived from studies of children living with their mothers and their stepfathers. Many of the important initial findings came from carefully designed longitudinal controlled studies of European American middle-class families in the United States, such as the Developmental Issues in Stepfamilies study (DIS; Bray & Berger, 1993) and the work of Hetherington and colleagues on the Virginia Longitudinal Study of Divorce and Remarriage (VLS; Hetherington, 1993; Hetherington et al., 1982), the Hetherington and Clingempeel Study of Divorce and Remarriage (HCSDR; Hetherington & Clingempeel, 1992) and the Nonshared Environment in Adolescent Development (NEAD) study (Reiss et al., 1994). Initial data from both the DIS and Hetherington's studies generally indicates that the children in stepfamilies displayed more externalizing problems and lower social competency than the children in either mother-father families or single-mother households on the Child Behavior Checklist (CBCL) and associated Teacher Report Form (TRF) (Achenbach & Edelbrock, 1983). However, other findings have presented a more nuanced picture, and suggest wider variance in developmental outcomes among the children who live in stepfamilies, compared with other family types.

Data from the VLS highlighted the importance of both the timing of maternal remarriage in relation to the child's gender and life-cycle development, and the recency of the remarriage, for the child's adjustment. Earlier data from the VLS seem to indicate that, while boys had a more difficult time adjusting to parental divorce (Hetherington et al., 1982), girls had more difficulty later in childhood

if their mother remarried (Hetherington, 1993). However, Skaggs and Jodl (1999), examining data from a 3-year follow-up wave of the stepfamilies in the NEAD study, found no differences between the adolescent boys and girls, and the adolescents in stable, simple stepfather families did not differ from the adolescents in the nonstepfamily comparison group on CBCL-derived measures of adolescent adjustment.

Findings from other studies of nationally representative samples have been inconsistent with respect to gender differences in children's adjustment. Aughinbaugh, Pierret, and Rothstein (2005), using data on the marital transitions of young women recruited to the U.S. National Longitudinal Survey of Youth in 1979 (NLSY79) and subsequent data on their children's developmental outcomes, found a more substantial increase in behavioral problems following mothers' remarriages for girls than for boys. However, data from the Avon Longitudinal Study of Parents and Childhood (ALSPAC), an epidemiological study of 14,000 families in the United Kingdom, showed that, at Age 4, boys, rather than girls, in stepfather family settings displayed greater emotional and behavioral problems and less prosocial behavior, even after the quality of parent-child relationships, maternal history, and current socioeconomic status were controlled for (Dunn et al., 1998).

Other studies have focused on educational outcomes and socioemotional problems among children in stepfather families. For example, Zill (1994) examined data from the National Household Education Survey (NHES) and found that, even after sociodemographic factors were controlled for, adolescents from stepfather families were more likely to have been excluded from school or to have had problems progressing through school, than those from mother-father families. Nevertheless, most adolescents from all types of families completed high school. Other data from the NHES indicated that levels of involvement of one or both parents in school were lower for students in stepfather families, than in mother-father families. And although greater parental involvement in school was associated with better student progression through school for those from stepfather families, this did not cancel out the effect of stepfamily status. However, Thomson, Hanson, and McLanahan (1994) examined parental reports of children's academic grades as gathered in the National Survey of Families and Households (NSFH) and found no significant differences between the academic performance of children in stepfather families and those in mother-father homes, but did find that parents reported stepchildren to display

more socioemotional problems. Thomson and colleagues found that poorer economic resources accounted for some, but not all, of the detrimental effects of family structure on stepchildren's academic grades and socioemotional behavior. Race/ethnicity effects were also found in longitudinal analyses of the NLSY79 dataset (Aughinbaugh et al., 2005). For Latino American children, behavioral problems increased subsequent to the mothers' marriages, whereas this was not the case for European American or African American children.

Research has indicated that parental divorce and remarriage might also have an effect on children's pubertal development, and might influence psychological outcomes via either adolescent hormones or self and others' perceptions of maturity. In the VLS, both the absence of biological fathers and the presence of stepfathers in the home were associated with the early onset of puberty for girls, but not for boys (Hetherington, 1993). Furthermore, adolescent girls who matured early were more likely than girls who matured later to become involved with older peers, including those involved in antisocial behavior; this difference was more pronounced in early maturing girls from remarried, as compared with married, mother families. Adolescents in remarried mother families were more susceptible to negative peer group influences than were children in nondivorced families (Hetherington, 1993).

Some researchers have examined whether growing up in stepfamilies is associated with differences in the young adults' attachment styles. An investigation of Australian university students found partial evidence that the students from stepfamily backgrounds were less likely than those from mother-father backgrounds to be securely attached (Planitz, Feeney, & Peterson, 2009). Further analyses revealed that satisfaction with the quality of their relationships with their biological fathers mediated the link between stepfamily background and negative attachment models. Students from stepfamily backgrounds also depended more on romantic partners as attachment figures than did participants from mother-father families. Hayashi and Strickland (1998) found that parental divorce disrupted young adults' feelings of security in their current romantic relationship. However, students from a background of parental divorce who rated at least one of their parental figures as accepting of them were more likely than others to feel secure in their romantic relationships.

Other studies have focused on the effects of family background on transitions into adulthood. Stepchildren tend to leave home earlier than children raised in mother-father families. Aquilino (1991) reported that 65%

of the stepchildren in his sample left home before 19 years of age, compared with 50% of the children brought up in mother-father families; this effect was stronger for stepdaughters than for stepsons, and also more noticeable if the stepchild had one or more stepsiblings living at home. The UK National Child Development Study (NCDS) also demonstrated that both stepsons and stepdaughters were more likely to leave home earlier than their peers in either mother-father or single-mother families, and left for college less often (Kiernan, 1992). In the NCDS, stepchildren were more likely than their peers to cite family conflict as a reason for leaving home. Data from the NCDS on young adult transitions also indicated that young people from stepfamily homes were more likely than those in single-mother families to leave school early and enter the labor force early. Goldscheider and Goldscheider (1993) found that the effect of stepfamily status on leaving home was stronger for young women than for young men, and that stepfamily status had a greater effect on the leaving-home patterns of European Americans and Asian Americans than it did for either Latino Americans or, especially, African Americans. McLanahan and Sandefur (1994) also identified differential effects of stepfamily living according to gender and race-ethnicity; young African American men in stepfamilies were at no greater risk of dropping out of school and young African American women were at no greater risk of teenage parenthood than were those in mother-father families. For European American youth, growing up in stepfamilies put them at greater risk of these outcomes, as compared with youth from mother-father families.

Nevertheless, some investigations have found no evidence that growing up in stepfamilies in itself influences long-term developmental outcomes for children. Longitudinal data from the Christchurch Health and Development Study in New Zealand initially indicated that growing up in stepfamilies increased the risk of various developmental outcomes at Age 18, including early onset of sexual activity and multiple sexual partners, a criminal record, substance misuse, and leaving school without educational qualifications (Nicholson, Fergusson, & Horwood, 1999). But additional analyses controlling for concomitant sociodemographic and individual risk factors that were present prior to stepfamily formation in middle childhood effectively nullified associations between stepfamily background and adolescent outcomes.

Regarding the influence of a stepfamily upbringing on young adults' family formation patterns, Goldscheider and Goldscheider (1993) found that stepchildren were

significantly more likely than their peers from mother-father families to marry early. Other reports, such as that by McLanahan and Bumpass (1988) using data from the U.S. National Survey of Family Growth, have found that children brought up in stepfamilies are more likely than those from mother-father family backgrounds to marry and have babies either early in marriage or before marriage. Adults from stepfamily or single-parent family backgrounds are also more likely to have their own marriages end in divorce than those from mother-father families.

Amato and Kane (2011) used longitudinal data from nearly 2,500 young women aged 16 years and older at the beginning of the Add Health study to examine the effects of parental marital status and relationship distress on daughters' family formation. Daughters from remarried-parent families were more likely than those with continuously married parents to have had either a nonmarital birth and/or to have cohabited by the third wave of the study 7 years later. Low self-esteem, symptoms of depression, poor school grades, and less traditional attitudes toward sex and pregnancy often mediated the association between family type and nonmarital births and cohabitations. Parental divorce, itself, did not increase the risk of an early marriage or a marital birth in this cohort, except for daughters whose resident parents reported unhappy remarriages. Levels of marital distress recorded for the continuously married parents group were not associated with daughters' family formation, thus suggesting that parental marital dissatisfaction was only influential against a background of prior parental divorce and subsequent remarriage.

In terms of social support over the life course, it seems that stepfamily support networks are weaker than those of biological kin (Harknett & Knab, 2007; White, 1994). Neither relationship quality nor level of contact between adult stepchildren and their stepparents were as high as for their counterparts from nondivorced families in White's (1994) analysis of data from the U.S. National Survey of Families and Households (NSFH). Adult stepchildren were also less likely to perceive their parents as available to offer emergency help if they needed it, or indeed to give help to their parents and stepfathers if requested. Nevertheless, current relationships with residential stepfathers were rated more highly on relationship quality than were relationships with nonresidential fathers. But if parental remarriages had ended in divorce, then contact had been lost with over half of the stepfathers involved. Other analyses of NSFH data indicated that stepsibling relationships were also weaker than full sibling relationships in adulthood; for example, stepsiblings were less likely than siblings to be called upon

for emergency assistance or to be listed as a "best friend" (White & Riedmann, 1992).

The evidence above seemingly indicates that children in stepfamilies have greater difficulties than do children in mother-father families in childhood, adolescence, and adulthood. However, it is important to frame the risk of problematic behavior within a picture of the general well-being of the majority of children growing up in stepfamilies, and of considerable within-group variation. As both Hetherington and Jodl (1994) and Bray (1999) have pointed out, most children living in stepfamilies (between two-thirds and three-quarters) score within the nonclinical range on standardized measures such as the CBCL.

Stepfamily Processes

Next we consider evidence on how family processes can influence the socioemotional well-being of children in stepfamilies. Given the wide variation in social developmental outcomes among children growing up in stepfamilies, it is crucial to consider how differences in the quality of family relationships within stepfamilies might sway the likelihood of different outcomes.

Family Instability

One perspective on the reasons for children's problems in stepfamilies is that children experience difficulties as part of family instability: a cycle of multiple family transitions from parental separation and repartnership and back again. Remarriages are more vulnerable to divorce, and end in divorce more quickly, than do first marriages (Bumpass & Raley, 2007; Cherlin, 2010). Remarriages also seem to be particularly vulnerable to divorce if mothers have children from previous relationships living in the households (Teachman, 2008; White & Booth, 1985). Findings from several studies point to a link between children's experiences of family instability and problematic behavior. For example, the most frequent and serious adjustment problems (hyperactivity, peer relationship problems, and conduct disorder) shown by the 4- and 7-year-old siblings in the ALSPAC study were more likely to have been displayed by children with family histories involving multiple transitions (Dunn et al., 1998). Capaldi and Patterson (1991) examined the relation between family transitions and children's adjustment problems in more than 200 boys aged 9 to 10 years from predominantly European American low-income families in the Oregon Youth Study, finding that boys who had experienced multiple transitions showed the poorest adjustment, even when

controls for family income were introduced. Likewise, studies using representative samples of 11- to 13-year-olds in New Zealand (Fergusson, Horwood, & Lynskey, 1992) and 12-year-olds in the United States (Kurdek, Fine, & Sinclair, 1995), respectively, found higher rates of juvenile offending and disruptive behavior among children who had experienced multiple changes in family structure. Some evidence from the NLSY79 indicates that the effects of transitions into new family forms might be even more disruptive for children than the ending of parental partnerships (Aughinbaugh et al., 2005; Fomby & Cherlin, 2007).

Longitudinal studies have indicated that the length of time stepfamilies have been together is an important factor influencing both stepfamily relationships and the quality of children's adjustment. Results from follow-up waves of both the DIS (Bray & Kelly, 1998) and Hetherington's longitudinal studies (Hetherington, Henderson, & Reiss, 1999) have demonstrated that, in long-term stable stepfamilies, good marital relationships, authoritative parenting, and positive sibling relationships are all associated with positive outcomes for adolescents.

A key element underlying the instability of remarriage is likely to be couple conflict. For children growing up in mother–father families, associations between the quality of the couple relationship and child adjustment are strong (Jenkins, Simpson, Dunn, Rasbash, & O'Connor, 2005). One question of interest has been whether the quality of couple relationships in repartnerships is positively associated with children's psychological adjustment in the same way as in mother–father families. Data from the VLS indicate that closer couple relationships for recently remarried mothers was associated with preadolescent girls displaying more internalizing and externalizing behaviors and more negative behavior toward their mothers and stepfathers in the early stages of remarriage (Hetherington, 1993). However, levels of couple satisfaction with remarriage were associated with lower levels of externalizing behaviors in preadolescent stepsons. And if maternal remarriage occurred when children were safely into their adolescent years, then close couple relationships were associated with greater acceptance of remarriage and less discordant parent–child relationships for stepchildren.

Other studies have also tended to support the view that positive couple relationships benefit stepchild adjustment. In the NEAD sample, remarried couples who disagreed less about childrearing were more likely to indicate satisfaction with their relationships (O'Connor & Insabella, 1999). Furthermore, greater relationship satisfaction for remarried

couples was associated with stepchildren exhibiting fewer externalizing behaviors. Similarly, the ALSPAC study found that positive relationships between mothers and stepfathers predicted positive family relationships, just as they did in non-stepfamilies (Dunn, Deater-Deckard, Pickering, Golding, & the ALSPAC Study Team, 1999). In addition, the DIS found that mothers and stepfathers who reported, and were observed to display, more positive family cohesion and communication also showed more positive mother–child and stepfather–child interactions (Bray & Berger, 1993). In particular, stepfathers' ratings of marital adjustment were strongly associated with both stepfathers' and mothers' relationships with the children.

In contrast, findings have been inconclusive with respect to the effects of negative couple relationships on stepchildren. Dunn et al. (1999) found that, in contrast to findings about mother–father families, levels of mother–stepfather hostility did not predict either parent–child or sibling relationship negativity for the older stepsiblings of the children in the ALSPAC sample. However, involvement in mother–stepfather conflict was associated with children aged 10 years and older displaying greater socioemotional problems on the CBCL, and the children themselves indicated that they were more likely to side with their biological parents than with their stepparents (Dunn, O'Connor, & Cheng, 2005). Findings from later waves of the DIS indicate that, while general levels of family conflict were similar in long-term stepfamilies and non-stepfamilies, associations between family conflict and poor adolescent adjustment were stronger in stepfamilies than in non-stepfamilies (Bray, 1999). Bray suggested that the meaning of conflict may be different for adolescents with stepfamily backgrounds, perhaps because it resonates with prior experience of parental separation.

Mother-Child Relationships in Stepfather Stepfamilies

Another reason for the variability in developmental outcomes for stepchildren is the range of different parent–child and stepparent–child relationships within these families. Dunn (2002) highlighted the mediating role that biological parent–child relationship quality plays in transmitting, or buffering, the effects of other stepfamily dynamics on children. This appears to be the case whether data are obtained from parents (Dunn et al., 1998) or children (Dunn, Davies, O'Connor, & Sturgess, 2001). Much of the variation in children's behavioral and emotional problems is explained by the quality of parent–child relationships, parental depression, and socioeconomic adversity (O'Connor, Dunn, Jenkins, Pickering, & Rasbash, 2001).

Across all three studies conducted by Hetherington and colleagues (the VLS, the HCSDR, and the NEAD) stepchildren reported closer relationships with their resident mothers than with their stepfathers (Hetherington & Jodl, 1994). In the early period after remarriage, just as after parental separation, parent-child relationships were less positive and more conflicted, and residential parents were less likely to display authoritative parenting styles. However, residential parents generally reestablished authoritative parenting over time and, in stabilized stepfamilies, few differences in parenting quality between mothers in remarried stepfather families and in nondivorced families were apparent.

Stepfather-Child Relationships

From the perspective of many stepchildren, stepfathers play a far more peripheral domestic role in contrast to the central role played by mothers. Hetherington and Jodl (1994) found that, compared with the majority of mothers in stabilized stepfamilies, stepfathers were more likely to have disengaged from parenting and less likely to have established an authoritative parenting style with their stepchildren. In stabilized stepfamilies with adolescent stepchildren, stepfather-stepson relationships have been found to be more likely to be positive than those between stepfathers and stepdaughters (Bray & Berger, 1993; Hetherington, 1993). Hetherington and Clingempeel (1992) found that if a resident parent remarried when children were entering early adolescence, then a poor stepfather-stepchild relationship and family functioning often ensued with little improvement in adolescent socioemotional problems or social and academic competence observed 2 years later. Nevertheless, if a positive stepfather-stepchild relationship had been established, then this was associated with better school grades and fewer externalizing and internalizing problems.

In considering possible reasons for disengaged or hostile stepfather-stepchild relationships, any stepfamily needs to be viewed against the family circumstances and arrangements that preceded it—especially the adolescent's preexisting relationship with the mother—in setting the stage for a stepfather's arrival. Weaver and Coleman's (2010) qualitative study found that mothers in stepfather families saw themselves as defenders of the others, gatekeepers, mediators, or interpreters, as they stood in the middle ushering in new relationships between their children and their new partners. According to stepfathers' reports, stepfathers were found to generally have better relationships with their stepchildren in families where

the children's mothers had better relationships with their children than in stepfamilies in which mother-child relationships were poor (Marsiglio, 1992). King's (2009) analyses of longitudinal data from the Add Health study also indicate that adolescents who felt they had close relationships with their mothers prior to maternal repartnership were more likely to report that they had developed close relationships with their new stepfathers 1 year later.

A number of studies have indicated ways in which stepfathers can approach stepparenting that may lead to better outcomes for stepchildren. Ganong, Coleman, Fine, and Martin (1999) found that stepparents who did not try to push stepchildren into relating to them succeeded in building positive relationships with their stepchildren, whereas stepparents who tried to control the relationships encountered resistance. Likewise, longitudinal data from the DIS indicate that stepparents gradually developed good relationships with their stepchildren when they let the biological parents do most of the disciplining and, instead, took supporting roles (Bray & Kelly, 1998). Findings from Erera-Weatherly's (1996) study of stepparents' entry into stepfamily relationships not only showed that the "stepparent as friend" style was associated with greater acceptance by stepchildren, but also that this resulted in a positive response from the child's parent and less competition from the child's nonresident parent.

Other studies have focused on establishing how children influence the development of stepfather-stepchild relationships. Cross-lagged regression analyses of data from Hetherington's studies, in particular, have revealed that, early in remarriage, adolescent children may be more influential than mothers or stepfathers in influencing the quality of stepfamily relationships (Hetherington & Clingempeel, 1992; Hetherington et al., 1999). Observational data gathered at family mealtimes indicated that early-adolescent children, particularly girls, often behaved more negatively and less positively to stepfathers, compared with new stepfathers' positive overtures toward them (Hetherington & Clingempeel, 1992). Furthermore, the initial level of the child's externalizing behavior was a good predictor of subsequent negativity and coercive strategies displayed by stepfathers, whereas higher levels of adolescent social competence were associated with subsequent positivity by both resident mothers and stepfathers (Hetherington et al., 1999).

There has been an increasing interest in children's perceptions of stepfamily relationships. Although adults in the family might think that family transitions have been explained to children, one of the few studies to interview

children found that only 5% of the 10- to 11-year-olds interviewed felt that they had been fully informed about family changes (Dunn et al., 2001). Most of the data on children's perceptions of stepparents have been collected from university students who no longer regularly live in their parental homes. Interviews with these grown-up children have emphasized the variability in experiences of stepfamily life, both between individuals and as children mature (Cartwright, Farnsworth, & Mobley, 2009; Ganong, Coleman, & Jamison, 2011; Kinniburgh-White, Cartwright, & Seymour, 2010).

Part of the reason for the effects of growing up in stepfamilies on developmental outcomes may be due to the way in which the entry of stepparents influences the general family environment. For instance, repartnership and remarriage have been associated with improvement in adult postdivorce well-being (Wang & Amato, 2000; Williams & Umberson, 2004). However, Dunn, Davies, O'Connor, and Sturgess (2000) found evidence for selection effects, such that divorced mothers in the ALSPAC sample who had had a series of marital and cohabiting relationships and negative life events tended to be with partners who had similar histories. Dunn and colleagues (2000) suggested that children might experience a double risk of problematic parenting arising from these factors, as the partners' life-course history would also predict negativity in the children's relationships with their parents.

The addition of a stepparent to the household might mean that the stepchild can benefit from the extra resources that another adult in the household may bring: financial, practical, and emotional. Sweeney's (2007) analyses of adolescent adjustment data from the Add Health study indicate that adolescents tended to benefit from both the greater financial resources and the extra parental presence in stepfather families, as compared with single-mother families. Yet a stepparent's additional income may come with a hidden cost, as economic resources might remain the same or even diminish because a nonresident father may contribute less. For example, one study of mothers on welfare found that nonresident fathers were less likely to provide informal support to children in stepfather families, especially if there were additional children born in the repartnership (Meyer & Cancian, 2012).

Nonresident Parent-Child Relationships

In stepfather stepfamilies formed after parental separation, stepfathers need to accommodate the presence of nonresident fathers, and the children and mothers need to work out how to manage additional relationships. Several

early studies have indicated that adolescents with stepfathers tend to have less involvement with their nonresident fathers (Furstenberg, Nord, Peterson, & Zill, 1983; Seltzer & Bianchi, 1988). However, using longitudinal data from the Add Health study, King (2009) found that the entry of stepfathers made little difference to children's closeness to, or contact with, their nonresident biological fathers, and that the quality of adolescents' relationships with their stepfathers was independent of the quality of their relationships with nonresident fathers.

Previous findings from the Add Health dataset indicate that, for adolescents who lived with their remarried mothers, both adolescent self-reported closeness to their stepfathers and reported closeness to their nonresident fathers were associated with adolescent educational attainment and emotional well-being (King, 2006). Around 25% of adolescents reported close relationships with both their stepfathers and their nonresident fathers, and they were least likely to be failing at school or exhibiting higher levels of internalizing and/or externalizing problems. Boys and girls both benefited from having close relationships with their stepfathers and their nonresident fathers, and boys, in particular, showed fewer externalizing problems if they were close to both father figures. Further, King (2006) found that, if adolescents were close to one father figure, those figures were more likely to be their stepfathers than their nonresident fathers, and that close relationships with only stepfathers was nearly as advantageous in terms of adolescent well-being as was having close ties to both fathers. Nonetheless, nearly a quarter of the adolescents were without close connections to either their residential stepfathers or their nonresident fathers. These adolescents also tended to be less close to their mothers and, more often, lived in homes where mother-stepfather relationship happiness was lower. Girls, rather than boys, were more likely to report a lack of closeness to any parental figures. There were no race-ethnicity or immigrant family status differences in reported closeness to either stepfathers or nonresident fathers.

Stepmother Stepfamilies

In the United States and Europe, a rise in joint custody arrangements and residential parenting by fathers post-separation has meant that more children have been reared by their fathers and their new partners. Yet there is far less information on children's socioemotional development in father-stepmother than in mother-stepfather households. Furthermore, studies on children's adjustment

in stepmother stepfamilies have often been unable to distinguish between the effects of being brought up in simple stepmother stepfamilies and the effects of being brought up in complex stepmother stepfamilies in which the stepmothers also have their own children present in the household.

Any consideration of the role that stepparents may play in fostering children's development needs to take into account the sociocultural context of myths and fairy tales—such as "Snow White" and "Cinderella"—that colors perceptions of stepparents, particularly stepmothers. For example, when American (Fine, 1986) and Australian (Planitz & Feeney, 2009) university students were asked to complete sentences or check bipolar adjective scales to examine attitudes toward stepparents, perceptions of stepparents—especially stepmothers—were less positive than those of biological parents for students from different types of family background. However, in Fine's study, American students from both stepfamily and single-parent backgrounds expressed more positive views of stepparents than did students from nondivorced families.

Qualitative research has illustrated the diversity of relationships children can form with their stepmothers. Adult stepdaughters interviewed by Crohn (2006) reported a variety of relationships with their stepmothers, who were described variously as: "my father's wife," "an older friend," "a type of kin," or "like another mother." Stepdaughters viewed positive relationships with their stepmothers in terms of friendships or companionship in shared interests. Nevertheless, qualitative data from a subsample of adults who participated in the UK National Child Development Study and who had spent part of their childhoods in stepfamilies showed that stepchildren generally gave far less favorable accounts of stepmothers than of stepfathers (Gorell Barnes, Thompson, Daniel, & Burchardt, 1998). In their qualitative study of university students who had experienced stepfamily formation, Ganong et al. (2011) found that stepmothers who were rejected were mostly nonresident stepmothers who were perceived to be jealous either of the time children spent with their nonresidential fathers or of the financial resources given to them.

In terms of child adjustment, stepchildren in complex stepmother stepfamilies in the Avon Longitudinal Study of Parents and Children had more difficulties than children in simple stepfather families or mother–father families (O'Connor et al., 2001). Few studies have examined the long-term implications of growing up in stepmother families for young adult outcomes. However, White (1994) reported that adults raised in stepmother families

were less likely to receive either regular help from their fathers and stepmothers or to see them as sources of emergency help.

Evidence from various studies suggests that biological parent–child relationships form the cornerstone of stepmother families, just as they do in stepfather families. Fine, Voydanoff, and Donnelly (1993) using NSFH data, found children's well-being to be positively related to parental warmth in both stepmother and stepfather households. Biological parents also perceived themselves as having better relationships with their children than did stepparents with their stepchildren. Longitudinal data from a small sample of remarried fathers and their new wives indicate that stepmothers were more satisfied with stepfamily life when fathers were actively involved in parenting, when role expectations of "who does what" in the stepfamilies were less ambiguous and when postdivorce relationships with the children's mothers were better (Guisinger, Cowan, & Schulberg, 1989). Whatever the family type, biological mothers were more warm and responsive to their own children than were stepmothers, although children also expressed more hostility as well as more positive behavior toward their biological mothers than toward their stepmothers. Furthermore, stepmothers were more likely than stepfathers to have to negotiate their parenting with the children's nonresident biological parents, because nonresidential mothers were more likely to remain involved with their children than were nonresidential fathers.

Conclusions

Across the studies reviewed, a consistent picture emerges of more problematic family processes in families containing stepparents. Data from both representative surveys and detailed qualitative research have been useful in piecing together trends and processes. It would no doubt be beneficial to have further mixed-methods studies that draw subsamples from epidemiological studies to learn more of the processes behind group differences. Data from investigations such as the Developmental Issues in Stepfamilies study and the Virginia Longitudinal Study of Divorce and Remarriage have indicated that there are higher levels of couple conflict and parent–child or stepparent–child conflict in stepfamilies than in non-stepfamilies. Nevertheless, it is still unclear whether higher levels of expressed conflict are the result of selection factors (such as less effective communication or listening), increased levels of stress in the stepfamily home, less shared history, or a sociocultural narrative of stepfamily relationships that colors stepfamily

members' reports and actions. Future research could be tailored to investigate these possibilities.

When children have close relationships with at least one parental figure, they appear to benefit in terms of greater well-being. And it seems that children can benefit from adding extra parental figures to their families if they have close relationships with their nonresident parents and resident stepparents. But when do parents' partners become recognized as stepparents in the eyes of different family members? Many single parents are very cautious about introducing new partners to their children and apprehensive of the intertwining of family relationships that would incur. As yet, we know little about the stepparenting formation process and, in particular, about the early stages of stepparenting prior to coresidency.

COHABITATION

Increasingly, researchers are distinguishing between different types of family structure based on the coresidence of parents, and not just on the basis of marital status. This is important because households with two cohabiting parents may have a different set of resources, and potential problems, as compared with married parents. Across the United States and Europe, cohabitation has become a *de facto* alternative to marriage. Many cohabitantes may ultimately wish to marry, but their social and financial conditions may not support that decision (Cherlin, 2004). Around half of the children born to unmarried mothers in the United States are born to mothers who are cohabiting with their children's fathers (McLanahan & Beck, 2010), and it has been estimated that about two-fifths of U.S. children will have lived in cohabiting unions by the age of 12 (Kennedy & Bumpass, 2008). Within Europe, rates of cohabitation are also increasing, although cohabitation is not as widespread in central, eastern, and southern European nations as it is in western Europe (Wik, Keizer, & Lappégard, 2012).

Cohabiting and married couples generally have very different sociodemographic profiles, and the main studies reviewed in this chapter have controlled for these differences. As Sweeney (2010) pointed out, it is essential to take account of the influence of selection factors as to who enters marital versus cohabiting unions, in order to pinpoint the influence of family structure *per se*. In general, cohabiting parents tend to be less well-educated and have lower incomes than married couples in both the United States (Brown, 2010; Morrison & Ritualo,

2000; Waldfogel et al., 2010) and the United Kingdom (A. Goodman & Greaves, 2010). Furthermore, compared with married mothers, cohabiting mothers tend to be younger and to have lived with their children's fathers for shorter periods of time. Both racial and ethnic cultural backgrounds have also been strongly associated with mothers' marital status. In the United States, around 10% of European American children are born to cohabiting couples, compared with nearly 20% of African American and Latino American children (Bumpass & Lu, 2000), and stepfamilies that have arisen through cohabitation subsequent to nonmarital births tend to be more common among African Americans than among European Americans (Stewart, 2007). Data from the Add Health survey and the Panel Survey of Income Dynamics (PSID) suggest that, for African American children, parental marital status does not matter as much for socioemotional well-being as it does for European American children, possibly because it is more common for children to live in nonmarried couple households in African American communities and, therefore, wider social support is available to them (Brinig, 2013). In the Millennium Cohort Study (MCS), which sampled approximately 18,000 births across the United Kingdom around the turn of the century, almost all of the mothers of Southeast Asian descent, around 70% of those identifying as White, and only half of the Black Caribbean mothers were married at the time of their children's births (A. Goodman & Greaves, 2010).

Other selection factors, such as parental attitudes and values, may also influence who enters into cohabitation and who enters into marriage. And of course it is much harder to control for psychosocial selection factors than for sociodemographic differences such as family income, ethnicity, or age. Musick (2002) found that only a minority of cohabiting mothers in the U.S. National Survey of Family Growth had planned their pregnancies. Likewise, data from the MCS revealed that fewer than half of the pregnancies of the study's cohabiting mothers had been planned (A. Goodman & Greaves, 2010). Moreover, MCS children born to cohabiting parents were more likely to have been born prematurely, or to be of low birth weight, than those born to married parents, and cohabiting mothers were less likely to breastfeed, more likely to smoke, and more likely to show indications of depression during their children's first years of life.

There is also the complicated question of the direction of association between couple happiness and likelihood of marriage. No doubt relationship happiness promotes the likelihood of marriage and so selects couples into

marital status. But in order to conclude that marriage makes a difference to couple relationship quality and thus affects developmental outcomes for children, it would be necessary to demonstrate that relationship happiness is a direct product of marriage.

Child Well-Being and Parental Cohabitation

Next we consider developmental outcomes for children of different ages in two types of cohabiting families: those born into two-parent families where parents are cohabiting rather than married, and those raised in two-parent families with parents and resident partners who are not the biological parents of the children. For the sake of simplicity, the former are referred to here as cohabiting families, and the latter as cohabiting stepparent families.

Studies of children younger than 2 years old have indicated that children born into cohabiting families are disadvantaged compared with those born into married families, although selection factors appear to account for much of the difference between family types. For example, in their analyses of data from the NICHD Study of Early Child Care and Youth Development (SECCYD), Aronson and Huston (2004) accounted for between 40% and 60% of the variance in maternal sensitivity and quality of the home environment, and fully accounted for differences in infant behavior and security of attachment, by controlling for family structure differences in maternal age, maternal educational level, and ethnic group.

Similar findings were reported from the Fragile Families and Child Wellbeing Study (FFCWS), which investigated the effects of growing up in cohabiting households on children's adjustment. In reviewing findings from previous FFCWS working papers, Waldfogel et al. (2010) concluded that parental marital status at birth was more associated with children's socioemotional development at Age 3 than with children's cognitive development (Craigie, 2008; Osborne, McLanahan, & Brooks-Gunn, 2004). Waldfogel et al.'s own analyses of data from FFCWS children at Age 5 confirmed that family structure made little difference to cognitive outcomes; what seemed to matter most were changes in family structure over time. Also using FFCWS data, Guterman, Lee, Lee, Waldfogel, and Rathouz (2009) found few differences between cohabiting, single, and married mothers of 3-year-olds in rates of aggressive or punitive parenting after controlling for sociodemographic and psychosocial variables.

Similarly, kindergarten children with cohabiting parents in the Early Childhood Longitudinal Study, Kindergarten

Class of 1998–1999 (ECLS-K) were reported by their mothers to show more sadness and less self-control than children with two married parents (Artis, 2007). Nevertheless, once children's characteristics, family socioeconomic status, parental relationship stability, maternal depression, and parenting practices were controlled for, the children in cohabiting families did not differ from those with married parents.

The Millennium Cohort Study (MCS) examined the effects of parental cohabitation on children's adjustment at Ages 3 and 5 (A. Goodman & Greaves, 2010). Differences in psychological adjustment between children born to cohabiting and married parents were found to be larger than differences in cognitive development. The most negative outcomes were found among the children of cohabiting parents who subsequently separated, whereas marginally more positive outcomes were observed for children of cohabiting parents who subsequently married. Controlling for parental education and socioeconomic status halved the gap in adjustment scores between children of cohabiting and married parents.

Few studies have examined outcomes for older children and adolescents born to cohabiting couples, but data is available on children growing up in cohabiting stepfather families. For example, analyses of child protection data made by Berger, Paxson, and Waldfogel (2009) revealed that children were more likely to have been reported to child protection services due to abuse or neglect if they lived in a cohabiting stepfather family than if they lived with both biological parents. This difference remained even after controlling for selection factors.

Brown (2004) compared data on children's well-being in different types of cohabiting families using the 1999 National Survey of America's Families to find that children in cohabiting and cohabiting stepparent families fared worse than those in married families with respect to school engagement and socioemotional problems. For children aged 6 to 11, controlling for economic resources and parental psychological well-being reduced much of the difference between children in married and cohabiting couple households. However, for adolescents, a negative association between parental cohabitation and well-being persisted even after the level of family resources was controlled for. Furthermore, successive waves of the Add Health study have indicated that the adolescents in stable cohabiting stepfather families had lower levels of well-being than did those in married stepfather families (Brown, 2006). Brown's (2006) findings concur with those of previous analyses of cross-sectional data from the Add

Health study, which have shown that the adolescents in cohabiting stepfather families exhibited higher rates of delinquency and lower grade point averages than did their counterparts in married stepfather families, with a maternal history of prior residential relationships accounting for much of the variation in both adolescent delinquency and grade point average scores (Manning & Lamb, 2003).

Sweeney's (2007) analyses of the Add Health dataset indicate that having married parents benefited youth in a number of ways, even if parental marriages ended in divorce. For example, compared with adolescents born outside of marriage who then lived with their mothers and stepfathers, adolescents who lived in postdivorce stepfather families tended to have better emotional well-being. The Add Health study also revealed that the arrival of stepfathers through maternal cohabitation was associated with a decline in adolescents' reports of closeness to their mothers, whereas the entry of stepfathers due to maternal remarriage did not have detrimental effects on mother-child relationship quality (King, 2009). Buchanan, Maccoby, and Dornbusch (1996) similarly reported from their 3-year postdivorce follow-up of more than 500 children between the ages of 10 and 18 that new maternal partnerships not involving remarriage negatively affected the quality of the mother-adolescent relationships. In contrast, adolescents whose resident mothers remarried generally retained close relationships with them.

While most published studies have reached the conclusion that children in cohabiting stepfamilies have poorer psychological well-being than do children in married stepfather families, this is not true of all studies. No differences in psychological adjustment were found between 4-year-old children in cohabiting and married stepfather families in the Avon Longitudinal Study of Parents and Children (ALSPAC) (Dunn et al., 1998). Neither were differences found in behavioral problems, self-esteem, or self-efficacy between children with residential stepfathers and children who lived with their married parents in the Panel Survey of Income Dynamics (PSID) (Brinig, 2013). Both studies identified difficulties for children whether the mothers were cohabiting or married.

Why More Problems for Children in Cohabiting Unions?

Why might children in cohabiting families exhibit more problems than do children in married families? Controlling for sociodemographic selection factors clearly reduces the difference between married and cohabiting parent families.

Nevertheless, differences between children brought up by cohabiting parents and married parents remain. Various interconnected reasons for the generally poorer outcomes for children from cohabiting unions have been investigated, including parental relationship instability, low parent or stepparent involvement, poor parenting quality, and parental mental health problems.

Family instability is generally accompanied by distress for parents and children, and often leaves a vacuum in parenting as parental roles are redefined. It is also likely that parental distress contributes to dissatisfaction with the couple relationship and thus increases the likelihood of separation. A number of studies have indicated that cohabiting relationships are less stable than marital unions, both among cohabiting couples with joint children and among cohabiting stepparent families, and that this is the key factor associated with children's emotional and behavioral problems. In the Millennium Cohort Study (MCS), only 5% of married couples with children had separated by the time their children were 3 years old, in comparison with around 20% of the parents who were cohabiting when their children were born (A. Goodman & Greaves, 2010). The MCS also pointed to poorer relationship quality between cohabiting parents in the year following the birth of their children, when married parents were more likely than cohabiting parents to report that their partners were sensitive to their needs. By the time the children were 3 years old, cohabiting couples were more likely to be living apart or to have had temporary separations (A. Goodman & Greaves, 2010). Similarly, in the United States, the Study of Early Child Care and Youth Development (SECCYD) showed that children born to cohabiting parents were more likely to experience instability in parental relationships than were children born to two married parents (Cavanagh & Huston, 2006). On entry into school, SECCYD children with histories of parental relationship instability displayed more negative behaviors with both teachers and peers.

There were similar findings from the Fragile Families study. Children were more than 5 times more likely to experience parental separations by their third birthday if their parents were cohabiting rather than married (Osborne, Manning, & Smock, 2007). Differences between married and cohabiting parent families in terms of demographic factors, including the presence of children from previous unions and the quality of the couple relationship at birth, accounted for half of the variation in the rate of union stability between family types. However, the effect of parental marital status on relationship instability was

significantly greater for European American children than for African American or Mexican American children. Several factors were associated with cohabiting relationship instability for European American children, including lower parental educational qualifications, paternal substance abuse, prior marital relationships, and the presence of children from these unions. For African American and Mexican American children, none of these factors clearly explained differences in parental relationship stability. The Fragile Families study also showed that more extensive behavioral problems were displayed by children from unstable cohabiting families than from married two-parent families, whereas children from stable cohabiting and stable married families did not differ in levels of behavioral difficulties (Osborne & McLanahan, 2007). Furthermore, the level of behavioral problems children displayed increased incrementally with each family transition, with maternal stress and parenting quality mediating this increase.

The Fragile Families study indicates that couple relationship quality may play a key role in influencing the amount of time and energy each parent has to engage in effective parenting, irrespective of marital status (Fomby & Osborne, 2008). Nevertheless, it appears that parenting might be particularly vulnerable to couple relationship distress for parents who are cohabiting rather than married. Mothers in cohabiting relationships who reported relationship unhappiness were found to report higher levels of conflict and less cooperation over parenting than mothers in marital relationships (McLanahan & Beck, 2010). Poor parental relationship quality, as reported by both married and cohabiting couples, was linked to poor maternal and paternal engagement in parenting, particularly in children's infant, toddler, and preschool years (Carlson, Pilkauskas, McLanahan, & Brooks-Gunn, 2011). Carlson and colleagues (2011) found that married and cohabiting couples displayed a similar overall pattern of linkages between couple relationship quality and parenting engagement from birth to 5 years. However, couple relationship quality had a marginally larger association with cohabiting fathers' engagement in parenting, perhaps indicating that the quality of the fathers' relationships with the mothers are more likely to influence the parenting engagement of cohabiting, rather than married, fathers.

Rates of maternal depression have been shown to be higher for mothers in unstable cohabiting parent families in both the SECCYD (Cavanagh & Huston, 2006; Klausli & Owen, 2009) and the Fragile Families study (Cooper, Osborne, Beck, & McLanahan, 2010). Klausli

and Owen (2009) also found that mothers in cohabiting couples who remained together reported higher levels of depression and showed lower levels of parental sensitivity during parent-child observations than did married mothers, and that these differences persisted even after socio-demographic variables were controlled for. Nevertheless, associations between maternal depression and parental sensitivity were partly mediated by maternal reports of couple conflict and ambivalence about the relationship, suggesting that at least some of the variance in child well-being between stable cohabiting and married parent families might be explained by parental relationship difficulties. Cooper and colleagues (2010) also demonstrated that the link between parental relationship instability and children's behavioral problems is in part mediated by maternal mental health problems and associated harsh parenting. Nevertheless, it is unclear whether women with a tendency toward depression are more likely to cohabit, rather than marry, in the first instance, or whether having children in a cohabiting relationship itself influences the likelihood of maternal depression and subsequent poor parenting.

Fathers' involvement with their children appears to be associated with the longevity of cohabiting relationships. In the Fragile Families study, it was found that cohabiting fathers' reports of paternal involvement, as well as mothers' reports of the extent of coparenting at the birth of their children, were associated with a decreased probability of separation 5 years later (McClain, 2011). Paternal involvement and coparenting engagement predicted the continuation of parental cohabitation over and above the quality of the parental relationships, initial expectations of marriage, and individual characteristics of the mothers, fathers, and children. Cohabiting stepfathers have also been found to spend less time with their stepchildren than married stepfathers (Hofferth & Anderson, 2003), even after demographic variation is controlled for (Berger, Carlson, Bzostek, & Osborne, 2008).

With respect to wider societal influences, Brinig (2013) argued that, compared with formal marriage, cohabitation lacks social capital and so is not so trusted by the community surrounding the couple. Therefore, cohabiting couples may receive less legal, financial, or social support for their joint households from either their communities or extended families. The incomplete institutionalization of cohabiting families may contribute toward the greater instability of these families. The Fragile Families study showed that the way in which cohabiting families were embedded in intergenerational family relationships was associated with the stability of the couple unions,

irrespective of sociodemographic factors, couple relationship quality and attitudes, grandmother coresidence, and family of origin characteristics. On the one hand, better couple relationships and more positive relationships with each partner's parents, together with more time spent with paternal grandparents, was associated with an increased likelihood that the couple would still be cohabiting by the child's fifth birthday (Högnaas & Carlson, 2010). On the other hand, if the 1-year-old child spent more time with his or her maternal grandparents, then the parents were less likely to be cohabiting at follow-up. Without further investigation, the meaning of time spent with maternal relatives is difficult to know, because it could be a cause of parental separation, the result of a rocky couple relationship, or a simple reflection of as yet unobserved factors.

Is Marriage, Itself, Advantageous for Children?

If marriage, itself, makes a difference to children's outcomes, then we would expect to see evidence of a boost in the well-being of children whose cohabiting parents have later married. The Fragile Families study provides some support for this, in that children born to cohabiting parents who later married were similar on all outcomes to those whose parents had been married before the children's births (Waldfogel et al., 2010). Nevertheless, once sociodemographic factors and relationship stability were controlled for, group differences between cohabiting to married and stable cohabiting groups were negligible. Brown (2006) also found that the transition from cohabiting stepfather families to married stepfather families between waves of the Add Health survey made no appreciable difference to adolescent adjustment, suggesting that, as far as adolescents are concerned, parental marital status is of negligible impact.

One of the few studies to have examined the possibility that marriage might act as an "intervention" on children's well-being is a Swedish study that used national records to investigate whether a marriage boom among cohabiting couples in 1989 due to a reform of pension rights had any effect on children's grade point averages (Björklund, Ginther, & Sundström, 2007). No effects were observed for families that would have financially benefited from the reform. However, marriage did seem to have a positive effect on the grade point average of sons of cohabiting parents who married but did not stand to financially benefit. This suggests that selection factors promote marriage and child well-being, rather than marriage enhancing children's well-being per se.

Conclusions

From the evidence reviewed above, there appears to be some advantage to children in terms of socioemotional development of having married rather than cohabiting parents. However, any advantage is slight once sociodemographic factors are taken into account, and may be due to unobserved selection effects such as relationship quality. That is, cohabiting couples with good relationships may be more likely to marry and also more likely to have positive relationships with their children. Various factors may contribute to the small gap in well-being between children in cohabiting and married parent families after adjusting for possible selection effects, including a greater investment in marriage over cohabitation on the part of the couple, the higher level of institutionalized security that marriage entails, and the greater recognition and support given by extended family and others to a marital, rather than cohabiting, union. Future longitudinal research needs to investigate the various factors that distinguish stable and unstable cohabiting unions and how the quality of the cohabiting partnership influences parental or stepparental involvement.

ASSISTED REPRODUCTION FAMILIES

The first "test-tube" baby, Louise Brown, was born through in vitro fertilization (IVF) in the United Kingdom in 1978 (Steptoe & Edwards, 1978). Since that time, more than 5 million children worldwide have been born through assisted reproductive technologies (ARTs) (Adamson, 2012). There has been much concern about the potentially negative effects of ARTs on the psychological well-being of children and their families. This section examines the impact of conceiving children through "high-tech" procedures such as IVF or intracytoplasmic sperm injection (ICSI), and through third-party involvement such as egg donation, sperm donation, embryo donation, and surrogacy, on parenting and child development. Although a negative consequence of ARTs, especially of IVF and ICSI, is the high rate of multiple births (and associated problems of preterm delivery and low birth weight), this is not a focus here, because studies of the psychological outcomes of ARTs have tended to exclude such families to avoid the potentially confounding effects of multiple births on parent-child relationships and child development.

IVF involves the fertilization of an egg with sperm in the laboratory and the transfer of the resulting embryo to

the mother's uterus. In the related procedure of ICSI, a single sperm is injected directly into the egg. When the mother's egg and father's sperm are used in IVF or ICSI and the mother undergoes the pregnancy, the parents have both a genetic and a gestational connection to their child in the same way as do parents of naturally conceived children. However, a growing number of children are being born through reproductive donation (Richards, Pennings, & Appleby, 2012); that is, by the donation of gametes (sperm or eggs) or embryos, or the hosting of a pregnancy for another woman (surrogacy).

With sperm donation (usually referred to as donor insemination), the child lacks a genetic relation with the father, whereas egg donation results in the absence of a genetic link with the mother. In the case of embryo donation, the child is genetically unrelated to both parents; this situation is similar to adoption, apart from the parents' experience of pregnancy and birth. There are two types of surrogacy: gestational surrogacy, in which the child lacks a gestational relationship with the mother but the mother and father are the child's genetic parents; and genetic surrogacy, in which the surrogate and the father are the child's genetic parents and the child lacks both a genetic and a gestational link with the mother.

For the purpose of this chapter, the different family types described above are organized according to the following categories, as each raises a different set of issues and concerns: (a) "high-tech" families (IVF and ICSI); (b) donor conception families (sperm, egg, and embryo donation); and (c) surrogacy families (gestational and genetic). However, these categories are not mutually exclusive; for example, donated eggs, sperm, or embryos may be used in IVF and ICSI.

"High-Tech" Families (IVF and ICSI)

A frequently voiced concern regarding "high-tech" families is that, due to the experience of infertility and its treatment (often lasting for many years), parents may be overprotective of their longed-for children when they eventually arrive (Covington & Burns, 2006). It has also been suggested that these mothers and fathers may set themselves unattainably high standards of parenting and may have unrealistically high expectations of their children. An additional concern relating specifically to ICSI is the potential risk for children of the procedure itself, particularly the bypassing of natural sperm selection barriers and the use of suboptimal sperm (Ponjaert-Kristoffersen et al., 2005).

Parenting in IVF Families

A study of parenting in families with an IVF infant was conducted in Australia (McMahon & Gibson, 2002). IVF families and a comparison group of natural conception families were recruited during pregnancy and followed up when the infant was 4 months and 1 year old. At 4 months, the IVF mothers reported lower levels of perceived competence as parents than did the natural conception mothers, in terms of their ability to soothe their infants and understand their signals (McMahon, Ungerer, Tennant, & Saunders, 1997), and at 1 year, the IVF mothers saw their children as more vulnerable and "special" (Gibson, Ungerer, Tennant, & Saunders, 2000). Nevertheless, the IVF mothers did not differ from the natural conception mothers in sensitivity toward their infants at 4 months or 1 year, and there was no difference at Age 1 in the proportion of IVF and natural conception infants classified according to the Strange Situation test as securely attached (Gibson, Ungerer, McMahon, Leslie, & Saunders, 2000). For fathers, no differences were identified between those with IVF and naturally conceived children in perceptions of parenting competency at 4 months (McMahon et al., 1997) or 1 year (Gibson, Ungerer, Tennant, & Saunders, 2000).

Families with 2-year-old children were investigated in Belgium (Colpin, Demyttenaere, & Vandemeulebroecke, 1995), where IVF families were compared with natural conception families using observational assessments of mother-child interaction and questionnaire assessments of attitudes and emotions about the children completed by mothers and fathers. No differences were found between family types with respect to the children's behavior toward their mothers or the mothers' behavior toward the children in the interaction task, or for mothers' and fathers' thoughts and feelings toward the children. In a follow-up when the children were 8 to 9 years old, the IVF families did not differ from the natural conception families in mothers' or fathers' reports of parenting behavior or parenting stress (Colpin & Soenen, 2002).

IVF families with 4- to 8-year-old children were the focus of the first phase of the European Study of Assisted Reproduction Families conducted in the United Kingdom, the Netherlands, Spain, and Italy (Golombok et al., 1996; Golombok, Cook, Bish, & Murray, 1995). The study recruited 116 families with children conceived by IVF, and comparison groups of 115 families with children adopted in infancy and 120 families with naturally conceived children. A group of 111 families with children conceived by donor insemination was also recruited (see below).

In-depth standardized interviews designed to assess quality of parenting and the Parenting Stress Index were administered to mothers and fathers, separately. The IVF mothers were found to show greater warmth toward their children, to be more emotionally involved, to interact more, and to report less stress associated with parenting than were natural conception mothers. IVF fathers were reported by mothers to interact with their children more than were natural conception fathers, and the fathers, themselves, reported less parenting stress. The adoptive parents fell between the IVF and natural conception parents on these measures. In the first study to be conducted in a non-Western culture, Hahn and Dipietro (2001) examined IVF families with preschool and early school-age children in Taiwan. The quality of parenting was generally found to be good, although IVF mothers showed greater protectiveness of their children. The children's teachers, who were unaware of the nature of the children's conception, rated the IVF mothers as more affectionate toward their children, but not more protective or intrusive, than the natural conception parents.

In order to examine the functioning of IVF families when children approach adolescence, the parents and children in the European Study of Assisted Reproduction Families were assessed using standardized interview and questionnaire assessments of parent-child relationships when the children were aged 12. The IVF mothers and fathers were generally found to have positive relationships with their adolescent children, characterized by a combination of affection and age-appropriate control (Golombok, Brewaeys, et al., 2002; Golombok, MacCallum, & Goodman, 2001). The few differences that were identified reflected more positive functioning among the IVF than among the adopted and natural conception families, with the exception of the overinvolvement with their children of a small proportion of IVF parents. The UK families were followed up once again when the children reached Age 18 (Owen & Golombok, 2009). The IVF mothers and fathers did not differ from the other mothers and fathers on any of the variables relating to warmth or conflict, apart from greater disciplinary indulgence shown by IVF mothers. The 18-year-olds were, themselves, administered a standardized interview and questionnaires to assess the quality of their relationship with their parents (Golombok, Owen, Blake, Murray, & Jadva, 2009). The IVF young adults were found to have good relationships with their parents. Similar findings were reported in a follow-up of the Belgian study when the children were aged 15 to 16 (Colpin & Bossaert, 2008).

Children in IVF Families

The Australian study of infants found some evidence of elevated levels of behavioral difficulties in IVF infants, compared with naturally conceived infants. IVF mothers rated their infants as more temperamentally difficult at 4 months than did natural conception mothers (McMahon et al., 1997), and as showing more behavioral problems and more difficult temperaments at Age 1 (Gibson, Ungerer, Leslie, Saunders, & Tennant, 1998).

The European Study of Assisted Reproduction Families assessed the psychological adjustment of 4- to 8-year-old IVF children using the Strengths and Difficulties Questionnaire, a measure of behavioral and emotional problems completed by mothers and teachers (R. Goodman, 2001). In addition, the children were administered tests of self-esteem. The IVF children did not differ from the naturally conceived children on these measures (Golombok et al., 1995, 1996). In the Belgian study, mothers, fathers, and teachers completed the Child Behavior Checklist (CBCL) when the children were 8 to 9 years old (Colpin & Soenen, 2002). There were no differences in child adjustment between the IVF and naturally conceived children as rated by parents or teachers. Only one study, conducted in Israel, reported raised levels of emotional problems among IVF children of middle-school age (Levy-Shiff et al., 1998). In comparison with naturally conceived children, IVF children showed poorer adjustment to school as rated by teachers, and reported themselves to be more aggressive, more anxious, and more depressed. Although the reason for the discrepancy between the findings of this study and the other studies is not known, it may be associated with the older age of the IVF parents than the natural conception parents in the Israeli sample.

In the European Study of Assisted Reproduction Families, parents and teachers again completed the Strengths and Difficulties Questionnaire when the children were aged 12 (Golombok, Brewaeys, et al., 2002; Golombok, MacCallum, & Goodman, 2001). There were no differences found between family types for either mothers' or teachers' ratings. At Age 18, no differences between the IVF adolescents and the comparison groups of early-adopted and natural conception adolescents were found on the anxiety, depression, hostility, and interpersonal sensitivity subscales of the SCL-90 (Golombok et al., 2009). This study provided the first opportunity for researchers to ask young people how they felt about the unusual nature of their conception. Although a small minority reported a negative

reaction on finding out, by Age 18 not one was distressed about having been conceived by IVF.

Wagenaar and colleagues (2009) compared the behavior and socioemotional functioning of 139 IVF children with that of 143 children born spontaneously to parents who had previously experienced fertility problems. The mean age of the children was 13.5 years. Parents completed the CBCL and teachers completed the Teacher Report Form (TRF). The adolescents were found to be functioning within the normal range. Where differences were identified, these reflected higher levels of adjustment among the IVF children, particularly in relation to externalizing behavior. When the adolescents themselves reported on their behavioral and socioemotional functioning by completing the Youth Self-Report, no differences were identified according to family type. Colpin and Bossaert (2008) administered the CBCL to mothers and fathers, and the Youth Self-Report to 15- to 16-year-old adolescents, in their longitudinal study in Belgium. No differences in adjustment between adolescents conceived by IVF and those conceived naturally were found for either parents' or adolescents' ratings.

Parenting in ICSI Families

A large-scale, multisite study of 540 ICSI, 439 IVF, and 542 natural conception families with 5-year-old children was conducted in Belgium, Denmark, Greece, Sweden, and the United Kingdom. Few differences in parenting between family types were identified, although ICSI mothers reported fewer hostile or aggressive feelings toward their children and higher levels of commitment to parenting than did the mothers of naturally conceived children (Barnes et al., 2004). The children were administered the Bene-Anthony Family Relations Test to provide an assessment of parent-child relationships from the perspective of the children. No differences were found according to family type for children's positive or negative feelings toward, or involvement with, either their mothers or their fathers. Similar findings were reported from a study in the Netherlands of ICSI families, IVF families, and natural conception families with 5- to 8-year-old children (Knoester, Helmerhorst, van der Westerlaken, Walther, & Veen, 2007). In a study of 8-year-olds in Belgium (Leunens, Celestin-Westreich, Bonduelle, Liebaers, & Ponjaert-Kristoffersen, 2006), there were no differences in the parenting stress reported by mothers and fathers.

Children in ICSI Families

With respect to psychological adjustment, Barnes et al. (2004) found no differences between ICSI children and

comparison groups of IVF and natural conception children for externalizing or internalizing problems as rated by mothers and fathers on the CBCL. The CBCL was also administered to mothers by Knoester et al. (2007). Although no differences were identified between ICSI, IVF and naturally conceived boys, there was a difference found between ICSI and IVF girls, resulting from the particularly low scores of IVF girls.

Due to the specific concerns regarding ICSI noted above, attention has focused on the cognitive development of ICSI children. The Bayley Scales of Infant Development were administered to ICSI children at 2 years of age in Belgium, and no evidence was found of delayed mental development in relation to norms for this age group (Bonduelle, Joris, Hofmans, Liebaers, & van Steirteghem, 1998). A comparison between 439 ICSI children and 207 IVF children by the same research team found no differences in Bayley scale scores (Bonduelle, 2003). Similar findings were reported in the United Kingdom following the administration of the Griffiths scales to a representative sample of 208 ICSI children and a comparison group of 221 naturally conceived children aged 1 to 2 years (Sutcliffe et al., 2001). In contrast, significantly poorer Bayley Scale scores were found when 1-year-old ICSI children, particularly boys, were compared with IVF and naturally conceived children in Australia (Bowen, Gibson, Leslie, & Saunders, 1998). Seventeen percent of the ICSI children showed mildly or significantly delayed development compared with 2% of the IVF and 1% of the natural conception children.

In order to address the controversial question of whether or not the ICSI children showed developmental delay, the Australian children were followed up at Age 5 and the sample size was increased (Leslie et al., 2003). No differences were identified between the ICSI children and the comparison groups of IVF and natural conception children for IQ scores or the proportion of children who showed delayed development. In line with this finding, a study of 5-year-olds conducted in Belgium, Denmark, Greece, Sweden, and the United Kingdom (Ponjaert-Kristoffersen et al., 2005), in which 511 ICSI children were compared with 424 IVF children and 488 naturally conceived children on the Revised Wechsler Preschool and Primary Scale of Intelligence (WPPSI-R) and the Motor Scale of the McCarthy Scales of Children's Abilities, no differences were identified between the ICSI, IVF and natural conception children. In a different Belgian sample, the cognitive development of ICSI children and a comparison group of naturally conceived children was

examined at Age 8 (Leunens et al., 2006) and Age 10 (Leunens, Celestin-Westreich, Bonduelle, Liebaers, & Ponjaert-Kristoffersen, 2008), using the Wechsler Intelligence Scale for Children-Revised (WISC-R). Although the ICSI children obtained higher scores at Age 8, there were no differences between the ICSI and the natural conception children at Age 10.

Donor Conception Families (Sperm, Egg, and Embryo Donation)

It has often been suggested that the creation of families using donated sperm, eggs, or embryos may have negative consequences for parenting and children's psychological adjustment, due to either the absence of a genetic link between one or both parents and the children, or to secrecy about the children's genetic origins (Daniels, Gillett, & Grace, 2009; McGee, Brakman, & Gurman, 2001).

The view that the absence of genetic connections between parents and children may be detrimental to positive family functioning derives from research on adoptive families in which both parents are genetically unrelated to the child. Although increased rates of child psychological problems have been identified in adoptive families (Palacios & Brodzinsky, 2010), recent meta-analyses have shown the differences between adoptive and nonadoptive families to be small, with the large majority of adopted children functioning within the normal range (Juffer & van IJzendoorn, 2005, 2007). Moreover, child adjustment problems appear to be largely related to factors associated with the adoption, such as children's experience of abusive or neglectful parenting and multiple caretakers in the years before the adoptions took place, rather than to the absence of a biological link between the parents and the children (Dozier & Rutter, 2008; Palacios & Brodzinsky, 2010).

To the extent that adoption is relevant to donor conception, it is important to note that the transition to adolescence presents specific challenges for adopted children, particularly in terms of identity formation (Grotevant, Rueter, Von Korff, & Gonzalez, 2011). It has been shown that adopted adolescents need to integrate their experiences of being adopted into meaningful narratives in order to develop a secure sense of identity. As part of this process, adopted adolescents often gather information about their past, including information about their birth parents, and some search for, and make contact with, members of their birth families. The development of coherent adoptive identities is considered influential in the psychological well-being of adopted adolescents, with problems in adoptive identity development often resulting from a lack of

information about themselves and their origins. There is much variation in the extent to which being adopted is central to an adolescent's identity (Grotevant, 1999). Thus, searching for birth relatives may be important to some but viewed as irrelevant by others. Adolescents who were highly preoccupied with their adoption were found to report greater alienation from their adoptive parents (Kohler, Grotevant, & McRoy, 2002), although the direction of effects is unclear.

Children born through gamete donation differ from adopted children in that they are genetically related to one parent and are born into the families in which they are reared. However, the absence of a genetic connection to one parent is considered by some to create important similarities between donor-conceived children and adopted children (Cahn, 2009; Feast, 2003), which may have implications for identity development, adjustment, and relationships with parents.

The concern about secrecy in donor conception families has also arisen from research on adoption, which has shown that adopted children who are not given information about their birth parents are at risk for emotional, behavioral, and identity problems (Brodzinsky, 2006; Grotevant, 1997; Grotevant, Perry, & McRoy, 2005). It is now generally accepted that open communication between adoptive parents and their children, such that children are given developmentally appropriate information about their adoption and feel free to discuss adoption-related issues as they arise, is important for positive parent-child relationships and the psychological well-being of adopted children (Brodzinsky & Pinderhughes, 2002).

The family therapy literature also points to the potentially negative psychological consequences of keeping children's origins secret (Imber-Black, 1998; Papp, 1993). From a family therapy perspective, secrets are believed to be detrimental to family functioning because they create boundaries between those who know the secret and those who do not (Bok, 1982; Vangelisti, & Caughlin, 1997), and cause anxiety when topics related to the secret are discussed (Lane & Wegner, 1995). In examining the particular case of parents keeping secrets from their children, Papp (1993) suggested that children can sense when information is being withheld from them due to the taboo that surrounds the discussion of certain topics, and that children may become confused and anxious, or even develop symptoms of psychological disorder, as a result.

In relation to donor conception, it has been argued that keeping the circumstances of conception secret interferes with communication between those who know the secret (the parents) and those who do not (the children)

(Clamar, 1989). The extent to which donor-conceived children suspect that secrets about their parentage are being kept from them cannot be established, but it is thought that children may “pick up” that they are different in some way (Daniels, Grace, & Gillett, 2011). Parents of donor-conceived children have reported difficulties responding to comments or questions about family resemblances (Becker, Butler, & Nachtigall, 2005), and, in a qualitative study of adults who were aware of their donor insemination, some reported that, as children, they suspected that something was amiss (Turner & Coyle, 2000).

Rates of Disclosure in Donor-Conceived Families

The majority of parents who gave birth to donor-conceived children do not tell their children about their genetic origins. In the European Study of Assisted Reproduction Families, not one set of the 111 donor insemination parents who participated had disclosed the donor conception to their child by early school age (Golombok et al., 1996), less than 10% of parents had disclosed by early adolescence (Golombok, Brewaeys, et al., 2002), and no additional parents had done so by Age 18 (Owen & Golombok, 2009). A similar pattern was found for egg donation families in the United Kingdom (Golombok, Murray, Brinsden, & Abdalla, 1999; Murray, MacCallum, & Golombok, 2006) and in Finland (Söderström-Anttila, Sajaniemi, Tiitinen, & Hovatta, 1998). With respect to embryo donation, MacCallum and Golombok (2007) found that only 9% of parents of preschool children born through embryo donation had begun to talk to their children about the children’s biological origins, rising to only 18% by middle childhood (MacCallum & Keeley, 2008). This was in stark contrast to the comparison group of adoptive parents, all of whom had disclosed the adoption to their children (MacCallum & Keeley, 2012). Even in Sweden, where legislation giving donor offspring the right to obtain information about the donors’ identity came into force in 1985, more than a decade later, only 11% of parents had informed their children of their donor conception (Gottlieb, Lalos, & Lindblad, 2000; Lindblad, Gottlieb, & Lalos, 2000). Investigations in the United States have produced comparable findings, with rates of disclosure to the children reported to range between 14% and 30% (Leiblum & Aviv, 1997; Nachtigall, Tschann, Szkupinski Quiroga, Pitcher, & Becker, 1997). When questioned about their reasons for secrecy, parents in the European Study of Assisted Reproduction Families reported concern that their children would be upset, shocked, and confused

by the knowledge that their fathers or mothers were not genetically related to them (Cook, Golombok, Bish, & Murray, 1995; Golombok et al., 1999). They were also apprehensive about jeopardizing the positive relationships that existed between the children and their nongenetic parents. In addition, they did not know when or how to tell their children and, as the donors were anonymous, were concerned about not being able to answer the children’s inevitable questions about the donors’ identities.

There has been a rise in the number of parents who intend to tell their children about their donor conception (Daniels et al., 2009; Hahn & Craft-Rosenberg, 2002). Nevertheless, in spite of their intentions, many parents do not actually disclose this information. In a longitudinal study of children born in the United Kingdom in 2000 (the Millennium Babies Study), 46% of parents of infants conceived by donor insemination and 56% of parents of infants conceived by egg donation planned to tell their child about their donor conception. However, only 28% of donor insemination parents and 41% of egg donation parents actually did so by Age 7 (Readings, Blake, Casey, Jadva, & Golombok, 2011), the age by which most adopted children are informed of their adoption. Moreover, some parents who reported that they had told their children had done so simply by discussing the use of fertility treatment but not the use of donated eggs or sperm (Readings et al., 2011). Parents of children conceived by embryo donation have similarly been shown to give only partial information about the conception to their children (MacCallum & Keeley, 2012).

Family Functioning in Nondisclosing Families

In spite of the growing number of families formed through donor conception, few studies have investigated parent-child relationships and children’s socioemotional development in these families. The European Study of Assisted Reproduction Families included a group of families created by donor insemination and found the quality of parenting in DI families to be similar to that of IVF families, and superior to that of natural conception families (Golombok et al., 1995, 1996). This suggests that the couples who conceived children through donor insemination became highly committed parents, and that the absence of a genetic connection between the fathers and the children did not interfere with the development of positive relationships between them. The families were followed up as the children approached adolescence (Golombok, Brewaeys, et al., 2002; Golombok, MacCallum, Goodman, & Rutter, 2002). Although the donor insemination families no longer

showed higher levels of parenting quality than the natural conception families, they were characterized by high levels of warmth between parents and children, accompanied by appropriate levels of discipline and control. In a follow-up of the UK families at Age 18, higher levels of warmth and discipline were shown by donor insemination than by IVF mothers, and no differences were found for fathers (Owen & Golombok, 2009).

A sample of egg donation families was also recruited in the United Kingdom and compared with the donor insemination families (Golombok et al., 1999). The only difference to emerge was that mothers and fathers of young children conceived by egg donation reported lower levels of stress associated with parenting than did parents of donor insemination children. Again, few differences in parenting were identified when the children reached adolescence, although the egg donation mothers showed lower levels of sensitive responding and were less likely to be emotionally overinvolved with their children than were the donor insemination mothers (Murray et al., 2006). It is conceivable that these differences stemmed from the absence of a genetic relationship between the egg donation mothers and their children.

In terms of child adjustment, no differences in emotional or behavioral problems between children conceived by either sperm donation (Golombok, Brewaeys, et al., 2002; Golombok et al., 1995; Golombok et al., 1996; Golombok, MacCallum, et al., 2002) or egg donation (Golombok et al., 1999; Murray et al., 2006) and comparison groups of IVF, natural conception, and early-adopted children were found in childhood or early adolescence. This suggests that, in families where children are unaware of their donor conception, the absence of a genetic link with fathers in donor insemination families or mothers in egg donation families is not associated with raised levels of child adjustment problems.

In the only study of parenting and child development in families formed through embryo donation, families were found to be functioning well when the children were of preschool age (MacCallum, Golombok, & Brinsden, 2007) and when followed up in middle childhood (MacCallum & Keeley, 2008). The parents differed from comparison groups of adoptive and IVF parents only in terms of greater emotional overinvolvement with the children. The children were not found to be at increased risk of psychological problems either in their preschool (MacCallum et al., 2007) or their early school years (MacCallum & Keeley, 2008).

In an investigation that used parent questionnaires to compare sperm donation, egg donation, embryo donation,

and surrogacy families with families created by assisted reproductive procedures using the parents' own gametes, no differences in the psychological adjustment of 5- to 9-year-old children were found (Shelton et al., 2009). A further questionnaire-based study compared donor insemination families with naturally conceived two-parent families, single-mother families, and stepfather families in terms of parental psychological distress, parental relationship quality, general family functioning, parenting quality, and quality of parent-child relationships (Kovacs, Wise, & Finch, 2013). The children ranged in age from 5 to 13 years. Where differences were identified between the donor insemination families and the other family types, these reflected more positive functioning in the donor insemination families. Of particular interest are the more positive findings for donor insemination fathers than for stepfathers, suggesting that the intention to become non-genetic parents, and the age of the children at the time of becoming nongenetic parents, may be important factors in determining the quality of the relationship between fathers—and possibly mothers—and their genetically unrelated children. Further support for this possibility comes from Dunn et al.'s (1998) finding that many stepparents do not view their stepchildren as their "own" children.

Family Functioning in Disclosing Families

Contrary to parents' concerns, it appears that children who are told about their donor conception in their preschool years respond neutrally, or with curiosity rather than distress (Blake, Casey, Readings, Jadv, & Golombok, 2010; Mac Dougall, Becker, Scheib, & Nachtigall, 2007; Rumball & Adair, 1999). However, they appear to have little understanding of egg or sperm donation by Age 7 (Blake et al., 2010), the age by which most adopted children understand what it means to be adopted (Brodzinsky & Pinderhughes, 2002). It is not until Age 10 that most are able to give clear accounts of the nature of their conception (Blake, Casey, Jadv, & Golombok, 2013). In a study of the thoughts and feelings of adolescents who grew up with the knowledge that they were donor-conceived, the majority reported feeling comfortable about their donor conception and felt that learning about their donor conception did not have a negative impact on their relationship with their parents (Scheib et al., 2005).

The experience of those who are told, or find out about, their donor conception in adolescence or adulthood as opposed to early childhood can be strikingly different. Participants in qualitative studies have reported that secrecy about the nature of their conception has caused

them severe psychological harm, and many have felt deceived by their parents and angry toward them (Blyth, 2012; Turner & Coyle, 2000). Moreover, in a survey of 165 donor offspring who were members of the Donor Sibling Registry, those who had found out about their donor conception in adolescence or beyond were more likely to report feeling upset, angry, shocked, and confused than were those who had been told in childhood (Jadva, Freeman, et al., 2009). It is important to note, however, that the participants in these studies had either joined a support group for donor-conceived offspring or the Donor Sibling Registry, and thus the extent to which they are representative of individuals who are aware of their donor conception is not known. Also, all had been conceived by donor insemination; no data are yet available on the feelings and experiences of adolescents and young adults conceived by egg or embryo donation. This will be an important issue to research in the years to come.

In order to investigate the psychological consequences for families of openness with children about their donor conception, a longitudinal investigation of families created by donor insemination and egg donation was initiated at the millennium in the United Kingdom (the U.K. Longitudinal Study of Assisted Reproduction Families). Phase 1 was conducted when the children were 1 year old (Golombok, Lycett, et al., 2004), Phase 2 was conducted at Age 2 (Golombok, Jadva, Lycett, Murray, & MacCallum, 2005), Phase 3 was conducted at Age 3 (Golombok, Murray, et al., 2006), Phase 4 was conducted at Age 7 (Casey, Jadva, Blake, & Golombok, 2013; Golombok, Readings, Blake, Casey, Mellish, et al., 2011) and Phase 5 was conducted at Age 10 (Golombok, Blake, Casey, Roman, & Jadva, 2013). In the preschool years, the differences identified between family types pointed to more positive parent-child relationships in families created by gamete donation than in the comparison group of natural conception families, with no differences in the quality of family relationships according to whether the children lacked a genetic connection to the father (in the case of donor insemination) or the mother (in the case of egg donation) (Golombok, Lycett, et al., 2004; Golombok et al., 2005; Golombok, Murray, et al., 2006). The donor-conceived children were found to be functioning well, but, in spite of their highly involved parenting, did not show higher levels of adjustment than their counterparts from natural conception families. These findings replicated those obtained in the European Study conducted 15 years earlier.

In contrast to the more positive outcomes for the donor conception families in the preschool years, greater

difficulties emerged at Age 7 (Casey et al., 2013; Golombok, Readings, Blake, Casey, Mellish, et al., 2011), the age by which children show an understanding of biological inheritance (Gregg, Solomon, Johnson, Zaitchik, & Carey, 1996; Williams & Smith, 2010) and the meaning and implications of the absence of a biological connection to parents (Brodzinsky & Pinderhughes, 2002). The gamete (egg and sperm) -donation mothers who had kept their children's origins secret showed higher levels of emotional distress than did those who had been open with their children about their origins. With respect to the relationship between parents and children, interview and observational assessments of mother-child interaction revealed less positive interaction in the donor-conceived families in which parents had not disclosed the method of conception to the children than in the natural conception families. There were no differences for fathers apart from higher negativity shown by donor-insemination children during an observational assessment of interaction with their fathers. It is important to note that the differences identified at Age 7 are not indicative of dysfunctional family relationships, but, instead, reflect variation within the normal range.

In terms of child adjustment, the absence of genetic connection to either the mother or the father was not associated with emotional or behavioral problems at 3, 7, or 10 years old (Golombok, Blake, et al., 2013). At Age 10, the children were interviewed about their relationships with their parents; those who were aware of their origins were asked about their feelings about being donor conceived (Blake et al., 2013). The large majority in all three family types perceived their relationships with their mothers and fathers as warm and involved; the absence of genetic relationships did not appear to affect children's feelings of closeness to their parents. Most had positive feelings about their donor conception. However, they tended not to discuss this with friends and family, and some reported feeling embarrassed when talking about the subject. As the children studied so far have been preadolescent, the longer-term outcomes of the awareness of donor conception for parent-child relationships and child adjustment are not yet known. As adolescence is the developmental stage at which issues relating to identity become salient and difficulties in parent-child relationships are most likely to arise, adolescence may present particular challenges to donor-conception families. The consequences of donor conception for adolescent development and well-being is thus an important area for future research.

Searching for Donor Relations

As discussed above, the wish to obtain information about their birth family is characteristic of adopted children at adolescence (Grotevant & Von Korff, 2011; Wrobel & Dillon, 2009), and it has been argued that research on adoption provides valuable insight into how donor-conceived offspring may feel about searching for and contacting their genetic relations (Cahn, 2009; Feast, 2003). The main reason given by adopted individuals for searching for birth relatives is to gain a more complete understanding of their family history in order to enhance their own sense of identity (Brodzinsky, Smith, & Brodzinsky, 1998). In a study of the experiences of adopted individuals who had found information about their origins (Howe & Feast, 2000), the majority reported that this had helped them gain a better sense of self and had improved their psychological well-being.

There is growing evidence that similar processes are at play for children born through gamete donation, although the data available comes from those who were conceived through donated sperm rather than donated eggs or embryos. In a survey of 165 donor offspring aged between 13 and 61 years who were members of the Donor Sibling Registry, the main reasons given for searching for donor relations were to satisfy curiosity about the characteristics of their donor and to enhance their sense of identity (Jadva et al., 2010). Although many wished to meet their donor and donor siblings, not one mentioned wanting to form a relationship with their donor as their main reason for searching. Adolescents with identity-release sperm donors were studied by Scheib et al. (2005). Again, the large majority were curious to know what their donor was like as a person. Most planned to request the identity of their donor on reaching Age 18 and pursue contact with him. However, only 10% reported that he was an important person in their life and only 6.9% wanted a father-child relationship.

Surrogacy Families

Although children conceived by egg donation are genetically unrelated to their mothers, children conceived by sperm donation are genetically unrelated to their fathers, and children conceived by embryo donation are genetically unrelated to both parents, these children are all born to the parents who will raise them. In the case of surrogacy, the mother who gives birth to the child and the mother who parents the child are not the same. Children born through

gestational surrogacy lack a gestational link with their mother, and children born through genetic surrogacy lack both a gestational and a genetic link with her.

Of all the assisted reproductive procedures that have been practiced, surrogacy remains the most contentious. It has been suggested that the characteristics that distinguish surrogacy from other types of assisted reproduction may produce greater problems for surrogacy families than for families created by more traditional assisted reproduction techniques (Golombok, Murray, Jadva, MacCallum, & Lycett, 2004). Intended parents must live throughout the pregnancy uncertain whether the surrogate mother will relinquish the child, and must establish a mutually acceptable relationship with her to ensure that their relationship does not break down. From the perspective of the intended mother who is unable to give birth, herself, the relationship with the fertile and often younger surrogate, to whom she is indebted, may result in feelings of inadequacy, depression, and low self-esteem. Difficulties may also arise if the surrogate remains in contact with the family after the birth, especially if she is the genetic mother of the child. Moreover, due to the controversial nature of surrogacy, intended parents may experience disapproval from family, friends, and the wider social world. Unlike other forms of assisted reproduction, in which the mother experiences a pregnancy and can choose to keep the circumstances of the child's conception secret, parents of children born through surrogacy must explain the arrival of their newborn baby. All of these factors have the potential to negatively affect the quality of parenting in surrogacy families and, consequently, the psychological well-being of children.

In order to examine these issues, a group of surrogacy families was recruited as part of the U.K. Longitudinal Study of Assisted Reproduction Families and compared with the egg donation and natural conception families. This was the first investigation of surrogacy families in which in-depth data on family functioning and child development was obtained from infancy onward. At Age 1, the differences that were identified indicated greater parental psychological well-being and greater adaptation to parenthood by mothers and fathers of children born through surrogacy than by natural conception parents (Golombok, Murray, et al., 2004; MacCallum, Lycett, Murray, Jadva, & Golombok, 2003). The families were next assessed at the time of the children's second birthdays. In comparison to the natural conception families, the surrogacy mothers showed more positive parent-child relationships than did mothers with naturally conceived children, the surrogacy

fathers reported lower levels of parenting stress than did their natural conception counterparts, and there were no group differences in the children's cognitive development or psychological adjustment (Golombok, MacCallum, Murray, Lycett, & Jadva, 2006). Assessments of family relationships and child development were conducted again when the children reached 3 years of age (Golombok, Murray, et al., 2006). The differences found between family types reflected higher levels of warmth and interaction between mothers and children in surrogacy families than in families with naturally conceived children. Thus, the findings from the preschool phases of the study indicated more positive parent-child relationships in surrogacy than in natural conception families. At all three phases, the egg donation families were more similar to the surrogacy than to the natural conception families.

When followed up at Age 7, once the children had acquired a greater understanding of surrogacy, there were no differences in positive or negative aspects of parenting between mothers in the different family types. However, observational assessments of mother-child interaction revealed less positive interaction in mother-child dyads from the surrogacy and egg donation groups than in the natural conception families (Golombok, Readings, Blake, Casey, Marks, et al., 2011). With respect to the children, data on emotional and behavioral problems were obtained for the surrogacy, egg donation, donor insemination, and natural conception children at Ages 3, 7, and 10. Although the children were generally functioning within the normal range, the surrogacy children showed higher levels of adjustment problems than did children conceived by gamete donation at Age 7, suggesting that the absence of a gestational connection between parents and children may be more problematic for children than the absence of a genetic link (Golombok, Blake, et al., 2013). Interestingly, infant-placed internationally adopted children have been found to show a similar increase in behavioral problems at Age 7 (Stams, Juffer, Rispens, & Hoksbergen, 2000), and both the surrogacy and the internationally adopted children's behavioral problems had reduced when followed up at Age 10 and early adolescence, respectively. A possible explanation is that both groups of children struggle with identity issues earlier than other children do, as they must face up to being different at an early age. Contrary to commonly voiced concerns, the majority of families who kept in contact with their surrogate mother maintained a good relationship with her over the first 10 years of the children's lives (Jadva, Blake, Casey, & Golombok, 2012).

Conclusions

It seems that concerns about the potentially negative consequences of "high-tech" assisted reproductive technologies for children's socioemotional development are unfounded. Indeed, these extremely wanted children appear to experience particularly positive parenting. Procedures involving reproductive donation bring additional concerns, especially relating to secrecy about the children's genetic origins. Although children and young adolescents who are unaware of their donor conception do not appear to be at risk for psychological problems, little is known about older adolescents or adults in this situation. Children whose parents disclose their donor conception at an early age seem to integrate this information into their developing sense of self, whereas some donor offspring who find out about their donor conception in adolescence or adulthood report enduring psychological distress. Those who are aware of their donor conception may wish to search for their donor and donor siblings. Their main motivation is curiosity and the wish to incorporate information about their family background into their life story in order to develop a more complete sense of who they are. Further research is needed on the nature of relationships formed with donors and donor siblings, and on the consequences for parents and children of the use of known rather than anonymous donors.

SAME-SEX PARENTING

Same-sex parenting can take place through a number of different pathways. Since the 1980s onward, assisted reproduction techniques have been used by lesbians and gay men to have children within the context of same-sex couple relationships, or as single parents, in planned or *de novo* family arrangements. The majority of children in planned lesbian families appear to have been born to lesbian mothers through donor insemination at a clinic, according to parental reports in the studies reviewed below. However, an unknown number of children have been born to lesbian mothers through self-insemination at home using either sperm from anonymous donors, previously unknown men, male friends, or male relatives of the receiving women's female partners. Some gay men have planned fatherhood through donor agreements with lesbian or single heterosexual women (Segal-Engelchin, Erera, & Cwikel, 2005). Others may have initially seen themselves simply as sperm donors, but later have taken

up parenting roles through involvement in their children's lives and the agreement of the children's mothers. A few celebrity gay male couples have hit the headlines by having children through surrogacy, but few clinics offer this expensive treatment and, as yet, few legislatures support it (Berkowitz, 2013; Greenfield & Seli, 2011; Tasker 2013a).

Same-sex parenting may also come about through adopting children (Farr & Patterson, 2013; Golombok, Mellish, et al., 2013). Gates (2011) indicated that the number of lesbian and gay adoptive parents in the United States has doubled in the past decade. In countries such as the United Kingdom, in which joint adoption by same-sex couples has become possible, adoption is often the first choice, because both parents can be legally recognized as parents with an equal connection to genetically unrelated children (Jennings, Mellish, Tasker, Lamb, & Golombok, 2013). Some lesbians and gay men have also taken on *in loco parentis* roles as foster carers (Hicks, 2011).

Many men and women who parent in same-sex couples have conceived or adopted their children within a heterosexual relationship that has ended with parental separation or the death of a parent (Tasker, 2013b). The legacy of a previous relationship inevitably makes for more complex family networks than those in planned or *de novo* same-sex families. In some cases, instead of ending an established relationship, a lesbian, gay, or bisexual parent might continue to parent within a mixed-orientation marriage (Buxton, 2005). Most of the information on the developmental outcomes for children of nonheterosexual parents has been produced by studies that have recruited samples of self-identified lesbian or gay parents. Little is known about parenting by adults who identify as bisexual or queer (Ross & Dobinson, 2013).

Parenting

Data from numerous studies of lesbian mother families have indicated that parent-child relationships are just as warm and nurturing as they are in heterosexual families, and the smaller number of studies of gay father families has produced similar results. The earliest investigations, which were of children who had been conceived in heterosexual relationships but brought up by lesbian mothers after the parents had divorced or separated, found that mother-child relationships were just as close in lesbian families as they were in postseparation families headed by single heterosexual mothers (Golombok, Spencer, & Rutter, 1983; Green, Mandel, Hotvedt, Gray, & Smith, 1986; Hoeffer, 1981; Kirkpatrick, Smith, & Roy, 1981).

Surprisingly little research has focused on the parenting of gay fathers who have had children in previous heterosexual relationships, perhaps because most of these children live with their mothers rather than their fathers after their parents' separation. Studies that have asked nonresidential gay fathers about parenting have found that gay and heterosexual fathers reported similar problems keeping in touch with their children's lives (Bigner & Jacobsen, 1989a, 1989b), with gay fathers tending to be more receptive to children's needs, employing more reasoning strategies, and emphasizing limit-setting more often than do heterosexual fathers postdivorce (Bigner & Jacobsen, 1992).

It has been suggested that children raised by lesbian couples may receive a "double dose" of warm, child-centered parenting because they have two mothers (Biblarz & Stacey, 2010). For instance, Flaks, Ficher, Masterpasqua, and Joseph (1995) studied lesbian couples parenting 3- to 9-year-old children conceived by donor insemination (DI) and found them to be more likely than heterosexual couples to identify and think through critical issues in childcare situations. In an investigation of parent-child relationships in a community sample of lesbian, two-parent heterosexual, and single heterosexual parent families recruited through the Avon Longitudinal Study of Parents and Children in the United Kingdom (Golombok et al., 2003), lesbian mothers were found to engage in more imaginative and domestic play with their children and were less likely to smack their children than heterosexual mothers. Bos, van Balen, and van den Boom (2004) compared a Dutch sample of lesbian mother families with donor insemination children aged 4 to 8 with a school-recruited comparison group of heterosexual families with naturally conceived children. Lesbian and heterosexual mothers reported similarly competent parenting practices and seemed to have equivalent levels of parenting stress. However, co-mothers (lesbian mothers who had not given birth to their children) seemed to feel the need to present or justify their parenting more than the other parents in the study.

Studies of adoptive parenting by same-sex couples have produced similarly positive results. The Cambridge Study of Adoptive Family Life examined lesbian, gay, and heterosexual couples and their 3- to 9-year-old adopted children (Golombok, Mellish, et al., 2013). By the time of assessment, which took place at least 1 year after the children had been placed with the couples, generally positive parent-child relationships, characterized by parental warmth and sensitivity, had been established in all three groups. Where differences were found, these reflected more positive parental well-being and parent-child

relationships in gay, rather than heterosexual, families. In a study of adoptive two-parent families in the United States, few differences between gay, lesbian, and heterosexual families were found in parenting stress, parental discipline, or parental relationship satisfaction (Farr, Forssell, & Patterson, 2010; Tornello, Farr, & Patterson, 2010). Erich, Leung, and Kindle (2005) collected data from a convenience sample of lesbian and gay adoptive parents of children of varying ages. No significant differences between groups were found for family functioning using the Family Assessment Measure–III (FAM–III). The authors noted that the lesbian and gay parents who had adopted older children with histories of abuse generally reported higher levels of family functioning than were expected for children with difficult preadoption histories. Self-report data from lesbian and gay adoptive parents similarly indicated that adoptive parents showed good parenting skills (Ryan, 2007), again despite many of the children having experienced preadoption trauma.

Longitudinal studies of adolescent and young adult offspring of lesbian mothers have confirmed that parent–child relationships continue to be positive as children grow up. The UK follow-up of children raised by lesbian mothers after their mothers and fathers had separated found that, in their mid-20s, offspring continued to report close relationships with their mothers and had closer stepparenting relationships with their mothers' female partners than adults in the heterosexual mother comparison group had with their mothers' male partners (Tasker & Golombok, 1997). In the Fatherless Families Study, a longitudinal study of planned lesbian families that included comparison groups of families headed by single heterosexual mothers and married heterosexual parents, the children were first interviewed at Age 3 to 9 years (Golombok, Tasker, & Murray, 1997), followed up at Age 12 (MacCallum & Golombok, 2004) and again at Age 18 (Golombok & Badger, 2010). Mother–child relationships were found to be closer in both types of fatherless families in childhood, and early adolescent children in fatherless families again reported closer relationships with their mothers, although mothers in fatherless families also reported more severe disputes with their adolescent offspring. At the subsequent follow-up, young adults from different family types did not differ in the quality of their relationships with their mothers, but the mothers in fatherless families showed greater emotional involvement in the lives of their offspring than did married mothers.

Some commentators have suggested that rates of parental separation may be higher for children parented

by lesbian couples than for those parented by heterosexual couples (Biblarz & Stacey, 2010). For example, Gartrell, Bos, Peyser, Deck, and Rodas (2011) found that the rate of partnership dissolution in the National Longitudinal Lesbian Family Study was higher than the divorce rate among age-matched heterosexual parents in the U.S. National Survey of Family Growth. However, separation rates are likely to be higher than divorce rates, and it is worth bearing in mind that few of the lesbian couples had access to same-sex marriage or civil union status. Bos, Gartrell, van Balen, Peyser, and Sandfort (2008) noted a significantly higher rate of separation among lesbian couples in the U.S. sample than in a Dutch sample, further suggesting the importance of cultural context for same-sex relationship stability.

Psychological Adjustment of Young Children

The psychological adjustment of children raised in lesbian families has been a continuing focus of research since the initial publications in the field. The rationale for this body of research is that claims made in custody disputes that a child's psychological well-being will be harmed by being brought up by parents who have same-sex relationships should be put to the test. These claims are based upon psychoanalytic and classic social learning theories implying that mothers and fathers in heterosexual relationships are necessary for positive child development (Golombok, 2000; Golombok & Tasker, 1994). It is also argued that children might be at risk for anxiety or depression, either because of peer stigma or parental neglect, because their parent will be distracted from parenting by pursuit of new same-sex relationships (Logue, 2002).

None of the original studies in either the United Kingdom (Golombok et al., 1983) or the United States (Green et al., 1986; Kirkpatrick et al., 1981) of parents and children in postdivorce lesbian mother families found that these children were more challenged in their mental health than were children brought up by single heterosexual mothers after divorce. The long-term follow-up of Golombok et al.'s (1983) sample found no signs of poor mental health in adulthood (Tasker & Golombok, 1997). Other studies of children brought up by lesbian mothers after their mothers and fathers separated found no differences in intelligence test scores (Green et al., 1986) or self-concept (Puryear, 1983). Huggins (1989) compared the self-esteem of adolescents brought up by lesbian mothers and single heterosexual mothers after the mothers' and fathers' separation. No differences were

found between the two groups of young people. However, Huggins did find evidence of a bimodal distribution of self-esteem among adolescents from lesbian families: self-esteem was higher than comparison group scores for those who were positive about their mothers' lesbian identity, and correspondingly lower than comparison group scores if the adolescents held negative views. No controlled studies have examined the psychological well-being of children whose fathers have come out as gay after separating from the mothers. Nevertheless, there have been no indications from studies of gay fathers and their children that the children generally have difficulties with respect to well-being (Barrett & Tasker, 2001; Bozett, 1987a, 1987b; Miller, 1979).

Regarding children conceived through assisted reproductive technologies by lesbian and gay parents and thus reared by same-sex parents from birth, a number of studies have used the Child Behavioral Checklist (CBCL) to examine parental and sometimes teacher reports of children's internalizing and externalizing behaviors. For example, Chan, Brooks, Raboy, and Patterson (1998) studied children aged around 7 years who were conceived by donor insemination to single and two-parent lesbian and heterosexual families. It was concluded that neither family structure nor parental sexual orientation influenced children's psychological adjustment. Instead, higher levels of parenting stress, parental conflict, and relationship dissatisfaction correlated with both internalizing and externalizing behaviors, regardless of family type. Findings from the National Longitudinal Lesbian Families Study also showed that 10-year-old children did not differ from CBCL norms in terms of social competence or psychological adjustment (Gartrell, Deck, Rodas, Peyser, & Banks, 2005). Neither were there differences in the CBCL scores of elementary school aged children raised in lesbian or heterosexual two-parent families studied by Flaks et al. (1995). Similarly, studies in Belgium (Brewaeys, Ponjaert, van Hall, & Golombok, 1997) and the Netherlands (Bos, van Balen, & van den Boom, 2007) found no evidence of elevated levels of CBCL scores in DI children conceived by lesbian mothers. Again, children's CBCL scores were associated with family process variables, including parental satisfaction with their partners, power assertion, and parental concern. A similar absence of differences in child adjustment between children in lesbian and heterosexual two-parent households was found using the Strengths and Difficulties Questionnaire administered to parents and teachers in the United Kingdom (Golombok et al., 1997; Golombok et al., 2003). Predictable associations were found across

families between children's problematic behavior and higher frequencies of parenting disputes, greater parental stress, and lower levels of parental warmth (Golombok et al., 2003).

Investigators have also included positive indices of psychological well-being in studies of children in lesbian families. For example, no differences between DI children conceived by lesbian and heterosexual couples were identified in children's CBCL social competence scores measuring children's engagement in social activities at home or at school (Chan et al., 1998). Children from both family types showed higher levels of social engagement in comparison with CBCL norms. In addition, Golombok et al. (2003) found no differences in self-esteem between children in families headed by lesbian mothers, single heterosexual mothers, and married heterosexual mothers. However, in the earlier Fatherless Families Study, children in families led by lesbian mothers tended not to score as highly on self-perceived physical and cognitive competence as did children in heterosexual two-parent families (Golombok et al., 1997).

Children adopted by same-sex parents also do not appear to show higher rates of psychological problems than do children adopted by heterosexual parents. In their comparison of the psychological well-being of preschool children adopted in infancy by matched groups of lesbian, gay, and heterosexual couples, Farr et al. (2010) and Tornello et al. (2010) found that children adopted by same-sex couples were as well-adjusted as those adopted by heterosexual couples, according to both parents' and teachers' reports on the CBCL. Irrespective of family structure, the authors concluded that the factors related to child adjustment were positive parenting, the absence of parenting stress, and harmonious couple relationships. In contrast, observed competitiveness between adoptive parents and parent-reported dissatisfaction with the division of childcare were related to increased levels of behavioral problems. A smaller study that sampled children from early childhood through to adolescence also compared lesbian, gay, and heterosexual adoptive parents' reports of their children's behavior on the CBCL, again finding no significant differences in behavioral problems across family types (Erich et al., 2005). In the United Kingdom, children adopted by gay fathers showed lower levels of externalizing problems than did children adopted by heterosexual parents (Golombok et al., 2013). It was not possible to determine whether the more positive adjustment among children adopted by gay fathers resulted from gay fathers having less troubled children placed with them

or from the highly positive parenting environment they provided for their adopted children.

Psychological Adjustment of Adolescent and Young Adult Offspring

Findings from the National Longitudinal Lesbian Families Study, an in-depth qualitative study of children born to lesbian couples by donor insemination, indicate that the psychological well-being of the 17-year-olds raised in lesbian families did not differ from matched adolescents in the Washington Health Youth Survey (van Gelderen, Bos, Gartrell, Hermanns, & Perrin, 2012). Likewise, Gartrell and Bos (2010) found that these adolescents were functioning at least as well, and in some instances better, than expected from adolescent CBCL norms. Similar findings were obtained from the Fatherless Families Study in the United Kingdom when adolescents and young adult offspring parented by lesbian mothers were compared with those parented by heterosexual single mothers or heterosexual married couples (Golombok & Badger, 2010; MacCallum & Golombok, 2004), with young adults who had grown up in mother-headed families (either single heterosexual mothers or lesbian mothers) showing lower levels of anxiety, depression, hostility, and problematic alcohol use, coupled with higher levels of self-esteem, than did young adults from father-present families.

Confidence in the general psychological well-being of children and adolescents raised in same-sex parented families has been increased by findings from studies that have used large, nationally representative samples to investigate psychological adjustment in lesbian and gay families. Using the Add Health national database of U.S. high school students, adolescents from households headed by lesbian couples were not found to differ from their peers from heterosexual two-parent families on either psychological or school adjustment (Wainright, Russell, & Patterson, 2004). Adolescents in same-sex parented households also generally reported low levels of delinquent behavior and substance use (Wainright & Patterson, 2006). In addition, Rosenfeld (2010) analyzed data from the U.S. Census 2000 to find that differences in parental socioeconomic status accounted for most of the small gap in rates of retention across school grades between children living in households headed by heterosexual married couples and those living in households headed by stable same-sex couples. In the United Kingdom, Rivers, Poteat, and Noret (2008) examined the psychological adjustment of a subsample drawn from a UK school survey

of 12- to 16-year-olds who reported living with their mothers and their same-sex partners and a matched group of pupils living with their heterosexual mothers and fathers. Adolescents parented by lesbian mothers did not differ from those with heterosexual parents on a questionnaire measure of psychological problems.

Peer Relationships

A further concern about children parented by nonheterosexual parents has been that these children may be subjected to stigma through association. The likelihood of encountering stigma has been thought to relate to the extent to which their parents are "out" about their sexual identity, and also dependent on the level of acceptance and visibility of LGBTQ people in the wider society and local neighborhood. How children manage prejudice likely depends upon several factors: How apparent they think their parents' sexual orientation may be, the extent to which they, themselves, identify with their parents' sense of being different, their ages, and whether or not they reside with their lesbian or gay parents and their parents' same-sex partners.

Studies of children brought up by their lesbian mothers or gay fathers postseparation have not found these children to be more likely to be victimized than their peers. Neither Green et al. (1986) in the United States nor Golombok et al. (1983) in the United Kingdom found that children with lesbian mothers had difficulties with peer relationships or in forming friendships, in comparison with their peers from single heterosexual mother families. When the children in the UK study were followed up as young adults, those with lesbian mothers were no more likely to say that they had encountered teasing or bullying than were those in the comparison group (Tasker & Golombok, 1997). However, when asked specifically whether they had ever been teased about their own sexuality, daughters, and more particularly sons, from lesbian families tended to be more likely to say that they had been teased, perhaps because of their sensitivity to peer group comments.

Compared with the heterosexual mothers in the UK Avon Longitudinal Study of Parents and Children, lesbian mothers were slightly more likely to report that their elementary school aged children had experienced some peer relationship difficulties (Golombok et al., 2003). But no differences in peer relationship difficulties were reported by the children themselves or their class teachers. Other studies have found that overall rates of stigmatization experienced by children in planned lesbian families are

not higher than rates experienced by comparison groups. For example, in the Fatherless Families Study, no differences in rates of victimization by family type were found when children were studied at elementary school age (Golombok et al., 1997), in early adolescence (MacCallum & Golombok, 2004) or in early adulthood (Golombok & Badger, 2010). Studies in the United States (Ryan & Cash, 2004) and the United Kingdom (Mellish, Jennings, Tasker, Lamb, & Golombok, 2013) of adopted children placed with lesbian or gay parents have similarly found few reported difficulties in either peer stigmatization or friendship-forming at school. For example, none of the 59 children interviewed by Mellish and colleagues (2013) reported being teased or bullied about having lesbian or gay parents.

Aside from studies of adopted children, we still know little about the experiences of children with gay fathers, except through a few studies of gay men parenting children conceived through a previous heterosexual relationship. Adult offspring of gay fathers have not generally reported peer group problems when interviewed about their experiences (Bozett, 1987a, 1987b; Miller, 1979). Bozett's qualitative research indicated that both gay fathers and their children effectively exercised "boundary control" to limit the possibilities for prejudice. Boundary control strategies included presenting the fathers' male partners as friends or not displaying any signifiers that might indicate gay identities.

Investigators using subsamples of adolescents with same-sex parents drawn from nationally representative databases have recorded no differences in rates of victimization according to family type. Adolescents brought up by two female parents in the Add Health dataset reported no more instances of victimization than did controls (Wainright & Patterson, 2006). Similarly, Rivers et al. (2008) found no significant differences between victimization scores on a bullying questionnaire completed by adolescents in same-sex parented households and those from the matched comparison group or the wider sample. However, adolescents from same-sex parented families in the study by Rivers and colleagues (2008) were less likely to consider using school-based support systems if they encountered problems.

Nevertheless, some studies have found that some children from same-sex parented families indeed experience teasing and bullying associated with their nontraditional family background. While over 80% of National Longitudinal Lesbian Families Study mothers described their 10-year-olds as relating well to peers at school, and nearly

60% were completely out to their peers about their mothers' lesbian relationships, just over 40% of the children interviewed said that they had experienced some kind of homophobia (Gartrell et al., 2005). When offspring were 17 years old, about half reported having experienced some kind of homophobic stigmatization by the end of their school careers, with most of these incidents stemming from peer prejudice (van Gelderen, Gartrell, et al., 2012). Most of this stigmatization consisted of disapproving comments and teasing about the mothers. The majority of adolescents had been able to cope with these instances adaptively without self-blame, or had been able to confront the perpetrators either on their own or with support. Adolescents who had used other coping strategies to cope with stigmatization had often used an avoidant coping style, deciding to keep their lesbian family backgrounds a secret; boys had been more likely to do this than girls.

Cultural context seems to play an important role in whether or not children with two parents of the same sex experience peer group stigmatization. Bos, Gartrell, van Balen, et al. (2008) compared data from Dutch 8- to 12-year-old children and 10-year-old children in the National Longitudinal Lesbian Families Study. The Dutch children were found to be more open about their family backgrounds and experienced less homonegativity than did their American counterparts. Furthermore, experience of homonegativity was found to account for part of the variance in the generally poorer psychological adjustment scores in the U.S. sample.

A reason for the disparity in findings between studies may be connected to variations in the particular questions asked. For example, Wyers (1987) surveyed 32 gay fathers who had children within previous heterosexual relationships to find that around 75% of these children had experienced some peer group problems because their fathers were gay. When fathers were asked to detail what the problems had been, many involved children's concerns over what to tell peers about their fathers, or anxiety about the possibility of being bullied, rather than actual incidents. Only about 20% of children were reported by their fathers to have actually experienced one or more incidents of peer group stigma. Other authors have noted a discrepancy between asking about general rates of teasing and bullying and asking specifically about victimization related particularly to family background or sexuality, such that children with lesbian parents were no more likely to be teased or bullied than were children with heterosexual parents but when victimization occurred the negative comments were

more likely to focus on their family background or their sexuality (Tasker & Golombok, 1997).

Nevertheless, peer stigmatization can be hard to deal with when it happens. At Age 10, National Longitudinal Lesbian Family Study children who had experienced victimization were more likely to have higher problem behavior scores on the CBCL (Bos, Gartrell, Peyser, & van Balen, 2008). A similar pattern was evident at the follow-up at Age 17 (Bos & Gartrell, 2010). Likewise, the follow-up of children in the Netherlands indicated an association between homophobic stigmatization and poorer psychosocial adjustment (Bos & van Balen, 2008).

Gershon, Tschan, and Jemerin (1999) found a complex relationship between adolescent self-esteem and the perceived levels of stigma adolescents reported in their social environment. Adolescents who perceived higher levels of stigma associated with having lesbian mothers tended to have lower self-esteem. Furthermore, adolescents' assessments of their own coping skills influenced the extent to which the perception of stigma correlated with their self-esteem scores. In the face of high perceived stigma, adolescents who reported more decision-making coping skills had higher self-esteem. But adolescents who tended to rely on social support coping skills had lower levels of self-esteem if they perceived high levels of social stigma. Adolescents who reported disclosing their mothers' lesbian identities reported higher self-esteem, specifically in the ability to engage in close friendships.

Conclusions

Research on the socioemotional development of children in lesbian mother families formed after divorce or separation has consistently shown that children do not differ from children in heterosexual parent families. The same is true of children born to lesbian mothers through donor insemination and thus raised in lesbian mother families from birth. Moreover, these findings have been confirmed by studies of general population samples. Studies of adoptive gay father families have shown that gay fathers can parent as competently as can lesbian or heterosexual mothers, and that children in adoptive gay father families are functioning well. Future research on gay father families would no doubt help to investigate whether parental gender made a difference to parenting and child development under other family circumstances such as separation or divorce. The cultural context of same-sex parenting is currently changing with more states recognizing same-sex domestic unions or marriage. Further research can usefully

investigate the influence that legislation has on the social context of same-sex partnerships and parenting.

GENERAL CONCLUSIONS

So what can be concluded about the socioemotional development of children in changing family contexts? Is it the case that the traditional two-parent family is best for children? Or can children do as well, or perhaps even better, in certain types of new family forms? It is important to remember that traditional families headed by two married heterosexual parents vary enormously in the extent to which they provide supportive environments for children. The same is true of nontraditional family forms. Rather than focusing on whether individual children may be harmed or may flourish, the aim of this chapter has been to consider the consequences of different family structures for parenting and child development more generally, and to establish what is known about the processes through which children's socioemotional development may be influenced by growing up in different family contexts.

It is clear that some family types are more associated with negative outcomes for children than are others. Single-parent families formed as a result of parental separation or divorce, single-parent families headed by unmarried mothers, stepfamilies, and families with cohabiting parents are generally more likely than traditional families to result in difficulties for children. In contrast, children with lesbian or gay parents, and children conceived using assisted reproductive technologies, appear to be functioning well. So how can we explain these differences? The answer seems to lie in the circumstances surrounding the different family forms. Whereas the former set of families generally experience greater adversity than do traditional families, in terms of financial hardship, marital or relationship difficulties, and mental health problems (all of which are associated with impaired parenting and children's emotional and behavioral problems), this is not the case for families formed by same-sex parents and through assisted reproductive technologies. It may also be relevant that the latter types of family are, by necessity, planned.

Research on nontraditional family forms enables the impact of different family structures, and the relative impact of family structure and family processes, on children's socioemotional development to be explored. Families with children conceived by sperm donation, egg donation, embryo donation, and surrogacy allow the absence of genetic and/or gestational relationships between one or

both parents and the children to be investigated; studies of families with same-sex parents shed light on the influence of sexual orientation; comparisons of single-mother and single-father families, and of two-parent lesbian mother families and two-parent gay father families, provide information about the role of parental gender; and comparisons between two-parent and single-parent families with parents of the same gender increase understanding of the effects of the number of parents in the family.

Just because some family types are associated with more negative outcomes for children does not mean that family structure, in itself, has a direct impact on children's socioemotional well-being. Findings from the growing body of research on nontraditional families suggest that family processes such as warmth, communication, and conflict are better predictors of children's socioemotional development than is family structure (Biblarz & Stacey, 2010; Golombok, 2000, 2015; Lamb, 2012). This can also be concluded from the studies reviewed in this chapter showing, for example, that the differences between children with single parents, cohabiting parents or stepparents and their counterparts in traditional families are largely explained by factors such as economic disadvantage and maternal depression, which are characteristic of these nontraditional family types.

Further evidence for the greater importance of family process over family structure comes from studies that have directly examined the relative contribution of each (Chan et al., 1998; Demuth & Brown, 2004; Dunn et al., 1998; Farr et al., 2010; Golombok, Mellish, et al., 2013; Hetherington, 1989; Lansford, Ceballo, Abbey, & Stewart, 2001). These studies have shown that it is not family structure per se that influences the socioemotional well-being of children in different family forms. Instead, the quality of parent-child relationships, the quality of parents' relationships with each other, and the quality of the wider social environment appear to be more predictive of children's adjustment. Whether children have one parent or two, whether they have a genetic or gestational link to their parents, whether their parents are married or cohabiting, whether their parents are male or female, and whether their parents are of the same sex or opposite sex seem to matter less for children than does the quality of family life.

Nevertheless, the disadvantage experienced by children in some nontraditional family forms is real, and should be central to family policy and practice. Although assisted reproduction children and children raised by same-sex parents do not generally show adjustment problems, certain aspects of these family types may present difficulties for

children, too. Some who discover in adolescence or beyond that they are donor conceived are distressed by this information, and some children of same-sex parents experience stigma at school. These problems are associated, at least in part, with lack of openness and poor communication, both inside and outside the family. The provision of counseling for parents who are embarking upon assisted reproduction using donated gametes to help them consider the implications of disclosure and nondisclosure of this information to their children, and programs designed to inform schools about the needs of children with same-sex parents and to counter homophobia, are likely to enhance the well-being of children in these emerging family forms.

In terms of wider theoretical perspectives, the empirical research reviewed in this chapter has highlighted the value of a developmental systems approach that takes account of the complex interactions between children, families, and their wider social world for understanding socioemotional development in changing family contexts. As we have seen, the quality of parenting in different family forms and the psychological consequences for children are influenced by family circumstances. One example is the socioeconomic disadvantage experienced by single mothers, which has repeatedly been shown to have an adverse effect on children's adjustment. It is also essential to consider children's temperament and personality characteristics, as these may affect how children cope with different family environments. As discussed above, some children show emotional or behavioral problems in response to adverse family circumstances, whereas others appear to be more resilient. Although there are large bodies of research on temperament (see Chen & Schmidt, Chapter 5, this *Handbook*, this volume), and on risk and resilience (see Luthar, Crossman, & Small, Chapter 7, this *Handbook*, this volume), little is known about individual differences in children's responses to growing up in nontraditional families, particularly in relation to those family types that have emerged most recently. From a life-span perspective, it is also important to stress that particular challenges may arise at specific developmental transitions, similar to the identity issues faced by donor-conceived children as they enter adolescence.

The emphasis of developmental systems theory on the importance of historical time and place is especially relevant to the study of family forms that either did not exist or were invisible before the latter part of the 20th century—lesbian mother families and families created by assisted reproductive technologies—and highlights the role of societal attitudes in family functioning.

In the 1970s, prejudice and discrimination were features of nontraditional family life; lesbian mothers lived in fear of losing custody of their children, donor insemination was shrouded in secrecy, and “test-tube” babies were viewed with suspicion. Although prejudice has not been eliminated, more positive attitudes generally prevail today, creating a more favorable environment for children. Since the turn of the century, same-sex marriage has been introduced in several countries and in some U.S. states. In addition, donor-conceived half-siblings growing up in different families have begun to make contact with each other and “test-tube” babies have become commonplace. Nevertheless, children’s experiences will depend, to a large extent, on their own social environment, including their extended families, their community and the geopolitical context in which they are raised.

There are limitations to the research reviewed in this chapter that must be borne in mind. Over the past decade or so, nationally representative surveys have enabled us to establish the generality of conclusions on the effects of single-parenting, parental cohabitation, and stepparenting on children’s socioemotional development, which were previously limited by sample size and convenience sampling. The luxury of analyzing data from large datasets has also meant that researchers have been able to control for fixed effects to establish whether developmental outcome deficits shrink once variation in sociodemographic factors are controlled for. Nevertheless, even some of the excellent databases now available are limited in various ways. For example, the Add Health and Fragile Families studies relied on single-item self-report measures of couple and parent-child relationship variables that appear to play a crucial part in mediating the effects of family structure for children. Moreover, investigations of the newest family forms do not have the benefit of large nationally representative samples and, more importantly, have not yet assessed children at adolescence or beyond. Although the studies that exist today have begun to shed light on the experiences and functioning of these families, it is incumbent on the next generation of developmental psychologists to extend understanding of the socioemotional development of children in these emerging family forms, particularly in relation to different cultural, ethnic-racial, and socioeconomic contexts.

Moreover, little attention has been paid to the positive consequences for children of being raised in new family forms. This is because most research has examined negative, rather than positive, outcomes. Nevertheless, some researchers are beginning to focus on positive aspects, such

as the greater tolerance to diversity shown by children of same-sex parents. The strengths, as opposed to the weaknesses, of nontraditional families are set to be a fruitful new area of research.

Family forms that are currently emerging, or that are still on the horizon, will provide novel ways of addressing questions about family influences on children’s socioemotional development and new theoretical insights. The demographic shift toward older motherhood is a topic of current interest, as is the new phenomenon of gay fathers having children through surrogacy and egg donation; these children are being reared in families that are non-traditional on three counts: the absence of a mother from the family home, the presence of same-sex parents, and the use of assisted reproductive procedures. Even single heterosexual men are beginning to have children in this way. In addition, men and women who were previously unknown to each other are now using the Internet to create families together.

In the not too distant future, scientific advances will enable children to be born through mitochondrial DNA transfer and thus, for the first time, with genetic material from three people—a mother, a father, and a woman who donates her mitochondrial DNA. This procedure, which involves transferring the nuclear DNA of the intended parents into a donor egg containing healthy mitochondria, is being developed to enable women at risk of having children with serious mitochondrial disease to have healthy children. Moreover, artificial gametes might soon make it possible for women to produce sperm and for men to produce eggs. Although intended for use in the treatment of infertility, this will allow both partners in same-sex couples to be genetically related to their children. Research is also being conducted on “artificial wombs” (essentially machines that would simulate the uterus and enable gestation to take place outside the mother’s body), and human cloning remains a theoretical possibility. These are just some of the changing family contexts in which children will be reared in the years to come.

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CHAPTER 12

Children and the Law

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INTRODUCTION

In this chapter, we use the word *children* when referring to infants, toddlers, preschoolers, school-aged children, youth, and adolescents. Together, they are characterized by an extremely diverse and broad array of emerging cognitive, social, and emotional abilities. This fact in itself complicates researchers' understanding of children's involvement, participation, and understanding of their roles in legal contexts, as well as expectations of them. The situation is further complicated when considering developmental delays that may potentiate or be a consequence of children's involvement in the legal system and to recognize the diverse ways in which increasing numbers of young people are so involved.

In the past, legal decisions affecting children were often made without their knowledge or participation. This was due, in many cases, to a shallow understanding of children's capabilities and strengths, an overemphasis on their

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perceived cognitive and social limitations, and more general disregard for psychological research, as Munsterberg (1908) lamented more than a century ago. Despite initial skepticism (Cairns, 1935; Wigmore, 1909), applied psychology is belatedly attaining some of the promise Munsterberg anticipated, perhaps especially in relation to children and the law.

Indeed, as developmental psychology emerged as a distinct discipline early in the 20th century, applied issues were at the forefront: Psychologists regularly provided parents, teachers, and pediatricians with advice, even in cases where the advice was not always well-informed by empirical research (Clarke-Stewart, 1998; Sears, 1975). By the middle of the 20th century, however, developmentalists shifted their focus to basic research questions, apparently fearing that a concern with applied issues at the expense of a solid empirical foundation made developmental psychology less credible as a science. Increases in our understanding of children's abilities have prompted another shift

in thinking with respect to children and the law. In the face of widespread beliefs that children should be as actively involved in decisions affecting their lives as their abilities allow, many developmental psychologists have sought to improve decision making and outcomes for children and families within all aspects of the legal system.

Thousands of published studies have revealed much about children's abilities in the legal realm and have provided a more accurate and realistic view of their limitations. Moreover, research has become increasingly "convincing" to non-psychologists because basic laboratory research has been complemented by methods that have clear ecological validity, yielding findings that are better understood, accepted, and applied in legal contexts. Lawyers, judges, social workers, jurors, parents, and others must make important (often life-transforming) decisions about children every day and there is increasing recognition that psychological research can and should guide many of these crucial decisions.

As Bruck, Ceci, and Principe (2006) observed, the numbers of children experiencing contact with the legal, social service, and child welfare systems around the world represent "a large and growing legal constituency, one that possesses a special set of constraints involving basic developmental competencies, including cognitive, social, and emotional, that may constrain their effective participation" (p. 777). For example, although the exact number of child-abuse victims in the United Kingdom has not been calculated, more than 66,000 children were the subjects of child protection plans and were thus considered to be at risk for physical, emotional, or sexual abuse and neglect in 2012 (National Society for Prevention of Cruelty to Children, 2013). In the United States, about 3 million investigations of suspected child maltreatment are carried out annually (Gelles & Brigham, 2011) with nearly 800,000 children classified as victims of maltreatment in 2007 (U.S. Department of Health and Human Services, Administration on Children, Youth, and Families, 2009). The situation is alarming elsewhere as well. In 2008, approximately 236,000 child maltreatment investigations were conducted in Canada, with approximately 36% of these cases substantiated by child-protection workers (Trocme et al., 2010). Between 2001–2002 and 2005–2006, the number of child-protection notifications in Australia almost doubled from 138,000 to 267,000 (Australian Institute of Health and Welfare, 2007).

Of course, children often assume other roles than victims in the legal system, with many of them considered suspects and defendants and others classed as witnesses. In England

and Wales, 241,737 juveniles were arrested in fiscal year 2009–2010, accounting for 17% of all arrests during that same period (Ministry of Justice, 2012) and law enforcement agencies in the United States arrested approximately 2.1 million juveniles in 2008 (Puzzanchera, 2009). Following arrest, 66% of those referred to court initially appeared in juvenile court and 10% were referred to adult criminal court, with other young suspects later referred to criminal court as well.

Family breakdowns and divorce also draw children into legal contexts. In the United States, the numbers of relationships that end in divorce or separation vary greatly according to ethnicity and race, but it has been estimated that about half of the children in the country spend part of their childhoods in single-parent families—a substantial number of these children drawn into legal proceedings to determine where and with whom they should live (Amato & Doriis, 2010). Unfortunately, large (though smaller) proportions of children are drawn into such proceedings in other countries such as the United Kingdom as well (Dunn & Layard, 2013).

With so many young people drawn into and affected by the legal system, it is crucial for researchers and practitioners both to recognize that diverse developmental factors—cognitive, emotional, and social—can seriously compromise the effective participation of young people in legal contexts (Bruck et al., 2006) and to explore practices that might facilitate participation and ameliorate the potentially negative effects on the children involved. Regardless of whether youth are participating in the legal system as victims, witnesses, or suspects, the primary goal is typically to obtain information from them via interviews conducted by adults. Although the legal and child protection systems have been responsive to developmental research with policies and protocols for interviewing young people who are victims or witnesses to crime, research has not similarly affected practice where juveniles are suspected of committing crimes. The age of criminal responsibility (i.e., adult responsibility) is very low in many countries. For example, in the United States, some states automatically exclude certain offenses from juvenile court discretion, even with children as young as 10 years of age (see Fagan, 2008, for a review). Furthermore, adolescent suspects are allowed to be questioned in the same manner as adult suspects. Criticizing the fact that young suspects are often treated in less developmentally appropriate ways than young victims and witnesses, Owen-Kostelnik, Reppucci, and Meyer (2006), wrote, "Our assumption is that 'kids are kids' no matter the context in which they find themselves; being

suspected of committing a crime does not make a child an adult" (p. 286).

Indeed, although legal and social service interventions are often justified by reference to children's vulnerability and dependency, the interventions themselves are seldom informed by reference to developmental theory or the results of scientific research. Instead, political, ideological, and cultural values may guide the development of policies such as those that allow the prosecution of juvenile offenders in adult courts (e.g., "get tough on crime" policies) or emphasize family preservation rather than the termination of parental rights when children have been severely and persistently abused by their parents. It is unfortunate that policy makers sometimes fail to take advantage of a burgeoning and increasingly sophisticated understanding of child development in this way because improved public policy and law would surely emerge if policies and practices were better informed by developmental research.

In this chapter, we discuss the developmental factors that affect children's legal participation in relation to child maltreatment, divorce, and juvenile justice. Children may be victims, witnesses, suspects, and affected parties and their developmental characteristics are the same regardless of their roles. Unfortunately, in legal contexts, knowledge of child development has been unevenly applied, with far more attention paid to developmental science where child victims are concerned. Accordingly, we show how applied and basic psychological research can help inform practice in legal contexts, with researchers helping guide practitioners and the latter in turn offering insights and asking questions that foster a more complete understanding of developmental processes.

We begin the chapter with a review of developmental trajectories in the principal domains of development known or likely to affect children in legal contexts. Much of the initial research was conducted in experimental contexts, but an increasing proportion of the research on the development of memory processes and the factors affecting what children remember, forget, and report is now being conducted in settings that afford a more straightforward generalization to performance in legal contexts. Children's legal participation is not only affected by memory, so we also describe, in turn, emergent understanding of such key concepts as time and numerosity, the development of metacognition, reasoning, and logical thinking, the growth of language and communicative skills, and crucial aspects of social and emotional development, with an emphasis on the development and significance of affective relationships, first with parents and later also with peers. Both

social and cognitive factors are important when seeking to understand the phenomenon of suggestibility, as we show at the end of this section on foundational constructs. In the second major section, we turn attention to the implications of normative developmental processes for children in a variety of legal contexts. We begin with discussion of the implications of developmental differences for investigative interviews, both with alleged victim/witnesses and with children who are suspected of having committed offenses, before focusing attention on the implications of the developmental literature for behavior and practices in family and dependency court. Our review is not exhaustive. The "children and the law" literature has not given equal treatment to all research areas, and our review follows suit. Furthermore, some aspects of child development (e.g., physiological development) are less relevant to children's legal involvement and performance than other aspects (e.g., cognitive development). Some relevant topics (e.g., juvenile sentencing policies) are covered in-depth by other chapters in this *Handbook* (see Cauffman, Shulman, Bechtold, & Steinberg, Chapter 16, this *Handbook*, Volume 4). Thus, our intent is to provide a broad overview of the field and discuss evidence concerning several research topics central to the study of children and the law. The chapter ends with an examination of the key questions to which researchers should turn their attention in the years to come if they are to fully realize the potential to contribute fully and informatively to knowledge and practices concerning children and the law.

THE DEVELOPMENTAL SCIENCE OF CHILDREN AND THE LAW

In this section, we review developmental trajectories in the principal domains of development (neurophysiological, cognitive, communicative, and socioemotional) known or likely to affect children in legal contexts.

Neurophysiological Development

Infants and young children show very clear limitations and emerging abilities in many domains that are directly linked to the physiological development of the brain. Human brain development is marked by a very long period of postnatal development shaped by both physiological changes and experience. At birth, the gross structures of the brain are adult-like and almost all the neural cells are present although much neural development has yet to take place

(M. H. Johnson, 2011). For the most part, this postnatal development involves increases in the numbers of synaptic connections, resulting in a doubling of the brain's size by the first birthday, following which many connections are pruned as the brain is resculpted by experience. In general terms, the primary sensory systems mature first, followed over the first year of life by changes in the neural mechanisms that allow increasing attentional control over the sensory systems. Higher-level association areas, especially in the cortex, develop later (Casey, Galvan, & Hare, 2005). The prefrontal cortex, which is especially important for many of the cognitive processes that underlie reasoning, decision making, self-control, planning, and memory, undergoes dramatic changes toward the end of the first year and then again between the ages of 4 and 6 years (Drumney & Newcombe, 2002) but continues to improve in function and capacity until early adulthood (Olson & Luciana, 2008). Not surprisingly, therefore, we see children of 4 years able to control their behavior well enough to take turns in a game or sit still when asked whereas those of 12 to 16 still have difficulty inhibiting impulsive actions when the immediate benefits are appealing and reflection is not prompted (Dansereau, Knight, & Flynn, 2013). fMRI studies consistently show that the structural and functional maturation of the prefrontal cortex is not complete until the early 20s (e.g., Blakemore & Choudhury, 2006; Casey, Tottenham, Liston, & Durston, 2005; Sowell, Thompson, Holmes, Jernigan, & Toga, 1999).

Similarly, face perception is initially under subcortical control, and although it becomes more sophisticated later in infancy (de Haan, Humphrey, & Johnson, 2002), it continues to develop at least until early adolescence (M. H. Johnson, Grossmann, & Cohen-Kadosh, 2009). The fact that changes in cortical thickness continue until at least 19 years of age, with the magnitude of these changes, rather than the thickness per se, predicting adult IQ (Shaw et al., 2006), underscores the more general point that neurological development is a slow process, shaped by both maturation and experience, that continues from birth until early adulthood. These developmental changes have obvious implications for the cognitive, memory, linguistic, and socioemotional changes described in later sections, and thus need to be accorded attention when seeking to understand developmental changes in relation to children and the law. In legal contexts, it is important to recognize that important abilities associated with attention, problem solving, and decision making, balancing short- and long-term goals, and processing different sources of information and experience are *emerging* abilities and that children and youth behave and

make decisions that are constrained or potentiated by their neurocognitive status.

Other important developmental shifts in the second decade of life are associated with puberty. Puberty is, of course, a biological transitional event but apart from the reproductive maturation of boys and girls, puberty is also associated with increases in emotionality (K. Lewin, 1939), emotional lability (Larson & Lampman-Petraitis, 1989), sensation-seeking (Steinberg et al., 2008), inadequate inhibitory self-control (Greenberger, 1982), and, more generally, many aspects of brain development (Blakemore, Burnett, & Dahl, 2010) and risky behavior (B. J. Ellis et al., 2012). These characteristics appear to be associated with the immature status of the limbic system in adolescence; a number of studies have documented that the structural and functional maturation of the limbic system is typically incomplete until mid-adolescence (e.g., Giedd, 2008; J. F. Schneider & Vergesslich, 2007). Sensation or thrill-seeking behavior coupled with a lack of inhibitory control may lead youth to engage in risky behavior, including delinquent or criminal acts (B. J. Ellis et al., 2012). Furthermore, because adolescents have difficulty regulating their emotions, disagreements or other interpersonal interactions may escalate to a point where legal intervention is needed.

As noted in an amicus brief submitted to the U.S. Supreme Court when it was considering the constitutionality of the death penalty for juveniles (*Roper v. Simmons*, 2005): "Research shows that adolescent brains are more active in regions related to aggression, anger, and fear, and less active in regions related to impulse control, risk assessment, and moral reasoning than adult brains" (p. 12). This basic neuroscience research thus confirms what research psychologists have learned about adolescent behavior (see also Hollenstein & Lougheed, 2013).

Cognitive Development

Many aspects of children's cognitive development affect legal participation. We focus here on aspects of children's memory; metacognition, reasoning, and logic; and language and communication because these areas of research have been especially influential in understanding and enhancing children's performance in legal contexts.

Children's Memory

The ability to describe experiences (e.g., what has been seen and heard) is critical in legal contexts, and psychologists' understanding of memory development has grown

dramatically in the past few decades (Bauer & Fivush, 2014). Contemporary students of children's memory have paid special attention to the use of ecologically valid methodologies to address specific questions that arise in legal and forensic contexts, thereby doing more than simply applying findings obtained in traditional theory-driven laboratory research (Hintzman, 2011). Features of our experiences and surroundings "capture" our attention and interact in ways that are not fully understood, with both conscious and unconscious mental processing then allowing some memories to be accessed again in the future (Berntsen, 2009; Erdelyi, 2010). The processes involved in remembering experiences can operate independently and in complex ways. For example, information can be "forgotten" (lost from conscious memory) and later remembered; older memories can be confused with more recent memories; and specific memories can be recalled on one occasion but not on others. In short, memory is a reconstructive process (Erdelyi, 1996). Experiences are more likely to be remembered when they make sense, which means that younger children may sometimes not store information because they do not understand what has occurred. Information about events is also more likely to be stored when associations to other experiences are readily available—experiences come to mind that share some features, or perhaps have contrasting features. Again, this places children at a disadvantage relative to adolescents and adults, because they have had fewer experiences with which to make associations or to prompt recall.

Unlike those studying memory in adults, students of children's memory have extensively addressed such factors as differences between the memories of participants and observers, dynamic changes in memory that occur as children grow older, and possible barriers to "disclosing" well-remembered events. Memory research of particular interest to legal contexts includes research concerning infantile amnesia, language, forgetting, the amount and accuracy of information provided, the stability and consistency of memory, and the effects of stress on memory. Each will be covered in turn.

Infantile Amnesia and Early Memories

For many years, it was thought that the ability to remember experiences was closely related to the development of language (see Hayne, 2004). This conclusion seemed plausible: When children learn to speak, they become able to name and describe their experiences using impressive vocabularies, and begin to locate memories "in time" by linking personal experiences to other events and concepts,

thus forming their own personal histories. Language would thus be necessary in order to fully remember experiences and to communicate them in a coherent way to others. This view is consistent with the observation that, as adults, humans have virtually no recollection of very early years of life, and that the events we do remember tend to date from the age at which we first learned to master language. This is referred to as the paradox of infantile amnesia. It is considered paradoxical because individuals cannot remember their early experiences as well as later ones even though young children and infants nevertheless can remember their experiences. For example, 3-year-olds can recount details of events that occurred 1 year earlier, but are likely to have forgotten those events by adulthood (e.g., Bruck, Ceci, Francouer, & Renick, 1995; Fivush, Gray, & Fromhoff, 1987; Quas & Schaaf, 2002). Many researchers have shown that even babies remember events for brief periods of time. Babies quickly learn that they can make a mobile above their cots move by kicking their feet: Several studies have shown that 2-month-olds remember the "kick-to-make-the-mobile-move" experience for 1 to 3 days; 3-month-olds for 6 to 8 days; and 6-month-olds for 15 to 16 days (Hayne, 2004). Thus, language appears unnecessary for memory formation.

Evidence shows infantile amnesia with respect to nonemotional and positive events such as the birth of a sibling as well as negative or stressful experiences such as distressing medical procedures or emergency room visits (e.g., Peterson & Parsons, 2005; Sheingold & Tenney, 1982; Usher & Neisser, 1993). For instance, Quas et al. (1999) tested children's memories of an invasive medical procedure that occurred when the children were between 2 and 7 years of age. The procedure (voiding cystourethrogram, or VCUG), designed to identify potential kidney disease, involves filling the bladder with fluid containing an X-ray-visible dye and then taking X-rays while the child urinates. When children were interviewed between 1 and 5 years after the VCUG, no children who had been 2 years old at the time of the procedure had any memory of the procedure. However, half of the children aged 3, and most children aged 5, remembered some details. Thus, although the procedure involved invasive genital contact and was quite distressing for most children, those who were between 2 and 3 years of age when it took place evinced no memory for it later. Focusing on nontraumatic experiences, similarly, Bauer and Larkina (2013) showed that 5- to 7-year-olds remembered only 60% whereas 8- to 9-year-olds remembered only 40% of the memories they described at 3 years of age.

Researchers and practitioners must, therefore, treat accounts dating to very early experiences, and claims that these experiences can be somehow accessed, with great suspicion. If older children or adults are asked to describe events that occurred prior to Age 3 or 4 (that is, during the phase of infantile amnesia), it is *highly unlikely* that their reports will be based on clear or detailed memories of the events in question. Instead, memories stemming from the first few years of life are likely to have been reconstructed based on what “probably” or “might” have happened rather than episodic accounts of what “did” happen. These memories can be reconstructed based on conversations with others (e.g., siblings, peers, parents), interviewer and therapist suggestions, childhood photographs, or from vague memories and beliefs that have been reinterpreted over time and possibly mixed with current knowledge and beliefs (e.g., Fivush, McDermott Sales, Goldberg, Bahrick, & Parker, 2004; Peterson, 2012). Although older children and adults cannot remember events that occurred in infancy or toddlerhood (see Bauer, 2006a, 2006b; Pillemer & White, 1989), many people hold inaccurate beliefs about early memory capabilities. In a study of adults’ perceptions of children’s eyewitness abilities, almost two-thirds (64%) agreed with the statement, “If a child has been repeatedly and painfully sexually abused as an infant, he or she can remember it” (Quas, Thompson, & Clarke-Stewart, 2005).

Unlike those of infants and toddlers, older children’s memories can be studied more easily because they can speak. A common procedure for researchers studying children’s memory for legal purposes is to “stage” or record (as with the studies of children’s medical procedures such as the VCUG) events about which the children are questioned sometime later. Because the events in question are documented in detail and objectively verifiable, it is possible to compare what is later recalled to what actually happened to determine the accuracy of memory.

How well human beings remember experiences and how quickly they forget them has direct implications for any expectations about how much children should be able to tell about their experiences, including in legal contexts. Should children be expected to remember many specific details about their experiences, especially if the events were brief, confusing, and/or happened a long time ago? Research indicates that children (like adults) remember a fraction of their experiences. For example, in one study, La Rooy, Pipe, and Murray (2005) asked 5-year-old children about a 15-minute interaction with a “friendly pirate” in a staged “pirate show” during which the children performed a series of activities such as “feeding the bird,” “painting

the map,” and “finding the treasure,” involving a total of 60 actions and associated objects. When the children were interviewed immediately after the pirate visit, at a time when recall was expected to be the best, they only recalled 15 pieces of information on average; this amounted to a mere 25% of the available details. When the children were interviewed again 6 months later, they recalled 8 pieces of information or only 13% of the details.

Studies reveal that age is the most important determinant of children’s memory capacity. As children develop, they are progressively able to remember their experiences for longer and longer periods of time—from a few days in infancy to several years by the time they are 5 years old. For example, Goodman, Hirschman, Hepps, and Rudy (1991) studied children’s memory for an inoculation at a medical clinic, finding that the 3- to 6-year-old children were able to remember some details following a 1-year delay. Other studies have confirmed that young children can remember their experiences for long delays of a year or more (Bruck et al., 1995; Fivush et al., 1987; Pipe, Sutherland, Webster, Jones, & La Rooy, 2004; Quas & Schaaf, 2002).

Forgetting

Memory declines over time. Over 100 years ago, Ebbinghaus (1964/1885) documented this phenomenon in a series of experiments in which he tested his own memory for lists of nonsense (i.e., made-up) words. Specifically, his studies, and many conducted since, revealed that forgetting is most rapid soon after a to-be-remembered event; as more time passes, the amount of forgetting decreases, until there is very little further forgetting. Jones and Pipe (2002) documented the rate of forgetting among children by asking 5- and 6-year-olds about a staged school-based event, either immediately, or 1 day, 1 week, 1 month, or 6 months later. The children were asked to provide a free-recall account of what they could recall before they were given cued recall prompts to elicit additional information. The average rate of forgetting was very similar to the rate of forgetting measured in other experimental contexts (Ebbinghaus, 1964/1885): Forgetting was rapid following brief delays but the amount of forgetting decreased after longer delays. Also, in this and other studies, forgetting was accompanied by gradual increases in the number of errors (Bruck, Ceci, & Hembroke, 2002; La Rooy, Pipe, & Murray, 2007; Melnyk & Bruck, 2004). Because children, like adults, forget information and because residual memories become increasingly fallible, the most accurate accounts are likely to be gathered soon after an event. Thus, it is crucial to interview child victims and witnesses as soon as

possible after target events. This is especially important where young children are concerned, because they tend to forget more rapidly than older children and adults: The basic finding that younger children forget more quickly than older children is underscored by the results of laboratory experiments in which children memorize and recall lists of words (Brainerd, Reyna, Howe & Kingma, 1990).

Event characteristics affect forgetting, too. Several researchers have shown that the amount of correct information recalled about experienced events does not necessarily decrease dramatically with the passage of time. Children's recall of medical treatments or procedures (Ornstein, Gordon, & Larus, 1992; Peterson, 1999) and natural disasters (Ackil, Van Abbema, & Bauer, 2003; Fivush et al., 2004) may remain relatively stable, for example. Perhaps because such events are personally significant, children's memories may be kept "alive" by more frequent opportunities to talk and think about the events. These opportunities for memory "rehearsal" ensure that memories are "consolidated" or made stronger over time, but also provide opportunities for contamination. For example, if misinformation is introduced in a conversation with a friend about a past experience it can be incorporated into future recollections (see La Rooy, Lamb & Pipe, 2009, for a review).

Amount and Accuracy of Information Reported

As mentioned above, the amount and accuracy of children's event reports depend, in part, on the salience and significance of the events themselves. In one experiment, 5- and 6-year-old children participated in a staged event directly, observed another child in the same event, or were told a story about that event (Murachver, Pipe, Gordon, Owens & Fivush, 1996). Children's memory was tested a few days later. Children who *experienced* the event produced more complete and accurate accounts of what happened than children who had only seen or heard a story about what happened (also see Baker-Ward, Hess, & Flannagan, 1990). Also, the completeness and accuracy of children's memory accounts depend at least partly on how well they comprehend their experiences and can associate or "link" them in memory with other experiences. For example, children's prior knowledge of medical experiences or what happens during a routine medical exam facilitates children's recall of specific health checks (see Ornstein, Baker-Ward, Gordon, & Merritt, 1997, for a review). Prior knowledge may help children encode events because they are better able to process and understand the events at the time. Also, this knowledge may be used subsequently to generate cues linking the events with other experiences,

thus facilitating retrieval (Hershkowitz, Lamb, Orbach, Katz, & Horowitz, 2012).

Once children begin to recall and talk about their experiences, their abilities are often impressive, although significant developmental changes continue, especially through early childhood. Young children typically recall significantly less information than older children, particularly in response to very general prompts such as "Tell me what happened," and although their recall responses are not less accurate than those of older children, they may omit information that adults consider important (see Lamb, Hershkowitz, Orbach, & Esplin, 2008; Ornstein et al., 1997, for reviews). Four- and 5-year-olds typically receive more specific prompts from interviewers (Lamb et al., 2008) to which they respond less accurately than older children do (Bjorklund, Bjorklund, Brown, & Cassel, 1998; Goodman, Quas, Batterman-Faunce, Riddlesberger, & Kuhn, 1994). Nevertheless, field research shows that children as young as 4 years of age provide proportionally as much information in response to open-ended questions as older children, although the brevity of their responses often necessitates that interviewers prompt for additional information, preferably using children's prior responses as cues to trigger further recall (Lamb et al., 2003). Field research involving investigative interviews with 3- to 6-year-olds has shown that the youngest children provide most information when prompted using a series of recall-based specific questions, with more open-ended questions, ideally incorporating references to previous responses to cue further relevant retrieval, becoming increasingly useful as children grow older (Hershkowitz et al., 2012).

Regardless of age, the accuracy of information retrieved from memory varies depending on *how* it is elicited. Studies conducted in both experimental and field contexts over nearly four decades have consistently shown that information elicited using open-ended recall prompts (e.g., "Tell me what happened") is more likely to be accurate than information elicited using more focused prompts, especially those that present the respondent with options from which to choose a response ("Was it red or black?"; "Did it hurt?") or those that imply an expected response ("It hurt, didn't it?") (e.g., Dent & Stephenson, 1979; Hutcheson, Baxter, Telfer, & Warden, 1995; Lamb & Fauchier, 2001; Oates & Shrimpton, 1991).

Stability and Consistency of Memory

How stable are memories? What changes may happen over time? As discussed, children can only recall a small

amount about their experiences initially, and what they do recall either decreases or remains stable as time goes by. Because more information is encoded into memory than they realize, correct new event details are sometimes remembered days, weeks, or even years later. What they remember about their experiences is therefore dynamic (Erdelyi, 1996, 2010; La Rooy et al., 2009). Thus, when La Rooy et al. (2005) reinterviewed 5- and 6-year-old children about a staged event the day after their first interview, all 40 children reported new accurate information in this second interview. In another study, La Rooy et al. (2007) conducted repeated interviews after a 6-month delay and found that 81% of the children recalled additional information the second time that they were questioned. Similarly, Hamond and Fivush (1991) reinterviewed preschoolers about a trip to Disneyworld and found that, although most of the information provided in the second interview was accurate, most of it (75%) was also new (i.e., not reported in the first interview). This phenomenon—called reminiscence—is also very common in adults and has been documented in studies dating back more than a century (Ballard, 1913). For example, Gilbert and Fisher (2006) asked adults who had witnessed a videotaped mock crime (bank robbery) to recall what they could remember immediately and then reinterviewed them after 48 hours: 98% of the participants reported new details that they had not reported 2 days prior.

Such well-established features of memory (i.e., instability, inconsistency) are quite troublesome when children testify in legal contexts. When new information is not mentioned initially but recalled later in time, it is often greeted suspiciously because competing explanations appear plausible; perhaps the new information is fabricated or inaccurate and this explains why it was not reported at earlier time points. In fact, jurors often rely on consistency as an indicator of veracity, and inconsistencies (including the addition of new details to subsequent retellings) are commonly viewed as troubling inaccuracies (Leippe, Manion, & Romancyzk, 1992; Quas et al., 2005). In legal contexts, witnesses, including children, are often cross-examined about earlier statements that are inconsistent with later testimony in the hopes of impeaching witness credibility (see below for a discussion of the research on cross examination).

While the accuracy of information added subsequent to an initial statement may vary for several reasons, including the way that information is elicited (La Rooy et al., 2009), the better remembered an event is, the more likely it is that new details are accurate (La Rooy et al., 2005). Interviewers and fact finders should remember that inconsistencies

in the form of new information (as opposed to blatant contradictions) are a normal function of memory and are not uncommon when children or adults recount true experiences (Fivush, Hamond, Harsch, Singer, & Wolf, 1991; Goodman, Quas, & Ogle, 2010; Hamond & Fivush, 1991; La Rooy et al., 2009; Peterson, Moores, & White, 2001).

Stress and Memory

Whether or not the stressfulness of experienced events affects memory has also elicited controversy. The relations between stress and memory are inconsistent, with some studies suggesting enhanced performance by stressed children (e.g., Buchanan & Lovallo, 2001; Goodman, Hirschman, et al., 1991) and others showing detrimental effects of stress (e.g., Quas, Bauer, & Boyce, 2004). Results may vary depending on whether one is talking about stress at encoding or stress at retrieval (see “Features of Legal Contexts” below for a discussion of the effects of stress at retrieval), but memories of stressful or even traumatic experiences are subject to the same basic encoding, storage, and retrieval principles as are memories for more mundane events, meaning that (a) humans can forget traumatic events, just as we can forget other experiences; (b) traumatic or stressful experiences are not necessarily remembered in richer detail just because the events were traumatic; and (c) *all* memories can be contaminated by suggestion (e.g., Howe, Toth, & Cicchetti, 2006). Some researchers theorize that stress may narrow children’s focus to central aspects of distressing events so that they remember these central aspects (e.g., the identity of the assailant) well but remember peripheral aspects (e.g., the color of the assailant’s shirt) in less detail (see Christianson, 1992). However, this hypothesis has not been well supported empirically.

Conceptual Understanding

To be effective legal participants, children need to understand certain concepts, which include those pertaining to time and numerosity as well as those related to the distinction between fantasy and reality.

Time

When children are witnesses in criminal cases, a critical issue is the need to establish *when* target events occurred. Although legal requirements are sometimes relaxed in cases involving young children (Poole & Lamb, 1998), the prosecution must generally specify alleged events that occurred at designated times in order to provide defendants

with sufficient opportunity to challenge the allegations (e.g., provide alibis, etc.). Furthermore, when children's testimony includes temporal information such as the time of day when an offense occurred, it may be possible for investigators to solicit further information.

Unfortunately, as Piaget (1927/1971) concluded long ago, children have difficulty conceptualizing time. The ability to make accurate temporal judgments improves gradually with age (e.g., Fivush & Mandler, 1985; see Friedman, 2008, 2014, for reviews; Tartas, 2001), especially in middle childhood (i.e., 8–10 years). However, even adolescents do not fully understand some temporal concepts, and even adults can struggle when asked to date autobiographical events (Wright, Gaskell, & O'Muircheartaigh, 1997), despite being given temporal cues (Friedman & Lyon, 2005). Such judgments require knowledge of conventional time patterns (e.g., days of the week, months, seasons), which are acquired gradually over many years (Friedman, 2014).

Although children have difficulty accurately locating events in time even in adolescence or adulthood, they are able to order or sequence events and to make judgments of relative recency at earlier ages (e.g., which one happened a longer time ago). Friedman and Lyon (2005) thus found that by about 6 years, children were able to accurately order two staged events but most children (even the oldest) were unable to judge correctly whether one of the events occurred before or after Halloween.

Researchers have rarely studied the temporal judgments of children in legal settings. In one study examining children's responses to open-ended prompts about suspected abuse, sequencing was often referenced by 4- to 8-year-old children during forensic interviews, with children as young as 4 years structuring narrative accounts of allegedly experienced events and using the appropriate relational vocabulary (e.g., next, before, after; Lamb et al., 2003). After examining 250 forensic interviews of 4- to 10-year-old alleged victims of sexual abuse, Orbach and Lamb (2007) later revealed age-related increases in children's references to temporal attributes of events using the appropriate relational terminology, both spontaneously and in response to requests for temporal information. Sequencing was the most commonly referenced temporal category. Although references to both sequences and temporal locations increased with age, there was a marked shift in the number of references to both temporal categories at Age 10.

Even when children have a firm grasp of time concepts, they must understand the questions that interviewers ask if they are to respond accurately. Temporal terms may

be problematic for children, perhaps because words like "before," "after," "first," and "last" have multiple meanings, including both spatial and temporal. Context also matters: When placed in the context of familiar daily activities, children may be able to make temporal judgments that they are incapable of making in other contexts. For example, children can specify backward sequences of familiar daily activities ("Before we went to sleep, we watched TV") earlier than they can specify backward sequences of the months of the year ("November is the month before December"). Although children as young as 3 years might know some temporal terminology and be able to recite commonly rehearsed temporal patterns (e.g., the days of the week or months in a year), they may not grasp how these concepts fit together into a temporal pattern or how to apply this knowledge in context.

Numerosity

In 2002, a kidnapping in Orange County, California made headlines. Five-year-old Samantha Runnion was abducted from her front yard. Her 5-year-old friend, witnessed the crime and provided police with a relatively detailed description of the suspect and his vehicle (T. Lewin, 2002). Based on DNA evidence, Alejandro Avila was eventually convicted for the sexual assault and murder. One year prior to Samantha's abduction, Avila had been acquitted of molesting two 9-year-old girls (*People v. Avila*, 2001) in part because the girls had difficulty judging the frequency of past alleged abuse and answering temporal questions about these events. For example, during the trial, the judge asked one of the alleged victims "how many times" Avila had performed a particular sexual act. The child responded, "I don't know. Fifty times out of the whole entire year. I don't really do numbers." The judge proceeded to follow up with several yes/no questions (e.g., "More than once?" "More than five times?"). When explaining the acquittal, one juror said, "They weren't consistent on their story. We know that they were young and we understand they are children but the story was like did he touch you three times, yes, did he touch you five times, yes, did he touch you 50 times, yes. Everything was yes, yes, yes" (Riverside Press Enterprise, 2002). (For a full description of the case, see Lyon and Saywitz, 2006.)

In Avila's case, the alleged victims' difficulties making judgments about numerosity (i.e., event frequency) appeared to damage their credibility with jurors. Many victims of child maltreatment are abused on multiple occasions (e.g., Connolly & Read, 2006), however, so many children will need to testify about repeated events. Some details may

vary across abusive episodes while some aspects of the events may remain highly similar. In many jurisdictions, children are required to “particularize” specific incidents in some detail (Guadagno, Powell, & Wright, 2006). That is, judgments about the frequency of abusive events may be needed to determine whether suspects can be charged, and estimates of the number of times particular offenses occurred may affect the type of charges. Also, establishing event frequency helps investigative interviewers proceed with effective questioning strategies, because interviews should proceed differently depending on whether interviewers are asking children to describe multiple or single incidents of abuse. When discussing multiple incidents, children may resort to “generic” language describing what *usually happens* rather than describing what *happened* during a particular incident using “episodic” language (Brubacher, Malloy, Lamb, & Roberts, 2013; Powell, Roberts, & Guadagno, 2007). It is important for interviewers to encourage children to respond episodically by isolating instances and using appropriate prompts to elicit details about each. This may be facilitated by knowledge concerning the number and timing of incidents.

Despite the fact that children are regularly asked to make numerosity judgments in forensic interviews and in courtroom testimony, there has been very little empirical research on this topic (Lyon & Saywitz, 2006). Previous research examining children’s ability to make numerosity judgments has largely focused on children’s judgments of stimuli in laboratory settings (e.g., words, sounds) rather than their judgments of event frequency, with the latter types of judgments having more relevance to legal settings (e.g., Chalmers & Grogan, 2006; McCormack & Russell, 1997).

A study conducted by Sharman, Powell, and Roberts (2011) represents an important exception. The researchers invited 4- to 8-year-olds to participate in laboratory events one time or multiple times (6 or 11 times depending on condition). When children experienced a single event, they were highly accurate in reporting that it only happened once. When they experienced repeated events, they were also highly accurate in claiming that it happened “more than once.” However, for children who experienced repeated events, performance declined considerably when they were asked to provide a more specific estimate of the number of events that they had experienced. For instance, only 9% of the children who experienced 6 events and none of the children who experienced 11 events answered the question about event frequency correctly. As expected, children’s performance improved with age.

Sharman et al. (2011) asked children about staged events, which may not be as salient or emotional to children as legally relevant experiences. Also, the events were scheduled at regular intervals, which is unlikely to be the case for legally relevant experiences. Thus, Sharman et al.’s findings may not provide an accurate picture of children’s abilities to make such judgments in the “real world.” However, Malloy, Brubacher, Lamb, and Benton (2013) examined transcripts of investigative interviews with 4- to 8-year-old suspected victims of child sexual abuse to see how they responded to the question, “Did that happen one time or more than one time?” Only eight children (12%) gave an inappropriate response (e.g., responses that used incorrect terminology or involved implausible numbers), with 4- to 6-year-olds more likely to respond inappropriately. The 7- to 8-year-olds did not provide any inappropriate responses. As they grew older, children were also more likely to use numbers and quantifiers spontaneously in their narratives about abuse, especially in reference to people, objects, and time (e.g., dates, duration). Children who alleged multiple incidents of abuse were more likely to spontaneously mention event frequency during their interviews, although these researchers had no way of knowing whether the children’s references were accurate.

Wandrey, Lyon, Quas, and Friedman (2012) also explored children’s abilities to make legally relevant judgments about event frequency, but (unlike Malloy et al., 2013) they had access to data that made it possible to objectively verify children’s responses, thus enabling them to study their accuracy. Specifically, 6- to 10-year-old maltreated children judged how many times they had attended court hearings and the number of placements that they had experienced after being removed from home. The children often gave surprisingly inaccurate answers, although they were better at reasoning about more extreme values (e.g., when the number of actual experiences differed substantially from the number of experiences that they were asked about; “Did you come to the court building more than 10 times?” versus “Did you come to the court building more than five times?” when they had visited twice). One-third (35%) of the children provided inaccurate responses to the basic event frequency question often recommended, “Did that happen one time or more than one time?”

It is crucial for interviewers and legal professionals to recognize both that children may fail to answer or give implausible or inappropriate responses to questions concerning event frequency and numerosity, even when they are able to use numbers and quantifiers correctly in some contexts and that “inaccurate responses to time and number

questions may say little about whether the event actually occurred" (Wandrey et al., 2012, p. 100). Unfortunately, children rarely mention event frequency spontaneously, meaning that interviewers may need to prompt children for this information. Further research on this topic may help future interviewers question children about event frequency in ways that better recognize and operate within children's developmental limitations.

Fantasy and Reality

Fantasy and pretend play are normative and developmentally appropriate behaviors for children. However, children's belief in fantastical characters or their judgments about fantasy versus reality may be used to discredit their testimony as victims/witnesses. Children are often portrayed as confused about and unable to distinguish between fantasy and reality, and their belief in fantastical characters is often seen to exemplify their difficulties in this area (see Woolley & Ghosaini, 2013, for a review), with "a disproportionate amount of attention" paid to children's tendency to believe in fantastical beings. Three- and 4-year-olds are also prone to erroneously label real events or entities as "pretend," presumably because they are relying on their limited knowledge and experience when making such judgments. Like adults, children over 6 years of age can discriminate easily between imagined and experienced events (Carrick, Rush, & Quas, 2013; Lindsay & Johnson, 1987; Roberts, 2000). Studies show that even 3-year-olds can make some "fantasy versus reality" judgments accurately (e.g., they are aware that imaginary objects cannot simply appear in real life and that pretend actions are not real actions; Estes, Wellman, & Woolley, 1989; Flavell, Flavell, & Green, 1987; Woolley & Wellman, 1993). For example, Carrick and Quas (2006) presented preschoolers (3- to 5-year-olds) with real versus fantastical emotional images from children's storybooks (e.g., a mother yelling at a child versus a cat yelling at kittens; mice dancing in clothes versus people celebrating) and then asked children to indicate whether the scenes depicted "could happen in real life." Regardless of how realistic the images were, children were more likely to say that the positive images "could happen in real life." Thus, it appeared that children's judgments were, at least in part, desire-based (also see Samuels & Taylor, 1994).

Motivation, context, and experience all affect children's fantasy-reality judgments. For instance, using the storybook picture paradigm described above, Carrick and Ramirez (2012) investigated the role of motivation in 3- to 5-year-olds' fantasy and reality judgments: When children

were provided with incentives to be accurate (i.e., a prize for each correct judgment), their accuracy judging fantastic emotions improved. In false memory studies, children are more likely to claim to have experienced false events that are positive in emotional valence (e.g., hot-air balloon rides) than false events that are negative (e.g., getting stitches after a fall; Ceci, Loftus, Leichtman, & Bruck, 1994). Regarding context, children are more likely to judge characters as real in religious stories than in nonreligious stories (Vaden & Woolley, 2011). Similarly, children were more likely to judge a novel entity as real when it was supposedly used by doctors (and thus introduced in a scientific context) rather than collected by dragons (and thus introduced in a fantastical context). Children's ability to use context when make fantasy-reality judgments also improves between the ages of 3 and 5 (Woolley & Van Reet, 2006).

Children's adverse life experiences play a role in their ability to correctly distinguish between fantasy and reality as well. Specifically, Carrick, Quas, and Lyon (2010) predicted that maltreated children's personal experiences with negative events and their negativity biases in processing social information would lead them to be more realistic than nonmaltreated children when distinguishing between fantasy and reality. Again, after showing preschool children storybook pictures depicting different emotions (happiness, fear, anger, and neutral/control), the researchers asked, "Can this happen in real life?" Maltreated children failed to demonstrate the response bias found in previous work: They did not claim that negative real events could not happen and instead were more likely than nonmaltreated children to correctly report that these events were possible. Maltreated children were more inaccurate, however, when it came to the frightening images, reporting that frightening fantastical images could happen in real life.

Harris (2012) noted that "testimony" from trusted others can encourage children to embrace fantastical beliefs and is often needed to convince children of things that cannot be seen but *do* exist (e.g., germs; Harris, Pasquini, Duke, Asscher, & Pons, 2006). Parents and family members often go to great lengths to foster and reinforce children's beliefs in fantasy (e.g., the character "Santa Claus" known to children in many countries), even providing "evidence" consistent with these beliefs (e.g., return letters from "Santa Claus"). Woolley, Boerger, and Markman (2004) found that such evidence helped convince older children (4- to 5-year-olds) of a novel character's existence (the Candy Witch). When providing event reports, children are more likely to provide false information about

fantastical characters (e.g., Tooth Fairy) when they believe in those characters than when they do not (Principe & Smith, 2008a, 2008b).

According to Piaget (1945), children who commonly engage in fantasy and pretend play are in the “preoperational” stage of development (Ages 2 to 7) during which they have trouble using concrete logic and conducting mental operations and so perhaps use magical thinking to explain concepts and events that they do not yet understand (e.g., how planes fly, the physical transformation of objects; Rosengren & Hickling, 1994). However, beliefs in fantastical characters, magical thinking, or the existence of imaginary companions do not, in themselves, mean that children cannot provide accurate and reliable reports of witnessed or experienced events. We later discuss interviewing techniques that should be avoided with very young children to minimize the risk that they may confuse fantasy and reality.

Metacognition, Reasoning, and Logic

Several more complex aspects of thinking, reasoning, and cognitive development affect children’s ability to participate in legal contexts.

Metacognition

Legal participation may be difficult when children have immature metacognitive skills, relatively poor comprehension monitoring, and overestimate their mnemonic abilities (Flavell, 1981; Saywitz, Jaenicke, & Camparo, 1990). Children may, for example, downplay the likelihood that they will forget information or overestimate the number of items that they can remember (e.g., Flavell, Friedrichs, & Hoyt, 1970; Kreutzer, Leonard, & Flavell, 1975). Metacognitive and metalinguistic awareness and skills develop more fully after 5 years of age, meaning that preschool children are seldom able to monitor their comprehension as effectively as older children or adults (Markman, 1977, 1979) and younger children’s deficiencies may be exacerbated by the associated situational stresses, complexity, and unfamiliarity of forensic interviews and courtroom testimony (see “Features of Legal Contexts”). Such failures to recognize miscomprehension may help explain why children rarely ask for clarification of interview questions (Malloy, Katz, Lamb, & Mugno, in press; Saywitz, 1995; Saywitz, Snyder, & Nathanson, 1999). Also, when interviewers misrepresent what children say, they tend not to be corrected, and thus the mistakes, rather than the correct information, may be reported by the children later (Roberts & Lamb, 1999).

Reasoning and Logic

Developmental researchers have long been aware that there are dramatic increases in the ability to engage in logical thinking and problem solving during childhood. For example, during middle childhood, children’s thought becomes more organized and flexible, but generally when focused on more concrete, rather than abstract, problems. According to Piaget (1957), children in the concrete operational stage (i.e., approximately 7 to 11 years of age), develop several cognitive skills including seriation (ordering objects on quantitative dimensions) and more sophisticated classification skills (grouping objects into hierarchies). Once children can simultaneously consider more than one aspect of a problem, they are able to engage in much more sophisticated reasoning.

However, many developmental changes in reasoning and logic that are critical to legal decision making only take place between approximately 11 and 15 years of age (e.g., Neimark & Lewis, 1967; Saarni, 1973). Regardless of their legal roles (e.g., defendants, adolescents involved in custody battles), youth may be asked to reason about and make important and potentially life-altering decisions (e.g., whether to accept plea deals or help develop appropriate postdivorce parenting plans). Many of these legal decisions involve the calculation of risk and/or the evaluation of alternative scenarios, and the ability to engage in such complex decision making does not develop until adolescence.

By the time of Piaget’s “formal operational” stage, adolescents have an understanding of risk and probability that is roughly comparable to that of adults (Acredolo, O’Connor, Banks, & Horobin, 1989; Schlottmann, 2001; Schlottmann & Wilkening, 2011) but their ability to understand risk and probability is not accompanied by an equivalently sophisticated ability to use that information (M. Gardner & Steinberg, 2005; van Leijenhorst, Westenberg, & Crone, 2008). Older teenagers appear less capable than adults at using information about risk (e.g., estimating the probability of being caught following a transgression) because they tend to overvalue the possible benefits (for instance, of shoplifting) while simultaneously underestimating the potential costs (for example, of being caught; W. Gardner & Herman, 1990; Halpern-Felsher & Cauffman, 2001).

Research using several laboratory paradigms (e.g., gambling tasks, computerized driving games; Cauffman et al., 2010; M. Gardner & Steinberg, 2005; Steinberg et al., 2008) has shown that adolescents are more impulsive and less future-orientated than adults, even young adults

(e.g., Steinberg et al., 2009). When they consider the future consequences of their actions, they tend to focus on potential short- rather than long-term consequences, perhaps because their greater sensitivity to rewards than risks makes their judgments immature (Cauffman & Steinberg, 2000; B. J. Ellis et al., 2012; Steinberg & Cauffman, 1996; Steinberg et al., 2008; Steinberg et al., 2009). Shulman and Cauffman (2013) examined over 2,000 10- to 30-year-olds and found that, relative to preadolescence and adulthood, a self-reported bias toward rewards was elevated during adolescence. Further, even after controlling for key variables (e.g., intelligence, SES), adolescents' reward bias was more strongly correlated with their criminal behavior than was the bias of adults. Shulman and Cauffman (2013) suggested that the findings were consistent with the "dual systems" model of adolescent development in which increased risk-taking in middle adolescence is explained by the development of reward sensitivity *before* the ability to manage impulses effectively and exercise self-control (Steinberg, 2010).

Older adolescents are better able than children and younger adolescents to appraise the future consequences of their behavior (e.g., Crone & van der Molen, 2004; Spear, 2000) and to perform other complex executive functions (e.g., Leon-Carrion, García-Orza, & Pérez-Santamaría, 2004; Luciana, Conklin, Hooper, & Yarger, 2005) although these skills do not fully develop until late adolescence and early adulthood, probably because they depend on the structural and functional maturation of the pre-frontal cortex. Legal decision making and legal reasoning abilities improve with age (e.g., Grisso et al., 2003; Peterson-Badali & Abramovitch, 1993; Redlich, Silverman, & Steiner, 2003), although inadequate safeguards are in place for youth with emergent decision-making skills. Immature reasoning may be even more common among youth involved in the justice system, who are disproportionately affected by mental health issues and impairments in intellectual ability (e.g., Cauffman, 2004; Closson & Rogers, 2007; Quinn, Rutherford, Leone, Osher, & Poirier, 2005; Redlich, 2007).

When apprehended, suspects must decide (a) whether to submit to police questioning (which in the United States means deciding to waive Miranda rights) (b) whether to confess (truthfully or falsely) when interrogated, and (c) whether to plead guilty or proceed to trial, all of which are "high stakes" decisions. Several of the basic psychological principles that influence young people's ability to make mature decisions about their behavior and make them ineligible for the death penalty (see Cauffman,

Shulman, Bechtold, & Steinberg, Chapter 16, this *Handbook*, Volume 4) also increase their vulnerability in the interrogation room, as discussed below.

In the United States, the *Miranda v. Arizona* (1966) Supreme Court decision reaffirmed that suspects in custodial interrogations must be apprised of their rights to remain silent and to have legal counsel before anything they say can be admissible in court proceedings. The *In Re Gault* (1967) decision extended these rights to adolescents. Suspects can waive their Miranda rights but must do so in a "knowing, intelligent, and voluntary" manner. However, even adults of average intelligence who understand their Miranda rights may fail to comprehend the basic implications or relevance of their Miranda rights to their own case (see Kassin et al., 2010) with stress impairing Miranda comprehension by adults (Scherr & Madon, 2012).

Whereas adults frequently waive their Miranda rights (or equivalent rights in other jurisdictions) and submit to police questioning, adolescents are especially likely to misunderstand or to waive those rights and rarely ask for attorneys to be present (Goldstein, Condie, Kalbeitzter, Osman, & Geier, 2003; Grisso, 1980, 1981, 1997; Grisso et al., 2003; Malloy, Shulman & Cauffman, 2014; Viljoen, Klaver & Roesch, 2005). This is of particular concern with respect to youth with intellectual impairments and those younger than Age 14 (see Kassin et al., 2010). Adolescents who understood their legal rights poorly are more likely to report having waived them than those who understood them better (Viljoen et al., 2005). Although older youth (15 years of age and over) appear to have a factual understanding of their rights, they may still fail to recognize their relevance or to reason appropriately about their significance. For example, although adolescents may understand the right to have an attorney present when they are interrogated, they may withhold information from their attorneys or fail to express disagreements with them because they misunderstand their attorneys' roles (Viljoen et al., 2005).

Basic knowledge of the right to remain silent and receive legal advice does not necessarily mean that youth have the capacity or skills to reason about waiving these rights. For example, youth often fail to consider the evidence against them or the nature of the allegations when making hypothetical waiver decisions (Abramovitch, Peterson-Badali, & Rohan, 1995). Viljoen et al. (2005) found that, while 15- to 17-year-old juvenile defendants used the strength of the evidence against them to decide whether to make statements to the police, 11- to 14-year-olds did not. Thus, it is important to bear in mind developmental factors when considering

whether suspects have sufficient reasoning skills to waive rights in a “knowing” and “intelligent” manner as required by law.

An overwhelming majority of juveniles waive their Miranda rights (Feld, 2006; Grisso & Pomicter, 1977) and must then decide whether to confess. Grisso et al. (2003) presented community and justice-system-involved juveniles and young adults with vignettes describing police interrogation situations and asked participants to indicate what would be the “best choice” for the suspects: confess, remain silent, or deny involvement in hypothetical crimes. Over half of the 11- to 13-year-olds but only one-fifth of the adults reasoned that the “confess” option was the most sensible choice, highlighting juveniles’ general propensity to confess. Viljoen et al. (2005) found that 55% of the juvenile defendants they studied had confessed when questioned as suspects by the police, with confessors significantly younger than those who had remained silent. Furthermore, juveniles (and adults) sometimes reason that their best option is to confess *false*. Consider the case of DNA exoneree Jeffrey Deskovic. Jeffrey was 16 years old when the police in his hometown of Peekskill, New York, thought that his behavior following a crime was suspicious (e.g., he was displaying too much emotion about a classmate’s death). Over the succeeding months, he was interrogated several times, with only segments of the interrogations recorded, and confessed when told by police that DNA at the scene showed that the victim had been raped. Eager to terminate the interrogations and reasoning that the DNA evidence would exclude him, he confessed to this serious crime. The DNA evidence did exclude him, but he was convicted nonetheless and spent 16 years in prison before his exoneration in 2006. Indeed, when presented with hypothetical interrogation situations, 25% of male juvenile offenders report that they would choose to confess falsely in at least some circumstances (Goldstein et al., 2003), underscoring why false confessions are so problematic.

Numerous false confessions have been documented around the world. Over the last 30 years, advances in DNA testing have exonerated over 300 individuals in the United States, and in 25% of these cases, false admissions contributed to the wrongful convictions (Innocence Project, <http://www.innocenceproject.org/>). Although false confessions occur at all ages, young people are disproportionately likely to confess falsely. For example, in a study of individuals whose innocence had been verified using DNA evidence, Gross, Jacoby, Matheson, Montgomery, and Patel (2005) found that, whereas only 13% of the

adults had confessed falsely, 42% of the juveniles had done so, with the youngest exonerees (12- to 15-year-olds) confessing to murder or rape 69% of the time. In another study of “proven false confession cases,” Drizin and Leo (2004) found that 33% involved false confessions by juveniles, with 55% by juveniles who were 15 or younger. The U.S. National Registry of Exonerations reported that, over a 25-year period, 38% of juvenile exonerations, but only 11% of adult exonerations, involved false confessions (Gross & Shaffer, 2012).

Self-report data also speak to the frequency with which juveniles confess falsely (e.g., Gudjonsson, Sigurdsson, Sigfusdottir, & Asgeirsdottir, 2008; Viljoen et al., 2005). In a large study conducted in several European countries, youth were asked about their interrogation and false confession experiences. Of the 11.5% (2,726) interrogated by the police, 14% claimed to have falsely confessed (Gudjonsson, Sigurdsson, Asgeirsdottir, & Sigfusdottir, 2006). Among 193 male adolescents (14- to 17-year-olds) incarcerated for serious crimes in the United States, Malloy et al. (2014) found that 17% claimed to have falsely confessed to the police at least once.

Laboratory studies confirm that juveniles are more likely than adults to take responsibility for acts they have not committed. Redlich and Goodman (2003) accused adolescent and adult research participants of causing a computer to crash by hitting the “Alt” key, after warning them that they would have to enter data for 10 hours if they pressed this key. Young adults were the least likely to take responsibility for crashing the computer (59%); 12- and 13-year-olds were the most likely (78%); 15- and 16-year-olds fell in between (72%). Young participants may have reasoned that signing the confession represented the best way out of the situation or they may have done so in order to comply with adult authority figures.

Suspects must also decide whether to plead guilty or go to trial. In the United States, an estimated 95% of convictions are resolved by pleas (Cohen & Reaves, 2006), yet considerably more research and public attention has focused on trial dynamics than on the plea-bargaining process and there is a well-documented “trial penalty” (i.e., harsher penalties for those who do not plead but are convicted at trial; Ulmer & Bradley, 2006). When deciding whether to plead guilty, there are several factors that defendants might logically consider (e.g., the strength of evidence against them, the likelihood of conviction at trial, the proposed plea sentence compared to the sentence if convicted at trial, etc.) and there is some evidence that children as young as 10 years of age consider the strength

of the evidence against them when making plea decisions (Peterson-Badali & Abramovitch, 1993), although Viljoen et al. (2005) found in a field study that evidence strength was considered by older adolescents (15- to 17-year-olds) only. However, seemingly irrelevant characteristics such as race, gender, and age are correlated with plea decisions as well (Ball, 2006; Viljoen et al., 2005). Grisso et al. (2003) found that age was negatively associated with the willingness to plead guilty in hypothetical situations: Only half of adults but almost three-quarters of 11- to 13-year-olds accepted plea bargains. Moreover, adolescents reasoned in a less sophisticated way about plea agreements, focusing on the absolute length of the plea sentence rather than the alternative sentences or the probability of conviction.

Most research on guilty pleas has not differentiated true from false guilty pleas. In fact, research on the propensity of youth to plead guilty falsely has lagged substantially behind research on their tendency to confess falsely (Redlich, 2010). However, the decision to plead guilty falsely has enormous implications as well: The right to jury trials and the associated legal protections (e.g., the right to confront and cross-examine witnesses) are relinquished when defendants plead guilty. Plea "bargains" typically involve decisions to accept lesser sentences than might result from conviction at trial, so the abilities to reason about risk, probability, and long-term consequences are paramount. Redlich (2010) has argued that innocent individuals deciding whether to make deals are faced with "Hobson's choices" (i.e., the illusion of a free choice): They can take deals in exchange for reduced sentences or remain in jail and face more punitive sentences at trial.

On the one hand, youth may be particularly likely to plead guilty falsely. As explained below, the situations in which plea decisions are rendered may bear some similarities to the contexts in which youth decide to confess falsely (e.g., pressure from adult authority figures). On the other hand, research on immature decision making and risk proneness suggests that youth may be *unlikely* to plead guilty falsely because they are willing to take their chances at trial, even when positive outcomes are improbable. Unfortunately, very little research on the prevalence of false guilty pleas exists. Malloy et al. (2014) found that 25% of 193 incarcerated male adolescents (aged 14 to 17) reported having entered false guilty pleas whereas 17% reported making false confessions to the police. Similarly, Redlich, Summers, and Hoover (2010) found that false guilty pleas were more common than false confessions in a sample of mentally ill adult offenders, another population at disproportionate risk for false confession.

Although cases involving false guilty pleas have been documented (Redlich, 2010) and many individuals report having pled falsely, much remains to be learned in this area. More research is needed on the implications of the developing reasoning and logic skills of youth for their decisions to plead guilty both truthfully and falsely. Pleas are difficult to withdraw, and thus wrongful convictions based on pleas are difficult to discover and overturn (Redlich, 2010). Also, many youth may choose to plead guilty falsely after having confessed falsely. In fact, Malloy et al. (2014) found that, of the 17% of youth who reported making false confessions, 42% had also pled guilty falsely. As discussed below, "high stakes" plea decisions are further complicated by the sophisticated terminology and complexity of plea colloquies and tender-of-plea forms.

Development of Language and Communication

To be full and active participants in the legal process, individuals must understand and appreciate the language used in different legal contexts and communicate effectively with individuals playing various legal roles (e.g., judges, lawyers, social workers, evaluators, forensic interviewers). Although miscommunication can and does occur with all age groups, effective communication may present a significant challenge for many children and adolescents involved in the legal system.

At a basic level, interlocutors may misunderstand very young children's statements, in part because young children do not always articulate individual sounds consistently or appropriately (Reich, 1986). Also, compared to adults, young children's vocabularies are more limited and idiosyncratic and less descriptive (Dale, 1976; de Villiers & de Villiers, 1999). For example, children may say that they have never visited an alleged perpetrator's house, but answer differently if they are asked whether they have been to the alleged perpetrator's "apartment" (A. G. Walker & Kenniston, 2013). Preschoolers, in particular, may use words before they know their conventional adult meaning, use words that they do not understand at all or only understand in certain contexts, and understand poorly some apparently simple concepts such as "any" and "some." Indeed, children under 6 often understand narrowly some words like "touch" that may be important for forensic interviews. Bruck (2009) found that children failed to report touches in laboratory analogue situations because they classified the "touching" as rubbing or scratching instead.

Children may also struggle with legal jargon or terminology. For example, Cooper, Wallin, Quas, and Lyon

(2010) examined 4- to 14-year-olds' knowledge of legal terms. Half of the children were child maltreatment victims who had experience with the dependency court system, yet the youngest children (4- to 7-year-olds) understood very few legal terms (e.g., attorney, judge, foster parent) with one-fifth of them providing no correct information about any of the terms. There was substantial room for improvement among the 11- to 14-year-olds, too, indicating that even adolescents may need or benefit from assistance in understanding legal terms and the various roles of legal professionals.

Saywitz et al. (1990) also explored children's knowledge of legal vocabulary by asking 5-, 8-, and 11-year-old children to define 35 legal terms likely to be heard by children during legal proceedings. As expected, there were age-related improvements in children's performance, with the 11-year-olds accurately defining 25 terms on average, while the 8- and 5-year-olds accurately defined only 15 and 6 terms, respectively. Compared to the 11-year-olds, younger children were more likely to commit auditory discrimination errors ("Jury is like the stuff ladies wear on their fingers and ears and around their neck," mistaking "jury" for "jewelry") and homonym errors ("Charges are something you do with a credit card"), although they were asked about the legal context in particular. Both types of errors have the potential to damage children's testimonial credibility.

Unfortunately, adults often overestimate children's linguistic capacities and use words, sentence structures, or concepts that are developmentally inappropriate and exceed the children's competencies (Evans, Lee, & Lyon, 2009; A. G. Walker & Kenniston, 2013; Zajac & Hayne, 2003). Several decades of research findings make clear that the accuracy of children's eyewitness accounts is influenced by the linguistic style and the complexity of the language addressed to them by questioners (Carter, Bottoms, & Levine, 1996; Imhoff & Baker-Ward, 1999; Perry et al., 1995; Zajac, Gross, & Hayne, 2003). When testifying, children may be asked to negate adult statements (e.g., "Is it not true that . . . ?") or to confirm multifaceted "summaries" of their accounts. They may become confused when responding to syntactically complex or ambiguous compound sentences (Evans et al., 2009; N. E. Walker & Hunt, 1998). For example, consider the questions, "Did you say that when they were playing this game called Bingo that you knew that somebody was going to hurt people and when that happened you hid? Do you remember that?" and "Do you recall telling us that your mother had cleaned up after you throwing up back

in April when you testified?" Both of these complex questions were asked of children participating in actual criminal trials (Evans et al., 2009; A. G. Walker, 1993).

Children must also develop the social or pragmatic aspects of communication to provide rich and useful accounts in legal contexts. In part, providing coherent and structured narratives is learned through social interaction (Nelson & Fivush, 2004). Learning how to participate effectively in conversations may still be in process at the time that children are interviewed for forensic purposes. Young children are still developing their metalinguistic abilities—coming to know what listeners want to know, and how to report information coherently, monitor the success of their communication, and modify strategies as necessary to ensure that the listeners have understood (Lamb & Brown, 2006; Saywitz & Snyder, 1996). Children must learn how to stay on topic and how to adapt their speech appropriately to different audiences (e.g., unfamiliar interviewers who do not know their family members and were not present during the events in question). They must learn to "read between the lines" and avoid interpreting some questions literally (e.g., "Do you remember his name?" "Can you tell me where he touched you?"; A. G. Walker & Warren, 1995; Warren, Woodall, Hunt, & Perry, 1996). The challenge for interviewers is to obtain organized accounts that are sufficiently rich in descriptive detail to permit the children's testimony to be understood. Interviewers' word choices and the complexity of their utterances may profoundly influence the course and outcome of legal interactions with children, too.

As children grow older, the length, informativeness, and complexity of their narratives increase (see Fivush, 1997; Saywitz & Campano, 1998; W. Schneider & Pressley, 1997), but even very young children provide temporally organized and coherent narratives (e.g., Flin, Boon, Knox, & Bull, 1992; Hershkowitz et al., 2012; Lamb et al., 2003).

Young children are used to being questioned by adults who are already knowledgeable about the topics of conversation (Lamb, Orbach, Warren, Esplin, & Hershkowitz, 2007), but alleged victims of abuse are often the sole sources of information about the suspected events. As a result, interviewers need to communicate their needs and expectations clearly, motivating children to provide as much information as they can. One of the goals of the "presubstantive" portions of forensic interviews is to ensure that children understand the unique demands of forensic interview contexts (e.g., Sternberg, Lamb, Esplin, Orbach, & Hershkowitz, 2002). If children fail to appreciate that the interviewers have little, if any, knowledge

of the alleged events, or attribute superior knowledge to them (e.g., Ceci, Ross, & Toglia, 1987), they may fail to report all they know or defer to the interviewers' interpretation of events, as potentially revealed through leading or suggestive questions. Children are cognizant of differences between knowledgeable and naïve adults and vary their responses and trust in these individuals accordingly (Koenig & Harris, 2005; Welch-Ross, 1999).

Even when interviewers have attempted to communicate that they do not know what the children experienced, they may, by using the wrong sorts of questions, inadvertently encourage young children to respond as though they were being tested. For example, forensic interviewers frequently ask very specific questions (e.g., "Did he touch you?"). Young children (those under 6) have special difficulty answering specific questions, and may exhibit a response bias (e.g., Ahern, Lyon, & Quas, 2011; Fivush, Peterson & Schwarzmueller, 2002; Peterson, Dowden, & Tobin, 1999), or a reluctance to give "don't know" responses when they would be appropriate (Bruck & Ceci, 1999; G. Davies, Tarrant, & Flin, 1989; Poole & White, 1991; Saywitz & Snyder, 1993). Children do not provide more "don't know" responses to complex as opposed to simple questions (Carter et al., 1996). In fact, Waterman, Blades, and Spencer (2000, 2001, 2004) showed that 5- to 9-year-olds often attempted to answer impossible (nonsensical) or unanswerable (where the information has not been provided) questions, especially if they were phrased as yes/no rather than wh- questions and even when they accurately judged that the questions were nonsensical. The type of questions asked and their context thus determine whether questions enhance or degrade the reliability of children's reports. Detailed preinterview instructions focused on reminding children that the interviewers were not present at the target events can increase children's (at least 6-year-olds') tendency to give "don't know" responses to unanswerable questions (Waterman & Blades, 2013).

Older children's and adolescents' linguistic and communicative abilities may also be challenged in legal situations. For example, only 5% (3/66) of the 11- to 14-year-olds in Cooper et al.'s (2010) study of children involved in dependency court proceedings provided correct answers about five of the seven legal terms that they were asked to define, and one-fifth provided no correct definitions. Brennan and Brennan (1988) showed that fewer than two-thirds of the questions addressed to 6- to 15-year-olds in court were comprehensible to their peers. Regardless of age (kindergarten to university), Perry and colleagues (1995) found that students were more accurate answering

simple rather than complex questions about witnessed events. Furthermore, the kindergarteners often failed to recognize that they misunderstood the complex questions. Examining felony child sexual abuse cases, Evans et al. (2009) demonstrated that neither defense *nor* prosecution attorneys varied the length or complexity of their sentences directed to children despite the fact that the age range of the alleged child victims varied widely (i.e., 5 to 15 years). Even mental health professionals and trained investigative interviewers ask children developmentally inappropriate or complex questions in investigative interviews (Korkman, Santtila, Drzewiecki, & Sandnabba, 2008; Plotnikoff & Woolfson, 2009).

In order to assist in and make legal decisions, adolescents must be able to understand the relevant language, interactions, and proceedings; appreciate their significance; and communicate effectively with lawyers and other professionals. Although some studies show that adolescents feel comfortable disclosing information to their attorneys (e.g., Grisso et al., 2003), others report substantial amounts of distrust in attorneys by adolescents (e.g., Catton, 1978). Viljoen et al. (2005) found that 31% of juvenile defendants would not tell or were unsure about telling their attorneys what really happened.

Youth may also have difficulty making reasoned decisions about whether to waive their rights or enter a plea agreement, in part because both involve complex language. In one study, the warnings or cautions concerning Miranda rights offered to 122 juvenile Americans ranged in length from 64 to 1,020 words ($M = 214$) and the reading level required ranged from 7-year-old to post-college (Rogers, Hazelwood, Harrison, Sewell, & Shuman, 2008), leading the researchers to conclude, "The most obvious and far-reaching conclusion from the current data is that typical juvenile Miranda warnings are far beyond the abilities of the more than 115,000 preteen offenders charged annually with criminal offenses" (p. 75).

When alleged offenders plead guilty, they must answer questions designed to ascertain whether any additional promises were made (i.e., beyond the plea agreement), whether they understand their legal rights and the consequences of pleading guilty, and whether they are incapacitated in any way. However, there is no standard manner in which these questions are asked and there are no requirements regarding their comprehensibility (Redlich, 2010). Kaban and Quinlan (2004) found that youth involved in the juvenile justice system were able to define very few (an average of 2) of 36 terms contained in the Massachusetts tender-of-plea form or plea colloquies

in that state. Even youth who were instructed about court proceedings were able to define only five items correctly, on average.

In sum, linguistic competence is a substantial concern in legal contexts, regardless of whether those contexts involve victims or suspects, or 4-year-olds or teenagers. In every case, a failure to recognize the capacities of the individuals involved may seriously compromise communication and deny those children the justice they deserve.

Socioemotional Development

In addition to developmental changes in children's memory, thinking, and communicating, aspects of social and emotional development affect children's participation in legal contexts as well.

Rapport and Trust

Children are often reticent with strangers and most adults thus recognize the need to establish rapport when initiating conversations with unfamiliar children, especially when the topics are stressful or embarrassing as when they are being questioned about alleged instances of abuse (Collins, Lincoln, & Frank, 2002; Goodman, Bottoms, Schwartz-Kenney, & Rudy, 1991; Lamb et al., 2007; Sternberg et al., 1997). When questioned by unfamiliar adults or authority figures, some children may be reluctant to describe personally meaningful experiences that are intimate or embarrassing (e.g., Saywitz, Goodman, Nicholas, & Moan, 1991), and a substantial proportion of children are reluctant to disclose their abuse (see London, Bruck, Ceci, & Shuman, 2005, 2007, for reviews). Establishing rapport may help facilitate communication with children and encourage them to affirm and describe traumatic experiences in clinical (Boggs & Eyberg, 1990; Morgan & Friedemann, 1988), evaluative (Kanfer, Eyberg, & Krahn, 1992; Powell & Lancaster, 2003), or investigative (Aldridge & Wood, 1998; Goodman & Bottoms, 1993; Powell & Thomson, 1994) interviews. However, many forensic interviewers fail to make more than perfunctory efforts to establish rapport before broaching the substantive issue under investigation (Sternberg, Lamb, Esplin, & Baradaran, 1999; Warren et al., 1996).

Social Relationships With Parents, Other Adults, and Peers

As detailed by Thompson (2006; see also Thompson, Chapter 6, this *Handbook*, this volume), scholars have

long recognized that the attachments (i.e., close, enduring bonds) formed to parents are among the most critical achievements of the first year of life, and that attachment formation depends on reciprocal interactive processes that foster infants' abilities to discriminate their parents from other adults and to develop emotional ties to them (Lamb, Thompson, Gardner, & Charnov, 1985). By the middle of the first year of life, children's attachments are consolidated and characterized by the onset of separation anxiety and separation protest. Infants who receive sensitive, responsive care from specific adults tend to become securely attached to them (Dozier, Zeanah, & Bernard, 2013). Even relatively low levels of responsive parenting lead to the development of infant-parent attachments, although some of these attachments may be classified as "insecure" or "disorganized." Disorganized attachments, which are more common among children who have experienced maltreatment, put children at risk for a host of negative outcomes (see Cicchetti & Toth, Chapter 13, this *Handbook*, this volume). However, it is more advantageous for children to form insecure attachments than to fail to form attachment relationships at all because these enduring ties play essential formative roles in later social and emotional functioning (Thompson, 2006).

Infants and toddlers need regular interaction with their "attachment figures" in order to foster and maintain their attachments (Lamb & Kelly, 2009) and help them develop the abilities to appropriately regulate their behavior, emotions, and physiology (Hofer, 2006). Extended separations from either parent are undesirable because they unduly stress developing attachment relationships. Even though fathers typically spend less time with their infants than mothers do (e.g., Pleck, 2010), most infants form meaningful attachments to both of their parents at roughly the same age (6 to 7 months; Lamb & Lewis, 2010). Most infants come to "prefer" the parents who take primary responsibility for their care (typically their mothers), but relationships with secondary caregivers are still important.

Children's attachment relationships with parents play a crucial role in shaping children's socioemotional development (Lamb & Lewis, 2011). For example, these attachments influence perceptions of self, perceptions and expectations of others, social competence with peers, and emotional expressiveness (S. C. Johnson, Dweck, & Chen, 2007; Lucas-Thompson & Clarke-Stewart, 2007). Disrupted parent-child attachments have adverse effects on children's development and adjustment, and children who are deprived of meaningful relationships with one of their parents are at greater risk psychosocially, even

when they are able to maintain relationships with their other parent (e.g., Lamb & Kelly, 2009). Such data are, of course, extremely relevant when legal professionals are making decisions about children's living arrangements following their parents' separation.

In addition to the critical influence that attachment relationships have on child development, children's attachments to parents have implications for their behavior and decision making in legal contexts. For example, much attention and debate have focused on how and when children disclose adult wrongdoing (e.g., child maltreatment that is often perpetrated by adults who are close to them). London et al. (2005, 2007) and London, Bruck, Wright, and Ceci (2008) concluded that a majority of children delay disclosure of child sexual abuse for long periods of time, often until adulthood, with some children failing to disclose at all. Children may disclose reluctantly, fail to provide detailed accounts of their experiences, or recant prior allegations of abuse (Goodman-Brown, Edelstein, Goodman, Jones, & Gordon, 2003; Hershkowitz, Horowitz, & Lamb, 2007; Malloy, Lyon, & Quas, 2007; Pipe, Lamb, Orbach, & Cederborg, 2007). In laboratory analogue studies, children often deny or fail to disclose even the minor wrongdoings of adults (e.g., spilling something, breaking a toy, playing with a forbidden toy; Bottoms, Goodman, Schwartz-Kenney, & Thomas, 2002; Lyon, Malloy, Quas, & Talwar, 2008; Pipe & Wilson, 1994).

Whether children disclose adult wrongdoing also depends on the adults' identity. Due to their attachments to and dependency on known and trusted adults, especially parents, children appear less likely to disclose their wrongdoings. For example, several studies have demonstrated that children are less likely to disclose and more likely to delay disclosing abuse by family members than less familiar adults (see London et al., 2008; Lyon, 2009; Paine & Hansen, 2002, for reviews), and more likely to recant abuse allegations made against parent figures (e.g., Malloy et al., 2007). If nonoffending caregivers (typically mothers) react unsupportively to abuse disclosure, recantation is more likely (Elliott & Briere, 1994; Malloy et al., 2007), highlighting the important influence parents exert, even indirectly, on what children are willing to reveal (and maintain) in legal contexts.

Similar findings are evident in laboratory contexts. In one study, 6- to 10-year-old children witnessed either research assistants or parents steal books. In both conditions, the "thieves" told the children that the thefts were secret and encouraged them to lie and blame another research assistant. When the thief was the research

assistant, most children (81%) levied an accusation against him or her. However, when the parents stole, 56% of the children accused the research assistant rather than the parents, thus appearing more willing to lie to protect parents (Tye, Amato, Honts, Devitt, & Peters, 1999). Also, responding to hypothetical vignettes, children were less likely to endorse disclosure of wrongdoing by parents rather than strangers (Lyon, Carrick, & Quas, 2010). This may be, in part, related to developmental changes in children's understanding of family loyalty and obligation (Leibig & Green, 1999). In sum, both naturalistic field studies and experimental research indicate that, when parents are implicated in wrongdoing, children are less forthcoming with interviewers than when other individuals are implicated.

Children may be more reluctant to report parents' transgressions because they expect negative consequences to befall their parents, others close to them, or even themselves. Adults who claim that they were abused as children often report that they considered the potential effects of disclosure on themselves and others when deciding whether and when to disclose (Anderson et al., 1993; Fleming, 1997). Child victims have also reported fears and expectations of harmful outcomes as reasons for delayed disclosure (Goodman-Brown et al., 2003; Hershkowitz, Lanes, & Lamb, 2007; Sas & Cunningham, 1995). Malloy, Brubacher, and Lamb (2011) found that nearly half of the alleged victims whose interviews they studied mentioned at least one expected consequence of disclosure, with children who alleged abuse by parent figures no more likely to mention expected consequences. However, children who alleged abuse by parent figures were more likely to mention expected consequences for *others* (e.g., siblings, mothers) and to mention serious consequences for themselves (e.g., physical harm, death). Clearly, these motivations and expectations may affect children's statements when they are questioned in Family or Dependency Court about their preferences and beliefs (see below).

Peer Relationships

Although parents remain important influences on child development through adolescence, children are increasingly eager to spend time with other children, and these relationships become more important with age. This can have important implications. For example, in many of the infamous daycare cases, "co-witness" information had a powerful influence on children's reports, leading many children to acquiesce to suggestions about adult misbehavior (Garven, Wood, Malpass, & Shaw, 1998). Indeed,

information from peers spread through the “rumor mill” may be reported in detail when children are asked to recount staged events (e.g., Principe, Kanaya, Ceci, & Singh, 2006), creating false beliefs that nonexperienced events occurred (Principe, Haines, Adkins, & Giuliano, 2010).

Beginning in middle childhood, children shift from using parents to using peers as primary reference sources and this trend accelerates during the period between 10 and 14 years of age. The latter period is thus marked by a sharp shift from focus on behavior that may elicit approval from parents to that which might elicit approval from peers (Nickerson & Nagle, 2005; Steinberg & Silverberg, 1986). This transition is often accompanied by anxiety and concern on the part of adolescents about their own identities and social standing (Erikson, 1968). As at other points in the life cycle, such uncertainty increases the extent to which individuals look to others for guidance and approval. The increased desire to gain social approval parallels the focal shift from parents to peers, a shift that leads children and adolescents to be particularly focused on obtaining approval from peers who, like the adolescents themselves, have much less mature and effective means of judging the appropriateness and suitability of behavior.

Adolescents are more affected than younger children or adults by peer pressure, taking more chances and making more risky decisions when in groups rather than alone (e.g., M. Gardner & Steinberg, 2005). Some choices may have minimal long-term consequences, but other choices (e.g., deciding to commit illegal acts or engage in other risky behaviors) reveal the potentially problematic nature of the susceptibility of youth to peer influence. In multiple studies examining adolescents’ self-reported false confessions to the police, the desire to protect someone else has been the most common reason reported by youth for falsely confessing (Malloy et al., 2014; Viljoen et al., 2005). Thus, not only are youth at risk for engaging in illegal behavior with peers, but they may also put themselves at risk of prosecution by covering up for others’ bad behavior and attempting to spare them the consequences.

Compliance, Obedience, and Approval Seeking

Young children are typically motivated to earn social approval from others, especially adults whom they respect or like, such as parents and teachers, and other authority figures, like police officers. As indicated above, peers become increasingly important to children and adolescents, but this tends to broaden the range of people from whom they seek to gain approval, and these motivations can powerfully affect children’s behavior when they are questioned.

For example, if children infer that interviewers would prefer particular responses, they may tailor their accounts in order to appear cooperative (Ceci, Kulkofsky, Klemfuss, Sweeney, & Bruck, 2007; Melnyk, Crossman, & Scullin, 2007). Ceci and his colleagues (2007) found, for example, that preschoolers are less likely to accept false suggestions made by 7-year-old children rather than by adults. In the forensic context, therefore, interviewers must be sensitive to children’s perceptions of their knowledge and status.

Although adolescents are often portrayed as rebellious, they are more obedient to authority than adults and this may be of particular consequence during interrogations or when considering the legal advice of parents and lawyers. Not only are there clear linear age differences in adolescents’ willingness to take responsibility for acts they have not committed, but there are similar developmental differences in the willingness to question authority (Redlich & Goodman, 2003). Thus, the majority (65%) of 12- and 13-year-olds took responsibility by signing confessions without questioning the researchers, but this tendency decreased with age (46% of the 15- and 16-year-olds and 33% of the young adults asked at least one question before signing confessions).

Suggestibility and Contamination: The Confluence of Social and Cognitive Factors

Suggestibility is “the degree to which children’s encoding, storage, retrieval, and reporting of events can be influenced by a range of social and psychological factors” (Ceci & Bruck, 1993, p. 404). Social factors, such as the interviewers’ superior status, and cognitive factors, including those relating to pretense or imagination, profoundly influence children’s suggestibility and susceptibility to misinformation (Ceci & Bruck, 2006). Initial laboratory-based research appeared to produce inconsistent findings regarding the suggestibility of young children. Goodman and her colleagues showed that children as young as 3 to 4 years of age could successfully resist misleading questions suggesting actions that were very different from those that had occurred or been witnessed (Goodman & Aman, 1990; Goodman, Aman, & Hirschman, 1987; Goodman et al., 1991; Goodman, Rudy, Bottoms, & Aman, 1990). When the suggestive pressure was more persistent, however, preschoolers appeared especially susceptible to suggestion (e.g., Ceci et al., 1987; King & Yuille, 1987). Leichtman and Ceci (1995) showed that preschoolers who were repeatedly led to believe that a person was very clumsy acquiesced more easily over a 10-week period to

allegations consistent with the clumsy stereotype than children who were given neutral information about the person. Specifically, the combination of suggestive interviewing and negative stereotyping led 30% of the 5- to 6-year-olds and 46% of the 3- to 4-year olds to agree that they had seen the person misbehave, although half of the youngest children did not acquiesce to suggestions.

Children may, under certain conditions, come to provide elaborate accounts of entire events that they never experienced (e.g., Bruck et al., 2002; Ceci, Huffman, Smith, & Loftus, 1994; Ceci, Loftus, et al., 1994; Quas et al., 2007; Strange, Garry, & Sutherland, 2003). For example, Ceci, Huffman, et al. (1994) asked 3- to 6-year-olds to repeatedly imagine experiencing fictitious events (e.g., getting their fingers caught in a mousetrap and having this injury treated). Many children later claimed to have experienced these events, and even after debriefing, some of the children refused to accept that the events were only imagined. Bruck, Hembrooke, and Ceci (1997) found that, when subjected to such techniques as repeated suggestion, instructions to imagine or pretend, and selective reinforcement in a series of interviews, preschool children assented to 95% of the false events mentioned (e.g., claiming that they witnessed the theft of food at daycare) by the third interview session.

Findings concerning suggestibility and false reporting are not limited to children, however, with several studies demonstrating that adults, too, may come to produce detailed "memories" of entirely fictitious events (see Loftus, 1997, 2003, for reviews). Nevertheless, it is clear that suggestive questioning played a major role in leading preschoolers in several multi-accuser cases to believe falsely that they had been abused. For example, Garven et al. (1998) showed that the techniques used in the McMartin Preschool case (offering positive or negative consequences for making or not making allegations of abuse, posing the same questions repeatedly, and suggesting that other children had already disclosed) led 3- to 6-year-old children to respond inaccurately when questioned about staged events. The children who were interviewed using a combination of highly suggestive techniques (e.g., repeated suggestive questions plus rewards for making allegations) produced significantly more false accusations than children who were interviewed using only one suggestive technique. In fact, after being interviewed with multiple suggestive questioning techniques for only 4.5 minutes, children acquiesced to the false accusations nearly 60% of the time, whereas those interviewed using only one suggestive technique acquiesced 17% of the

time. Garven, Wood, and Malpass (2000) later showed that children interviewed suggestively using reinforcement made false allegations about mundane events (e.g., that a man said a bad word) 35% of the time, whereas those interviewed without such reinforcement made false allegations 12% of the time. Children who were reinforced also alleged fantastic events (e.g., that a man took a child on a helicopter ride) more often than children in the control group. In Leichtman and Ceci's (1995) study, very few children who were interviewed nonsuggestively made claims about the "bad deeds" of a classroom visitor even when negative stereotypes (i.e., clumsiness) about him had been introduced beforehand.

Researchers have largely been unsuccessful in their efforts to identify reliable individual differences in suggestibility (see Bruck & Melnyk, 2004, for a review). Although this line of study may help researchers understand the mechanisms underlying suggestibility, it also signals that, rather than attempting to identify "suggestible" children, it is important to recognize that children enter the forensic interview or courtroom with different abilities and characteristics and having had different experiences. Children inevitably vary with respect to how much information they provide, how long it takes them to build rapport, how acquiescent they are to adult authority and suggestion, and how shy they appear when talking with new adults. Findings concerning individual differences underscore the need for interviewers to adhere to best practice guidelines.

Cross-examination, one of the most feared parts of legal involvement, has also been examined experimentally because it underscores children's vulnerabilities when questioned suggestively, coercively, and confusingly. In both analogue (Zajac & Hayne, 2003, 2006; Zajac, Jury, & O'Neill, 2009) as well as courtroom (Zajac & Cannan, 2009) settings, cross-examination has negative effects on the accuracy of children's testimony. Zajac and Hayne (2003) interviewed 5- and 6-year-olds about a visit to a police station using both direct and cross-examination. During the cross-examination, interviewers used several techniques often observed in actual court cases (e.g., complex, leading, irrelevant questions; challenges to children's certainty; expressions of disbelief), and most (over 85%) of the children changed at least some answers that they had provided during direct testimony. The changes occurred regardless of whether children's original responses were accurate or inaccurate. Some changes were considered small alterations in specific details, whereas others represented total retractions of children's original reports. In fact, nearly a third of the children changed all of their

original responses! In a later study, Zajac and Hayne (2006) reported that 9- to 10-year-old children changed fewer accurate than inaccurate answers, although they still changed 40% of correct answers under cross-examination, suggesting that the accuracy of older children's testimony is also compromised during cross-examination.

Cross-examination style questioning also affects the accuracy of 5- to 10-year-old children's accounts of both neutral and transgressive events (Fogliati & Bussey, 2013) and following both short (1 week) and longer (6 month) delays (O'Neill & Zajac, 2013). In comparable studies of adult witnesses, participants also made many changes to their previous statements and altered both correct and incorrect answers when cross-examined (Valentine & Maras, 2011); adults' accuracy decreased in real courtroom cross-examinations as well (Zajac & Cannan, 2009). Interestingly, however, aggressive cross-examination of young witnesses does not always achieve the desired results. Evans et al. (2009) found that convictions rather than acquittals were more likely when American defense lawyers asked more complex questions, whereas the complexity of the questions asked by prosecutors was not associated with the likelihood of conviction. Whether the same results would be obtained in other jurisdictions is unknown.

Children's changing responses can involve either changed memories or simply acquiescence—the tendency to agree when asked leading questions (e.g., Greenstock & Pipe, 1997; Pipe & Wilson, 1994). Acquiescence increases when a power imbalance exists between the person asking the questions and the person answering them (Ceci et al., 1987), and this is certainly the case when adults, especially adults in positions of authority (e.g., police officers, judges), question children. At least in the experimental laboratory, however, information suggested by interviewers is often incorporated by eyewitnesses into their memories of experienced events (Ackil & Zaragoza, 1995; Ceci & Bruck, 1993, 1995) especially when preschool children are involved (Brady, Poole, Warren & Jones, 1999; Cassel & Bjorklund, 1995; Ceci & Bruck, 1993; Ceci & Crotteau-Huffman, 1997; Leichtman & Ceci, 1995; Quas et al., 1999) and the suggestions are repeated (Mitchell & Zaragoza, 1996). In addition, Endres, Poggenpohl, and Erben (1999) and Orbach and Lamb (2001) showed that suggestive prompts led preschoolers to contradict information that they had provided earlier.

The contaminating effects of option-posing (e.g., Yes/No) and suggestive utterances are aggravated when they are repeated. That is, children contradict themselves at a

higher rate when option-posing questions are asked again (Andrews & Lamb, 2014; Bruck, Ceci, & Hembrooke, 1998) and repeated exposure to yes/no and suggestive questions reduces children's overall accuracy (Memon & Vartoukian, 1996; Poole & White, 1991, 1993, 1995; but see Lyon et al., 2008). Whereas repeated open-ended questions are often perceived as requests for additional information, suggested Poole and White (1991), repeated yes/no questions might be perceived, especially by younger children (4-year-olds), as indications that the initial responses were unacceptable and thus should be changed.

As mentioned earlier, children's sensitivity to the interviewers' status and knowledge may also foster compliance with suggestive or misleading prompts because children misunderstand the purpose of the interviewers' statements, assume that interviewers have superior knowledge, or simply want to be cooperative. As shown below, when interviewers (a) adequately prepare children for their role as experts, empower them to correct interviewers, and admit that they "don't know" some answers, (b) avoid asking children to pretend or imagine, (c) avoid being coercive, (d) do not repeat misleading questions, and (e) keep children focused on central details of personally experienced events, children are better able to resist misleading questions and provide meaningful and accurate accounts of their experiences (Pipe et al., 2004).

In addition, research indicates that awareness of suggestion, also labeled meta-suggestibility, continues during the school years. For example, in a study conducted by London, Bruck, Poole, and Melnyk (2011), 6- and 7-year-olds who had watched a filmed suggestive interview, failed to recognize its effects on a boy who made a false allegation. Awareness of suggestibility increased between 8 and 11 years of age, so that 12-year-olds understood the suggestibility process well.

Children's Deception

In forensic interviews, interrogations, and the courtroom, it is imperative that individuals provide honest reports of experienced events only, so researchers, parents, legal professionals, and fact finders have long been concerned that children might intentionally make false reports of nonexperienced events. Researchers are also interested in children's deceptive abilities because lying is a "lens through which one can examine a multitude of behaviors, including children's developing cognitive, social, and moral abilities" (Talwar & Crossman, 2012, p. 337). Like suggestibility, both cognitive and social factors influence

children's lying behavior. In fact, although parents and other adults tend to be displeased when children lie, the ability to intentionally deceive others signifies cognitive and social competence, such as advanced theory of mind, executive functioning skills, and sophisticated navigation of social situations (e.g., Evans & Lee, 2011; Talwar & Lee, 2008; Talwar, Murphy, & Lee, 2007).

The Development of Lie-Telling

Lie-telling is normative, begins early in development, and takes several different forms (see Talwar & Crossman, 2012; Talwar, Crossman, Muir, & Williams, 2011, for reviews). For example, children may tell prosocial lies, sometimes encouraged by adults, in order to avoid hurting someone's feelings. However, antisocial lies (i.e., lies told to protect oneself or for personal gain) are most relevant to the legal system. Observational and experimental studies have revealed that lie-telling emerges as early as Age 2 and increases dramatically after Age 3 alongside the development of theory of mind (Evans & Lee, 2013; Newton, Reddy, & Bull, 2000; Talwar & Lee, 2002; Wilson, Smith, & Ross, 2003; see also Hughes & Devine, Chapter 14, this *Handbook*, this volume; Carpendale & Lewis, Chapter 10, this *Handbook*, Volume 2). Typically, children's early lies are told to avoid punishment (e.g., conceal a wrongdoing), and tend to be relatively easy for others to detect (Talwar & Crossman, 2011, 2012; Talwar & Lee, 2008). Prior to the age of 6 or 7, children are not very skilled lie tellers, often revealing the deceptive nature of their statements via their nonverbal behavior or by failing to conceal their knowledge or evidence inconsistent with their lies (Talwar, Gordon, & Lee, 2007; Talwar & Lee, 2002, 2008). Older children have enough sense to clean up the incriminating "evidence" or to feign ignorance (Talwar et al., 2012) because they have developed "semantic leakage control." As children grow older, they become more sophisticated liars and are better able to demonstrate semantic leakage control; key developmental changes in lie maintenance emerge around 7 years of age (Talwar & Crossman, 2011).

The temptation resistance paradigm is commonly used to study children's lie-telling behavior. This experimental paradigm was designed to measure children's use of antisocial lies to conceal minor transgressions. A typical version of the paradigm involves guessing games during which children are asked to guess the identity of toys based solely on musical jingles; the children cannot see the toys. After multiple trials, experimenters leave the room after setting out the final toys, playing musical clips, and instructing

the children not to peek. Upon returning, the experimenters ask the children whether they peeked and then, to measure semantic leakage control, to guess the toys' identity. The children's behavior is recorded covertly.

Many studies have used the temptation resistance paradigm, with fairly consistent results. Most young children are tempted to peek, and most lie about it later. Overall, peeking rates have ranged from 50% to almost 90%, depending on the ages of the children studied. For example, Talwar, Lee, Bala, and Lindsay (2002) found that over 80% of the 3- to 7-year-olds peeked while the experimenter was gone, while around 80% lied about having peeked. Using a version of the temptation resistance paradigm modified for older children (i.e., a trivia game instead of a toy), Talwar, Gordon, et al. (2007) found that approximately half of the 6- to 11-year-olds peeked, and that the majority (93.1%) who did lied about having peeked.

Detecting Lies

If children's lies were easily identifiable by adults, then the honesty of their reports would not be of serious concern in legal contexts. However, adults detect children's deception poorly. For example, in Talwar, Lee, Bala, and Lindsay's (2006) study, adult participants watched recorded mock testimony of children who had been coached by adults to provide true or fabricated reports. Most adults rated the children as honest and truthful and did not identify truths and lies at better than chance levels. Other studies have also found that adults exhibit a "truth bias" when judging children's reports (e.g., Strömwall, Granhag, & Landström, 2007). However, evidence demonstrates that the accuracy of adults' judgments may depend on the type of lies being told. Block et al. (2012) asked adults to judge video-recorded interviews conducted with 3- and 5-year-olds making accurate reports, false reports, accurate denials, or false denials. Adult judges had the most difficulty judging children's false denials, often expressing confidence that the events had not occurred when, in fact, they had. These results suggested that adults (including investigators and fact-finders) may be particularly prone to believe children's claims that they have not been abused when they have been victimized, leaving those children inadequately protected.

Investigators and fact-finders seldom know with confidence whether children have indeed been abused as they allege (or deny) so field research on credibility assessment has been rare. However, Lamb et al. (1997) used the Criterion Based Content Analysis (CBCA) procedure developed by Raskin and Esplin (1991) to assess the testimonies

of 98 children, some of whom were determined to have been describing incidents that were improbable, while others described events for which there was strong corroborating evidence. CBCA scores differentiated between the plausible and implausible accounts, but there was considerable overlap between the scores and the technique was clearly not precise enough to be used in forensic contexts.

Lamb et al. (1997) noted that most of the testimonies included few narratives, making it difficult for raters to identify the crucial criteria. In a later study, Hershkowitz, Fisher, Lamb, and Horowitz (2007) showed that investigators assessed credibility more accurately when the children provided more narratives and the interviews had been conducted in accordance with best-practice guidelines (see below) although, as in previous studies, the raters correctly identified plausible statements much more accurately than they identified implausible ones.

Promoting Truth-Telling

Concerns about children's false allegations (i.e., accusations against innocent individuals) and false denials (i.e., nondisclosure and delayed disclosure of child maltreatment) have led researchers to attempt to develop empirically based methods to promote children's honesty in legal contexts. One particularly promising method is eliciting a promise to tell the truth, or a child-friendly version of "the oath." Lyon et al. (2008) found that administering a developmentally appropriate version of the oath ("Do you promise to tell the truth? Will you tell me any lies?") improved the honesty of 4- to 7-year-old maltreated children's reports of their play with forbidden toys. Lyon and Evans (2014) later showed that even very young children (4-year-olds) understood that "promising" to do something is stronger than saying one "might" do something. Promising to tell the truth is effective with older children as well: Evans and Lee (2010) found that 8- to 16-year-olds were 8 times more likely to change their responses about peeking at a test answer from dishonest to honest after promising to tell the truth. Eliciting a promise to tell the truth is more effective than reassuring children that they will not be in trouble for telling the truth (Lyon et al., 2008); statements of reassurance that mention specific transgressions may increase false reporting (Lyon & Dorado, 2008).

Summary

Child development is a complex and multifaceted process, as the contents of these four volumes indicate! In the

preceding pages, we have tried to show that many aspects of development affect children's interactions with the legal system. Importantly, whether the discussion is about the neural mechanisms that underlie cognitive processing, behavioral inhibition, and motivation, the ways in which children understand and remember their experiences, the changing nature of children's social relationships and understanding, their emergent communicative skills, their susceptibility to social influence, their decision making and evaluations, or their motivation to be honest or seek approval, it is clear that development is an extended process that is, in many respects, incomplete even by the time children are conventionally relabeled as young adults. The material reviewed above gives some limited insight into the developmental sequences while making clear how much has yet to be learned about each of the relevant developmental trajectories and, especially, about the interrelations among development in different domains. That ignorance notwithstanding, our collective understanding has grown dramatically over the three decades prior to the time of this writing, and we can now claim sufficient knowledge to guide developmentally sensitive practice in many legal domains.

FEATURES OF LEGAL CONTEXTS

Children, like adults, often find encounters with the legal system stressful. For child witnesses, testifying in open court (or while facing defendants) and being cross-examined are among the most distressing aspects (for a detailed review, see Spencer, 2011), and both are associated with poorer memory performance (e.g., Nathanson & Saywitz, 2003; Quas & Lench, 2007).

In one well-known field study, Goodman et al. (1992) found that children who were more fearful about testifying in front of the accused adults were less able to answer prosecutors' questions than children who were less fearful. In experimental studies, where it is possible to verify the accuracy of children's memory, children's free recall is less complete and their responses to direct questions are less accurate when they are questioned in courtrooms rather than in more familiar (e.g., classrooms) or less intimidating locations (e.g., P. E. Hill & Hill, 1987). Similarly, Saywitz and Nathanson (1993) found that children who rated the "legal process" as stressful provided less information about staged events than children who rated it as less stressful. The stress associated with testifying may interfere with retrieval by consuming some cognitive resources. For example,

children may need to devote some of their cognitive or attentional resources to coping with their emotions instead of to memory retrieval (e.g., Quas et al., 2004). The stress of legal involvement may also lead to long-term negative consequences for children and adolescents (see below).

Although testifying in court may be particularly distressing for children, forensic interviews have several potentially stressful characteristics as well. Forensic interviews represent unfamiliar contexts for children. Children, especially young children, are not accustomed to being in the role of “experts” when being questioned by adults. However, in forensic interviews, they are supposed to be the “experts” and to do most of the talking. The demand characteristics of the situation are worth noting: Children may feel that they *must* answer the questions posed to them. As noted above, however, they may be asked complexly worded questions sometimes including legal terms that they do not understand. Depending on the nature of the interview, it may be necessary for them to discuss in detail experiences about which they feel embarrassed or ashamed. They may need to make accusations against family members or other loved ones, and this may lead to feelings of guilt or distress. And, while coping with these various stressors, children must conduct challenging memory searches and recount information in a detailed and accurate manner. It is thus not surprising that children may need time to build rapport with investigative interviewers before delving into the issues at hand.

To better understand the features of the legal contexts in which young suspects perform, it is similarly imperative to look closely at the interrogation context. The “Reid Technique” (Inbau, Reid, Buckley, & Jayne, 2013), now in its 5th edition, is taught and used by interrogators around the world and is the most widely used method in the United States (e.g., Kassin et al., 2007; Leo, 1996; Meyer & Repucci, 2007). This technique involves creating a confrontational environment in which the ultimate goal is to obtain confessions. Generally, these interrogations are guilt presumptive and accusatorial, permitting such tactics as lying to suspects, presenting fictitious evidence, minimizing and justifying crimes and their consequences (e.g., providing face-saving excuses for the crimes), interrupting and disallowing denials, and asking suspects to report hypothetical details about the crimes. Some of the face-saving minimization strategies are recommended for juveniles specifically: For example, interrogators might suggest that the lack of parental supervision or the temptation to use drugs partially justified criminal behavior (Inbau et al., 2013). Such techniques are designed to make suspects feel that it is in their

best interest to confess (Ofshe & Leo, 1997) and are known to increase false reporting by children and adults in other contexts (see Loftus, 1997, 2003, for reviews).

The various components of the Reid Technique are legal in the United States, for the most part regardless of the suspects’ age, and research indicates that these techniques are commonly used. Many U.S. police officers reported presenting fictitious evidence (23%), using deception (32%), and repeating questions (58%) when interrogating juveniles (Reppucci, Meyer, & Kostelnik, 2010). Observational studies similarly showed that police officers often confronted juvenile suspects with evidence against them (54%), accused them of lying (33%), and emphasized the seriousness of the alleged crimes (14%) (Feld, 2013; see also Feld, 2006). An alarming proportion of the incarcerated male adolescents (Aged 14 to 17) questioned by Malloy et al. (2014) claimed that they had experienced threats (81%), deception (81%), and verbal insults (59%). Many youth also claimed to have experienced the use of force (21.2%) and refusals (e.g., of breaks to rest or opportunities to speak to lawyers or parents; 38.7%), almost 40% claimed to have been interrogated while under the influence of drugs or alcohol, and nearly a third (30%) reported having felt “pressured or forced” by police to confess. Unlike the observational studies of recorded interrogations, there was no way to confirm the veracity of the reports of youth in this study. However, taken together, the observational and self-report studies suggest widespread use of techniques that may exert considerable pressure on youth to confess.

These tactics can be extremely effective in obtaining confessions from juvenile suspects (see Kassin et al., 2010). For example, Michael Crowe, a 14-year-old boy who falsely confessed to murdering his sister, was told several lies by police, including that his hair was found in her hands, his blood found in her room, and that he had failed a lie detector test. Martin Tankleff, a 17-year-old student who discovered the bodies of his stabbed parents, confessed after several hours of denial. He too was presented with false evidence. Most persuasive of all was the claim that his father had awoken from his coma and identified his son as the assailant. It took almost two decades before Tankleff was released from prison.

These real-world examples are consistent with a growing body of research demonstrating how some interrogation techniques elicit confessions in the laboratory and in the field. For example, lengthy interrogations and the use of deception (e.g., the false evidence ploy) increase the incidence of false confession (see Kassin et al., 2010).

Research suggests that presenting false evidence may not be necessary; merely *bluffing* that the evidence exists appears sufficient to induce false confessions of wrongdoing (i.e., pressing a forbidden computer key, cheating) at the same rate as presenting false evidence (Perillo & Kassin, 2010). Implying or promising lenient treatment are also associated with increases in the rate of false confessions (Kassin & McNall, 1991; Russano, Meissner, Narchet, & Kassin, 2005). Some techniques (e.g., minimization, bluffing) that appear relatively benign (in comparison with threats or the use of force) may nonetheless convince people that their best option is to confess, even if those confessions are false.

As discussed above, little is known about the contexts in which youth make plea decisions, but these contexts may actually share some similarities with police interrogations. For example, youth may be pressured to make immediate decisions (e.g., accept “one-time offer” plea deals) or they may be pressured by adult authority figures such as their lawyers (e.g., Drizin & Luloff, 2007; Malloy et al., 2013; Redlich, 2010). Indeed, the contexts in which plea deals are brokered may involve more pressure or coercion than police interrogations: Police are allowed to *imply* leniency using minimization tactics, but are prohibited from *promising* leniency explicitly. In contrast, explicit promises of leniency are the basis of plea agreements; plea deals generally involve “bargaining” for a lesser sentence than what would be at stake if the defendants were convicted at trial.

IMPLICATIONS FOR INTERVIEWS WITH ALLEGED VICTIMS, WITNESSES, AND SUSPECTS

Regardless of the types of experiences being remembered or reported, the methods used to elicit children’s and adolescents’ accounts of their experiences affect both the quantity and quality of information obtained. Different types of interviewer prompts access different types of memory. For example, free-recall memory and recognition memory are often considered opposite ends of a memory continuum. Recall is accessed when prompts provide no specific memory cues: Requesting that someone “tell everything that happened” does not specify or cue particular aspects of memory. What is recalled depends on the memory search conducted by the person being questioned. In contrast, recognition memory involves more specific questions about particular event details or aspects. These questions may involve asking interviewees

to select between alternatives offered by interviewers (e.g., “Was the touch over or under your clothes?”). These multiple-choice questions restrict the possible responses and tend to increase inaccuracies because options may be chosen even if the correct responses were not offered. Wh-questions (i.e., *what*, *when*, *why*, *where*, and *how*) fall somewhere between free recall and recognition memory. They do not force respondents to choose between options provided by interviewers, and instead ask for more details about something the interviewees have already mentioned, but they nonetheless require only short answers about aspect of the events or objects that may or may not be well encoded or remembered.

When adults and children are asked to describe events with free-recall prompts (“Tell me everything that happened”), their accounts may be brief and sketchy, but, as mentioned earlier, are more likely to be accurate than if more focused or closed-ended questions prompts are used. When provided with open-ended follow-up prompts such as “Tell me more about that” or “And then what happened?,” children and adults often report additional details by accessing recall memory. When interviewers prompt with leading questions such as “Did he have a beard?,” “Did he touch you with his private?,” or “Did this happen in the day or in the night?,” they shift from recall to recognition testing, and the probability of error rises dramatically (see Lamb et al., 2008, for a review). When open-ended prompts are used, respondents attempt to provide as much relevant information as they “remember,” whereas children may have to confirm or reject information provided by interviewers when focused questions tapping recognition memory are asked. Recognition questions or prompts refocus children on domains of interest to investigators and exert greater pressure to respond, regardless of whether the respondents are sure of their responses. Recognition probes are more likely to elicit erroneous responses in eyewitness contexts because of response biases (i.e., tendencies to say “yes” or “no” without reflection) and false recognition of details that were only mentioned in previous interviews or are inferred from the gist of the experienced events (Brainerd & Reyna, 1996). Focused or recognition questions vary greatly in their complexity, however. As mentioned earlier, answers to questions about the timing of past events may be difficult (especially for children) to answer accurately. Because questions like these seem very reasonable, children often make educated guesses in response rather than recalling information from memory. By contrast, other focused questions (e.g., “What is your brother’s name?”) are easier to answer because the

requested information involves semantic general knowledge rather than memory of a specific event. Questions such as "How come he got away with it for so long?" may seem similarly reasonable but unfortunately invite speculation, and do not direct respondents to search for memories of experienced events. Some questions (e.g., "Why did he do that?") are simply impossible for children to answer even with the best of event memories and thus should be avoided.

Effective interviewers should thus maximize the reliance on recall memory by offering open-ended prompts so as to minimize the risk of eliciting erroneous information. Free-recall reports are not always accurate, of course, especially when the events occurred long before or there have been opportunities for either pre- or postevent contamination (Bruck & Ceci, 2004; Leichtman & Ceci, 1995; London, Bruck, & Melnyk, 2009; Poole & Lindsay, 1995; Quas et al., 2007; Warren & Lane, 1995) but they are likely to be considerably more accurate than reports elicited using recognition cues or prompts. Furthermore, the completeness of brief initial responses can be increased when interviewers use the information provided by respondents as prompts for further elaboration (e.g., "You said the man touched you; tell me more about that touching"; Lamb et al., 2003).

Best Practice When Interviewing Alleged Victims of Child Abuse

Child maltreatment is, at times, very difficult to investigate and substantiate. Regarding sexual abuse in particular, corroborative evidence rarely exists either because the nature of the abuse does not lend itself to physical evidence (e.g., fondling), or physical evidence has disappeared due to delayed reporting, which is quite common (Goodman-Brown et al., 2003; London et al., 2005; Pipe et al., 2007). Physical evidence may also not identify particular perpetrators. As a result, children's eyewitness testimony is often critical. Without it, it is more difficult for the goals of justice, child protection, and treatment to be met. Thus, it is imperative that children's reports are clear, detailed, and accurate. When children's accounts are vague, inconsistent, and/or incomplete, their reports tend to be met with skepticism (e.g., Leippe et al., 1992; see Myers, 1992).

Informed by the research summarized earlier in this chapter, expert professional groups have long agreed that children should be interviewed as soon as possible after the alleged offenses by interviewers who themselves introduce as little information as possible while encouraging

children to provide as much information as possible in the form of narratives elicited using open-ended prompts ("Tell me what happened"). Before substantive issues are discussed, interviewers are typically urged to explain their roles, the purpose of the interview, and the "ground rules" (for example, ask children to limit themselves to descriptions of events "that really happened" and to correct the interviewer, request explanations or clarification, and acknowledge ignorance, as necessary). Investigators are consistently instructed to give priority to open-ended recall prompts and use recognition prompts as late in the interview as possible and only when needed to elicit undisclosed forensically relevant information. The presence of props (such as toys or dolls) usually associated with fantasy (Thierry, Goh, Pipe, & Murray, 2005) and interviewers prompting children to "imagine" or "pretend" are associated with the presence of fantastic elements in children's accounts of abuse so forensic investigators are routinely advised to avoid both (Pipe & Salmon, 2009; Poole, Bruck, & Pipe, 2011).

Unfortunately, researchers have repeatedly shown that these research-based and expert-endorsed recommendations are widely proclaimed but seldom followed. Descriptive studies of forensic interviews conducted in various parts of the United States, United Kingdom, Canada, Sweden, Finland, and Israel have consistently demonstrated that forensic interviewers used open-ended prompts quite rarely, even with the knowledge that such prompts reliably elicit more information than more focused prompts (see Lamb et al., 2007, 2008, for reviews). To the distress of trainers and administrators, furthermore, such deviations from "best practice" were evident even when the interviewers had been trained extensively, were well-aware of the recommended practices, and often believed that they were adhering to those recommendations. For these reasons, a group of researchers at the U.S. National Institute of Child Health and Human Development (NICHD) developed a structured interview protocol designed to translate professional recommendations into operational guidelines (Lamb et al., 2008; Orbach et al., 2000).

Characteristics of the NICHD Investigative Interview Protocol

The NICHD Protocol covers all phases of the investigative interview (see Lamb et al., 2008; Lamb, La Rooy, Malloy, & Katz, 2011, for the entire Protocol). In the introductory phase, the interviewer introduces him- or herself, clarifies the child's task (the need to describe events in detail and to tell the truth), and explains the

ground rules and expectations (i.e., that the child can and should say "I don't remember," "I don't know," "I don't understand," or correct the interviewer when appropriate). In many jurisdictions, law enforcement agencies have also requested the inclusion of several questions designed to establish that children understand the difference between true and false statements. These questions typically ask the child to confirm or negate true or false statements (e.g., "If I said that my shoes were red, would that be true or not true?") rather than asking children to complete the developmentally inappropriate task of providing definitions for abstract concepts such as "truth" and "lie" (Lyon, 2011).

The rapport-building phase that follows the introductory phase comprises two sections. The first is designed to create a relaxed, supportive environment for children and to establish rapport between children and interviewers. In the second section, children are prompted to describe recently experienced neutral events in detail. This "episodic memory training" is designed to familiarize children with the open-ended investigative strategies and techniques used in the substantive phase while demonstrating the specific level of detail expected of them.

In a transitional part between the presubstantive and the substantive phases of the interview, a series of prompts are used to identify the target event(s) under investigation nonsuggestively and with prompts that are as open as possible. The interviewer only moves on to some carefully worded and increasingly focused prompts if the child fails to identify the target event(s). If the child makes an allegation, the free-recall phase begins with an invitation ("Tell me everything...") and other free-recall prompts or invitations are recommended as follow-up questions. As soon as the first narrative is completed, the interviewer prompts the child to indicate whether the incident occurred "one time or more than one time" and then proceeds to secure incident-specific information using follow-up ("Then what happened?") and cued (e.g., "Earlier you mentioned a [person/object/action] invitations. Tell me everything about that") making reference to details mentioned previously by the child to elicit uncontaminated free-recall accounts of the alleged incident(s).

Only after exhaustive free-recall prompting do interviewers proceed to directive questions (focused-recall questions that address details previously mentioned by the children) and request information within specific categories (e.g., time, appearance) such as "When did it happen?" or "What color was that [mentioned] car?" If important, forensically relevant details are still missing, interviewers then ask limited option-posing questions (mostly yes/no

or forced-choice questions referencing issues or details that the children failed to address previously). Suggestive utterances, which communicate the expected responses, are strongly discouraged.

Evaluation of the NICHD Investigative Interview Protocol

The findings obtained in independent field studies in four different countries (Cyr & Lamb, 2009; Lamb et al., 2009; Orbach et al., 2000; Sternberg, Lamb, Orbach, Esplin, & Mitchell, 2001) demonstrate convincingly that, when forensic investigators employ recommended interview procedures by following the structured NICHD Protocol, they enhance the quality of information elicited from alleged victims. Interviewers relying on the Protocol use at least 3 times more open-ended and approximately half as many option-posing and suggestive prompts as they do when exploring comparable incidents, involving children of the same age, without the Protocol. In each study, about half of the informative and forensically relevant details and more than 80% of the initial disclosures of sexual abuse were provided by preschoolers in response to free-recall prompts. Such findings suggest that the likely accuracy of information provided by alleged victims is enhanced when interviewers use free-recall prompts exhaustively before turning to more focused prompts. These findings also indicate that cued-invitations should be exhausted before "wh-" prompts are introduced because cued-invitations are input-free and thus foster retrieval of free-recall information without limiting responses to investigator-specified categories. Nonsuggestive yes/no and forced-choice questions (i.e., option-posing prompts), in which interviewers introduce information, should be used only if essential information is still missing after free-recall and directive prompts have been exhausted, because these riskier alternatives are more likely to elicit inaccurate information and their introduction may contaminate subsequent information.

Interviewers using the Protocol also introduce option-posing and suggestive questions later in the interview process than do peers not using the Protocol. Because option-posing and suggestive questions by definition involve the introduction of information by investigators, they have the potential to contaminate later phases of the children's reports, especially when younger children are involved (Bjorklund et al., 1998; Ceci & Bruck, 1995; Memon, Wark, Holley, Bull, & Koehnken, 1996), and thus their delayed utilization is forensically important. Clearly, forensic interviewers should provide children

with opportunities to recall information in response to open-ended prompts before assuming that special (i.e., more risky) interview techniques are needed.

When priority was given to open-ended strategies and techniques in Protocol interviews, there were also significant increases in the number of facilitators and other supportive comments addressed to child witnesses (Hershkowitz, Orbach, Lamb, Sternberg, & Horowitz, 2006); this further enhanced the recall and reporting of information by encouraging children to be more cooperative.

Children Who Are Reluctant to Make Allegations

Despite the use of evidence-based interviewing strategies, many suspected victims of child maltreatment are reluctant to allege abuse when formally interviewed in forensic contexts, even when there is clear evidence that they were, in fact, abused. Investigative interview protocols, including the NICHD Protocol, emphasize techniques that help motivated children to report information about experienced events but pay less attention to the motivational factors (such as loyalty to parents) that make some children reluctant to disclose abuse or other negative experiences. Research has yielded new insight into the dynamics of interviews with reluctant children (Hershkowitz et al., 2006; Hershkowitz, Horowitz, et al., 2007; Hershkowitz, Lamb, Katz, & Malloy, 2013; Katz et al., 2012; Orbach, Shiloach, & Lamb, 2007), however. In these studies, reluctant children avoided establishing rapport with the interviewers and signaled their reluctance verbally and nonverbally in the presubstantive phase of the interview, with manifest reluctance increasing as the interviews proceeded. In a study of interviews with children whose victimization had been independently corroborated, Hershkowitz et al. (2006) found that interviewers tended to respond to reluctance counterproductively by (a) putting pressure on reluctant children rather than giving them support, (b) shifting the discussion to sensitive issues before the children seemed comfortable, and (c) using intrusive rather than open-ended prompts when exploring the possibility that abuse might have occurred.

Recognizing the need to enhance rapport with allegedly abused children, especially those who are reluctant to talk, Hershkowitz et al. (2013, 2014) formulated a revision of the NICHD Protocol. In order to enhance trust and cooperation, rapport-building preceded (rather than followed) explanation of the ground rules and expectations, and additional guidance was provided to interviewers with respect to building and maintaining rapport. In addition to inviting narratives about recent experiences during the

rapport-building phase, interviewers were encouraged to express interest in the children's experiences, both verbally and nonverbally, and to show empathy with the children's expressed feelings. Close comparisons between interviews conducted with alleged victims using either the "standard" or "revised" Protocols showed that the enhanced focus on rapport indeed encouraged children to be more cooperative and less resistant. When 1,424 4- to 13-year-old suspected victims of intrafamilial abuse in Israel were interviewed using either the standard NICHD Investigative Interview Protocol ($n = 613$) or the revised version ($n = 811$), Hershkowitz, Lamb, and Katz (2014) reported that use of the revised protocol reduced reluctance during the interview and increased the willingness to disclose abuse, underscoring the importance of rapport when children are asked to talk about abuse, especially when family members are suspected of involvement (Hershkowitz, Horowitz, et al., 2007). As a result, significantly more children who were known to have been abused by family members made allegations when interviewed using the Revised rather than the Standard Protocol (Hershkowitz et al., 2014).

Interrogating Young Suspects

The Protocols discussed above for interviewing young victims and witnesses were designed with children's developmental strengths and limitations in mind. Clearly, children *can* be competent witnesses if they are well-interviewed by experts who understand the relevant developmental factors. Interviewed less appropriately, children may be rendered incompetent and/or incredible. Much is at stake when youth are questioned as suspects as well. Research has led to various recommendations concerning the interrogation of young suspects. However, these recommendations have yet to produce major change in the laws and procedures concerning how youth are interrogated (Owen-Kostelnik et al., 2006).

Unfortunately, the rather obvious fact that children have the same characteristics whether they are called victims or suspects has not been widely respected. In 1993, the year after the *Memorandum of Good Practice on Video Recorded Interviews with Child Witnesses for Criminal Proceedings* was published by the British Home Office, Jon Venables and Robert Thompson were arrested by the police for their role in the murder of a toddler named James Bulger. These 10-year-old youngsters would have benefited from the involvement of skilled and specially trained interviewers had they been suspected victims of abuse; instead, they were subjected to some 20 hours of

questioning by police officers who were guided more by their experiences as interviewers of adult criminals rather than by developmentally sensitive evidence documenting the special needs and circumstances of young children in forensic contexts. The Police and Criminal Evidence Act of 1984 (PACE), which served as the interviewers' guide, recognizes that British suspects under 17 should have access to a responsible "appropriate adult," whose role is to give advice, facilitate communication, and ensure that the interview is conducted properly and fairly (Home Office, 2008). Unfortunately, further guidance was not given. Compared to professional guidelines for interviewing child victims, the rubric pertaining to young suspects is thus considerably less detailed, less informed by the developmental research, and outdated in light of the considerable amount of research conducted since 1984 and summarized above.

"Appropriate adults" such as parents, relatives, and social workers infrequently intervene in ways that prevent children and adolescents from incriminating themselves (Drizin & Colgan, 2004; Medford, Gudjonsson, & Pearse, 2003; Sim & Lamb, 2013). Only the presence of lawyers is systematically associated with reductions in the likelihood that British adolescents will provide incriminating information or make admissions during questioning (Clarke, Milne, & Bull, 2011; Medford et al., 2003; Sim & Lamb, 2013). Presumably, lawyers are more aware than other appropriate persons that arrest and prosecution are typically impossible in the absence of corroborated evidence concerning the suspects' misbehavior.

Despite the developmental differences discussed earlier in this chapter, proponents of Reid-like interrogation techniques pay little or no attention to the age of suspects being interviewed. In fact, when interrogating adolescents, the Reid training manual recommends, "Apart from statutory requirements prescribed in a few states, and except for particular rules established by a few state courts...the interrogation of juvenile suspects may be conducted in essentially the same way as for adults" (Inbau et al., 2013, p. 419). As discussed above, research confirms that Reid-like techniques are used commonly with juvenile suspects in the United States (Feld, 2006; Malloy et al., 2014; Meyer & Reppucci, 2007).

In their white paper, Kassin et al. (2010) warned:

There is a strong consensus among psychologists, legal scholars, and practitioners that juveniles and individuals with cognitive impairments or psychological disorders are particularly susceptible to false confession under pressure. Yet little action

has been taken to modulate the methods by which these vulnerable groups are questioned when placed into custody as crime suspects. (p. 30)

As Kassin et al. (2010) recommended, individuals who conduct interviews and interrogations with juveniles should receive special training concerning the risks associated with youthful age (as well as the risks associated with other vulnerabilities such as mental retardation and mental illness). Ideally, this training would cover the relevant aspects of developmental psychology and interview strategies and structure discussed earlier in this chapter.

Even the authors of the Reid training manual have started recognizing that juveniles (and others with intellectual vulnerabilities) are at increased risk for false confession. Accordingly, more recent versions of the manual (Inbau, Reid, Buckley, & Jayne, 2001, 2013) recommend taking some precautions when interrogating juvenile suspects. In discussing the presentation of fictitious evidence, for example, they note,

This technique should be avoided when interrogating a youthful suspect with low social maturity or a suspect with diminished mental capacity.... These suspects may not have the fortitude or confidence to challenge such evidence and, depending on the nature of the crime, may become confused as to their own possible involvement. (Inbau et al., 2013, p. 255)

They recommended that adolescents' "level of social responsibility" and "general maturity" be given consideration before police use the fictitious evidence technique. However, researchers have not established whether police interrogators can accurately judge adolescents' social maturity or social responsibility, especially as these terms have not been clearly defined.

Researchers interested in reforming interrogation procedures for youth have also tested alternative interrogation techniques. In one study, 9- to 14-year-olds suspected of committing sexual offenses were interviewed using a modified version of the NICHD Protocol (Hershkowitz, Horowitz, Lamb, Orbach, & Sternberg, 2004). Young suspects who partially or fully admitted their offenses reported absolutely and proportionally more details in response to invitations as opposed to suggestive prompts, confirming that, like alleged victims, youthful suspects can provide considerable amounts of forensically relevant information in response to open-ended prompts, even when they minimize their own involvement and culpability. However, interviewers behaved differently when addressing alleged

suspects as opposed to victims, providing suspects with proportionally fewer invitations and proportionally more intrusive (e.g., suggestive) prompts. The study underscored the fact that the suspects were children, and that they should be interviewed sensitively, with consideration for their developing cognitive and interpersonal skills and limitations.

Such findings are important because of their relevance to false confessions, and their far more serious and surprisingly common counterpart, coerced confessions (Drizin & Colgan, 2004). As mentioned earlier, juveniles are more likely than older suspects both to confess (Redlich, Silverman, Chen, & Steiner, 2004) and to confess falsely (Drizin & Leo, 2004). These differences are especially significant considering the crucial role that confessions play in the criminal justice system. Confessions may establish a confirmatory bias that leads investigators to discount possibly exculpatory evidence while evaluating the available evidence (e.g., C. Hill, Memon, & McGeorge, 2008; Kassin, Bogart, & Kerner, 2012; Kassin, Goldstein, & Savitsky, 2003; Narchet, Meissner, & Russano, 2011; Snook, Luther, Quinlan, & Milne, 2012). Indeed, suspects who have provided confessions are treated differently at every subsequent stage of the criminal process (Leo, 1996).

Not only are the interviewing techniques drastically different for young victims/witnesses and suspects, but the evaluations and assumptions that fact finders and investigators make about youth may also vary considerably depending on their legal role. As Malloy and Lamb (2010) have observed, different assumptions seem to be made about the capabilities and credibility of young victims, witnesses, and suspects, especially when one considers the contrasting ways in which fact finders and investigators view inconsistencies in the testimonies of alleged offenders and victims. When victims change their testimony, either by adding additional embellishments to their accounts or by recanting allegations they have made, considerable skepticism ensues, and there is substantial evidence that courts often fail to convict when principal victim-witnesses significantly alter their accounts (Myers, 1992; Quas et al., 2005). By contrast, when suspects change their accounts, especially when they claim to have confessed falsely, this tends to have very little effect on fact finders, who instead tend to regard such recantations as tactical changes that do not undermine the probative value of the initial confessions. Malloy and Lamb (2010) proposed that fact finders and investigators must be similarly cautious when considering changes in any forensic statements, particularly when the individuals involved are children or adolescents

whose developmental characteristics may affect the quality, reliability, and trustworthiness of the statements they are believed to have provided.

Post-Adjudication Issues With Respect to Young Offenders

Looking beyond the interrogation context, developmental differences also need to be considered when focusing on the possibility for rehabilitation. Importantly, the majority of youth who engage in delinquent behavior in adolescence (as many do, for reasons explained earlier in this chapter) are most likely not to engage in further misbehavior as they grow older (Moffitt & Caspi, 2001; Moffitt, Caspi, Harrington, & Milne, 2002; Odgers et al., 2008). Because of this, it is extremely important not to punish young offenders in ways that increase the likelihood that they may embrace lives of crime. For example, it makes little sense to punish offenders by placing them in custodial circumstances where they may encounter and learn from others who are criminally inclined. Similarly, it is important not to stigmatize or label youth in ways that limit their ability to resume more conventional law-abiding behavioral trajectories as they grow older. One of the best predictors of further criminality on the part of young offenders is educational attainment (Blomberg, Bales, & Piquero, 2011; Katsiyannis, Ryan, Zhang, & Spann, 2008), and thus any forms of punishment that restrict the ability of youngsters to complete their education and training can significantly and destructively impede their chances to become productive members of society in the future. This is a matter of particular concern in those jurisdictions, especially but not only in the United States, where young offenders are increasingly treated as adults and may find themselves spending part or all of their incarceration in adult prisons where there are fewer opportunities for education and training in preparation for their return to the civilian world.

Although, as Steinberg (2009) noted, sensitivity to developmental issues is not a panacea, decision making can and should be informed by the lessons learned by developmental psychologists. The U.S. Supreme Court's decision to abolish the death penalty for adolescents is illustrative. In *Roper v. Simmons* (2005), the Supreme Court ruled that the execution of offenders for crimes committed at the age of 16 or 17 constituted cruel and unusual punishment in violation of the Eighth Amendment to the Constitution. In prior decisions, the death penalty had already been deemed unsuitable for those under 15 in *Thompson v. Oklahoma*

(1988), but left standing for 16- and 17-year-olds in *Stanford v. Kentucky* (1989). The court's decision in *Roper v. Simmons* was based on evidence mitigating adolescent culpability as a result of developmental status summarized in an amicus curiae brief (American Medical Association et al., 2004) submitted by a coalition of academic professional bodies. Reviewing some of the information presented in this chapter and in that by Cauffman et al. (see Cauffman, Shulman, Bechtold, & Steinberg, Chapter 16, this *Handbook*, Volume 4), the brief argued that "Older adolescents behave differently than adults because their minds operate differently, their emotions are more volatile, and their brains are anatomically immature" (p. 4), and thus that "Executing adolescents does not serve the recognized purposes of the death penalty" (p. 21). One such purpose is to deter future crime. However, research has shown that punitive policies (e.g., transfer to adult criminal court) are not only costly to taxpayers (Greenwood, 2006) but also fail to deter future criminal activity (Bishop & Frazier, 2000; Singer & McDowall, 1988; see Fagan, 2008 for review) and jeopardizes the safety, mental health, and future prospects of many juveniles (e.g., Bishop & Frazier, 2000; Cauffman, Lexcen, Goldweber, Shulman, & Grisso, 2007; Cesaroni & Peterson-Badali, 2005; see Fagan, 2008).

Although the past 20 years have seen a rapid development of effective and developmentally oriented interventions, most services provided in the juvenile justice system have not been evaluated or shown to be effective. In their critical review, Henggeler and Schoenwald (2011) concluded that common practices (including residential placement) designed to reduce recidivism are often ineffective (Drake, Aos, & Miller, 2009; Howell, 2003; Lipsey, 2009). Similarly, a meta-analysis of controlled studies (Petrosino, Turpin-Petrosino, & Guckenborg, 2010) showed that processing through the juvenile system seemed to increase rather than decrease criminal behavior. Transferring youth to adult criminal court, which is supposed to have an additional deterrent effect, further increased criminal behavior (Redding, 2010; but see Bechtold & Cauffman, 2014). These conclusions are especially alarming because of the high economic costs of such ineffective services. Resources could have been used for therapeutic and educational services instead.

Juvenile Sex Offenders

Juvenile sex offenders represent one of the few remaining populations for whom long-term institutional care is accepted on a routine basis and for whom public

registration or notification and community management practices apply (Chaffin, 2009). Such approaches were founded on misperceptions and unproven assumptions drawn from theories about adult pedophilia and apparently do not promote either youth rehabilitation or child protection (Chaffin, 2009). Many children and youth are likely to be harmed needlessly by the failure to adopt evidence-based policies and practices.

Placing youth on public registries not only causes permanent stigmatization but can also lead to social exclusion and marginalization as registered individuals are expelled from educational institutions and have difficulty finding employment. These youth are often referred to separate treatment programs operated by professionals trained to treat sex offenders, even when they have unrelated problems such as learning difficulties. Treatment components are routinely borrowed from programs for adult pedophiles, even though they may be irrelevant and counterproductive. For example, a meta-analysis of intervention effectiveness conducted by St. Amand, Bard, and Silovsky (2008) showed that focus on the treatment of misconduct (e.g., by strengthening the behavior management skills of parents or caregivers) was beneficial for juvenile sex offenders whereas elements specific to sex-offending were counterproductive (see also Borduin & Dopp, 2012).

A growing body of data shows that children who display sexually intrusive behaviors, similar to adolescent sex offenders, are unlikely to commit sex crimes later (Alexander, 1999; Caldwell, 2002; Carpentier, Silovsky, & Chaffin, 2006), often improving without treatment (Silovsky, Niec, Bard, & Hecht, 2007), and that effective treatment reduces the display of inappropriate sexual behavior (Carpentier et al., 2006), sometimes to the same level as in groups of nonoffending children with other developmental disorders. Contrary to mistaken beliefs attributable to the confusion between prospective and retrospective data (for many adult pedophiles, sexually aggressive behavior began in childhood or adolescence but very few sexually offending children and adolescents continue misbehaving in adulthood), sexually aggressive behavior is neither compulsive nor addictive and tends not to persist, especially in the face of effective treatment.

IMPLICATIONS OF DEVELOPMENTAL SCIENCE FOR FAMILY AND DEPENDENCY COURT

Developmental considerations are relevant not only when considering children involved in the criminal justice

system; they affect children caught up in family and dependency courts processes as well.

Developmental Considerations in Dependency Court

Although many factors affect children's adjustment, both family break-up and maltreatment can profoundly affect children's cognitive, socioemotional, and even physical development. These effects may be long-lasting: Child maltreatment is a major risk factor for short- and long-term adjustment problems, including adult psychopathology (see Cicchetti and Toth, Chapter 13, this *Handbook*, this volume). Early identification of maltreatment is critical for ending victimization, protecting children, and providing children, families, and perpetrators with appropriate services and treatment while also allowing offenders to be punished when appropriate. Early identification is clearly facilitated by attention to the recommendations made in this chapter.

Many children are removed from home due to substantiated child abuse or neglect during their first few years of life. These interventions are designed to protect children from further maltreatment and allow time for intervention and assessment of the suitability of family reunification or permanent alternative placement. Research shows that intensive interventions can successfully address problems in some families (improving parenting skills and parent-child relationships), obviating the need for prolonged foster care placements or adoption (Bernard et al., 2012; Cicchetti, Rogosch, & Toth, 2006; Kirk & Griffith, 2004). Of course, even short-term separations can adversely affect child-parent attachments and it is important to recognize that most abused children are attached to their parents, even if those attachments are insecure or disorganized (e.g., Lamb et al., 1985; Lyons-Ruth, Bronfman, & Parsons, 1999). Furthermore, children placed in foster or adoptive homes need to establish new relationships and often face repeated disruption as they are moved between foster homes despite stated commitments to stability and permanence (Bernard et al., 2012).

As discussed above, the formation and maintenance of attachment relationships during these early years is critical for optimal development. Consequently, developmentally sensitive intervention strategies have been devised to help very young, vulnerable children in both foster/adoptive and birth families. As Dozier et al. (2013) state, "Foster care for children younger than about 5

should be considered as an intervention that is fundamentally different from that for older children" (p. 4). Two intervention strategies that have received empirical support are worth noting in this regard: Attachment and Biobehavioral Catch-Up (ABC) and the New Orleans Intervention.

The ABC approach was designed to improve caregivers' responses to their children, specifically increasing both birth and foster parents' synchronous and nurturing responses and decreasing their threatening or intrusive responses. In the course of 10 home visits, parents learn how to modify their behaviors via coaching, feedback on video-recorded interactions, and live commentary on their "real-time" interactions with their children. Several studies have examined the ABC intervention in families involved in the child welfare system. Randomized clinical trials have shown that this intervention improves parents' behaviors toward their children, making them more "synchronous" (i.e., appearing to follow children's leads in the interactions). Furthermore, there are lower rates of disorganized attachment following intervention (see Dozier et al., 2013, for a review). This relatively brief intervention (10 sessions) holds promise for producing positive outcomes following adverse experiences in early life.

The New Orleans Intervention is another "attachment-based" intervention strategy aimed at children who experience maltreatment in the first few years of life (Zeanah et al., 2001). It is a large-scale "systems" intervention that involves coordination among multiple service providers. Mental health components are integrated into foster care and child protective services as multidisciplinary teams strive to enhance children's relationships with caregivers by focusing on synchrony, nurturance, stability, and commitment. Depending on the individual circumstances, the New Orleans Intervention may target biological parents, foster parents, and childcare providers. Families who participated in the New Orleans Intervention were at reduced risk for having children placed in foster care later (Zeanah et al., 2001).

Unfortunately, interventions such as these are exceptional rather than normative, with the majority of abused children and their families receiving inadequate interventions, and most alternative placements both unstable and unsatisfactory. Unsurprisingly, outcomes for children who have been in care tend to be extremely poor and long-lasting (e.g., Oosterman, Schuengel, Slot, Bullens, & Doreleijers, 2007; Racusin, Maerlender, Sengupta, Isquith, & Straus, 2005).

Developmental Considerations in Family Court

Although divorce and parental separation clearly affect more children than child maltreatment, the effects tend to be less dramatic. On average, children benefit from being raised in two-parent families rather than separated, divorced, or never-married single-parent households (see Amato & Doriis, 2010, for a review), although there is considerable variability within groups, and the mean differences (in psychosocial adjustment, behavior and achievement at school, educational attainment, employment trajectories, income generation, involvement in antisocial and even criminal behavior, and the ability to establish and maintain intimate relationships) between groups are relatively small (Lamb, 2012). Approximately 25% of the children in postseparation and divorced families give evidence of adjustment problems, compared to 12%–15% in two-parent families. Thus, the majority of children from separated families evince no psychopathology or behavioral symptoms, although they are likely to experience psychic pain for at least some period of time (Hetherington & Kelly, 2002). The crucial individual differences in children's adjustment are accounted for by economic stresses, declines in the quality of parent–child relationships, and conflict between parents or between parents and their intimates (see reviews by Carlson & McLanahan, 2010; Fabricius, Braver, Diaz, & Velez, 2010; Lamb, 2012; Marsiglio & Hinojosa, 2010).

When parents separate, there is considerable evidence that postdivorce arrangements should specifically seek to maximize positive and meaningful paternal involvement rather than simply allow minimal levels of visitation. As in nondivorced families, in other words, the quality of continued relationships with both parents is crucial (Lamb & Kelly, 2009; Warshak, 2014). Stated differently and succinctly, the better (richer, deeper, and more secure) the parent–child relationships, the better the children's adjustment, whether or not the parents live together. More involved parents are also more likely to provide financially for their children whether or not they live together most of the time.

Unfortunately, legal decision-makers do not always appear to understand what sort of interaction is needed to consolidate and maintain parent–child relationships and attachment bonds. As a result, their decisions seldom ensure either sufficient amounts of time or adequate distributions of that time for children and parents. Traditional "visiting guidelines" in many jurisdictions assign every other weekend to the nonresident parent (with perhaps a

brief midweek visit), and mental health professionals often rely on unsubstantiated beliefs that every other weekend is best for children because it ensures that children continue to have only one "real home."

These plans have left much to be desired for many families, and have caused great dissatisfaction and sense of loss to the majority of children in postdivorce arrangements (Fabricius et al., 2010). Research on children's and young adults' retrospective views of their postdivorce living arrangements indicates that the majority express strong wishes and longing for more time with their fathers, a desire for more closeness, and favorable views of shared physical custody arrangements (see Fabricius et al., 2010). Even young children should regularly spend overnight periods with both parents when both have been involved in their care prior to separation (Lamb & Kelly, 2009; Pruitt, Insabella, & Gustafson, 2005; Warshak, 2014).

To facilitate children's adjustment to their parents' separation, many jurisdictions have introduced education programs that explain to separating parents the effects of divorce on children, the impact of parent conflict, the particular risk when parents use their children to express their anger and disagreement, the need to separate children's needs from adult needs, parenting skills, and often provide skill-based training to minimize conflict and promote more effective communication. At least in the short term, these courses appear to be effective (e.g., Arbuthnot & Gordon, 1996; Bacon & McKenzie, 2004; D. Ellis & Anderson, 2003; Pedro-Carroll, Nakhnikian, & Montes, 2001), particularly when the content is empirically based and includes skill-based training and role-play exercises. More extensive research-based parent education programs appear to bring about meaningful behavioral changes in both mothers and fathers (for reviews, see Braver, Griffin, Cookston, Sandler, & Williams, 2005; Haine, Sandler, Wolchik, Tein, & Dawson-McClure, 2003). Parents should also talk to their children about those aspects of the separation and divorce that directly affect them, though this seldom happens (Dunn, Davies, O'Connor, & Sturgess, 2001; Smart, 2002; Smart & Neale, 2000), leaving children to cope with major and hard-to-understand changes in their lives without emotional support.

Especially in the United States, many divorcing couples make use of custody evaluations, conducted by mental health professionals who advise the court on postdivorce parenting arrangements most likely to advance the best interests of the children involved, whether or not they are "fair" to the parents. Custody evaluators should be familiar with and guided by the empirical literature regarding

attachment, child development, parent-child relationships, parental separation, and children's adjustment and attend to individual circumstances as well as the parents' and children's strengths, schedules, and needs (Kelly, 2005, 2007; Kuehnle & Drozd, 2012; Smyth & Chisholm, 2006). There is some controversy about the extent to which they do so (Tippins & Wittman, 2005), however, with Emery and his colleagues (Emery, Otto, & O'Donohue, 2005) severely criticizing widespread practices. To date, there has been little research on the value of custody evaluations.

Cashmore and Parkinson (2009) have articulated the view that children have the right to participate in legal processes destined to affect them, although they recognize, as Fidler, Bala, and Saini (2013) make clear, that children's expressed views should not be determinative and that there are some circumstances in which it may be preferable not to involve children in decision making. Exactly how children's voices should be heard varies depending on their ages, characteristics, and circumstances, with various options (including legal representation, and informal or formal interviewing by judges or mental health professionals) discussed by Fidler et al. (2013). In many cases, a mental health professional or custody evaluator interviews affected children and considers their preferences and best interests, which are conveyed in reports prepared for the court.

As noted earlier, conflict between parents is reliably associated with the increased likelihood of maladjustment on the part of the children involved, whether or not the parents live together and whether or not they are separating (Amato & Doriis, 2010; P. T. Davies, Martin, & Cicchetti, 2012; Kelly, 2004). Not surprisingly, therefore, considerable attention has been paid by researchers to interventions that might minimize children's exposure to harmful levels of conflict. Research shows that custody and divorce mediation can have substantial short-term (e.g., earlier settlement of parenting disputes, reduced parental conflict, improved parental support) and longer-term (e.g., more sustained contact between nonresident fathers and children 12 years later) benefits for the families involved (Emery, Laumann-Billings, Waldron, Sbarra, & Dillon, 2001; Kelly, 2004). On a more mundane level, it is important to ensure that exchanges between the homes take place in neutral settings and at times that limit contact between the parents (Flory, Dunn, Berg-Weger, & Milstead, 2001).

Postdivorce, parenting coordinators are also increasingly used in the United States to address the needs of children when there is very high conflict between the parents by helping parents settle disputes regarding their

children in a timely manner, while facilitating compliance with parenting plans and related court orders (*Family Court Review*, 2001; Kelly, 2010). Surveys show that parent coordinators can be very effective, especially in reducing the frequency and intensity of disputes (Coates, Deutsch, Starnes, Sullivan, & Sydlik, 2004), although to date there has been no systematic research on their impact. Of course, there are some situations in which at least one of the parents is incapable of providing parental support of adequate quality or in which the levels of conflict or violence are so high and so intractable as to preclude regular contact between children and their parents, but these families appear to be rare (Kelly, 2012). More research is needed on the adjustment of children in these families, and on techniques that might promote their well-being.

Summary

Children involved with the Family and Dependency/Juvenile Courts have developmental and situational needs that need to be recognized and accommodated by the professionals with whom they interact. In addition to the possible sequelae of stressful experiences, such as maltreatment or their parents' separation, many children and youth must also grapple with concerns about competing loyalties to their parents in the context of continuing levels of dependency and emotional vulnerability. Mental health professionals have developed some techniques to minimize the adverse effects and increase the chances that parent-child relationships can be enhanced, but their use is exceptional, rather than normative. In Dependency Court settings, the focus is often on obviating the risk of future abuse, regardless of the possible effects on children's relationships with their parents and other family members, whereas in Family Court, the tendency to focus on the needs of the litigating parents often obscures focus on the children's best interests. In both contexts, insufficient attention is paid to developmental differences in the children's preferences or understanding of the proceedings and their possible outcomes.

CONCLUSION AND SUGGESTIONS FOR FUTURE RESEARCH

In this chapter, we have shown how children's development in a variety of domains profoundly affects their participation in the legal system, regardless of the specific

roles—as victims, as offenders, as witnesses, and as affected parties—they are called upon to play. Despite the best efforts of researchers, especially psychologists, to focus their attention narrowly on specific aspects of psychological function (attention, memory, language, emotion, social understanding, logic and reasoning), children (like adults) are coherent holistic entities whose behavior and performance are constrained, made possible, and guided by capacities and limitations in a varied array of interrelated dimensions or facets. Accordingly, we used the first portion of this chapter to describe the relevant developments in each of the domains known to affect children's performance in legal contexts and then showed both how these intersecting developmental trajectories affect behavior in legal contexts and how recognition of these factors can be used to maximize children's participation while ensuring that legal processes yield outcomes that are most likely to address children's interests and needs. This collective intellectual exercise is very much a work in progress, with considerably more research needed to flesh out the implications of developments delineated in experimental contexts and to document their implications for children in diverse legal contexts, not simply in specific domains. Equally clear is the fact that different questions have provoked different amounts of attention from scholars and researchers. Our review is not exhaustive, though we have attempted to provide a broad overview and to discuss the available evidence concerning several central topics.

The vast majority of research and theorizing in relation to children and the law has focused on the testimonial capacities and weaknesses of victimized children—especially young children—as witnesses, with considerable research also focused on the less obvious weaknesses and characteristics of youth who have allegedly committed offenses. There has been substantially less research on children whose living arrangements are determined by legal proceedings, either because their parents have separated or because their parenting skills and motivation have been unacceptably poor, even though many more children fall into the latter categories than into the former. Many of the children affected by parental separation are adversely affected, but there have been relatively few studies in which children in such circumstances have been followed over time to allow examination of the factors accounting for individual differences in adjustment. Accordingly, we have made the case both that there is a serious need for sophisticated research on children in these civil law (family and dependency court) circumstances, and that many of the same developmental considerations that affect the

performance of young witnesses describing their victimization also warrant consideration when considering the testimony and culpability of juvenile offenders, or the preferences and well-being of children whose long-term considerations are being decided by professionals in the legal system, many of whom have had little training in or understanding of child development.

There are, of course, some differences between the different legal contexts and the different roles played by children, and it would behoove future researchers to explore some of these differences in depth. In the criminal law context, for example, young victims or offenders may be asked to describe in detail specific experienced events, but they may be motivated to emphasize or minimize certain types of details, and explanations or justifications may be more important in one context than in another. In other legal contexts, however, the focus is not on specific incidents but on patterns of behavior over time (quality of parenting, neglectful behavior) and expectations of future behavior. It is very likely (though the issue has yet to receive any substantial attention) that different techniques and questions would be needed both to elicit these different types of information and to evaluate it. For example, by definition, neglectful behavior involves acts of omission, so children's accounts of neglectful parental behavior should be elicited using different techniques than their accounts of acts of commission (e.g., physical or sexual abuse).

Certainly, children's behavior in legal contexts is affected by motivational factors associated with the nature of their relationships, especially with the adults involved. Thus, for example, researchers know that young victims often fail to, delay, recant, or minimize reports and accusations of abuse by those they love or on whom they are dependent, and these findings underscore the need for considerably more research on the extent to which affective and motivational factors influence the extent to which children encode, recall, or recount details about their experiences. Although some research illustrates the role of motivation in affecting the performance of young victim-witnesses, for example, very little is known about the psychological mechanisms, especially as they pertain not simply to recounting, but to the other psychological processes (e.g., encoding, forgetting) involved. In the civil law domain, furthermore, studies have documented the value of well-designed interventions promoting beneficial relationships between birth, foster, or adoptive parents and their children, but there is still very little methodologically sound research on the relative psychological costs of maltreatment, estrangement (e.g., from one parent), legally

enforced separations (e.g., during temporary placement in foster care), or repeated transitions (e.g., from one foster family to another) on the well-being of children at different developmental stages and of differing dispositions. Indeed, research on individual differences is extremely rare in the literature on children and the law, with the few relevant findings either weak or inconsistent. Thus there is a clear need to conduct more intensive and systematic research on individual differences in the future.

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CHAPTER 13

Child Maltreatment

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INTRODUCTION

In this chapter, we provide an overview of historical issues accompanying the study of child maltreatment and address advances, as well as challenges that have emerged over decades of research in this area. We infuse a developmental psychopathology perspective into our understanding of the sequelae of maltreatment. Specifically, we highlight the importance of utilizing a multilevel perspective when examining aspects of socioemotional, cognitive,

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psychophysiological, neurobiological, and genetic functioning. Employing a developmental lens, we discuss: affect differentiation and emotion regulation, emotion recognition, attachment, the development of an autonomous self, peer relationships, adaptation to school, memory, and personality organization and psychopathology. We also present findings on gene \times environment interaction (G \times E), allostatic load, neuroendocrine functioning, physical health outcomes, and neurobiological development. Studies elucidating resilience despite caregiving adversity also are presented. The importance of better understanding maltreatment in the context of racial and ethnic differences, as well as possible differential outcomes associated with maltreatment subtype and gender, are highlighted. We then address methodological issues in maltreatment research

and the translation of research into prevention, intervention, and social policy arenas. We conclude by turning our attention to the next generation of work in this area, highlighting new approaches to research that are likely to advance the field's understanding of child maltreatment and its effects across the life course, as well as recommending strategies for fostering advances and addressing challenges that have and will continue to accompany the investigation of this enormous societal problem.

Child maltreatment represents a pathogenic relational environment that confers significant risk for maladaptation across both psychological and biological domains of development. Importantly, the deleterious sequelae accompanying child maltreatment not only result in adverse consequences during childhood, but also often initiate a negative developmental cascade that continues throughout the life course (Masten & Cicchetti, 2010). The proximal environment involving the nuclear family, as well as more distal factors associated with the community and culture more broadly, transact to undermine normal biological and psychological developmental processes in children who have experienced maltreatment (Cicchetti & Toth, 2006a). Childhood maltreatment has been associated with increased internalizing and externalizing problems, suggesting that etiological pathways exist between these symptoms and a number of psychiatric disorders (Keyes et al., 2012). In a meta-analytic examination of 16 epidemiological studies with over 23,000 participants, childhood maltreatment was associated with an elevated risk of experiencing recurrent and persistent depressive episodes (Nanni, Uher, & Danese, 2012). A further meta-analysis of 10 clinical trials with over 3,000 participants found that childhood maltreatment was also related to lack of response to treatment or lack of remission of depression during treatment (Nanni et al., 2012).

The public health implications of the adverse effects accompanying child maltreatment are enormous. According to the Center for Disease Control (Fang, Brown, Florence, & Mercy, 2012), 1 year of confirmed cases of child maltreatment (including cases of physical, sexual, and verbal abuse and neglect) costs \$124 billion over the life span of the abused children. Information garnered from the Adverse Childhood Experiences (ACE) Study (Anda, Dube, & Giles, 2006), one of the largest and arguably most important public health studies in the United States, indicates that childhood trauma, including maltreatment, is associated with an extraordinary number of adult health risk behaviors, including psychosocial and substance abuse problems. Importantly, individuals with elevated ACEs

are also at increased risk for diseases, including diabetes, immunological and cardiovascular problems, and early morbidity. Perhaps most strikingly, the ACE findings demonstrate that childhood trauma is not a rare occurrence, with over two thirds of the adults surveyed in this middle-income population having experienced one or more types of adverse childhood experiences and with 87% having experienced two or more types of trauma. Thus, the magnitude of the effects of childhood maltreatment and the toll it exerts on society cannot be understated.

Over the years, the sophistication of research conducted on this significant societal problem has increased substantially. Although early studies were fraught with methodological limitations, current approaches are empirically rigorous and both intervention and social policy initiatives are increasingly informed by the results of empirical studies (Toth & Cicchetti, 2006). We begin our discussion of the consequences of child maltreatment by addressing aspects related to the definition of child abuse and neglect, a fundamental issue that must be grappled with if this area of research and practice is to continue to move forward.

DEFINITIONAL CONSIDERATIONS

Perhaps one of the most important advances in understanding child maltreatment was related to refining the approach to defining child maltreatment. In order to be able to compare findings across laboratories and effectively communicate research results more broadly to both clinicians and policy makers, systematized definitions of maltreatment are essential. Historically, problems in agreeing upon an operational definition of maltreatment arose due to a lack of consensus about what constitutes acceptable versus inappropriate parenting, uncertainty about whether to define maltreatment based on caregiver actions, child outcome, or a combination of the two, controversy over whether criteria of harm or endangerment should be utilized, and disagreements about whether similar definitions were applicable to scientific, legal, and clinical purposes.

One of the most comprehensive and sustained efforts to understand the magnitude of the problem of child abuse and neglect in the United States emanated from the National Incidence Study (NIS), a congressionally mandated effort initiated in 1974 in response to the requirements of the Child Abuse Prevention and Treatment Act. Initially, data were collected beginning in 1979. The NIS includes not only children reported to Child Protective Services (CPS), but also those who were screened out by CPS without an

investigation. Thus, NIS estimates are based on a nationally representative sample that includes both maltreated children designated as such by CPS and those identified by the community who were not officially designated as maltreated.

NIS-4, the most recent survey, was conducted in 2005 and 2006 (Sedlak et al., 2010). According to NIS classifications, maltreatment includes both abuse (physical, sexual, and emotional) and neglect (physical, emotional, educational). Standardized NIS definitions describe both acts of commission and omission for each subtype. In addition, a number of additional features such as the child's relationship to the perpetrator, the severity of the harm, and the amount of evidence existing about the perpetrator are recorded. NIS definitional standards include the Harm Standard, which is the more stringent definition requiring demonstrable harm to the child, and the Endangerment Standard, which includes children who are endangered but not yet harmed. NIS-4 reports an overall decrease in the incidence of maltreatment since NIS-3, with a 19% decrease according to the Harm Standard. When accounting for the growth in the child population during this time period, this equated to a 26% decline in maltreatment. Statistically reliable changes were not apparent in the incidence of children who experienced maltreatment according to the Endangerment Standard. Importantly, NIS-4 documents that maltreatment is also associated with a number of co-occurring risk factors, including parental unemployment, low socioeconomic status, and race. With respect to race, a higher incidence of maltreatment was observed for African American children. Because socioeconomic status and race are often highly correlated, it is difficult to disentangle the relative contributions that each of these factors may make to the increased rate of maltreatment. NIS-4 was the first U.S. survey to detect racial differences in rates of maltreatment (we will discuss this later in the chapter).

It is important to note that maltreatment is a global problem. In 2000, the National Society for the Prevention of Cruelty to Children (NSPCC) published groundbreaking information on the prevalence and impact of child maltreatment in the United Kingdom. A subsequent report by the NSPCC that included a random probability sample of parents, children, and young adults found similar rates of neglect but found that rates of severe child maltreatment were lower in 2009 than in 1998, suggesting a similar decline in the prevalence of maltreatment as was found in the United States (Radford et al., 2011). Despite this decline, a substantial number of children continued to experience severe maltreatment, with 5.9% of children

under 11 years and 18.6% of those aged 11–17 years experiencing severe maltreatment. All forms of abuse during childhood were associated with worse mental health outcomes and elevated delinquent behavior. According to the NSPCC, maltreatment is defined as

All forms of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment, or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust, or power. (Butchart, Putney, Furniss, & Kahane, 2006, p. 9)

Determination of the incidence of maltreatment is intertwined with reporting procedures and definitions utilized and, thus, the extent of documented maltreatment varies considerably across Europe and is also related to societal norms and values (Daro, 2006). Compared to incidence rates reported in the NSPCC survey, a World Health Organization prevalence study of maltreatment in Romanian families found that 24% of adolescents aged 13–14 years had experienced physical abuse, 9% had experienced sexual abuse, and 46% had experienced physical neglect (Browne, 2002). In general, between 7% and 36% of women and 3% and 29% of men internationally have experienced sexual abuse, with rates remaining constant for almost two decades (Finkelhor, 1994; Pereda, Guilera, Forns, & Gómez-Benito, 2009).

Despite an emerging consensus regarding classification of maltreatment subtypes (Manly, 2005), some divergence remains in the field regarding how best to ascertain the presence of maltreatment. Although some advocate for reliance on information obtained from officially documented reports of maltreatment (Manly, 2005), other investigators argue that caregiver and child reports are preferable because reliance on officially documented cases may result in only the most severe forms of maltreatment being captured. Ideally, a multipronged approach to defining maltreatment is preferable, including systematic coding of documented reports, access to information obtained in medical records, and interview information from caregivers and children. One system for coding official records examined in the aforementioned study, the MCS (Barnett, Manly, & Cicchetti, 1993) captures not only subtypes of maltreatment, but also dimensions such as severity, frequency/chronicity, perpetrator(s), and developmental period(s) during which maltreatment occurred. The MCS has been used in more than 50 research laboratories in both the United States and Europe and has demonstrated excellent reliability and validity. In order to obtain

supplementary information, the Maternal Maltreatment Classification Interview (MMCI; Cicchetti, Toth, & Manly, 2003) also can be administered to caregivers. Other widely utilized measures for assessing childhood maltreatment include the Childhood Experience of Care & Abuse instrument (Bifulco, Brown, & Harris, 1994) and the Childhood Trauma Questionnaire (Bernstein & Fink, 1998).

Despite advances related to improved definitions of child maltreatment, far too many investigations fail to utilize validated classification systems or to provide comprehensive information on the maltreatment experience. Issues related to the perpetrator of maltreatment, chronicity and severity of maltreatment, and when in the developmental period maltreatment occurred frequently are not considered. The ascertainment of a comprehensive portrayal of maltreatment becomes even more difficult in retrospective investigations that rely on the recall of maltreated individuals. Moreover, societal mores and attitudes toward corporal punishment vary considerably across cultures and further complicate estimates on the incidence and prevalence of child maltreatment. These issues can contribute to widely discrepant conclusions across investigations and warrant increased attention in future studies (Baker, 2009; Barnett et al., 1993).

In addition to arriving at a consensus on how child maltreatment is defined, considerations regarding conceptualization of the etiology of child maltreatment are of paramount importance in investigations of maltreatment.

ETIOLOGICAL MODELS OF CHILD MALTREATMENT

In discussing the etiology of child maltreatment, it is important to recognize that most forms of maltreatment are part of a pattern of maladaptive behavior that emerges over time. Early views on the development of maltreatment emerged from a “main effects” perspective, in which it was thought that single risk factors such as parental psychopathology, poverty, or a parental history of maltreatment could provide an etiological account of the occurrence of child maltreatment (Cicchetti & Rizley, 1981). These unidimensional views on the etiology of child maltreatment soon gave way to more complex causal models, as it became clear that no single risk factor or set of risk factors would explain the development of maltreatment (Belsky, 1980; Cicchetti & Rizley, 1981).

Applying Bronfenbrenner’s (1979) theory of human development, the etiological model proposed by Belsky (1980) initiated dramatic changes in the conceptualization

of child maltreatment, as it necessitated the consideration of the broader environment in which maltreatment occurs. According to Belsky (1980), child maltreatment is a social-psychological phenomenon that cannot be understood in isolation from the community and the culture within which the family and the individual are embedded. As such, his model contains four levels of analysis: the *macrosystem*, including the cultural beliefs and values that contribute to and influence child maltreatment; the *exosystem*, including aspects of the community that contribute to the incidence of maltreatment; the *microsystem*, including factors within the family that contribute to the occurrence of maltreatment; and *ontogenetic* development, including factors within the individual that are associated with being a perpetrator of maltreatment. Given that proximity to the individual increases with each subsequent level of the ecology (from the macrosystem to the ontogenetic context), Belsky (1980) further highlighted that risk factors at ecological levels that are closer to the individual exert a more direct influence on an individual’s development. Moreover, interactions exist between and among all levels of the ecology, contributing to and influencing the occurrence of child maltreatment.

Cicchetti and Rizley (1981), drawing on the work of Sameroff and Chandler (1975), introduced additional elements to the etiological model of maltreatment by proposing a transactional model. This model focused on the reciprocal interactions of the environment, the caregiver, and the child, which together contribute to the outcomes of child development. An important distinction was made between two classes of risk factors: those that are *potentiating*, thereby increasing the risk for maltreatment, and those that are *compensatory*, which decrease the risk for maltreatment. Additionally, a temporal dimension was added to distinguish between risk factors that are *transient* versus those that are *enduring*. By combining these categorical and temporal dimensions of risk factors, Cicchetti and Rizley (1981) proposed four classes of determinants for the occurrence of child maltreatment:

1. *Enduring vulnerability factors* include all relatively long-lasting factors, conditions, or attributes that serve to potentiate maltreatment. These may involve parental, child, or environmental characteristics. Vulnerability factors may be biological in nature, historical (e.g., a parent with a history of being maltreated), psychological, and sociological.
2. *Transient challengers* include short-term conditions and stresses such as loss (of status, a job, or a loved one),

physical injury or illness, legal difficulties, marital or family problems, discipline problems with children, and the emergence of a child into a new and more difficult developmental period.

3. *Enduring protective factors* include relatively permanent conditions that decrease the risk of maltreatment. Examples of likely protective factors include a parent's history of good parenting and a secure quality of intimate relationship between the parent figures.
4. *Transient buffers* include factors that may protect a family from stress, such as sudden improvement in financial conditions, periods of marital harmony, and a child's transition out of a difficult developmental period.

It is the transactions among ecological levels that result in potentiating and compensatory factors and in mechanisms for the precursors and sequelae of child maltreatment. The Cicchetti and Rizley (1981) model conceptualized the risk for child maltreatment as probabilistic, proposing that the likelihood of maltreatment occurring is determined by the balance among risk and protective factors and processes. Overall, the balance of potentiating and compensatory factors that are present in the various ecological levels is thought to determine in a probabilistic fashion the absence or presence of child maltreatment.

Integrating the etiological models of Belsky (1980) and of Cicchetti and Rizley (1981), Cicchetti and Lynch (1993) proposed the ecological-transactional model of child maltreatment. By incorporating the ideas of the average expectable environment (Cicchetti & Lynch, 1995) and probabilistic epigenesis (Gottlieb, 1992) into a broad integrative framework, this model explains how processes at each level of the ecology exert reciprocal influences on each other and shape the course of child development (Cicchetti & Lynch, 1993). As such, potentiating and compensatory risk factors associated with maltreatment are present at each level of the ecology and can influence processes in the surrounding environmental levels. These dynamic transactions, which operate both horizontally and vertically throughout the levels of ecology, determine the amount of risk for maltreatment that an individual faces at any given time. The levels of ecology most proximal to the child have the most direct impact on child development relative to the more distally located macrosystem. Although characterized by an overall pattern in which risk factors outweigh protective factors, there are infinite permutations of these risk variables across and within each level of the ecology, providing multiple pathways (known as equifinality) to the occurrence of maltreatment.

It is important to consider that factors that increase or decrease the likelihood of risk during one period of children's development may not do so during other developmental periods. Moreover, the temporal dimension of potentiating and compensatory risk factors is not static. Risk factors that are enduring can become transient and vice versa. For example, potentiators that originally are associated with relatively transient factors, such as initial unemployment, can become enduring when they persist over time, as in the case of chronic unemployment. Risk factors that had acted as potentiators can also be associated later on with compensatory risk factors. Perhaps the successful handling of a challenge can result in the development of new compensatory factors. For example, children who are able to survive the direct and indirect challenges presented by such potentiating factors as child maltreatment, poverty, and community violence develop inner characteristics that later are able to function as compensatory factors. The reverse is also possible. A compensatory risk factor could become a potentiating risk factor for maladaptation. Behaviors that are positive at one developmental period, such as a young child's dependence on a caregiver for support, might become counterproductive if continued into late adolescence, when more autonomy is expected.

Ultimately, it is the child's own ontogenetic processes, as manifested by the particular developmental pathway that individuals engage in, that culminate in eventual adaptation or maladaptation. The challenges or supports presented to children by the family, community, and society contribute to these ontogenetic processes; however, children also play an active role in their organismic development as they respond to these influences and engage in the resolution of stage-salient developmental issues. In the case of child maltreatment, one could imagine how the increased presence of enduring vulnerability factors and transient challenges associated with maltreatment at each level of ecology contributes to unsuccessful resolution of stage-salient developmental issues, setting the child on a pathway to maladaptive developmental outcomes and psychopathology (Cicchetti & Toth, 2006a). The ecological-transactional model of Cicchetti and Lynch (1993) may also aid in providing an account for resilient outcomes. The presence of enduring protective factors may approximate features of the average expectable environment, thus allowing some children to display successful adaptation in the face of maltreatment (Cicchetti, 2013).

We next turn our attention toward the effects of child maltreatment, with a particular focus on the developmental processes involved.

SEQUELAE OF CHILD MALTREATMENT

Empirical research on the developmental sequelae of child maltreatment has been conducted for the past half century. Studies of the consequences of maltreatment are very important for enhancing the quality of clinical, legal, and policy-making decisions for maltreated children. Decisions concerning such issues as whether to report a child as maltreated, whether to remove a child from the home, how to develop interventions to meet the specific psychological needs of maltreated children, and how to evaluate the efficacy and the effectiveness of these interventions all necessitate a solid and sophisticated database on the developmental sequelae of child maltreatment. As Aber and Cicchetti (1984) cautioned, “without rigor in design and method . . . myth will be put forward in place of knowledge as a guide to social action” (pp. 196–197).

Child abuse and neglect represent a severe dysfunction in parenting, as well as a substantial disturbance in parent-child relationships that may result in serious child maladaptation and aberrant development across the life span (Belsky & Jaffee, 2006). In fact, child maltreatment may constitute the greatest failure of the caregiving environment to provide opportunities for normal development (Cicchetti & Lynch, 1995). Moreover, maltreatment experiences may provide serious challenges to the species-typical organism–environment “coactions” that play important roles in the emergence and timing of normal developmental change.

The most important early study of the developmental consequences of child abuse and neglect is also the most controversial. Previously, none of the studies investigating the effects of child abuse and neglect had employed a matched comparison group; however, Elmer (1977) studied abused children matched on age, race, gender, and socioeconomic status (SES) to a group of children who had experienced accidents but were not abused. The abused children and the accident children initially were studied when they were approximately 12 months of age. These children were followed up again eight years later. Additionally, Elmer (1977) added a nontrauma comparison group of children at the follow-up assessment.

The major findings of the study were the absence of group differences in health history, intellectual status in school, language development, and self-concept. Despite the maltreatment classification, measurement, conceptual, and sampling flaws in the study (see Aber & Cicchetti, 1984), Elmer concluded that membership in the low-SES may have as profound an impact as abuse on child

development. Elmer’s conclusion placed the issue of what constitutes “developmental risk” in a stark sociopolitical light. It was essential that future investigations transcend the scientific flaws of Elmer’s study (see Aber & Cicchetti, 1984).

Developmental scientists took up the challenge during the 1980s and began conducting investigations of the sequelae of child maltreatment (see, e.g., Cicchetti & Carlson, 1989; Egeland & Sroufe, 1981; Lamb, Gaensbauer, Malkin, & Schultz, 1985). Consistent with the tenets of the field of developmental psychopathology, these investigators believed that it was possible to learn more about an individual’s normal functioning by studying its pathology and, likewise, more about its pathology by studying its normal conditions (Cicchetti, 1984; Cicchetti & Toth, 2009; Sroufe & Rutter, 1984). It was thought that theorizing about development without considering deviations that might be expected from the prominent and wide-ranging intra- and extraorganismic disturbances, as well as the transactions that occur among them, would eventuate in incomplete and ambiguous accounts of developmental processes. Methodologically rigorous examinations of the consequences of child maltreatment, in comparison to comparable groups of nonmaltreated children drawn from low-SES environments and informed by developmental theory and research, provided researchers with an excellent opportunity to test the veridicality of Elmer’s (1977) conclusions and to uncover potential developmental deviations, as well as the ecological disturbances associated with them. These initial developmentally informed and well-designed investigations, as well as decades of subsequent sound research, unquestionably demonstrate that the deleterious effects of child maltreatment transcend those of poverty (Cicchetti & Toth, 2005).

The study of maltreated children can make numerous contributions to the processes underlying normal development—primarily through contributing precision to developmental theory, affirming it, challenging it, and impelling theoreticians and researchers to examine extant developmental theories more critically in relation to knowledge about maladaptation, psychopathology, and resilience. Conversely, before one is capable of grasping deviances that exist in a developing system, one must also possess an accurate description of the system itself. In order to comprehend how abnormalities are transmitted from one developmental level to another, one must know how the normal transitions from one level of functioning to another are accomplished. Only when one understands the total ongoing development of normal systems can

one comprehend developmental deviations as adaptational irregularities of those systems (Cicchetti, 1984, 1993; Sameroff, 1983; von Bertalanffy, 1968).

Through investigations of the effects of severe environmental disturbances such as child abuse and neglect, researchers may be able to gain insight into processes that normally are so subtle and gradual that they are not observed. For example, by examining the development of children who have not experienced a benign rearing environment, such as is the case with children who have been maltreated, researchers may be able to elucidate the impact that the quality of caregiving can exert on neurobiological structure and function (Belsky & de Haan, 2011; Cicchetti, 2002a, 2002b).

Research on child maltreatment also informs, and can be informed by, the significant functions of normal parenting (Belsky & Vondra, 1989; Rogosch, Cicchetti, Shields, & Toth, 1995). The specific acts of omission and commission that define child maltreatment are salient features of maltreated children's microsystems. It is in this immediate context of deviant parenting that maltreated children's atypical development takes shape. Close analysis of the maltreating caregiving environment and its links with poor developmental outcomes can shed light on the protective processes associated with appropriate parenting.

Investigations of the determinants of resilient functioning in maltreated children also can provide information about the multiple possible pathways of development. Despite having different specific experiences, many maltreated children exhibit similar failures in the stage-salient tasks of development (i.e., "equifinality"). On the other hand, not all maltreated children are equally affected by their experiences (i.e., "multifinality") with some achieving resilient outcomes and the rest exhibiting maladaptive development (Cicchetti, 2013). Investigations of maltreated children's development and struggles with adaptation can teach researchers about the range and variability of individual response to challenge and adversity. Instances of maltreated children succeeding at particular developmental tasks or who otherwise achieve resilient adaptation can teach researchers about the self-righting properties inherent to development despite poor-quality care (Sameroff & Chandler, 1975; Waddington, 1957). On the other hand, findings that reveal the relative rarity with which maltreated children display resilient outcomes highlight some of the real constraints on children's self-righting abilities.

Although a comprehensive review of the sequelae of child maltreatment is not addressed in the present chapter, we cover developmental issues that forebode later

maladaptation in the absence of efficacious evidence-based intervention. Moreover, although some investigations reveal negative sequelae associated with specific subtypes of maltreatment, it is extremely difficult to disentangle specific effects of maltreatment by subtype given their frequent overlapping occurrence. As investigations continue to refine definitions of dimensions of maltreatment, it will be increasingly possible to ascertain if there are any sequelae that are more likely to be associated with a specific subtype of maltreatment.

THE ORGANIZATIONAL PERSPECTIVE ON DEVELOPMENT

Much research conducted on the effects of child abuse and neglect is guided by the ecological-transactional model and an organizational perspective on development, a powerful theoretical framework for conceptualizing the intricacies of a life-span approach to risk and resilience, as well as to normal development (Cicchetti, 1989; Cicchetti & Toth, 1995, 1998; Sroufe, 1997; Sroufe & Rutter, 1984). The organizational perspective focuses on the quality of integration both within and between the biological and psychological systems of the individual. Moreover, the organizational perspective addresses how development occurs, specifically identifying a progression of qualitative reorganizations within and among the biological and psychological systems that proceed through differentiation and subsequent hierarchical integration (Werner & Kaplan, 1963). In accord with the organizational perspective, development is not viewed as consisting of a series of tasks that need to be accomplished and that subsequently decrease in importance. Rather, development is conceived as comprising a number of age- and stage-relevant tasks. Although the salience of these tasks may wane in relation to newly emerging issues, the tasks remain important to adaptation over time (Cicchetti, 1993). A hierarchical picture of adaptation emerges in which the successful resolution of an early stage-salient issue increases the probability of subsequent successful adjustment (Sroufe & Rutter, 1984). As each new stage-salient issue comes to the fore, opportunities for growth and consolidation, as well as challenges associated with new vulnerabilities, arise. These tasks include the development of emotion regulation, the formation of attachment relationships, the development of an autonomous self, the formation of effective peer relationships, and successful adaptation to school. To our knowledge, little research has been conducted

on the stage-salient issues of adolescence and emerging adulthood in child maltreatment, such as psychological autonomy, forming close relationships within and across gender, and deriving a cohesive sense of self-identity (Cicchetti & Rogosch, 2002; Masten & Coatsworth, 1998). These issues deserve future research attention.

Despite the fact that more distal historical factors and current influences are important to the process of development, individual choice and self-organization have increasingly been viewed as exerting critical influences on development (Cicchetti & Rogosch, 1997; Cicchetti & Tucker, 1994). Across the developmental course, the evolving capacities of individuals and their active choices allow for new aspects of experience, both internal (e.g., genetic/biological) and external, to be coordinated in increasingly complex ways. Moreover, not only because biological factors can influence psychological processes, but also because social and psychological experiences exert actions on the brain by feeding back on it to modify gene expression and brain structure, function, and organization (Cicchetti & Tucker, 1994; Eisenberg, 1995; Kandel, 1998; Szyf & Bick, 2013), developmental plasticity can be brought about by both biological and psychological self-organization (Cicchetti, 2002a; Cicchetti & Tucker, 1994). Thus, for example, the fact that most maltreated children evidence at least some self-righting tendencies in the face of extreme adversity attests to the strong biological and psychological strivings toward resilience that virtually all humans and living organisms possess (Cicchetti & Curtis, 2006; Cicchetti & Rogosch, 1997; Waddington, 1957). In contrast, the absence of such resilient self-strivings in some maltreated children attests to the deleterious and pernicious impact that traumatic experiences can exert on core biological and psychological developmental processes. We next address the effects of maltreatment on stage-salient issues.

Affect Differentiation and Emotion Regulation

An early stage-salient issue in infancy involves the ability to differentiate and regulate emotions. Conceptualized as the monitoring, evaluating, and modifying of emotional reactions for the purpose of achieving individual goals, emotion regulation optimizes one's adaptive engagement with the environment (Thompson, Lewis, & Calkins, 2008). Cicchetti, Ackerman, and Izard (1995) argued that emotion regulation is critical both in initiating, motivating, and organizing adaptive behavior, and in preventing stressful levels of negative emotions and maladaptive behavior.

Emotion regulation is a developmentally acquired process that emerges from increasing differentiation and hierarchical integration of biological and psychological systems. Emotion regulation evolves as a function of both intrinsic features and extrinsic socioemotional experiences within the context of early parent-child interactions (Cicchetti, Ganiban, & Barnett, 1991). At the biological level, important intraorganismic factors for the development of emotion regulation include individual differences in genotypic variation, organizational changes in central nervous system structure and function, cerebral hemispheric lateralization, and the development of neurotransmitter systems. Extraorganismically, children's emotional experiences, expressiveness, and arousal are influenced by caregivers' response to and tolerance of affect (Sroufe, 1996). Parents' socialization of affect displays during early interpersonal exchanges serves as the model through which aspects of emotional regulation may be learned (Hesse & Cicchetti, 1982; Thompson et al., 2008).

Child maltreatment represents a significant threat to the optimal development of affective processing abilities. Given the severe disturbances in the average expectable environment provided by maltreating families, considerable evidence has mounted to demonstrate the detrimental effects of aspects of maltreatment on children's emotional development and regulation. Specifically, maltreated children have shown deviations in emotion expression, recognition, communications, and understanding (Cicchetti & Ng, 2014). Moreover, in accord with the organizational perspective, adequate emotion regulation serves as a foundation for the development of secure attachment relationships, an autonomous and coherent self-system, and effective relationships with peers, whereas early affect-regulatory failures increase the probability that a child will develop future insecure disorganized attachment relationships, self-system impairments, and peer difficulties (Cicchetti & Valentino, 2006).

Divergence in maltreated children's emotional expression has been noted as early as 3 months of age, where severely physically abused infants have evinced increased rates of fearfulness, anger, and sadness during mother-infant interactions (Gaensbauer, Mrazek, & Harmon, 1981). The expression of fear and anger among physically abused infants at 3 months of age is a particularly salient finding considering that the normative ontogenetic development of these affects does not typically occur until approximately 7 to 9 months of age (Sroufe, 1996). In contrast, neglected infants have been shown to display an attenuated range of emotional expression and an increased

duration of negative affect as compared to nonmaltreated infants (Gaensbauer et al., 1981). Thus, excessive amounts of negative affect or blunted patterns of affect have been observed in maltreated infants long before they occur in normal development.

It is likely that early malevolent care accelerates the development of negative affect circuitry in the brains of maltreated infants. This may be accomplished by excessive synaptic pruning of the positive affect neurobiological circuits as a result of inadequate or insufficient early positive experiences by abused babies. The accelerated development of negative affect circuitry may lay the groundwork for the "negativity bias" (Ayoub et al., 2006) manifested by abused children in behavioral and psychophysiological studies of attention to facial expressions and in studies of social information processing (Pollak, 2005; Teisl & Cicchetti, 2008). Thus, maltreated children may already be at risk for developing differential emotion regulation developmental pathways by 3 months of life.

The early maladaptive processing of stimuli that contributes to affective regulatory problems may lay the foundation for future difficulties in modulating affect. Corroboration for the prediction, emanating from the organizational perspective, that maltreated children are at increased risk for evidencing a developmental progression from affect-regulatory problems to behavioral dysregulation has been obtained in a number of cross-sectional investigations. Maltreated toddlers have been shown to react to peer distress with poorly regulated and situationally inappropriate affect and behavior, including anger, fear, and aggression, as opposed to the more normatively expected response of empathy and concern (Main & George, 1985). Likewise, maltreated preschool and school-age children have been found to exhibit a range of dysregulated behaviors that are frequently characterized by disruptive and aggressive situations. In addition, physically abused preschool boys who witnessed an angry simulated interaction directed at their mothers evinced greater aggressiveness and more coping directed toward the alleviation of maternal distress than did nonabused boys (Cummings, Hennessy, Rabideau, & Cicchetti, 1994).

Shields, Cicchetti, and Ryan (1994) have shown in an observational study that maltreated children are deficient in affective and behavioral regulation, and that this attenuated self-regulation mediates the negative effects of maltreatment on children's social competence with peers. In accord with an organizational perspective, although affective and behavioral self-regulatory processes were interrelated, each appeared to represent a distinct

developmental system that differentially and individually affects children's competence. Finally, in an investigation of 4- to 6-year-old children, approximately 80% of maltreated preschoolers exhibited patterns of emotion dysregulation (i.e., undercontrolled/ambivalent and overcontrolled/unresponsive types) in response to witnessing interadult anger, compared to only 37% of the nonmaltreated comparison children. Undercontrolled/ambivalent emotion regulation patterns were associated with maternal reports of child behavior problems and were found to mediate the link between maltreatment and children's symptoms of anxiety or depression (Maughan & Cicchetti, 2002). Findings such as these support a sensitization model whereby repeated exposure to anger and familial violence results in greater emotional reactivity.

During the school-age years, children continue to develop emotion regulation skills as they encounter increasing socialization demands from peers as well as from family. In an investigation conducted in the context of a research summer day camp, Shields and Cicchetti (1998) examined the interplay among emotion, attention, and aggression in a sample of school-age maltreated and nonmaltreated children. A central focus of this investigation was to examine processes underlying maltreatment's deleterious effects on behavioral and emotional dysregulation.

Shields and Cicchetti (1998) found that maltreated children were more verbally and physically assaultive than were the nonmaltreated comparison children, with physical abuse placing children at heightened risk for aggression. Maltreated children also were more likely than comparison children to exhibit the distractibility, overactivity, and poor concentration characteristic of children who experience deficits in attention modulation. Physically and sexually abused children also displayed attention disturbances suggestive of subclinical or nonpathological dissociation, including daydreaming, blank stares, and confusion. Deficits in emotion regulation also were evident, in that maltreated children were less likely than comparison children to show adaptive regulation and more likely to display emotional lability/negativity and contextually inappropriate emotion expressions. Such pervasive deficits in maltreated children's regulatory capacities are cause for special concern, as the ability to modulate behavior, attention, and emotion underlie children's adaptive functioning in a number of key domains, including self-development, academic achievement, and interpersonal relationships (Cicchetti, 1989, 1991; Shonk & Cicchetti, 2001).

Shields and Cicchetti (1998) also demonstrated that impaired capacities for attention modulation contribute to

emotion dysregulation in maltreated children. Specifically, attention deficits mediated maltreatment's effects on emotional lability/negativity, inappropriate affect, and attenuated emotion regulation. Attention processes that suggest subclinical or nonpathological dissociation also contributed to maltreated children's deficits in emotion regulation. Thus, abuse seems to potentiate disruptions in attention that result in both a relative detachment from and unawareness of one's surroundings, as well as in hyperattention and hyperreactivity to the social surround (Pollak & Tolley-Schell, 2003; Rieder & Cicchetti, 1989). Together, these deficits appear to compromise maltreated children's ability to regulate behavior and affect in social settings.

In another investigation, Shields and Cicchetti (2001) examined children who were maltreated by their caregivers in order to ascertain whether these children would be more likely to bully others and to be at increased risk for victimization by peers than would nonmaltreated comparison children. An additional focus was to investigate emotion's role in bullying and victimization among maltreated children. Maltreated children were found to be more likely than nonmaltreated children to bully other children. Bullying was especially prevalent among abused children who experienced maltreating acts of commission (physical or sexual abuse). Maltreatment also placed children at risk for victimization by peers. As expected, both bullies and victims evidenced problems with emotion regulation. Furthermore, logistic regression analyses suggested that emotion dysregulation made a unique contribution to differentiating bullies and victims from children who did not evince bully or victim problems. Additionally, maltreatment's effects on children's risks for bullying and victimization were mediated by emotion dysregulation.

In a short-term longitudinal study, Kim and Cicchetti (2010) found that children who are more adept at regulating negative emotions show higher social competence in peer interactions and higher peer competence, resulting in lower levels of internalizing symptomatology. In contrast, poor emotion regulation is a significant predictor of both maladaptive social functioning, such as peer rejection and internalizing symptomatology. Furthermore, Kim-Spoon, Cicchetti, and Rogosch (2013) investigated the longitudinal contributions of emotion regulation and emotion lability-negativity to internalizing symptomatology. A sample of more than 300 maltreated ($N = 171$) and nonmaltreated ($N = 151$) children were followed from Age 7 to 10 years. For both maltreated and nonmaltreated children, emotion regulation was a mediator between emotion lability-negativity and internalizing symptomatology,

whereas emotion lability-negativity did not mediate the relation between emotion regulation and externalizing symptomatology. Early maltreatment was associated with high emotional lability-negativity (Age 7) that contributed to poor emotion regulation (Age 8), which in turn was predictive of increases in internalizing symptomatology (from Age 8 to 9).

These findings suggest that emotion regulation and emotion lability-negativity may be important factors in identifying distinct pathways to child psychopathology. Specifically, low emotion lability-negativity and adaptive emotion regulation appear to play protective roles in the development of internalizing symptomatology. The findings also suggest that emotion regulation is an important mediational process between emotion lability-negativity and internalizing symptomatology. Therefore, to alter emotional processes that are related to the subsequent development of internalizing symptomatology, a focus on improving emotion regulation skills in children is likely to be an effective strategy that can impede the progression of internalizing problems. The results also imply that emotion regulation can be targeted to reduce the deleterious effects of emotion lability-negativity heightened by early maltreatment experiences, thus preventing internalizing symptomatology.

In a particularly important mega-analytic study designed to examine the effects of family violence on children's behavioral problems, Sternberg and colleagues (Sternberg, Baradaran, Abbott, Lamb, & Guterman, 2006) found that children who experienced multiple forms of family violence were at heightened risk for behavior problems compared with those who experienced only a single type of violence. Regardless of type of abuse, age, or gender, more children had behavior problems in the nonclinical than in the clinical range. This was the case even for children who were abused and also witnessed family violence, where only 28%–50% of the children in any group had clinically significant behavior problems. These results highlight the remarkable resilience that can be present, even in the context of extreme family adversity.

Emotion Recognition

To examine the affective input that maltreated children receive, Camras and colleagues (1988, 1990) conducted a series of investigations of maternal facial expressions. When asked to deliberately produce facial expressions, maltreating mothers' demonstrations of emotion faces were less easily identified by observers than were the expression

of nonmaltreating mothers (Camras et al., 1988). During mother-child interactions, maltreating mothers differed from nonmaltreating mothers with regard to the expression of sadness (Camras et al., 1990). Taken together, the emotion displays of abused and neglected infants highlights the centrality of interactions with caregivers in shaping the development of affect expression or differentiation. Moreover, maternal emotional expression ability contributes to their children's ability to recognize facial expression of emotions (Camras et al., 1988).

Difficulties in mentally representing and processing social information have also been noted in children with histories of maltreatment. Children who have been neglected have difficulty discriminating emotional expressions, whereas physically abused children demonstrate a response bias to angry emotional expressions (Pollak, Cicchetti, Hornung, & Reed, 2000). Pollak et al. (2000) hypothesized that physically abused preschool children would demonstrate an increased sensitivity to anger-related cues, perhaps also resulting in decreased attention to other emotional cues. The results of their study revealed that, when physically abused children were exposed to a perceptual scaling task, they perceived angry faces as highly salient and more distinctive than other emotion categories (Pollak et al., 2000). Additionally, when asked to match facial expressions to an emotional situation, physically abused children showed a response bias for anger such that, when they were uncertain which facial expression to choose, they showed a lower threshold for selecting anger. Pollak and Sinha (2002) further demonstrated that physically abused children required less sensory input than did comparison children in order to accurately identify facial displays of anger. Pollak and Sinha (2002) utilized a gradual evolution of images depicting facial expressions of various emotions. Physically abused children detected angry emotions at lower steps of the sequence but did not exhibit increased sensitivity for the other facial displays. The authors concluded that physically abused children have facilitated access to representations of anger. Similarly, in a task in which pairs of photographs of emotional expressions were morphed into each other (Pollak & Kistler 2002), physically abused children detected anger with lower signal strength than did controls. In combination, these studies suggest that physically abused children can detect facial expressions of anger more accurately and at lower levels of perceptual intensity than other emotions.

In an investigation of the attentional mechanism underlying the finding that physically abused children overattend

to angry experiences, Pollak and Tolley-Schell (2003) found that children who had experienced physical abuse demonstrated delayed disengagement when angry faces served as invalid cues and exhibited increased attention to valid angry trials. These results suggest that early adverse experiences influence maltreated children's selective attention to threat-related signals.

In addition, Pollak, Vardi, Putzer-Bechner, and Curtin (2005) examined the effects of early child physical abuse on 4-year-old children's regulation of attention in the presence of interpersonal hostility. Pollak et al. (2005) measured abused children's reactions to the unfolding of a realistic interpersonal emotional situation through multiple methods, including autonomic nervous system changes (i.e., heart rate, skin conductance level) and overt behavioral performance on an attention task. Although the physically abused and nonabused comparison children did not differ in terms of their baseline levels of arousal, marked differences emerged in physically abused children's regulatory responses to background anger. The findings suggest that children with physical abuse histories exhibit anticipatory monitoring of the environment in response to the emergence of anger. Relatedly, Pollak, Messner, Kistler, and Cohn (2009) presented abused children with arrays of stimuli that depicted the unfolding of facial expressions, from neutrality to peak emotions. These investigators found that abused children were able to recognize anger early in the formation of the facial expression, when few physiological cues were available. The speed of children's recognition was associated with the degree of self-reported anger/hostility by the child's parent. Thus, these findings highlight the ways in which perceptual learning can shape the timing of emotion perception.

Perlman, Kalish, and Pollak (2008) conducted an investigation of emotion understanding in maltreated and nonmaltreated children. To assess how well children understood the antecedents of emotional reactions in others, children were presented with a variety of emotional situations that varied in outcome and equivocality. Children were told the emotional outcomes and asked to rate whether a situation was a likely cause of such an outcome. The investigators tested the effects of maltreatment experience on children's ability to map emotion to their eliciting events and their understanding of emotion-situation pairings. Nonmaltreated children were able to distinguish between common elicitors of positive and negative events, whereas children who developed within maltreating contexts interpreted positive, negative, and equivocal events as being equally plausible causes of sadness and anger.

Maltreated children are exposed to an atypical emotional environment, characterized by less positive emotion (Bugental, Blue, & Lewis, 1990) and more negative emotion (Herrenkohl, Herrenkohl, Egolf, & Wu, 1991) in comparison to that expressed in nonmaltreating homes. Among maltreating families, physically abusive parents are more negative than neglecting parents and engage in higher rates of aggression directed toward their children. Neglected children experience an impoverished emotional environment, marked by infrequent affective exchanges with their caregivers (Crittenden, 1981). Ultimately, it is believed that these aberrant emotional experiences eventuate in neuropathological connections that undermine effective emotion-regulation capabilities.

Shackman et al. (2010) evaluated the quality of facial and vocal emotional expressions in abusive and nonabusive mothers and assessed whether mothers' emotional expression quality was related to their children's cognitive processing of emotion and behavioral problems. Relative to nonabusive mothers, abusive mothers produced less prototypical angry facial expressions, and less prototypical angry, happy, and sad vocal expressions. In addition, children's cognitive processing of their mothers' angry faces was related to the quality of mothers' facial expressions. The finding that abusive mothers' expressions of anger were characterized by less intensity and arousal may lead to their children interpreting these expressions of anger as hard to predict and more difficult to interpret (Shackman et al., 2010). Accordingly, abused children's exposure to poorer quality emotional signals may deprive them of an important source of information about the meaning of emotional expressions.

Psychophysiological studies also provide evidence that maltreated children allocate more attentional resources to the detection of anger (Pollak, Klorman, Thatcher, & Cicchetti, 2001). In particular, measurement of cognitive event-related brain potentials (ERP) indicates that school-age maltreated children display larger P3b amplitude when their attention is directed toward angry, as opposed to happy, targets (Pollak et al., 2001; Pollak & Tolley-Schell, 2003; Shackman, Shackman, & Pollak, 2007). Moreover, this pattern of response appears to be specific to anger, rather than to negative emotions in general (Pollak et al., 2001). Similar findings indicate that maltreated infants exhibit brain-based abnormalities in the processing of facial affect as early as 15 months of age (Curtis & Cicchetti, 2013). Together, these results suggest more efficient cognitive organization and processing of anger among abused children.

Behavioral and psychophysiological evidence of maltreated children's differential processing of affective information suggests that early experience influences subsequent emotional development and shapes implicated brain circuitry (Cicchetti, 2002a). The effects observed among maltreated children may reflect experience-dependent processes that involve the fine-tuning of attention, learning, perceptual, and memory systems that facilitate the rapid identification of anger (Pollak, 2009).

For the physically abused child, displays of anger may be the strongest predictor of threat; however, increased sensitivity to anger could result in decreased attention to other emotional cues. Conversely, the neglected child may suffer from an extremely limited emotional learning environment. A solution to the problem created for maltreated children by aberrant emotional signals from parents may be general constraints imposed on children in the form of immature or limited resources, which require young children to filter or select some environmental cues over others (Bjorklund, 1997). This developmentally normal aspect of selective attention suggests that, irrespective of the initial state of the organism, emotional development is contingent on the nature of the input or experiences made available to the child.

In a meta-analysis examining emotion recognition and understanding in children with histories of maltreatment (including abuse and/or neglect), maltreated children evidenced poorer performance on a range of indicators (Luke & Banerjee, 2013). Moderator analyses revealed more pronounced deficits in emotion understanding than in emotion recognition. Developmental effects were also found, with poorer performance emerging in early and middle childhood, but not in adolescents and adults. Taken in conjunction with the extant body of research, this meta-analysis confirms that maltreated children evidence deficits in a wide range of skills associated with social understanding. The meta-analysis also highlights the importance of future investigations utilizing a developmental framework and striving to disentangle the effects of specific dimensions of maltreatment on functioning.

Formation of Attachment Relationships

The establishment of a secure attachment relationship between an infant and his or her caregiver represents a primary task during the first year of life. As development proceeds, attachment theorists have posited that a secure attachment relationship provides a base from which to explore and, ultimately, contribute to the integration of cognitive, affective, and behavioral capacities that influence

ongoing and future relationships, as well as the understanding of the self (Bowlby, 1969; Sroufe, 1990). Children construct “internal working models” of their attachment figures out of their interactions with their caregivers, their own actions, and the feedback they receive from these interactions. Once organized, these internal working models tend to operate outside of conscious awareness and are thought to be relatively resistant to change. Children formulate their conceptions of how acceptable or unacceptable they are in the eyes of their attachment figures (i.e., their self-image) based on their interactional history with their primary caregivers. Exposed to insensitive and pathological care, maltreated children develop negative expectations regarding the availability and trustworthiness of others, as well as mental representations of the self as incompetent and unworthy.

Maltreated children are especially at risk for developing insecure disorganized attachments (see Cyr, Euser, Bakermans-Kranenburg, & van IJzendoorn, 2010, for a meta-analysis). Estimates of the manifestation of disorganized attachment among maltreated children range from 80% to over 90% (Cyr et al., 2010). In the Strange Situation paradigm, Type D infants demonstrate inconsistent and disorganized strategies for coping with separations from and reunions with their caregivers (Hesse & Main, 2006). In addition, these infants display bizarre behaviors such as freezing, stilling, and stereotypies, as well as contradictory behavior directed toward their attachment figures (e.g., approaching their parent with heads averted; Hesse & Main, 2006).

A number of explanations have been proffered to account for the preponderance of disorganized attachment relationships between maltreated children and their primary caregivers. Because inconsistent care is a hallmark of maltreating families (Rogosch et al., 1995), some have hypothesized that the combination of insensitive overstimulation and insensitive understimulation may lead to the contradictory behaviors observed among maltreated infants classified as Type D. According to Hesse and Main (2006), attachment disorganization is caused by frightened and frightening (FR) parental behavior, which is believed to have its origins in unresolved parental trauma. Maltreating behaviors are arguably among the most frightening parenting behaviors, placing children in an irresolvable paradox in which their attachment figures are simultaneously their source of safety and their source of fear (Hesse & Main, 2006).

Genetic variation also has been explored as a contributor to the development of disorganized attachment; however,

little consistent evidence has emerged for a candidate gene main effect on attachment disorganization (see Luijk et al., 2011). Among maltreated children, Cicchetti, Rogosch, and Toth (2011) found that neither the serotonin transporter gene (5-HTT) nor the dopamine receptor D4 gene (DRD4) were associated with disorganized attachment. They concluded that the anomalous aspects of maltreating parenting may be so robust that they overpower the potential effect of genetic variation in the etiological pathway to attachment disorganization (Cicchetti, Rogosch, & Toth, 2011).

Although attachment is conceptualized as an important stage-salient developmental task during the first year of life, attachment security continues to exert its influence on development across the life span. First, substantial stability in insecure and disorganized patterns of attachment have been observed among maltreated children (Barnett, Ganiban, & Cicchetti, 1999). Second, disorganized attachment initiates a maladaptive trajectory that heightens the risk for future relational dysfunction, as well as various forms of psychopathology (Hesse & Main, 2006).

Development of an Autonomous Self

The development of an integrated sense of self typically occurs in the toddler and preschool years, arising from the successful resolution of previous stage-salient tasks, such as the formation of a secure attachment relationship. Early caregiving experiences serve as the basis for the development of representational models of the attachment figure, as well as corresponding and coherent representational models of the self and of the self in relation to others (Sroufe & Fleeson, 1986). As discussed above, many maltreated infants fail to develop an organized pattern of attachment, increasing the probability of subsequent perturbations in representational development. Indeed, maltreated children show disruptions in many aspects of the self system.

Aberrations in self development have been observed as early as 18 months of age, as demonstrated by investigations of visual self-recognition. On the mirror-rouge paradigm, an assessment of the presence of a cognitive self, maltreated and nonmaltreated children are comparable in their capacity to recognize themselves; however, differences emerge with respect to their affective responses (Schneider-Rosen & Cicchetti, 1991). Specifically, maltreated toddlers are more likely than nonmaltreated comparison children to display neutral or negative emotions upon seeing their images in a mirror, which may be interpreted as reflecting negative feelings about the self.

In a longitudinal study of mother–child play and emerging social behavior among infants from maltreating and nonmaltreating families, no group differences were found in infants' play maturity at 13 or 28 months. However, infants from abusing families demonstrated more imitative play than infants from nonmaltreating families, and engaged in less independent play than infants from neglecting and nonmaltreating families, suggesting a delay in emerging social behaviors. At 28 months, once again there were no differences among the groups of children from abusing, neglecting, or nonmaltreating families in child play maturity. However, children from abusing families again engaged in less child-initiated play than the children from neglecting or nonmaltreating families. Evidence that toddlers from abusing families continued to demonstrate less autonomous and self-initiated behaviors suggests that it would be important for early intervention efforts to concentrate on supporting child autonomy and facilitating maternal autonomy support among abusing families (Valentino, Cicchetti, Rogosch, & Toth, 2011).

At 30 months of age, maltreated children demonstrate disruptions in their development of an internal-state lexicon. Even after controlling for receptive vocabulary, maltreated toddlers produce proportionately fewer internal state words, show less differentiation in their attributional focus, and are more context-bound in their use of internal-state language than nonmaltreated comparisons (Beeghly & Cicchetti, 1994). In particular, maltreated children appear to be most reluctant to talk about their negative internal states (Beeghly & Cicchetti, 1994). This result is corroborated by findings that maltreated children may actually inhibit negative affect, especially in the context of their relationships with their caregivers (Lynch & Cicchetti, 1991). Maltreated children may adopt a strategy designed to suppress the expression of their own negative feelings to avoid eliciting adverse responses from their caregivers. Although this approach may be adaptive in the context of a maltreating relationship, it can become maladaptive and lead to social incompetence in other interpersonal contexts. Additionally, the inability of maltreated children to identify and discuss their own distress may play a major role in these children's difficulties in displaying empathy toward their peers.

Negative self-system processes continue to be evident in the preschool period. Maltreated children's narrative representations of parents and of self are more negative than those of nonmaltreated children (Toth, Cicchetti, Macfie, Maughan, & VanMeenen, 2000). With respect to maltreatment subtype, neglected children have been found to tell

narratives containing more negative self-representations than nonmaltreated children, whereas physically abused children possess more grandiose self-representations. These variations by subtype may reflect differences in maltreating experiences. For example, grandiose self-representations may reflect a coping process to maintain personal control in an adverse and threatening home environment, while negative self-representations may develop from the chronic absence of attention and validation in a neglecting home (Toth et al., 2000).

Maltreated children also show delays in the development of false belief understanding, an important aspect of theory of mind (TOM) (Cicchetti, Rogosch, Maughan, Toth, & Bruce, 2003). The onset of maltreatment during the toddler period and physical abuse were the features of maltreatment associated with delay in the development of false belief understanding. The centrality of the relation between maltreatment during the toddler period and TOM deficits flows from the importance of self-development for false belief understanding. Internal state language, increased individuation and self-other differentiation, advances in language, conceptual development and symbolic maturity, and the development of self-conscious emotions all occur during early childhood. Maltreated youngsters manifest difficulties in these aspects of self-development, each of which is a precursor of TOM development. Thus, harsh caregiving, especially early in a child's life, impairs the development of TOM abilities.

Research among school-age maltreated children provides further evidence of self-system deviation. Relative to teacher ratings, younger maltreated children overestimate their own sense of social competence and peer acceptance (Vondra, Barnett, & Cicchetti, 1989). These children may be engaging in defensive processing in order to increase their sense of competence. In fact, research indicates that the development of a grandiose self, as reflected by inflated social self-efficacy, may serve as a protective factor in the link between maltreatment and internalizing symptomatology (Kim & Cicchetti, 2003). However, as maltreated children mature, they tend to underestimate their competence and are rated by teachers as having lower self-esteem (Vondra et al., 1989).

Finally, maltreated children are at risk for developing dissociative features and disorders, perhaps the most severe deficit in the integration of the self (Macfie, Cicchetti, & Toth, 2001a, 2001b; Toth, Pickreign Stronach, Rogosch, Caplan, & Cicchetti, 2011; Valentino, Cicchetti, Rogosch, & Toth, 2008a). The link between maltreatment and dissociation has been observed across a wide age range, from

preschoolers to adults. Among preschoolers, physical and sexual abuse appear to be most robustly related to dissociative features, with physical abuse emerging as particularly salient for the development of dissociation at clinical levels. Furthermore, longitudinal research indicates that fragmentations in self-organization have been found in sexually abused adolescent girls, who demonstrated deviant splitting between both positive and negative self-references (Calverley, Fischer, & Ayoub, 1994).

Peer Relationships

Consistent with an organizational perspective on development, it has been theorized that the negative relational patterns acquired in a maltreating environment become incorporated into the structures that are pertinent for successful peer relations. Within the context of their early caregiving experiences, maltreated children may develop negative expectations regarding the self and others, as well as a concept of relationships as involving victimization and coercion. These internalizations lead to the selection and structuring of later social interactions, such that familiar relationship patterns are recreated and validated (Sroufe & Fleeson, 1986). Research supports this conceptualization of continuity in relational functioning, as maltreated children have been shown to exhibit a broad range of difficulties in the peer domain.

With regard to peer relations, maltreated children appear to traverse one of two general developmental pathways: (1) withdrawal from peer interactions, or (2) heightened aggression toward peers. In addition to these two generally diverging pathways, a subgroup of maltreated and nonmaltreated children has been identified who demonstrate both aggressive and withdrawn behaviors (Rogosch & Cicchetti, 1994). Among maltreated children, those who evidence high aggression and high withdrawal demonstrate lower social effectiveness than is the case for nonmaltreated youngsters. This unusual pattern of interaction with peers is consistent with the attachment history of maltreated children, which may be related to disorganized representational models and may result in disturbances in social encounters. By revealing indications of a response predisposition to both "fight" and "flight," maltreated children's interactions with peers lends support to the notion that these children have internalized both sides of their relationships with their caregivers (Troy & Sroufe, 1987). Thus, maltreated children's representational models may have elements of both the victim and the victimizer, and these models may be enacted in their peer relationships. The link between

maltreatment and aggressive behavior is particularly robust (e.g., Cullerton-Sen et al., 2008; Shields & Cicchetti, 2001). Moreover, aggression appears to largely account for the association between maltreatment and peer rejection (Bolger & Patterson, 2001).

Maltreatment also places children at risk for being victimized by their peers. Schwartz, Dodge, Pettit, and Bates (1997) demonstrated that abusive family treatment predicted boys' status as aggressive victims. In an investigation of bullying and peer victimization that included both boys and girls, Shields and Cicchetti (2001) found that maltreated children were more likely than nonmaltreated children to bully other children and more likely to be victimized by their peers. Gender did not act as a moderator, suggesting that maltreated boys and girls are at comparable risk for bullying and victimization (Shields & Cicchetti, 2001).

The effects of maltreatment on disrupted peer group functioning may be explained by perturbations in cognitive and emotional processes. With regard to social information processing, physically abused children make errors in encoding social cues, exhibit biases toward attributing hostile intent, generate more aggressive responses, and positively evaluate aggression as an appropriate response (Teisl & Cicchetti, 2008). These deficits, in turn, mediate the association between physical abuse and aggression in the peer context. Whereas maladaptive social cognition emerges as a salient explanatory factor for physically abused children, emotion dysregulation appears to play an integral role in the link between maltreatment and aggression for all maltreated groups. Poor emotion regulation also mediates the association between maltreatment and victimization by peers (Shields & Cicchetti, 2001; Teisl & Cicchetti, 2008).

In addition to their difficulties in the larger peer group, maltreated children demonstrate weaknesses in developing and maintaining friendships (Parker & Herrera, 1996). Maltreated children report less caring and validation and more conflict and betrayal in their friendships than nonmaltreated children. In an observational setting, Parker and Herrera (1996) found that friendship dyads containing a physically abused adolescent displayed more conflict and less intimacy than dyads without an abused adolescent. Alternatively, having friends may serve as an important buffer for maltreated children against feelings of loneliness, low self-esteem, and victimization by the larger peer group.

Adaptation to School

Adaptation to school represents the major extrafamilial environment in which children are exposed to a novel

group of unfamiliar peers and adults. As such, it presents both a challenge to functioning and an opportunity to break free of patterns that have been established within a maltreating home. However, because an organizational perspective suggests that children's experiences in the home provide a foundation on which future transitions are built, probabilistically children who have been maltreated are at risk for failure in the school environment.

Abused and neglected children are at considerable risk for academic failure (Eckenrode, Laird, & Doris, 1993). Maltreated children perform worse on standardized tests, achieve lower grades, and are more likely to repeat a grade. Furthermore, they score lower on tests that assess cognitive maturity. However, it is unclear whether these difficulties can be attributed to cognitive or motivational issues. With regard to motivation, Aber and Allen (1987) proposed that effectance motivation, which is the intrinsic desire to deal competently with one's environment, and successful relations with novel adults are important factors related to children's ability to adapt to their first major out-of-home environment. As such, they defined the concept of "secure readiness to learn," as characterized by high effectance motivation and low dependency, as a representation for the ability to establish secure relationships with adults while feeling free to explore and engage in the environment in ways that promote cognitive development. Maltreated children score lower on secure readiness to learn than do nonmaltreated children, which is consistent with what one might expect given the insecurity or atypicality that pervades maltreated children's attachment histories. In efforts to identify those factors that might further mitigate against the impact of abuse on school performance, Trickett, McBride-Chang, and Putnam (1994) conducted an investigation with adolescent girls who had been sexually abused. Previous abuse was found to predict poorer social competence, impaired competence in learning, and lower overall academic performance. Higher levels of anxious depression, bizarre destructiveness, and dissociation were also present in victims of sexual abuse. Importantly, cognitive ability and perceived competence emerged as mediators of overall academic performance and achievement, whereas dissociative and destructive behaviors exacerbated the children's level of school success. Okun, Parker, and Levendosky (1994) also sought to examine the independent and interactive effects of physical abuse, recent exposure to additional life events such as death or illness, and social disadvantage on children's social, cognitive, and affective adjustment during middle childhood. Abused children were found to evidence difficulties in three areas:

peer adjustment, self-perception, and depression. Further analyses identified unique effects of negative events and socioeconomic disadvantage on children's adjustment. Additive contributions of abuse status and socioeconomic disadvantage also predicted behavior problems at school and in the home.

In yet another investigation of links between relationship patterns and school adaptation, Toth and Cicchetti (1996) found that the security that a child experienced in relation to his or her mother, in interaction with maltreatment status, significantly affected school functioning. Nonmaltreated children who reported secure patterns of relatedness to their mothers exhibited less externalizing behavior problems, more ego resilience, and fewer school risk factors (e.g., poor attendance, poor achievement test performance, suspensions, failure in 50% of courses, and grade retention) than did maltreated children who reported insecure patterns of relatedness. Moreover, nonmaltreated children with secure patterns of relatedness to their mothers exhibited more positive school adaptation than did nonmaltreated children who reported insecure patterns of relatedness.

In an investigation of more than 200 low-income children, impairments in academic engagement, social skills, and ego resiliency were found to be present in children with histories of maltreatment (Shonk & Cicchetti, 2001). Maltreated children manifested multiple forms of academic risk and exhibited more externalizing and internalizing behavior problems. The effects of maltreatment on academic adjustment were partially mediated by academic engagement, whereas maltreatment's effects on behavior problems were fully mediated by social competencies and ego resiliency.

Finally, Lansford and colleagues (2002) conducted a 12-year prospective study of the long-term consequences of early childhood physical maltreatment on academic, behavioral, and psychological problems in adolescence. These investigators found that adolescents who were maltreated early in life were absent from school more often and were less likely to anticipate attending college compared with nonmaltreated adolescents. Maltreated adolescents also exhibited higher levels of aggression, anxiety/depression, social withdrawal, dissociation, PTSD symptoms, and thought problems than those evidenced by nonmaltreated adolescents. The participants in the Lansford et al. (2002) study were recruited from a randomly selected sample of children from the community. The results of the Lansford et al. (2002) investigation demonstrate that undetected maltreatment in adolescents who are

not receiving protective services warrants identification and intervention.

Now that we have addressed stage-salient aspects of the sequelae of maltreatment, we next direct our attention toward memory, personality organization, and molecular genetic and neurobiological domains.

Effects of Maltreatment on Memory

There are a number of reasons maltreatment might be expected to alter basic memory processes (Howe, Cicchetti, & Toth, 2006). For example, the experience of stress associated with living in a maltreating home may potentiate neurological changes in the structures implicated in encoding and storing information. Observed delays in intellectual functioning, executive functioning, and language may also play roles in potential memory deficits. Furthermore, maltreated children are at risk for the development of post-traumatic stress disorder (PTSD) and dissociation, both of which have been linked to memory distortion among adults.

For the most part, hypothesized adverse effects of maltreatment on memory have not been empirically supported. Although the field is still in its infancy, many studies show no differences between maltreated and nonmaltreated children in terms of basic memory processes. Maltreated children are comparable to their nonmaltreated peers with respect to basic recall and recognition, as well as in their degree of suggestibility to misinformation (Eisen, Goodman, Qin, Davis, & Crayton, 2007; Howe, Cicchetti, Toth, & Cerrito, 2004; Porter, Lawson, & Bigler, 2005). Moreover, Beers and De Bellis (2002) did not find any differences in basic memory processes between maltreated children with PTSD and normative comparison youth. Similarity in memory functioning is evident in studies involving both neutral and emotionally laden stimuli (Howe et al., 2004; Howe, Toth, & Cicchetti, 2011). In addition, differences in memory processes fail to emerge with respect to ecologically valid and stressful information (Eisen et al., 2007). For example, Eisen and colleagues (2007) tested memory for an anogenital exam that occurred in the context of an inpatient abuse assessment. Memory accuracy and suggestibility did not vary by abuse status.

Although no between-group differences have been discovered, within-group investigations suggest variation in basic memory processes as a function of maltreatment subtype. For example, in a depth-of-processing incidental recall task of self-referent information, neglected children demonstrated a greater proportion of negative false recall

and less positive false recall than did the abused children, suggesting greater memory inaccuracy among neglected children (Valentino, Cicchetti, Rogosch, & Toth, 2008b). In another study by Valentino et al. (2008a), subtype differences emerged for memory of maternal-referent information, such that abused children exhibited lower recall compared to neglected children. These findings are suggestive of defensive processing of information that activates the attachment system as a protective mechanism among abused children. Relatedly, Lynch and Cicchetti (1998b) examined the links among trauma, representational models of caregivers, and children's memory for mother-referent information. Results were consistent with the hypothesis that experiences of trauma and representational models of caregivers are associated with differences in the way children process and retrieve information about positive and negative mother-attribute words. Specifically, victimized children with insecure representational models of their caregivers recalled the highest proportion of negative mother stimuli. Finally, Cicchetti, Rogosch, Howe, and Toth (2010) showed that children with a history of neglect and/or emotional maltreatment and low cortisol evinced increased levels of memory inaccuracy.

In addition to subtype differences in basic memory processes, Valentino, Toth, and Cicchetti (2009) revealed subtype-specific variation in autobiographical memory for nontraumatic events. Abused children's memories were more overgeneral than the memories of neglected and nonmaltreated children. Retrieving memory in generic form may reflect a strategy for avoiding negative affect associated with painful memories. Consistent with a dynamic skills framework, defensive, traumatogenic responses become more habitual and generalized over time, resulting in less integration of memories.

Personality Organization and Psychopathology

Child maltreatment ushers in motion a probabilistic path of epigenesis for abused and neglected children that often results in a profile of relatively enduring vulnerability factors that increase the probability of the emergence of maladaptation and psychopathology. Indeed, consistent with the concept of multifinality, maltreated children develop a broad range of psychopathological outcomes.

In general, the literature indicates that exposure to child maltreatment increases the risk for greater lifetime prevalence of high levels of many psychopathological symptoms and disorders. These include, but are not restricted to, mood and anxiety disorders (Kim & Cicchetti,

2006; Widom, DuMont, & Czaja, 2007), dissociation and suicidal behavior (Yates, Carlson, & Egeland, 2008), substance use disorders (Rogosch, Oshri, & Cicchetti, 2010; Widom, Marmorstein, & White, 2006), disruptive and antisocial behaviors (Egeland, Yates, Appleyard, & van Dulmen, 2002; Widom & Maxfield, 2001) and psychosis (Arseneault et al., 2011; Toth et al., 2011). Longitudinal research by Kaplow and Widom (2007) suggests that the age of onset of maltreatment may be an important factor in differentiating the effects of maltreatment on later mental health outcomes. In particular, individuals who were maltreated earlier in life (i.e., before the age of 6 and/or during the infancy or preschool years) evinced higher levels of internalizing problems as adults, whereas those who were older at the time of maltreatment went on to develop more externalizing outcomes in adulthood. The preschool years emerged as a potential sensitive period during which maltreatment may have an especially robust effect, potentiating the development of both internalizing and externalizing disorders (i.e., anxiety, depression, antisocial personality disorder).

Manly, Kim, Rogosch, and Cicchetti (2001) found that the severity of emotional maltreatment in the infancy-toddlerhood period and physical abuse during the preschool period predicted externalizing behavior and aggression. Severity of physical neglect, particularly when it occurred during the preschool period, was associated with internalizing symptomatology and withdrawn behavior. Additionally, maltreatment during the school-age period contributed significant variance after earlier maltreatment was controlled. Chronic maltreatment, especially with onset during infancy-toddlerhood or preschool periods, was linked with more maladaptive outcomes (Manly et al., 2001). The significance of chronic maltreatment attests to one of the tenets of the organizational perspective on development, in terms of links between adversity across multiple developmental periods and detrimental impact on later functioning. An examination of the interplay among developmental timing, severity, and subtype in relating to adaptation of maltreated children in the Manly et al. (2001) study provided a more clearly delineated picture of multifinality of outcomes within the phenomenon of maltreatment than a global categorization could provide.

Keiley, Howe, Dodge, Bates, and Pettit (2001) conducted a longitudinal study from kindergarten (roughly Ages 4 to 5) through the eighth grade (Age 12). Growth modeling was used to determine the developmental trajectories of mother-reported and teacher-reported internalizing and externalizing behaviors for two groups of

physically abused children—early-harmed (pre-Age 5), later-harmed (after Age 5) and a group of nonharmed children. Children who experienced early physical harm from significant adults in their lives were more likely to experience adjustment problems in early adolescence. Over multiple domains, early physical maltreatment was related to more negative sequelae than the same type of maltreatment occurring at later periods. In addition, the fitted growth models revealed that the early-harmed group exhibited somewhat higher initial levels of teacher-reported externalizing problems in kindergarten and significantly different rates of change in these problem behaviors than other children, as reported by mothers over the 9 years of this study. The early-harmed children also were seen by their kindergarten teachers as exhibiting higher levels of internalizing behavior. The later-harmed children were seen by their teachers as increasing their externalizing problem behaviors more rapidly over the 9 years than did the early- or nonharmed children. Like those of Manly et al. (2001), these findings indicate that the timing of maltreatment is a salient factor in examining the developmental effects of physical harm.

Maltreatment has also been implicated in the etiology of personality disorders. Given that personality disorders do not emerge spontaneously at the age of 18, the age cut-off established in the psychiatric nomenclature, some researchers have adopted a developmental psychopathology approach by seeking to identify early precursors and processes that confer vulnerability to later personality pathology (Cicchetti & Crick, 2009). Consistent with this approach, Rogosch and Cicchetti (2005) found that maltreated children exhibit higher mean levels of potential precursors to borderline personality disorder (e.g., emotional lability, conflictual relationships with adults and peers, relational aggression, self-harm) than do nonmaltreated comparisons. An examination of early risk factors for paranoid personality identified a history of child maltreatment as a predictor, alongside significant behavioral disturbances and negative peer relationships (Natsuaki, Cicchetti, & Rogosch, 2009). In a prospective investigation of personality organization, Rogosch and Cicchetti (2004) found that 6-year-old maltreated children exhibited lower agreeableness, conscientiousness, and openness to experience, as well as higher neuroticism than did nonmaltreated children. Analysis of personality clusters revealed that the majority of nonmaltreated children were represented in the adaptive *Gregarious* and *Reserved* personality clusters, whereas maltreated children largely accounted for the makeup of less adaptive personality profiles (i.e.,

Undercontroller, Overcontroller, and Dysphoric). Furthermore, longitudinal stabilities were observed across Ages 7, 8, and 9, suggesting continuity in maltreated children's personality liabilities.

Gene \times Environment Interaction (G \times E)

Research in molecular genetics suggests that maltreated children's risk for psychopathology is not inevitable. G \times E interaction (G \times E) occurs when the effect of exposure to an environmental factor on a behavioral, health, or biological phenotype is conditional upon a person's genotype or, conversely, when the genotype's effect is moderated by the environment (Moffitt, Caspi, & Rutter, 2005). Since 2005, the role of the environment and its interaction with genes has been further clarified, with reciprocal coactions between the environment and the individual resulting in differential expression of genetic material. Environmental conditions may interact with an individual's genetic makeup to alter processes such as the timing of the initiation of transcription and translation for a specific gene, the direction for which it does so, or whether the gene will ultimately be expressed.

In a landmark epidemiological study, Caspi and colleagues (2002) followed a large sample of male children from birth to adulthood to ascertain why some maltreated children grow up to develop Antisocial Personality Disorder, whereas others do not. Results revealed that a functional polymorphism in the promoter of the monoamine oxidase A (MAOA) gene moderated the effect of child maltreatment. The MAOA gene is located on the X chromosome and encodes the MAOA enzyme, which metabolizes neurotransmitters such as norepinephrine, serotonin, and dopamine, rendering them inactive. Maltreated children with the genotype conferring high MAOA activity were significantly less likely to develop antisocial behavior problems than maltreated children with the low MAOA-activity genotype. In addition, maltreatment and nonmaltreatment groups did not differ on MAOA activity, suggesting a lack of an evocative gene–environment correlation as an explanation for the G \times E findings. Many, but not all, subsequent studies have been successful in replicating Caspi et al.'s (2002) original findings and in extending them downward to samples of children and adolescents (Kim-Cohen et al., 2006).

In another seminal study, Caspi et al. (2003) examined the prospective link between maltreatment and depression. Caspi et al. (2003) found that genetic variation in a functional polymorphism (5-HTTLPR) in the promoter region

of the serotonin transporter gene (5-HTT) plays a moderating role. The particular serotonin gene variants (*s/s*, *s/l*, and *l/l*) affect the amount of serotonin transporter protein that is produced. The serotonin transporter is a protein that is critical to the regulation of serotonin function in the brain, through terminating the action of serotonin in the synapse via reuptake. The serotonin transporter gene plays a pivotal role in brain development and in individual differences in mood and behavioral regulation. Thus, 5-HTTLPR was an excellent candidate gene for Caspi et al.'s (2003) research. Adults carrying the *s* allele (*s/s* or *s/l*) were found to exhibit more depressive symptoms, diagnosable depression, and suicidality in response to stressful life events than individuals homozygous for the *l* (*l/l*) allele. In addition, an examination of early life stress showed that a history of child maltreatment predicted depression in adulthood, but only among *s* carriers.

Whereas work in behavior genetic and molecular genetic research using genome-wide association studies did not examine gene–environment interaction (G \times E), the Caspi et al. (2002, 2003) investigations generated much excitement because they suggested that the combination of molecular genetic elements and well-measured environments and phenotypes could not only increase understanding of the development of psychopathology, but also uncover additional genes that play roles in the etiology of psychopathology that would not have been discovered in “main effects” molecular genetic studies. G \times E research, however, has not been without its critics (Duncan & Keller, 2011). Some of the most notable emanated from the findings of the meta-analysis conducted by Risch et al. (2009) in which they conclude that 5-HTTLPR does not moderate the relation between stress and depression in contrast to the findings of Caspi et al. (2003).

In response, Caspi, Hariri, Holmes, Uher, and Moffitt (2010) evaluate multiple lines of evidence for the 5-HTT stress-sensitivity hypothesis. The evidence was drawn from experimental neuroscience, nonhuman primate research, and studies of genetically engineered 5-HTT mutations in rodents and dispels some misconceptions about G \times E research. Relatedly, Karg, Burmeister, Sheden, and Sen (2011) critically reviewed two meta-analyses that examined the interaction between 5-HTTLPR and stress in the development of depression (Munafo, Durrant, Lewis, & Flint, 2009; Risch et al., 2009). Contrary to Risch et al.'s (2009) meta-analysis, Karg and colleagues (2011) found strong evidence in support of the hypothesis that 5-HTTLPR moderates the relation between stress and depression.

We next selectively review G×E research on maltreated children, adolescents, and adults who report having experienced maltreatment in their childhoods. We focus on studies that examined the most commonly studied candidate genes in G×E research on child maltreatment, namely 5-HTTLPR, corticotropin releasing hormone receptor gene (CRHR1), and MAOA.

Kaufman et al. (2004) found that maltreated children with the *s/s* genotype of 5-HTTLPR evinced depression scores that were almost twice as high as the depression scores of maltreated children with the *s/l* and *l/l* genotypes. Kaufman et al. (2006) replicated these findings in a subsequent study, the results of which revealed a significant three-way interaction between brain-derived neurotrophic factor (BDNF) genotype, 5-HTTLPR, and maltreatment in predicting heightened levels of depression. In another instance of G×G×E, Cicchetti, Rogosch, and Sturge-Apple (2007) found that adolescents with a history of sexual abuse who carried both the *s/s* genotype and the low MAOA-activity genotype evinced higher levels of depression symptomatology than sexually abused adolescents with alternative combinations of the variants of the 5-HTT and MAOA genes.

Banny, Cicchetti, Rogosch, Oshri, and Crick (2013) examined child maltreatment, peer victimization, and 5-HTTLPR as predictors of depressive symptomatology. Path analyses revealed that both relational and overt victimization mediated the association between child maltreatment and depressive symptoms. Bootstrapping procedures used to test moderated mediation demonstrated that genotype moderated the indirect effects of relational and physical victimization on child depressive symptoms, such that victimized children with the *l/l* genotypic variant of 5-HTTLPR were at increased risk for depressive symptoms compared to victimized children carrying a short allele.

A number of investigations have demonstrated that individuals who had been maltreated possessed a significantly greater risk of experiencing suicidal behaviors (i.e., suicidal ideation, suicide attempts, completed suicide) than comparable samples of nonmaltreated persons from the same socioeconomic status. These studies have demonstrated that the experience of sexual and physical abuse are risk factors for suicidal behaviors in adolescents and adults (Brodsky & Stanley, 2008). Cicchetti, Rogosch, Sturge-Apple, and Toth (2010) investigated whether genotypic variation of 5-HTTLPR moderated the effect of maltreatment on suicidal ideation in a sample of low-income maltreated and nonmaltreated school-age children.

Higher suicidal ideation was found among maltreated than nonmaltreated children. Children with one to two maltreatment subtypes and *s/s* or *s/l* genotypes had higher suicidal ideation than those with the *l/l* genotype; suicidal ideation did not differ in nonmaltreated children or in children with three to four maltreatment subtypes based on 5-HTTLPR variation. Results were applicable to emotionally maltreated/neglected and to physically abused/sexually abused children. Interestingly, for the more extensively maltreated (i.e., those with three to four subtypes), children expressed higher levels of suicidal ideation, irrespective of genetic variation. Thus, the pathogenic relational environment of children who experienced extensive maltreatment appears to have predominated over genotypic variation in the risk for, or protection against, suicidal ideation.

In a final illustration of 5-HTTLPR as a moderator of depression in maltreated children, Uher et al. (2011) conducted a prospective longitudinal examination of G×E interaction in two large samples, one in New Zealand, and one in England. The former sample was followed until Age 32, the latter until Age 40. The prospective nature of this analysis is unique in that most studies of 5-HTTLPR × maltreatment on depression have been cross-sectional.

Uher and colleagues (2011) found that, in both longitudinal cohorts, statistical analyses of G×E interactions revealed positive results for depression that runs a persistent course in adulthood, but not for single-episode depression. Individuals with two short 5-HTTLPR alleles and child maltreatment had elevated risk of persistent but not single-episode depression. Thus, research that does not distinguish persistent course and single-episode depression may underestimate G×E effects and could explain some of the nonreplications found in G×E research (Duncan & Keller, 2011).

CRHR1 is another gene that has been shown to be a viable candidate gene that influences vulnerability to depression. Corticotropin-releasing hormone is the key activator of the hypothalamic-pituitary-adrenal (HPA) axis, binding to receptors that initiate the stress response, culminating with release of cortisol from the adrenal cortex. Overactivity of the HPA-axis has been shown to be partially caused by hyperactivity of CRH neurons. Additionally, CRH activity at the CRH type 1 receptor (CRHR1) in extra-hypothalamic regions also are thought to bring about internalizing disorders, such as depression and anxiety (Bradley et al., 2008). Published investigations to date suggest that hyperactivity of the HPA axis may be a function of early life stress (Cicchetti, Rogosch, Gunnar, & Toth, 2010; Heim, Newport, Mletzko, Miller, & Nemeroff, 2008).

Bradley and colleagues (2008) conducted a study to test the hypothesis that genetic polymorphisms that alter the functionality of CRHR1 may moderate the effects of child maltreatment on adult depression. These investigators found that a G×E interaction was important for the expression of depressive symptoms, or lack thereof, in adults who possess CRHR1 risk or protective alleles in conjunction with a history of child maltreatment. In keeping with Moffitt et al. (2005), the findings of Bradley et al. (2008) underscore the importance of taking the environment into account in genetic association and linkage studies that otherwise might miss many important genetic variants that are involved in the etiology of complex diseases. An extension and partial replication of the Bradley et al. (2008) study was conducted by Polanczyk et al. (2009). As in the investigation of Bradley et al. (2008), a CRHR1 haplotype was shown to exert a protective effect against depression in adults who were maltreated in their childhood; however, the replication only occurred when a retrospective, but not a prospective, measure of child maltreatment was used. The authors speculated that the protective effect of the CRHR1 haplotype was likely related to its function in consolidating memories of emotionally arousing experiences.

DeYoung, Cicchetti, and Rogosch (2011) examined the influence of CRHR1 variation on neuroticism, in interaction with child maltreatment, in a large sample of maltreated children and a well-matched nonmaltreated comparison group. Neuroticism, one of the Big Five personality characteristics, is a risk factor for mood and anxiety disorders. The biological systems involved in neuroticism are thus of great import in the etiology of internalizing disorders. Genes that are involved in the systems that are stress responsive, such as CRHR1, are thus important candidates for studies of the genetic moderation of the effects of major stressors like maltreatment.

DeYoung et al. (2011) found that the CRHR1 TAT haplotype significantly moderated the association of child maltreatment with neuroticism. Having two copies of the TAT haplotype of CRHR1 was associated with higher levels of neuroticism among maltreated children relative to nonmaltreated children, with the exception of sexually abused children and children who had experienced three or four types of maltreatment. The findings of this study are also important because they contribute to a growing body of evidence that variation in the CRHR1 gene moderates the effects of child maltreatment.

Research reviewed shows that G×E interactions mediating depressive symptomatology have been identified in both the stress-sensitive serotonergic (5-HTTLPR) and

corticotropin-releasing hormone (CRHR1) systems. In an investigation of African Americans of low-SES, Ressler et al. (2010) sought to determine whether the effects of child maltreatment are moderated by G×G×E interactions between CRHR1 and 5-HTTLPR polymorphisms. Ressler and colleagues (2010) first replicated the interaction of child maltreatment and 5-HTTLPR on lifetime major depressive disorder. They next replicated earlier work in their laboratory by Bradley et al. (2008), once again finding that an interaction between a CRHR1 haplotype and child maltreatment predicted current depressive symptoms. Furthermore, Ressler et al. (2010) discovered that a G (5-HTTLPR *s* allele) × G (CRHR1 haplotype) interaction with child maltreatment predicted current depressive symptoms.

MAOA is a mitochondrial enzyme that is expressed predominantly in catecholaminergic neurons and is responsible for the degradation of a variety of biogenic amines (Caspi et al., 2002). A well-characterized *u*-VNTR polymorphism exists in the promoter region of the MAOA gene that is known to affect gene expression. The number of tandem repeats of this polymorphism (i.e., 2, 3, 5 versus 3, 5, 4) determines the efficiency (i.e., high activity, low activity) with which MAOA is transcribed and ultimately produced within individuals (Caspi et al., 2002).

Weder et al. (2009) examined a G×E interaction of MAOA genotype and maltreated children. The maltreated children represented the extreme on a continuum of adversity. They were assessed at a highly stressful time—shortly after they had been removed from their parents' care because they had been physically abused. A total trauma index score was derived based on inclusion of physical abuse, sexual abuse, domestic violence exposure, multiple out-of-home placements, and community violence exposure. Scores were rated from mild to moderate to extreme. Weder et al. (2009) detected a significant interaction between exposure to moderate levels of trauma and the low activity MAOA genotype in conferring increased risk for aggression. Children who were exposed to extreme levels of trauma had high aggression scores regardless of MAOA genotype. Extreme levels of trauma appear to overshadow the effects of MAOA genotype, especially during a period when traumatized children are experiencing acute stress. The findings of Weder and colleagues are consistent with those of Caspi et al. (2002).

To provide a final example, as in Caspi et al.'s (2002) original study, Cicchetti, Rogosch, and Thibodeau (2012) conducted an investigation to examine a G×E interaction of MAOA genotype and child maltreatment on early signs

of antisocial behavior in school-age children. Because the MAOA gene is sex-linked and located on the X chromosome, males have one allele on the X chromosome. In contrast, females have an MAOA allele on each X chromosome; however, only one of the alleles is active. Consequently, ambiguity results in determining which allele is active among females who are heterozygous for MAOA activity level alleles (i.e., high-low or low-high activity). Thus, analyses involving MAOA were conducted only among boys.

For lifetime antisocial behaviors, Cicchetti et al. (2012) did not find MAOA to contribute to models of antisocial behavior as reported by peers or adults beyond the influence of maltreatment effects. The G×E interaction effect was significant. Among nonmaltreated children, those with low activity MAOA genotypes had higher observer-reported symptoms of antisocial behavior than those with high-activity MAOA genotypes. Moreover, maltreated children in the low-activity MAOA group had higher self-reported antisocial behavior than nonmaltreated children. A similar pattern of findings was observed for child self-report of antisocial behavior in the past 6 months, as the G×E interaction was significant. Specifically, maltreated children with low MAOA-activity genotypes had higher recent antisocial behavior than those with high activity genotypes. No significant differences were found among nonmaltreated children based on the MAOA genotype group. Furthermore, maltreated children with low MAOA activity genotypes had higher-level self-reported antisocial symptoms than nonmaltreated children. The risk for antisocial behavior associated with child maltreatment was reduced among children with high MAOA-activity genotypes. The findings of Cicchetti et al. (2012) are consistent with those reported by Caspi et al. (2002) and Weder et al. (2009) (for a meta-analysis, see Kim-Cohen et al., 2006).

Maltreatment and Allostatic Load

In addition to G×E effects, child abuse and neglect are also implicated in the disruption of biological systems, including neuroendocrine functioning, health outcomes, and neurobiology. The concepts of allostasis and allostatic load (AL) provide an integrative framework for understanding how exposure to chronic stress, such as child maltreatment, potentiates long-term liabilities for physical and mental health (Danese & McEwen, 2012). Allostasis is a process that involves the activation of multiple interactive physiological systems (e.g., HPA, sympathetic-adrenal-medullary axes, cardiovascular, immune, and metabolic

systems). In the short term, mobilization of these systems exerts a protective effect on the body and promotes an adaptive response to stress; however, with chronic activation, physiological reactions to stress become less efficient in protecting the individual. Ensuing damage to the body results in allostatic overload, which, in turn, contributes to changes in brain structure and function and the development of various disease states.

Shonkoff, Boyce, and McEwen (2009) differentiated among three types of stress that children may experience. Normative and routine life challenges that are embedded within a context of protective factors are examples of positive stress. Time-limited stresses within supportive relationships are considered tolerable stress. Toxic stress involves conditions in which the child is exposed to chronic, severe, and prolonged stress, often occurring in the absence of protective factors. Abuse and neglect constitute an example of toxic stressors.

Neuroendocrine Regulation and Reactivity

Cicchetti and Rogosch (2001a) examined the extent to which maltreated children vary with respect to cortisol regulation, a biomarker of AL. Although no differences in cortisol regulation were found between the maltreated and nonmaltreated groups, findings revealed significant within-group variation as a function of maltreatment subtype. In particular, children who had experienced both physical and sexual abuse, in combination with neglect and/or emotional maltreatment, exhibited substantial elevations in morning cortisol levels (i.e., hypercortisolism). In addition, a subgroup of physically abused children showed a trend toward lower morning cortisol relative to nonmaltreated children (i.e., hypocortisolism). Furthermore, the neglected and emotionally maltreated groups did not differ from nonmaltreated children in terms of cortisol regulation.

Longitudinal analysis of the developmental course of cortisol dysregulation accommodates findings of both hyper- and hypocortisolism among maltreated children. Trickett, Noll, Susman, Shenk, and Putnam (2010) measured cortisol activity at six time points spanning childhood, adolescence, and young adulthood to determine the effects of maltreatment on cortisol regulation. Although the cortisol levels of sexually abused females were initially higher compared to nonabused females, their levels were lower by early adulthood. Results support an attenuation hypothesis, whereby the HPA axis adapts to hypersecretion by downregulating its response to stress, eventually resulting in hyposecretion.

Research investigations also have examined whether cortisol differentially relates to social and psychological functioning based on maltreatment status (see Tarullo & Gunnar, 2006, for a review). This hypothesis was supported by the findings of Cicchetti and Rogosch (2001b), which indicated that depressed maltreated children exhibited a pattern of cortisol dysregulation that was not evident among depressed nonmaltreated children. Similarly, in a later study by Cicchetti, Rogosch, Gunnar, and Toth (2010), children who had experienced early sexual and/or physical abuse (i.e., in the first 5 years of life) and who also had high internalizing symptoms uniquely exhibited an attenuated diurnal decrease in cortisol, whereas nonmaltreated children with high internalizing symptomatology did not evince neuroendocrine dysregulation. The findings were specific to early sexual and physical abuse rather than later-onset physical and/or sexual abuse or early occurring neglect or emotional maltreatment.

Tyrka et al. (2009) conducted a study to determine whether CRHR1 polymorphisms interact with child maltreatment to predict HPA-axis reactivity, which has been linked both to early life stress and to depression. Several single nucleotide polymorphisms (SNPs) of CRHR1 showed interaction with maltreatment in the prediction of cortisol response to the dexamethasone (DEX) suppression test. For the adults who experienced maltreatment in their childhood, the GG genotype of each of the CRHR1 SNPs was associated with elevated cortisol responses to DEX. Tyrka et al. (2009) conjectured that excessive HPA axis activation could represent a mechanism of interaction of risk genes with stress in the development of mood disorders.

Relatedly, Cicchetti, Rogosch, and Oshri (2011), within an allostatic load framework, investigated the effect of G×E interactions on diurnal cortisol regulation and internalizing symptomatology. Variation in the CRHR1 TAT haplotype and 5-HTTLPR was identified in a sample of maltreated and nonmaltreated children. G×E effects for CRHR1 and maltreatment and early abuse (before Age 5) on diurnal cortisol regulation were observed; CRHR1 variation was related to cortisol dysregulation only among maltreated children. Early abuse and high internalizing symptoms also interacted to predict atypical diurnal cortisol regulation. The interaction of CRHR1, 5-HTTLPR, and child maltreatment (G×G×E) identified a subgroup of maltreated children with high internalizing symptoms who shared the same combination of the two genes. The findings provide support for an allostatic-load perspective on the effects of the toxic stress associated with child maltreatment on

cortisol regulation and internalizing symptomatology as moderated by genetic variation.

There are different models of how the effects of excesses, deficits, and dysregulation in the primary mediators of AL, particularly cortisol, may affect brain structure and function. Further, developmental considerations are important. In this regard, the timing of periods of severe stress may be critical. For example, variation in the age of maturation of brain structures, notably the hippocampus, prefrontal cortex, and the amygdala, may result in differential effects on functioning and health (Lupien, McEwen, Gunnar, & Heim, 2009; Shonkoff et al., 2009). Sensitive periods in the development of these brain structures may generate heightened vulnerability to the neurotoxic effects of excess glucocorticoids, thereby creating a long-term liability as development proceeds. Alternatively, the cumulative exposure to stressful experiences and concomitant dysregulation of the HPA axis may contribute to ongoing wear and tear on these brain structures. These effects of chronic stress are heightened, given that these areas of the brain have dense concentrations of glucocorticoid receptors, thereby promulgating progressive inefficiency in brain structure and function. For children in low-income environments and those subjected to abuse and neglect, the consequences may be particularly salient for health outcomes across the life span.

Adverse Physical Health Outcomes

In addition to cortisol dysregulation, maltreatment appears to be associated with other adverse health outcomes that may be implicated in the development of allostatic overload. For example, maltreatment predicts increased risk for hospital-based treatment of asthma, cardiorespiratory, and infectious disease in childhood (Lanier, Jonson-Reid, Stahlschmidt, Drake, & Constantino, 2010). Early child abuse has been linked to more health-related symptoms (e.g., sleep, eating, general health status), higher body mass index (BMI), and compromised immune system functioning in childhood and adolescence (Danese et al., 2011; G. E. Miller, Chen, & Parker, 2011; Shirtcliff, Coe, & Pollak, 2009). Furthermore, health liabilities extend into adulthood, as child maltreatment has been found to predict adult cardiovascular disease, elevated inflammation levels, type II diabetes, HIV risk, self-reported physical symptoms across a range of organ systems, and decreased longevity (Danese, Pariante, Caspi, Taylor, & Poulton, 2007; Felitti et al., 1998; Wilson & Widom, 2011). Moreover, child maltreatment has been linked to shortened leucocyte telomere

length and it is thought that maltreatment may influence cellular aging (Tyrka et al., 2010).

As discussed earlier, a valuable series of studies has examined diverse, long-term health outcomes in an extensive sample of HMO members who were exposed to varying adverse childhood experiences (ACE; Felitti et al., 1998). The ACE factors that were examined included exposure to childhood emotional, physical, and sexual abuse, substance abuse in the family, parental mental illness, domestic violence, and adult criminal behavior. The accumulation of adverse experiences across these risk domains was determined and linked to a range of adult health outcomes. For example, a gradient of exposure to increasing numbers of ACE factors was associated with a cumulative index of health risk behaviors linked with adult disease and mortality, (i.e., smoking, alcoholism, drug abuse, suicide attempts, high number of sex partners, sexually transmitted diseases, inactivity, obesity). Moreover, a dose-response relationship between ACE exposures and leading causes of death, including heart disease, cancer, chronic bronchitis or emphysema, hepatitis, skeletal fractures, and poor self-rated health, was also observed. Furthermore, ACE factors have been associated with hospitalization for diagnosed autoimmune diseases decades into adulthood and graded relationships between ACE factors and prescription rates for psychotropic medications have been found. This latter finding further illustrates the high rate of serious adult psychiatric morbidity that ensues among children exposed to high levels of adversity.

Consistent with the concept of AL, Rogosch, Dackis, and Cicchetti (2011) conducted a multidomain assessment of stress-sensitive systems among low-income maltreated and nonmaltreated comparison children. An AL composite was created from measurements of salivary cortisol and dehydroepiandrosterone (DHEA), BMI, waist-hip ratio, and blood pressure. Results indicated that maltreatment and AL independently predicted psychopathology and health difficulties (i.e., parent report of child's physical health status and utilization of health care system). As AL increased, the level of child health and psychological problems increased for all low-income children. Child maltreatment had an additive effect, contributing to the degree of physical and mental health problems beyond that accounted for by the AL composite. Therefore, children with both high AL and a history of maltreatment had the most health problems.

The findings of this investigation have important implications for programs designed to promote physical and mental health in the lives of low-income and maltreated children. Heckman (2006) has emphasized the economic

and humanitarian value to society of reducing the impact of adverse early family environments on developing children in order to ameliorate the diminished cognitive capacities ensuing from deprivation and high stress. AL is likely a major influence on these unrealized potentials, through the negative sequelae of stress occurring in early sensitive periods of brain development and progressive accumulation of liabilities that extend to other stress-sensitive systems. Although broad-based efforts to reduce the impact of poverty are crucial, targeted interventions to advance cognitive functioning and self-regulatory capacities (Blair & Diamond, 2008) are vital for enhancing self-righting processes and promoting resilience. For the most vulnerable children in low-SES environments, concerted efforts to prevent the occurrence of child abuse and neglect are of fundamental importance. Early intensive interventions in child maltreatment to establish more sensitive and nurturant parenting, secure attachment, and neurobiological reorganization in maltreated youngsters (Cicchetti, Rogosch, & Toth, 2006; Cicchetti, Rogosch, Toth, & Sturge-Apple, 2011) hold great promise for instilling adaptive developmental trajectories. Consolidated, multisystemic approaches beginning early in development are necessary to reduce environmental stress exposure, child maltreatment, and allostatic overload in order to improve physical and mental health across the life span.

MALTREATMENT EXPERIENCES AND NEUROBIOLOGICAL DEVELOPMENT

Abnormal brain development is a dynamic, self-organizing process. The perturbations that occur during abnormal brain development can potentiate a cascade of maturational and structural changes that eventuate in the neural system proceeding along a trajectory that deviates from that generally taken in normal neurobiological development (Cicchetti, 2002b; Cicchetti & Tucker, 1994; Courchesne, Chisum, & Townsend, 1994). For example, early maltreatment, either physical or emotional, may condition young neural networks to produce cascading effects through later development, possibly constraining the child's flexibility to adapt to new challenging situations with new strategies rather than with old conceptual and behavioral prototypes. Thus, early psychological trauma may eventuate not only in emotional sensitization, but also in pathological sensitization of neurophysiological reactivity.

Children who are endowed with normal brains may encounter a number of experiences (e.g., poverty,

community violence, child maltreatment) that exert a negative impact on developing brain structure, function, and organization and contribute to distorting these children's experiences of the world (Hackman, Farah, & Meaney, 2010). These findings proffer a unique opportunity for comprehending how environmental factors can bring about individual differences in neurobiological development.

Children may be especially vulnerable to the effects of pathological experiences during periods of rapid creation or modification of neuronal connections. Pathological experience may become part of a vicious cycle, as the pathology induced in brain structure may distort the child's experience, with subsequent alterations in cognition or social interactions, thereby causing additional pathological experience and added brain pathology (Cicchetti & Tucker, 1994). Because experience-expectant and experience-dependent processes may continue to operate during psychopathological states, children who incorporate pathological experience may add neuropathological connections into their developing brains instead of functional neuronal connections (Black, Jones, Nelson, & Greenough, 1998).

As has been stated, child maltreatment affects both neurobiological and psychological processes. Physiological and behavioral responses to maltreatment are interrelated and contribute to children's making choices and responding to experiences in ways that typically produce pathological development. Because maltreated children experience the extremes of "caretaking casualty" (Sameroff & Chandler, 1975), they provide one of the clearest opportunities for scientists to discover the multiple ways in which social and psychological stressors can affect biological systems. Numerous interconnected neurobiological systems are affected by the various stressors associated with child abuse and neglect (De Bellis, 2001, 2005). Moreover, each of these neurobiological systems influences and is influenced by multiple domains of biological and psychological development. Furthermore, in keeping with the principle of multifinality, the neurobiological development of maltreated children is not affected in the same way in all individuals. Of note, not all maltreated children exhibit anomalies in their brain structure or functioning and identifying protective mechanisms in these children emerges as an important area of future research.

Neuroimaging and Child Maltreatment

There has been a burgeoning of interest in comprehending how early adverse experiences, such as child maltreatment, exert their effects on the developing brain (Lupien et al.,

2009). Multiple brain regions and neural circuits are disrupted by the experience of child abuse and neglect. The aberrant neuronal circuitry most likely contributes to the multifinal phenotype observed in maltreated individuals. Magnetic resonance imaging (MRI) technology provides a noninvasive and safe methodology for examining brain morphology, physiology, and function in individuals who have been maltreated. Over the past several decades, neuroimaging investigations increasingly have been conducted with maltreated children and adolescents. Herein, we provide a selective review of these studies.

De Bellis and colleagues (1999) reported the results of an in-depth whole-brain volumetric analysis of a group of hospitalized maltreated children and adolescents with PTSD and a group of medically and psychiatrically well nonmaltreated comparison subjects. In contrast to findings reported in studies of adults who retrospectively reported their histories of child maltreatment, De Bellis et al. (1999) did not find a reduction in hippocampal volume in the group of maltreated children and adolescents with maltreatment and PTSD. The discrepant findings between the child and adult studies on the effects that maltreatment exerts on hippocampal volume may be a function of the increase in volume that normatively occurs in neurobiological development during adolescence (Spear, 2000). During adolescence, subcortical gray matter structures that include the hippocampus continue to develop, and these normative processes of adolescent brain development may mask any effects that maltreatment and PTSD may exert on the developing limbic system. Alternatively, because the maltreated children with PTSD who comprised the De Bellis, Hall, Boring, Frustaci, and Moritz (2001) sample were involved in ongoing individual or group treatment, these psychotherapeutic interventions may have contributed to an increase in hippocampal neurogenesis, thereby eliminating any actual difference between hippocampal volume in maltreated and nonmaltreated individuals.

After controlling for intracranial volume and SES, De Bellis and colleagues (1999) discovered a number of additional MRI-based brain structural anomalies in their sample of maltreated children and adolescents with PTSD. These included smaller intracranial volumes, cerebral volumes, and mid-sagittal corpus callosum areas and larger lateral ventricles than in the group of nonmaltreated comparison children and adolescents. De Bellis et al. (1999) also found a positive correlation between intracranial volumes and age of onset of PTSD trauma as well as a negative correlation with the duration of maltreatment that led to a PTSD diagnosis, suggesting that there may

be sensitive periods and dose effects for stress-related alterations in brain development. Furthermore, according to De Bellis et al. (1999), their finding that enlarged lateral ventricles in maltreated children and adolescents were correlated positively with the duration of the maltreatment experienced suggested that there may have been neuronal loss associated with severe stress.

In another investigation, De Bellis, Keshavan, Spencer, and Hall (2000) used magnetic resonance spectroscopy (MRS), a safe neuroimaging methodology, to investigate the *in-vivo* neurochemistry of neurobiological alterations in children's brains. De Bellis and colleagues (2000) measured the relative concentration of N-acetyl aspartate (NAA) and creatine in the anterior cingulate cortex of a small group ($n = 11$) of maltreated children and adolescents who also had PTSD and a healthy nonmaltreated comparison group ($n = 11$) matched on SES. NAA is considered to be a marker of neural integrity; moreover, decreased concentrations of NAA are associated with increased metabolism and loss of neurons. De Bellis et al. (2000) found that maltreated children and adolescents with PTSD had lower NAA-to-creatinine ratios, which are suggestive of neuronal loss in the anterior cingulate region of the medial prefrontal cortex, than did the nonmaltreated, SES-matched comparisons. The reduction in the ratio of NAA to creatine buttresses the hypothesis that maltreatment in childhood may alter the development of cortical neurons.

Approximately a dozen studies have replicated the results of De Bellis et al. (1999) that maltreated children and adolescents with PTSD do not have lower hippocampal volume than nonmaltreated comparisons (McCrory, DeBrito, & Viding, 2010). Thus, it appears that the hippocampal reduction effect may be specific to adults with a history of maltreatment. Perhaps the stress-induced prolonged exposure to glucocorticoids had a neurotoxic effect and contributed to a reduction in the complexity of hippocampal cells and even to cell death (Lupien et al., 2009). Preclinical research suggests that repeated exposure to stress hormones during development negatively affects neuronal migration, myelination, and neurogenesis, resulting in reduced dendritic spines, gray matter, and white matter connectivity in affected brain regions (Dackis, Rogosch, Oshri, & Cicchetti, 2012). Therefore, child maltreatment may lead to neurotoxic effects within limbic regions during sensitive periods of development.

Teicher and colleagues (2004) investigated the corpus callosum in children who had been abused or neglected to ascertain whether there were structural abnormalities in the regional anatomy. The corpus callosum connects the left

and right hemispheres and is the major myelinated tract in the brain. Regional corpus callosum area was measured by MRI in three groups of children: abused and neglected children, children admitted for psychiatric evaluation, and healthy comparisons. Teicher et al. (2004) found that the total area of the corpus callosum of the children who had experienced abuse and neglect was smaller than that of the children evaluated for psychiatric problems and the healthy comparisons. The latter two groups of children did not differ from each other. Child neglect was associated with a 15% to 18% reduction in corpus callosum regions; in contrast, reduced corpus callosum size in girls was most strongly associated with sexual abuse. These findings are congruent with the earlier assertion that negative early experiences can adversely affect neurobiological development.

With respect to corpus callosum and cerebellar volume, there is sound evidence for reduced volume in individuals who have experienced adversity (McCrory et al., 2010). On the other hand, structural MRI results are less consistent for the prefrontal cortex (PFC). It is unclear why there are inconsistent results for volumetric studies of the PFC. Among the possibilities are age differences across studies, variation in maltreatment subtype experienced (e.g., sexual abuse versus witnessing domestic violence), and methodological differences in scoring MRI scans (e.g., manual tracing, which characterized early studies, versus automated techniques such as voxel-based morphometry).

Structural neuroimaging studies also provide evidence for deficits in gray and white matter in several regions of the brain. The most prominently affected appear to be the anterior cingulate cortex, and the dorsolateral, orbitofrontal, and ventromedial prefrontal cortex (Hart & Rubia, 2012). Diffusion tensor imaging (DTI) studies have revealed deficits in structural connectivity between these areas, thereby suggesting abnormalities in neural networks.

In comparison to the number of studies that have examined structural neurobiological differences in maltreated children, adolescents, and adults, far fewer studies have investigated brain functional differences between maltreated and nonmaltreated individuals. Moreover, a very small percentage of these functional studies have been conducted with children. In terms of functional MRI (fMRI), investigations suggest that maltreatment experiences are associated with hypoactivity in the PFC of the dorsofrontal and ventromedial prefrontal cortex. The atypical activation in these brain regions occurs during response inhibition, working memory, and emotion-processing tasks (Hart

& Rubia, 2012). Investigations of maltreated children and adolescents should include both multimodal structural and functional measures and focus on neural networks in addition to isolated regions of interest.

Although our discussion of the sequelae of child maltreatment elucidates numerous negative outcomes, it is important to recognize that not all maltreated children are affected similarly and not all succumb to the adverse outcomes accompanying maltreatment. Within developmental psychopathology, the identification of resilience in the context of extreme adversity also has received considerable attention.

Child Maltreatment and Resilience

Deviations from the average expectable environment potentiate some individuals toward the development of maladaptive functioning, whereas others demonstrate positive adaptation in the face of the same challenges (Cicchetti, 2010; Masten, 2001). Resilience is conceived as a dynamic developmental process encompassing the attainment of positive adaptation despite exposure to significant threat, severe adversity, or trauma that typically constitute major assaults on the processes underlying biological and psychological development (Cicchetti, 2010; Luthar, Cicchetti, & Becker, 2000). Resilience is not a “magical” phenomenon (Masten, 2001). The same developmental cascades that can amplify maladaptive outcomes over time can perpetuate or amplify positive outcomes when the individual benefits from some combination of experiences and/or biological propensities that tip the initial balance toward adaptive outcomes (Cicchetti, 2013).

The occurrence of resilient outcomes in approximately 10%–25% of maltreated children point out that self-righting tendencies in human development may be strong, even in the face of deviance and failure in the environment (Cicchetti, 2013; Sameroff, 1983). At one level, different parts of the brain may attempt to compensate, and at another, maltreated individuals may seek out new experiences in areas where they possess strengths. Because plasticity is a central feature of the mammalian brain, early neurobiological anomalies or aberrant experience should not be considered as determining the ultimate fate of the maltreated child (Cicchetti & Curtis, 2006). Discovering how maltreated children develop and function resiliently despite their multitude of adverse experiences offers promise for informing the design, implementation, and multilevel evaluation of prevention and intervention programs (Luthar & Cicchetti, 2000).

Research on the correlates, pathways, and developmental course of resilient functioning in maltreated children has predominantly been gleaned from investigations that have focused on psychosocial variables (see Cicchetti, 2013, for a review). For example, in a 3-year longitudinal study conducted in a summer camp context, Cicchetti and Rogosch (1997) found that ego-resiliency and moderate ego-control, as well as self-system variables, predicted resilient functioning in maltreated children; in contrast, ego-resiliency, perceived emotional availability of the mother, and relationship quality with camp counselors were significantly more likely to be predictive of resilient functioning in nonmaltreated children from comparable low-SES backgrounds. Relationships were more critical to developing resilient outcomes in nonmaltreated children, whereas self-system processes and personality characteristics were more central to resilient outcomes in maltreated children. Thus, self-reliance, personal conviction, and self-confidence, in concert with interpersonal reserve, may bode well for the development of resilient adaptation in maltreated children.

In 2003, Curtis and Cicchetti urged researchers to incorporate neurobiological and molecular genetic assessments into their measurement batteries aimed at discovering pathways to resilient functioning. Technological advances in neuroscience and molecular genetics have helped to pave the way for an unprecedented opportunity to examine resilience from a multiple levels of analysis perspective. To date, few multilevel studies of resilient functioning in maltreated children have been completed. As investigations of biological contributions to resilience only have been conducted recently, each of these studies has been cross-sectional in nature.

Curtis and Cicchetti (2007) sought to discover whether the positive emotionality and increased emotion regulatory ability associated with resilient functioning would be related to greater left frontal EEG activity. A large body of literature concerning the meaning and correlates of hemispheric asymmetries in EEG activity has suggested that this ubiquitous phenomenon indexes a neural system that has emotion-specific influences whereby the two hemispheres of the cerebral cortex have been found to be differentially involved in emotion (Davidson, 2000). Specifically, the left hemisphere is associated with positive emotions/approach behavior and the right hemisphere is linked with negative emotions/withdrawal behavior. Emotions, and in particular, positive emotion and good emotion regulatory abilities, have consistently been associated with resilient adaptation. For example, Bonanno et al. (2007) coded genuine

(Duchenne) smiling and laughter and non-Duchenne smiling from videotapes of older adolescent and young adult females. Approximately half of the women had experienced sexual abuse during their childhoods. Bonanno and colleagues found that women who displayed genuine positive affect were significantly more likely to have better social adjustment 2 years later. In contrast, sexually abused women who expressed positive emotion in the context of describing a prior childhood sexual abuse experience had poorer long-term social adjustment, whereas those who exhibited positive affect when describing nonabuse experience had improved social adjustment. Thus, the potential connection of hemispheric EEG asymmetry with resilience lies in their common linkages with emotion and emotion regulation.

EEG asymmetry across central cortical regions distinguished between children with high and low resilient functioning such that left hemisphere activity characterized those maltreated children, who were adapting resiliently based on a competence composite index (e.g., good peer relations, adapting successfully to school, low levels of depressive symptomatology, low externalizing and internalizing psychopathology). Moreover, a behavioral measure of emotion regulation based on 35 hours of observation of the children, also independently contributed to the prediction of resilience in maltreated and nonmaltreated children.

The investigation of a neural-level phenomenon such as hemispheric EEG asymmetry, in the context of resilient adaptation underscores that there is certainly no one single characteristic that will be ascendant in the process of resilience over the course of development. Resilience is a dynamic, interactive, and bidirectional process between multiple levels across time, none of which holds primary importance at any given moment. However, the relative importance of various biological and psychological processes, although inevitably interrelated, may also vary across development.

In another multilevel investigation, resilient functioning in maltreated and nonmaltreated low-income children in relation to the regulation of two stress-responsive adrenal steroid hormones, cortisol and dehydroepiandrosterone (DHEA), as well as the personality constructs of ego resiliency and ego control, was examined. The steroid hormones chosen as potential predictors of resilience were the two primary adrenocortical products of secretory activity of the hypothalamic-pituitary-adrenal (HPA) axis. The capacity of individuals to elevate cortisol levels in response to exposure to acute trauma is important for survival.

DHEA exerts an impact upon a diverse array of biological actions, including effects on the immune, cardiovascular, endocrine, metabolic, and central nervous systems.

A composite measure of resilience was utilized that included multimethod, multi-informant assessments of competent peer relations, school success, and low levels of internalizing and externalizing symptomatology. Cicchetti and Rogosch (2007) found that personality characteristics, ego resiliency and moderate ego overcontrol and the adrenal steroid hormones associated with stress (i.e., cortisol and DHEA) made independent and noninteractive contributions to resilience. Although operating at different levels of analysis, behavioral/psychological and biological factors each made unique contributions to resilience.

Cicchetti and Rogosch (2007) found that higher morning levels of cortisol were related to lower levels of resilient functioning for the nonmaltreated children. High basal cortisol may indicate that nonmaltreated children are experiencing greater stress exposure and, consequently, are constrained in their ability to adapt competently. Within the group of maltreated children, differences in cortisol regulation were found as a function of the subtype(s) of maltreatment experienced. Physically abused children with high morning cortisol had significantly higher resilient functioning than physically abused children with lower levels of morning cortisol. The positive role of increased cortisol for physically abused children is divergent from the more general pattern of higher cortisol being related to lower resilient functioning that was discovered in the nonmaltreated and sexually abused children in this study.

Prior research on neuroendocrine regulation has indicated that physically abused children generally exhibit lower levels of morning cortisol secretion (Cicchetti & Rogosch, 2001a), especially those children who experienced physical abuse early in life (Cicchetti, Rogosch, Gunnar, & Toth, 2010; Cicchetti, Rogosch, & Oshri, 2011). It may be that the subgroup of physically abused children who were able to elevate cortisol to cope with stressful vicissitudes in their lives were demonstrating a greater striving for resilient adaptation. In contrast, the larger subgroup of physically abused children with lower levels of morning cortisol may have developed hypocortisolism over time in response to chronic stress exposure. As a result, for these children there may be a diminished capacity to mobilize the HPA axis to promote positive adaptation under conditions of ongoing stress. In addition, Cicchetti and Rogosch (2007) found that the very low level of resilience among sexually abused children with high basal cortisol may be a product of their different traumatic experiences

and consequences of chronic excessive vigilance and preoccupation, with commensurate HPA axis hyperarousal.

Finally, maltreated children with high resilient functioning exhibited a unique atypical pattern of a relative DHEA diurnal increase. Maltreated children who have the capacity to elevate DHEA over the course of the day may be better equipped to cope with the demands of high chronic exposure to stress and to adapt competently. In contrast, the nonmaltreated children who functioned resiliently did not exhibit the pattern of diurnal DHEA increase; instead they displayed the lowest levels of DHEA across the day. DHEA has been shown to generate effects that are associated with resilience. For example, DHEA counteracts the harmful effects of hypercortisolism, thereby potentially conferring neuroprotection on the brain (Charney, 2004).

The G×E studies on psychopathology reviewed earlier in this chapter are instructive and relevant for research on resilient functioning because they provide an illustration of how genetic variation may confer protection against mental disorder on individuals who have experienced child maltreatment. However, in our view, the absence of mental disorder is conceptually distinct from resilience, a dynamic multidimensional developmental process indicated by positive adjustment across domains of competent functioning despite the experience of significant adversity. Moreover, the presence of mental disorder does not preclude the achievement of resilient functioning. Many persons with mental disorder not only experience periods of remission, but also an appreciable number manage to function in an adaptive fashion for prolonged periods of their lives (Hinshaw & Cicchetti, 2000).

To our knowledge, there has been only one molecular genetic investigation that has specifically set out to test the hypothesis that particular genetic variants might be related to resilient functioning in the presence of child maltreatment. To examine the processes underlying the development of resilience at the molecular genetic level of analysis, Cicchetti and Rogosch (2012) embarked on research aimed at discovering whether there were genetic elements, in interaction with the experience of child maltreatment, that were associated with higher levels of resilient functioning in maltreated and nonmaltreated school-aged children. A multicomponent index of resilient functioning was identified. Four theoretically and empirically informed genes that have been found to be related to behaviors known to be associated with resilient functioning, 5-HTTLPR, CRHR1, DRD4 -521C/T, and OXTR, were chosen and genetic variants in each of these genes were investigated.

Maltreatment consistently exerted a strong, adverse main effect on resilient functioning; however, none of the gene variants of the four respective genes were shown to have a main effect on resilience. In contrast, G×E interaction (G×E) effects were obtained and a similar pattern emerged for all four genes—a particular genotype was found to differentiate between the level of resilient functioning in maltreated and nonmaltreated children more strongly. Contrary to the typical gene–environment interaction (G×E) studies on psychopathology, the results of the Cicchetti and Rogosch (2012) investigation revealed that genetic variation had a negligible effect for the maltreated group in predicting resilient functioning. In contrast, genotype was shown to contribute to higher resilient functioning in nonmaltreated children when they possessed a particular genotype, at least relative to the maltreated children with the same genotype.

In the case of 5-HTTLPR, nonmaltreated children with the *s/s* genotypic variant were more likely to have higher resilient functioning, whereas maltreated children who possessed the same genetic variant had lower resilient functioning. These findings are consistent with a differential susceptibility to environmental influences interpretation (Ellis, Boyce, Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2011). According to this perspective, the characteristics individuals possess that render them disproportionately vulnerable to adverse experiences also make these same individuals disproportionately likely to profit from supportive contexts. For children who possess the same *s/s* genotypic variant of 5-HTTLPR, nonmaltreated children, in the context of a more normal childrearing environment, achieved higher resilient functioning, whereas maltreated children, in the context of an adverse childrearing environment, demonstrated lower resilient functioning (see van IJzendoorn, Belsky, & Bakermans-Kranenburg, 2012).

For CRHR1, nonmaltreated children with zero copies of the TAT haplotype had higher levels of resilient functioning relative to maltreated children with the same number of copies of the TAT haplotype. Once again, these findings are consistent with a differential susceptibility to the environment perspective (Belsky & Pluess, 2009; Ellis et al., 2011). Maltreated and nonmaltreated children had the same genetic variant (i.e., zero copies of the TAT haplotype); however, the nonmaltreated children showed higher levels of resilient functioning, whereas the maltreated children (living in a more stressful context) evinced lower levels of resilient functioning.

Analyses of the DRD4 (dopamine receptor)-521C/T single nucleotide polymorphism (SNP), revealed that

nonmaltreated children and, in particular, those with the TT genotype, were more likely to exhibit higher resilient functioning scores than were maltreated children with this same genotype. The maltreated children manifested lower levels of resilient functioning. As with the previous results for 5-HTTLPR and CRHR1, findings with DRD4-521C/T provide support for the differential susceptibility to environmental influences perspective.

In further analyses, Cicchetti and Rogosch (2012) examined the relation between number of maltreatment subtypes and DRD4 -521C/T genotype to resilient strivings. Maltreated children who had experienced three or four subtypes fared dramatically worse with the TT genotype, whereas nonmaltreated children with this genotype fared the best. Maltreated children with three or four subtypes of maltreatment with the CC or CT genotypes were indistinguishable in level of resilient functioning from nonmaltreated children with these genotypes. Despite the very large detrimental effect that extensive maltreatment exerts on resilient functioning independent of genotype, these results exemplify how the three to four maltreatment subtype groups exhibit the same level of resilient functioning as do nonmaltreated comparisons with the same CC or CT genotypes.

Finally, with OXTR (oxytocin receptor), not being maltreated was related to higher resilient functioning scores; in contrast, maltreatment was strongly related to lower levels of resilient functioning. In particular, nonmaltreated children who had either the AA or AG genotypes of OXTR displayed greater levels of resilient functioning than maltreated children with these same genotypes. Consistent with the findings obtained with the three previous candidate genes, the results provide strong support for the differential susceptibility to environmental influences framework.

It is noteworthy that Cicchetti and Rogosch (2012) identified different gene variants as differentially important through contrasting maltreated and nonmaltreated children and their level of resilient functioning (i.e., low, medium, high). The variation among the genotypes and their relation to functioning differences would not be apparent without the consideration of experience. The genes did not have a singular role, outside of experiential context. The contrast between groups of maltreated and nonmaltreated children was therefore important for understanding development in normal and atypical rearing environments.

Cicchetti and Rogosch's (2012) findings suggest that the genes included in this investigation appear to be minimally related to resilient functioning in maltreated children. Maltreatment consistently had a main effect on resilient

functioning for each of the genes examined. Genetic variation had more of an impact on resilient functioning among the nonmaltreated children who also resided in stressful poverty-laden environments. Accordingly, it appears that the powerful maltreatment main effects may have overshadowed any potential contribution of genetics to resilient functioning in abused and neglected children. Despite the multidomain assessment of adaptive functioning and the large well-defined sample of maltreated and nonmaltreated children, a limitation of the study is its cross-sectional nature. Because resilience is a dynamic developmental construct that is not immutable, future investigations of gene-environment interaction and resilient functioning should be prospective and longitudinal.

Although many investigations of child maltreatment include racially and ethnically diverse populations, possible differences associated with these demographic characteristics are not consistently discussed. Thus, we next turn our attention to this important demographic variable.

Race and Ethnicity

In part as a function of concerns about the overrepresentation of children of color in the child welfare system and heightened awareness about disparities in access to quality health and mental health services for ethnic minorities, examinations of child maltreatment have increasingly sought to incorporate an understanding of issues related to race and ethnicity. The importance of this movement is underscored by findings from the most recent National Incidence Study. As stated earlier, NIS-4, the first NIS to detect racial and ethnic differences in rates of child maltreatment in the United States (Sedlak et al., 2010), found that African American children experience maltreatment at higher rates than do European American children in several subtypes of maltreatment, including higher rates of physical abuse, overall abuse, and overall maltreatment according to both the Harm and the Endangerment Standards. Under the Endangerment Standard, African American children also had higher rates of emotional neglect and overall neglect. The authors of the report qualified these findings by noting that NIS-4 estimates were more precise than those contained in prior NIS reports. Importantly, they also highlighted the role of socioeconomic status in these findings, noting widening income gaps between African American and European American families, with children in African American families being more likely to reside in low-income families.

A growing body of literature has examined factors such as ethnic differences in the disclosure of abuse (Meston,

Heiman, & Trapnell, 1999), utilization of varied definitions of abuse (Collier, McClure, Collier, Otto, & Polloi, 1999), and differences between what constitutes culturally sanctioned parenting and abusive parenting (A. Miller & Cross, 2006). However, despite recognition of the importance of better understanding maltreatment in the context of racial and cultural milieus, research in child maltreatment to date has done little to clarify these issues (Elliott & Urquiza, 2006). Unfortunately, progress on research in this area has been hindered by confounds between race and ethnicity, considerations related to low socioeconomic status among minorities, reliance on retrospective reports of maltreatment, and the utilization of small and geographically diverse samples. Thus, with the exception of robust differences in parenting styles identified among diverse ethnic and racial groups, research on race, ethnicity, and child maltreatment has yielded conflicting results (Elliott & Urquiza, 2006; Sedlak et al., 2010).

However, although there is inconsistency with respect to racial/ethnic differences in child maltreatment, clear differences emerge with respect to case status in the child welfare system (Hill, 2007). African American and Latino American children are more likely to be removed from their homes, to remain in foster care longer, to have more placement changes once removed from their homes, and to be less likely to be reunified with their parents once removed (Hill, 2007). Thus, the criticality of continuing to understand the role of ethnic and racial factors in relation to child maltreatment and the importance of incorporating these variables into future research cannot be minimized. Similarly, considerations associated with gender also warrant attention.

Gender

As with race and ethnicity, the literature on gender differences and child maltreatment has yielded mixed and often inconclusive findings. According to NIS-4, maltreatment gender differences with respect to subtype experienced are present, with girls being at a disproportionately higher risk for sexual abuse than boys (Sedlak et al., 2010). This finding is consistent with prior NIS reports and contributes to an overall increased incidence of abuse in general among girls. When examining the sequelae of child maltreatment, however, the results of investigations to date are much less clear. Over two decades ago, the National Research Council's Panel on Child Abuse and Neglect recommended that research be conducted to ascertain whether differential consequences of abuse occurred by gender

(National Committee on Science Education Standards and Assessment and National Research Council, 1993). Subsequent studies on the long-term consequences of child maltreatment have produced mixed findings. However, in general it appears that although both men and women with histories of abuse were at increased risk for anxiety disorders and alcohol abuse/dependence, only women were found to be at increased risk for depression or drug abuse/dependence (MacMillan et al., 2001). Findings that abused and neglected females were at higher risk for substance abuse/dependence than males also were found in a large longitudinal study (Widom & White, 1997). Data from the National Violence Against Women Survey, which included 16,000 men and women, found that men and women were equally likely to experience physical abuse during childhood and that both genders experienced negative consequences. However, abuse was generally more detrimental for girls, with increased mental health and physical health problems being present in adulthood (Thompson, Kingree, & Desai, 2004). Interestingly, this survey did not reveal gender differences with respect to alcohol or drug use. In an examination of over 5,000 adults, both men and women with histories of maltreatment were more likely to meet criteria for a major depressive disorder, but gender did not moderate the risk of depression (Arnow et al., 2011), contradicting the results of MacMillan and colleagues (2001).

A number of factors need to be considered in trying to understand these discrepant findings. First, the results are typically based on adult retrospective recall of maltreatment, introducing the very real possibility of biases associated with current life difficulties affecting memories. Second, many years elapsed from the occurrence of childhood abuse to adult reports and many intervening life events could influence adult functioning over and above childhood maltreatment. Additionally, few studies have examined gender by victimization interactions, raising the possibility that increased risk, for example, of depression among women could be confounded by higher rates of victimization in women. Investigations also do not consistently examine multiple subtypes of maltreatment or co-occurring subtypes, raising the possibility that the assessment of maltreatment may be incomplete and that the resulting sequelae could differ as a function of subtypes experienced. Finally, definitional differences related to maltreatment commonly exist across studies.

Given the potential difficulties involved with adult retrospective recall, targeting investigations toward childhood emerges as an important avenue for better understanding

possible gender effects and child maltreatment. Although some studies have not detected gender differences in the effects of family violence on children's behavior problems (Sternberg, 2006), others have found effects associated with gender. Sexually abused girls have been shown to experience difficulties controlling intrusive thoughts and to report increased hyperarousal compared to boys (Feiring, Taska, & Lewis, 1999). Perhaps as a consequence of a more ruminative style, maltreated girls have been found to be at increased risk for internalizing symptoms, whereas boys have been shown to be at increased risk for externalizing symptoms (Keyes et al., 2012). However, when externalizing symptoms are present in girls, they may be particularly significant. In a one-year longitudinal investigation, maltreated girls who evidenced early externalizing behavior were found to be at heightened risk for the emergence of subsequent depressive symptoms (Brensilver, Negriff, Mennen, & Trickett, 2011). Moreover, in an investigation of the association among maltreatment, aggression, and gender in school-age children, maltreatment was found to be associated with increased aggression, a relatively robust finding across the maltreatment literature (Cullerton-Sen et al., 2008). However, different patterns of aggression emerged. Maltreatment was associated with physical aggression in boys and with relational aggression in girls. Moreover, physical abuse was associated with physical aggression in general, but sexual abuse was related to relational aggression for girls only. These findings suggest that boys and girls may internalize the experience of maltreatment in different ways, initiating gender-specific pathways to the expression of externalizing behaviors. For example, maltreated girls may learn from their early parent-child interactions that love and affection can be withdrawn as punishment. When confronted with conflict in the peer group, maltreated girls may draw upon what they have learned in the home, such that they use the relationship as a vehicle of harm against their peers (i.e., relational aggression; Cullerton-Sen et al., 2008). In an investigation of the effects of family violence in a cohort of Israeli children, girls were found to be at increased risk for both internalizing and externalizing behavior problems compared to boys (Sternberg, Lamb, Guterman, & Abbott, 2006). Finally, in an investigation of the role of family environment in contributing to the emergence of oppositional defiant disorder (ODD), Burnette (2013) found that girls and boys evidenced equal levels of ODD symptoms. However, gender differences emerged with respect to the impact of physical abuse and emotional responsiveness, with the former being a significant predictor of ODD for

girls and the latter being significant for boys. The emerging literature does suggest gender differences with respect to behavioral symptoms and possible psychopathology and, it in fact mirrors retrospective report surveys that suggest that women victimized during childhood may be at increased risk for some negative mental health outcomes. Taken as a whole, however, issues related to sample size, the examination of developmental timing in relation to maltreatment, and possible delayed consequences need to be considered before definitive conclusions on maltreatment sequelae and gender can be made.

To our knowledge, only one study to date has examined gender differences in stress-hormone neurobiology functioning in maltreated children (Doom, Cicchetti, Rogosch, & Dackis, 2013). In an examination of the neuroendocrine profiles of school-age maltreated and demographically comparable nonmaltreated children, elevated daily cortisol levels were found for boys compared with girls in children having more pervasive maltreatment. Boys with less pervasive maltreatment had lower DHEA and higher cortisol/DHEA ratio levels than girls with similar experiences, nonmaltreated boys, and boys with more pervasive maltreatment. Down-regulation of cortisol was evident in girls with more pervasive maltreatment and in girls who experienced early onset maltreatment.

Although the extant literature is relatively sparse with respect to a consensus regarding gender differences associated with childhood maltreatment, results to date underscore the importance of striving to incorporate gender into investigations. An increased understanding of possible gender differences could ultimately have implications for the assessment of psychopathology and inform the provision of preventive interventions directed toward the amelioration of future psychopathology in children who have been maltreated.

Now that we have concluded our discussion of the consequences of child maltreatment, it is important to consider methodological issues that may affect the strength of conclusions to be drawn from this body of work.

METHODOLOGICAL ISSUES IN MALTREATMENT RESEARCH

Despite important advances that have occurred with respect to the quality of empirical research in the area of child maltreatment, a number of thorny methodological issues require ongoing attention. As evident from our discussion of the sequelae of child maltreatment, research in

maltreatment is complex for a number of reasons, which we elaborate on next.

Definitional Considerations

Perhaps first and foremost, increased agreement needs to occur with respect to defining child maltreatment. Despite the fact that progress has been made in terms of increased rigor in this domain, investigators continue to vary in their approaches to definition. Results are likely to diverge considerably if single subtypes of maltreatment are examined rather than dealing with the reality of a high prevalence of multiply occurring subtypes. Issues pertaining to perpetrator, severity, chronicity, and developmental period during which maltreatment occurs also should be routinely considered. However, limitations related to sample size, difficulty accessing comprehensive information due to legal restrictions on access to maltreatment registries, and report biases in parents and children often impede such efforts. Although the conduct of statistical analyses for all such variables may not be possible, ideally investigators should present descriptive information on these issues. In addition, clear information needs to be provided on how the maltreatment experience, including decisions on the assignment of subtype, was determined. Moreover, sequelae associated with particular subtypes that may not be immediately evident but may emerge over time highlight the importance of conducting longitudinal investigations.

Multiple Subtypes

It is rare that a child who has been maltreated experiences a single subtype of maltreatment. When multiple subtypes occur, it is challenging to determine how best to categorize the maltreatment experience. One strategy that has been used involves basing the “main” subtype designation for analytic purposes on the most societally egregious form of maltreatment, with categorization of sexual abuse, physical abuse, neglect, and emotional maltreatment ranging from most to least severe. In this methodological approach, if a child had been both physically abused and neglected, then they would be categorized as physically abused. Another approach suggests that assignment of the main subtype of maltreatment be based on the most severe form of maltreatment experienced. Thus, if a low level of physical abuse occurred, but a very severe neglect experience were present then the child would be classified as neglected. Regardless of the method adopted, it is critical that investigators clearly describe how the assignment to maltreatment group was made.

Comorbidity

Although concerns around the presence of comorbid disorders are a challenge for psychopathology research in general, this is a particularly problematic issue when investigating the sequelae of child maltreatment. Research consistently demonstrates that maltreatment is highly associated with other negative outcomes, including depression, PTSD, antisocial behavior, and substance use/abuse. When present, therefore, it becomes difficult to ascertain if a given negative outcome is directly attributable to maltreatment or to the co-occurring psychopathology. This is particularly challenging because it is usually impossible to ascertain which condition preceded the other. Again, although it may not be possible to categorize and analyze participants by the presence/absence of co-occurring psychopathology, descriptive information on the presence of psychopathology should be provided when possible.

Economic Adversity

Much of the extant research on child maltreatment has been conducted with economically disadvantaged samples. Although maltreatment is not limited to the low-income sector, children who come to the attention of authorities are much more likely to reside in families from the lower socioeconomic strata. Because a myriad of risks accompany residing in poverty, including exposure to community and/or domestic violence, stressors associated with difficulty meeting basic needs, and being a member of a racial or ethnic minority group, it can be particularly challenging to recruit and to retain participants. In fact, no-show rates with this population, even when home visits are scheduled, frequently average 50% of scheduled appointments. Moreover, research staff are routinely faced with very difficult situations when they enter high-crime communities. Thus, safety concerns need to be addressed. In addition to challenges accessing and retaining research samples, it is difficult to disentangle the effects of maltreatment from the co-occurring risk factors that are present. In efforts to minimize these issues, increased research needs to be conducted with maltreated children from a range of socioeconomic backgrounds.

Prevention and Intervention

Methodological challenges also accompany the conduct of research on prevention and intervention outcome studies. As discussed earlier, recruitment and retention, even for basic research studies, is quite difficult. This becomes

even more complex when enrolling maltreating families in intervention trials. Maltreating families are often not seeking treatment and typically may not even acknowledge that there is a problem and that they or their children require assistance. Retention in randomized control trials (RCTs) is problematic even in treatment-seeking populations, so it is not surprising that it emerges as a significant issue with non-treatment-seeking maltreating families. Once enrolled, further complications arise. When ongoing maltreatment is detected, a report must be filed with Child Protective Services, often resulting in a family becoming angry and withdrawing from treatment. Attrition is further exacerbated if a child is placed in foster care or, when studying children already in foster care, if placement changes occur. Issues related to high housing mobility and too often disconnected or changing cell phone numbers also make the consistent tracking of families difficult. Given the high co-occurrence of domestic violence and child maltreatment, the offending partner may be threatened by the involvement of the child or partner in services and interfere with their participation. All of these variables coalesce to make the attainment of large samples in maltreatment intervention studies particularly challenging. Unfortunately, smaller sample size results in reduced statistical power to detect treatment effects. As the conduct of multilevel investigations of treatment outcome becomes increasingly important, the incorporation of psychophysiological and genetic assessments into research batteries will require even larger samples. Although investigators have developed creative methods of facilitating recruitment and retention of participants, attaining large samples remains difficult. One possible solution is to utilize multiple sites for enrollment. However, the feasibility of this is hampered by the high costs of RCTs in combination with federal funding caps.

In summary, although much progress has occurred since child maltreatment was first identified as a factor that undermines the normative developmental process, significant challenges remain that need to be addressed if this area of research is to continue to advance. Moreover, the importance of ensuring the translation of this body of knowledge into clinical and social policy domains has been increasingly recognized.

Translational Research

Translational research refers to the examination of how basic behavioral and biological processes can inform the diagnosis, prevention, treatment, and delivery of services

for individuals at risk for, or who have developed, a mental illness (National Advisory Mental Health Council, 2000). Consistent with a developmental psychopathology perspective (Cicchetti & Toth, 2006b, 2009; Rutter & Sroufe, 2000), translational research can best be viewed as reciprocal in nature, with both basic researchers and individuals involved in the provision of clinical care benefiting from input derived from the other domain. The impetus to conduct translational research in the behavioral sciences emanated largely from the National Institute of Mental Health (Insel, 2005; Insel & Scolnick, 2006) and was spurred by the recognition of the tremendous individual, social, and economic burdens associated with mental illness (National Advisory Mental Health Council, 2000). As discussed earlier, a considerable body of research has examined the effect of child maltreatment on psychological and, increasingly, biological functioning (Cicchetti & Valentino, 2006; McCrory et al., 2010) and this scientific knowledge lends itself to the development, evaluation, and exportation of models of intervention designed to disrupt the cascade of negative developmental processes (Masten & Cicchetti, 2010).

Because the formation of a secure attachment relationship with the primary caregiver is one of the most important and universal tasks during the first year of life, and because child maltreatment has been shown to disrupt the development of secure attachments, the provision of interventions to promote attachment security in maltreated children has emerged as an important area of translational research.

Dozier, Peloso, Lewis, Laurenceau, and Levine (2008), working with a maltreated foster care population, developed Attachment and Biobehavioral Catch-up (ABC) as an intervention for foster parents. The three main components of this brief attachment theory informed intervention are to (1) provide an environment in which the foster child can feel nurtured and loved even when the parent feels pushed away by the child; (2) help the caregiver work through personal issues that may be interfering with their caregiving abilities; and (3) offer a highly controllable interpersonal environment to allow children to better regulate at the biobehavioral level (Dozier, 2003; Dozier et al. 2009). The ABC intervention is delivered in 10 joint parent-child sessions, and research supports its efficacy at promoting adaptive child attachment behaviors and regulating cortisol. Children from dyads participating in the ABC intervention displayed fewer avoidant behaviors in attachment system-eliciting situations compared to children from dyads who received an educational intervention (Dozier et al., 2009). Additionally, cortisol production in

foster infants and toddlers who received the ABC intervention resembled patterns similar to those found in children who had never been in foster care and was different from patterns found in foster infants and toddlers whose caregivers participated in an educational intervention (Dozier et al., 2008).

Moss and colleagues (2011) demonstrated the efficacy of a very brief (eight 90-minute sessions) parent-child intervention compared to a control condition to reorganize attachment for maltreated children Ages 1 to 5. Intervener structured parent-child play sessions were video-recorded and then watched immediately with the parent during the session to discuss parental observations and reinforce sensitive parental behavior (Moss et al., 2011). Children in the intervention condition were more likely to change from insecure or disorganized attachments to secure attachments after the 8-week intervention than the children in the control condition.

A widely utilized and evaluated intervention for young children with histories of maltreatment, Child Parent Psychotherapy (CPP; Lieberman & Van Horn, 2005) has its origins in attachment theory, developmental psychopathology, and stress and trauma work, and is also informed by cognitive-behavioral and social learning theories (Lieberman & Van Horn, 2009). CPP has gained increased attention as an evidence-based, culturally sensitive treatment for maltreated children and their caregivers.

Rather than focus individually on the child or parent, the therapist's client in CPP is the relationship between the caregiver and child. Through dyadic sessions, the therapist utilizes the child's spontaneous play and naturally occurring interactions between the parent and child as a vehicle for understanding maladaptive relational patterns and as an entryway for therapeutic change. The therapist encourages mutually enjoyable interactions between the parent and child, provides a voice for the child in order to interpret needs that the parent may be struggling to understand, and encourages developmentally appropriate parental expectations.

An additional focus of CPP involves helping the parent develop insight into how the "ghosts" from maladaptive relationships in his or her past can be influencing the present day interactions with the child in an effort to break the intergenerational transmission of maladaptive relational representations from parent to child (Fraiberg, Adelson, & Shapiro, 1975). The CPP model also recognizes the influence of broader contextual factors on the occurrence of child maltreatment and on the developing relationship between the parent and the child.

CPP has been found to be efficacious in a number of RCTs. Cicchetti and colleagues (2006) conducted an RCT of CPP compared to a psychoeducationally based parenting intervention (PPI) for maltreated infants and their primary caregivers. Preintervention, 87.5% of infants in the CPP condition and 83.3% in the PPI intervention evidenced disorganized attachments. Postintervention, these rates had decreased to 32% and 45%, respectively, for CPP and PPI, with the majority of toddlers in each intervention developing secure attachments by the end of the intervention. The two intervention groups had higher rates of securely attached children postintervention than the community standard group, although they did not differ from each other. Results provide strong support for the efficacy of CPP in promoting secure attachments in infants from maltreating families.

Another randomized clinical trial, conducted by Toth and colleagues, sought to explore the impact of CPP on preschool children's representations of self and mother (Toth, Maughan, Manly, Spagnola, & Cicchetti, 2002). Children and their caregivers were randomly assigned to CPP, PPI, or community standard, and representational models were assessed with the MacArthur Story-Stem Battery (Bretherton, Oppenheim, Buchsbaum, Emde, & The MacArthur Narrative Group, 1990). Children in the attachment-based intervention, CPP, experienced declines in negative self-representations and maladaptive maternal representations and increases in positive self-representations and mother-child relationship expectations from pre- to postintervention. While changes in representations were also found in the PPI condition, negative self-representations decreased significantly more in CPP than with PPI, and positive self-representations and mother-child relationship expectations improved nonsignificantly in the CPP relative to the PPI condition. These findings highlight the efficacy of CPP for reworking representations of self and other in maltreated children.

In addition to promoting attachment security in maltreated infants and improving representations of the self in maltreated preschoolers, CPP also promotes positive child adaptation in other domains. CPP was more effective than community-standard-plus-case-management at decreasing child behavioral problems and trauma symptoms for children aged 3 to 5 who had been exposed to marital violence (Lieberman, Van Horn & Ghosh Ippen, 2005). A 6-month follow-up study of CPP found that reductions in child behavior problems were maintained, suggesting the durability of CPP for treating child symptoms (Lieberman, Ghosh Ippen & Van Horn, 2006). The sustained

efficacy of CPP in promoting secure attachment 1 year posttreatment has been demonstrated (Pickreign Stronach, Toth, Rogosch, & Cicchetti, 2013). Not only did children receiving CPP have higher rates of security than children in the psychoeducational parenting model, but rates of disorganized attachment did not differ between children who received CPP and the nonmaltreated comparison children. Thus, although CPP and a psychoeducational parenting intervention both facilitated the completion of treatment, only CPP resulted in sustained security of attachment, suggesting that, although parenting interventions alone may be effective in the short term, they may not result in sustained attachment security over time.

The above findings support the efficacy of CPP in controlled research trials; however, it is critical that preventive interventions be exported to the clinical world more broadly once efficacy has been established. CPP was examined in a community setting emphasizing wraparound care for diverse youth in foster care (Weiner, Schneider, & Lyons, 2009). Child traumatic stress symptoms and behavioral and emotional needs decreased significantly for African American, biracial, and Latino American children receiving the CPP intervention, but not for European American children (Weiner et al., 2009). Additionally, risk behaviors decreased and strengths increased for African American and biracial children participating in this study (Weiner et al., 2009).

The feasibility and effectiveness of CPP was also examined in a community setting with families in which the parents had maltreated their children and were court-ordered to participate or were identified as at high risk for abuse or neglect (Osofsky et al., 2007). Attrition was high, with more than 50% of families dropping out before engagement or during treatment; however, increased behavioral and emotional responsiveness and positive discipline were observed in the caregivers who completed treatment, as was decreased intrusiveness. Additionally, development improved in at least one domain (communication, gross motor, fine motor, problem solving, or personal-social) for 50% of the children receiving CPP who had previously been screened as at risk for developmental delay. Importantly, during the first 3 years of the pilot study, there were no new reports of child abuse or neglect involving children completing CPP with their caregivers. These studies provide preliminary evidence for the feasibility of utilizing CPP with families willing to engage in a community setting, and results suggest that child symptom reduction and improved parenting are attainable when CPP is exported from the laboratory into the nonacademic clinical arena.

Research has coalesced to suggest that early preventive interventions with maltreated children are capable of promoting normative neurobiological development (Cicchetti, Rogosch, Toth, & Sturge-Apple, 2011; Fisher, Stoolmiller, Gunnar, & Burraston, 2007), highlighting the continued importance of studying change processes in the lab while applying efficacious interventions in the community.

A relatively new frontier with respect to evaluating and translating knowledge on efficacious interventions emanates from genetics research. As knowledge on the interplay of genes and the environment has increased, the benefits for prevention efforts have been suggested by both animal and human research. Importantly, as knowledge of genetic moderation with respect to prevention and treatment outcome increases, ethical questions also arise. Some may suggest that more cost-effective and efficient interventions could be delivered if youth with particular genetic constellations that place them at risk for maladaptive outcomes are screened and that only those most likely to benefit from a given intervention subsequently receive it. However, a number of considerations argue against this approach (Howe, Beach, & Brody, 2010). First, single genes or single $G \times E$ combinations fail to account for sufficient variance in outcomes to support screening for intervention provision. Most likely, multiple developmental pathways will eventuate in positive outcomes, a concept consistent with multifinality. It is more likely that genes will constrain or enhance various pathways than that they will deterministically contribute to outcomes, in part because the same genetic pattern may constrain a pathway in one context and enhance the same pathway in another context (Howe et al., 2010). The multiply influenced course of development cautions that genetic screening for selective intervention is unlikely to provide significant benefits in advancing intervention efforts, particularly given the current nascent state of research on $G \times E$ and intervention outcomes.

Although basic research is increasingly being translated to the prevention and treatment of child maltreatment, the growth of basic research knowledge has surpassed its application to mental disorders more generally. The prevention and treatment of the sequelae of child maltreatment is not an exception to this unfortunate reality. In order to bridge the gap between basic and applied research and its application to problems of clinical importance, investigators and clinicians must stretch beyond traditional boundaries. Collaborations across disciplines are necessary if areas as diverse as neuroscience, genetics, emotion, cognition, social cognition, and interpersonal processes are to be

incorporated into addressing the needs of children in maltreating families. As efforts have expanded to incorporate basic research knowledge into clinical arenas, it has become increasingly clear that this is necessarily a gradual process. To begin, it is critical that those conducting basic research are committed to conceiving their questions with the goal of having findings ultimately inform applications of the knowledge gained (Cicchetti & Toth, 2006b). Clearly, before theoretically informed models of prevention or intervention can be developed, applied to maltreating populations, and evaluated, there must be an understanding of the mechanisms and processes that contribute to a maladaptive course of development. As an exemplar of this process, the extensive basic research conducted on attachment theory and the consequences associated with children developing insecure or disorganized attachments to their primary caregivers contributed to the development of CPP. This theoretically derived intervention was then rigorously tested in multiple efficacy trials to determine its utility for maltreating families and for families with domestic violence in highly controlled research settings. Now that efficacy has been established, effectiveness studies have been and are currently being undertaken to determine the feasibility of exporting this empirically based treatment into the broader clinical arena. As a last step in this process, it is important for the scientific community to be open to feedback from those implementing interventions in the field and to use this information when revising interventions and seeking mediators and moderators of treatment efficacy. As will be discussed below, it also is critical that evidence-based models of intervention continue to be evaluated once exported to new community settings. Such initiatives will increase the probability that research will ultimately result in informing social policy for maltreated children.

Social Policy Perspectives

The value of translational research leads directly into considerations related to the social policy arena. The personal and economic burden of child maltreatment highlights the importance of utilizing information derived from research to inform policy initiatives. However, despite what should be an almost seamless integration of research, practice, and social policy, reciprocally beneficial interactions among these arenas have been difficult to achieve (Toth & Cicchetti, 2006). In reflecting upon impediments to this integration, Shonkoff (2000) suggested that, whereas scientists are trained to raise questions and to be guided by facts, policy makers are more prone to be governed by

political and economic forces. Similarly, service providers are more like policy makers because they are often faced with situations that require immediate action before empirical data are available to inform specific intervention strategies. In reflecting on this tension, Shonkoff (2000) stated, "Science is focused on *what we do not know*. Social policy and the delivery of health and human services are focused on *what we should do*" (p. 182, italics in the original). Even when data are available to inform intervention strategies, the realities of heavy clinical caseloads and lack of access to easily assimilable empirical information by clinicians and policy advocates may limit the likelihood of clinicians and policy advocates adopting evidence-based interventions. Unfortunately, over a decade since these observations were made, individuals committed to addressing the problem of child maltreatment continue to struggle to achieve an integration of research, practice, and social policy.

Increased calls have been made for the utilization of science to guide policy making and funding decisions (Baron & Haskins, 2011; Haskins & Baron, 2011). In fact, the Obama Administration has done much to advance the incorporation of scientific data into policy-making decisions. During his initial inaugural address, Obama stated that an important goal of his presidency would be to expand social programs that work and to eliminate those that are ineffective (Haskins & Baron, 2011). Early in his administration, six initiatives to expand evidence-based social programs were launched, including the utilization of home visitation to improve maternal and child health, early childhood development, and family functioning and programs to prevent teen pregnancy (see Orszag, 2008). Unfortunately, even when evidence exists that a program is ineffective, political forces may make it difficult to eliminate funding for these programs and redirect the funding toward those that are evidence-based (Baron & Sawhill, 2010).

Haskins and Baron (2011) argued that better population-level outcomes in education, crime reduction, and child well-being would occur if policy and funding decisions were made based on evidence of what works. The call for the utilization of evidence-based approaches, referred to as technocracy, is the norm in physical health care (Dodge & Mandel, 2012). However, in addressing the contrast between health care and issues affecting children, Baron (2007) stated:

In medicine...rigorous evaluations are common, and often drive policy and practice. By contrast, in education and most other areas of social policy, such studies are relatively rare.

In these areas, policy and practice tend to be driven more by advocacy studies and anecdote than by rigorous evidence, costing billions of dollars yet often failing to produce meaningful improvements. (p. 32)

In view of the magnitude of the adverse consequences of child maltreatment on both psychological and physical health outcomes, it is imperative that policy makers address and remedy difficulties in accessing high quality trauma-informed services. Because evidence-based services for children who have been maltreated are increasingly available (Toth, Gravener, Guild, & Cicchetti, 2013), the failure to ensure their widespread availability is particularly egregious. In order to reduce impediments to access, partnerships among professionals working with children, elected officials, and public interest advocates are critical (Harris, Lieberman, & Marans, 2007; Toth & Cicchetti, 2006).

It is unlikely that anyone invested in promoting the welfare of children would disagree with the importance of attaining the above-stated objectives. Why then has the reduction of the divide among research, practice, and social policy been so difficult to realize? A number of issues need to be considered, including points of entry to care, allocation of resources, and community-wide uptake.

Entry to Care

Chu and Lieberman (2010) discuss entry points to care for young children exposed to trauma. Although pediatric care providers are the professionals most likely to come in contact with young traumatized children, their effectiveness in identifying possible trauma may be hindered by a number of issues, including the brief visit duration, lack of training in recognizing trauma flags, and minimal knowledge regarding referral sources if trauma is revealed. Mental health providers may similarly lack knowledge regarding the identification of trauma in young children and when trauma is identified they may not have adequate training on the provision of evidence-based models of intervention. Childcare providers also are unlikely to have adequate training on the identification of trauma. Despite the high co-occurrence of domestic violence and child maltreatment, domestic violence shelter staff most typically focus on the needs of adult victims and fail to assess or address the presence of child trauma. Although the court system can mandate treatment for victims of child abuse, court personnel are also unlikely to be adequately versed in understanding the effects of trauma and the need for treatment. Unfortunately, the child welfare

system also often focuses on addressing parenting and may fail to consider the needs of maltreated children. When the need for treatment is recognized, far too few professionals are available to provide evidence-based trauma-informed treatments. Fortunately, systemic barriers to access to care can be minimized through large-scale educationally based initiatives that encourage collaborations among professionals from diverse disciplines. One such national initiative, the National Child Traumatic Stress Network (<http://www.nctsn.org>), has been very successful in increasing the availability of evidence-based services for traumatized children and improving the quality of care for children and families throughout the United States.

Allocation of Resources

Although there has been increased recognition of the importance of supporting evidence-based social programs, political forces that operate do not always act in accord with this goal. The decisions of policy makers are governed by myriad issues, including program cost, input from constituents, the position of party leaders, public opinion, pressure from lobbyists, and their own political philosophies. Far too often, politically “favored” programs are held intact or allocated increased resources. At times, even scientific evidence that identifies iatrogenic effects of programs is ignored (Barlow, 2010). As researchers accrue more and more evidence regarding effective prevention and treatment programs for children who have been maltreated, it will be increasingly important that they strive to ensure that findings are disseminated to and incorporated into the funding decision process. However, that is not to say that funding should be eliminated to support efforts to develop new innovative programs. Unfortunately, it is all too clear that even programs with strong scientific support are not equally effective for all individuals. Moreover, despite decades of research dedicated to evaluating programs designed to foster positive outcomes for children faced with economic and familial disadvantage, many with favorable outcomes, the overall effect sizes for these programs remain within the small to moderate range (Shonkoff & Fisher, 2013). Moreover, some evidence-based models, although shown to be effective for a designated population, address only a small percentage of individuals in need. For example, although the outcomes for the Nurse-Family Partnership home visitation program have been shown to be effective in a number of important arenas, such as improving parental caregiving and child health and preventing child abuse and neglect (Kitzman et al., 1997; Olds, Henderson,

& Kitzman, 1994), it limits enrollment to first-time mothers who are identified during their first trimester of pregnancy. Because many young mothers living in poverty do not seek prenatal care, these inclusion criteria result in the ineligibility of significant numbers of very high-risk mothers. Therefore, although efforts to increase the availability of evidence-based programs should be applauded, it would be premature to conclude that resources should be directed only toward those programs that have been supported by rigorous evaluation. Rather, *funding should be eliminated for programs that have been shown to be ineffective* and resources should be *channeled toward a combination of evidence-based models and innovative approaches* designed to address unmet needs or to improve the magnitude of positive outcomes for vulnerable children and families.

Community-Wide Uptake

Most typically, the “evidence base” for programs is derived from university-based randomized control trials (RCTs). Although these approaches reflect the “gold standard” in the field, they are not without challenges with respect to dissemination into community settings (Sternberg, 2006; Toth & Manly, 2011). RCTs are conducted under very controlled and often ideal settings, including utilization of strict inclusion and exclusion criteria for participants that make them unrepresentative of those seeking mental health care in community settings. Unfortunately, and not surprisingly, when such social programs are disseminated into community settings, they yield not only low rates of utilization with respect to individuals eligible for such services, but also tend to be less effective due to issues such as lower credentialed and less experienced providers, lack of supervision, and failure to ensure fidelity of implementation (Dodge & Mandel, 2012). This has been referred to as the “scale-up penalty” and estimated at 50% (Welsh, Sullivan, & Olds, 2010). Moreover, some changes during dissemination are planned and do not always lead to the intended positive outcome, resulting in considerable variation in the effectiveness of programs provided as part of RCTs and those exported to community settings (Weisz & Jensen, 1999). The way in which an intervention is conceptualized is also very likely to contribute to whether a community is invested in providing it and adhering to its fidelity (Dodge, 2008). Therefore, in order to promote community uptake, it is critical to consider the ultimate goal of exportation from the initial conceptualization of an RCT. Loosening parameters around the inclusion/exclusion of participants,

for example, ultimately might result in the likelihood that the intervention can be disseminated more effectively (Toth, Pianta, & Erickson, 2010). Regardless, despite best efforts to ensure effective implementation of an evidence-based model in community settings, it is critical that evidence on fidelity of implementation and outcomes within a given community be assessed. For this reason, some advocate that legislation should provide a mandate for ongoing evaluation of federally funded programs once evidence-based models have been disseminated to communities and provide the funding to make such evaluation possible (Haskins & Baron, 2011).

Now that we have concluded our discussion of definitional considerations and etiological models of child maltreatment and addressed the psychological and biological sequelae accompanying maltreatment, as well as implications for intervention, translational research, and social policy, we turn our attention toward exciting future opportunities for those committed to continuing the journey to prevent child maltreatment and its deleterious consequences.

THE NEXT GENERATION: NEW FRONTIERS IN CHILD MALTREATMENT RESEARCH

It is clear that the experience of child abuse and neglect, and the concomitant poor quality care received, exert a harmful impact on the development and functioning of multiple biological and psychological systems across the life course. However, despite considerable progress in understanding the consequences of maltreatment, important frontiers remain to be discovered.

It is of paramount importance that rigorous and precise definitions of the maltreatment experience be incorporated into all investigations of child maltreatment. Unless this very basic goal is routinely achieved, it will be impossible to move forward in increasing convergent findings related to the sequelae associated with various subtypes and dimensions of maltreatment. Such coherence is particularly important when seeking to translate research from basic investigations into the design and evaluation of prevention and intervention trials.

Studies of psychopathology and mental health have largely neglected the period between adolescence and adulthood (Schulenberg, Sameroff, & Cicchetti 2004). This unfortunate omission is no less true in research that has been conducted on child maltreatment. Although early experience is critical, its influence on subsequent

psychopathology and mental health is highly likely to be moderated by later experience (Cicchetti & Tucker, 1994; Sroufe, 1997). The failure to adequately account for the effect that experiences during this critical transitional period may exert on future functioning becomes particularly problematic when the retrospective recall of adults is relied upon to gauge the effects of early maltreatment. The conduct of investigations on the transition to adulthood in individuals with histories of child maltreatment emerges as a largely untapped arena. In this regard, the examination of relevant stage-salient mechanisms that may be operative during this period is particularly important. Longitudinal research will be needed to provide vital information about how maltreated adolescents and adults resolve later stage-salient developmental issues such as identity formation, autonomy, the development of personal relationships, intimacy, and work.

Most investigations of the consequences of child maltreatment have examined neurobiological and psychological systems separately. The time has come to emphasize the conduct of longitudinal research that examines biological and psychological systems concurrently over developmental time. In addition to multilevel investigations in basic maltreatment research, the incorporation of multi-level measurement strategies into RCTs of interventions for individuals with histories of maltreatment will be particularly important (Cicchetti & Gunnar, 2008). Such strategies may highlight very divergent mediators and moderators of treatment outcome in individuals with the same disorder who have or who have not experienced maltreatment. Moreover, determining the multiple levels at which change is engendered through RCTs that incorporate biological and psychological assessments of intervention efficacy will provide more insights into the processes of change and the extent to which neural plasticity may be promoted.

It is important to conduct longitudinal neuroimaging studies of maltreated children and adolescents. Moreover, there is a paucity of neuroimaging investigations that focus on brain function (i.e., fMRI and magnetoencephalography [MEG]) in maltreated individuals. Likewise, it is essential that neuroimaging research includes community samples of maltreated persons. Most of these studies have been conducted on maltreated individuals residing in psychiatric hospitals. These samples present many challenges to disentangling the effects of maltreatment on brain structure and function from other competing conditions (e.g., comorbid psychopathology; substance abuse; medication; psychotherapy).

Although groups of abused and neglected children have been found to differ from groups of nonmaltreated children from similar social class backgrounds on the vast majority of the biological and psychological systems investigated to date, not all maltreated children are affected by their experiences in the same fashion. Despite experiencing significant adversity, there are maltreated children who develop in a psychologically resilient fashion.

Furthermore, the neurobiology of some maltreated children does not appear to be structurally or functionally aberrant and may be reflective of an enhanced neural plasticity in resilient individuals (Cicchetti & Curtis, 2006). It remains to be discovered whether the neurobiological structural and/or functional difficulties displayed by abused and neglected children are irreversible, or, if reversible, whether there are sensitive periods when it is more likely that neural plasticity can occur. In addition, investigations must be conducted that examine whether some neural systems may be more plastic than other neural systems or whether particular neural systems may be more refractory to change, or have a more time-limited window when neural plasticity can occur. Because the brain is a dynamic, self-organizing system that is mutable, future neuroimaging research should strive to ascertain whether the brain structure and functioning of resilient maltreated children differ from those of resilient nonmaltreated children.

Relatedly, because resilience is a dynamic developmental process, it is critical that short- and long-term longitudinal studies on the determinants of resilient functioning are conducted in the future. Resilient functioning is not immutable. Transitional “turning points” (Rutter, 2012) provide opportunities and challenges for individuals either to remain on a positive trajectory despite ongoing adversity, to “bounce back” from a decline in functioning, to persist on a maladaptive trajectory, or to exhibit a decline in functioning from positive functioning (Cicchetti & Rogosch, 1997). In these longitudinal investigations, resilience should be conceptualized as a multidomain, multidimensional construct. Changes in one domain of competent functioning can cascade to affect other developmental domains over time (Cicchetti & Tucker, 1994; Masten & Cicchetti, 2010). Hence, a longitudinal multiple levels of analysis approach to investigating resilient functioning in maltreated children will help to ensure that resilience processes are examined in a thorough and developmentally appropriate fashion.

Findings from examinations of resilience in maltreated children hold great potential for informing preventions and intervention initiatives. When indicators of resilience

are identified, they can be incorporated into the development of RCTs. The conduct of longitudinal investigations of resilience will be particularly important in ensuring that interventions are timed, guided, and implemented as closely as possible to the identification of deviations from adaptive functioning (Luthar & Cicchetti, 2000; Toth & Cicchetti, 1999).

Although the number of evidence-based interventions that are available to treat children and adults with histories of maltreatment has increased, the dissemination and wide availability of evidence-based models must be expedited. Toward this end, exportation to community settings and the subsequent conduct of effectiveness trials must be a priority for individuals involved with the development and conduct of RCTs demonstrating efficacy. Unless a commitment to dissemination is made upon the completion of successful efficacy trials, valuable treatments may languish in academic settings. In addition, far more evidence-based models are available for treating the aftermath of maltreatment than for preventing its occurrence. Therefore, more attention needs to be directed toward the development of interventions directed toward the prevention of maltreatment. The field also would benefit greatly from research targeted toward identifying factors related to stopping the transmission of maltreatment across generations so that protective factors could be built into interventions for families that are at risk for multigenerational maltreatment.

Future investigations of molecular genetic contributions to resilience also should pay more attention to the process of development (D). For example, G×E×D studies could provide valuable information about how a particular genotypic variant may operate differently depending on the developmental period or environmental context.

We possess virtually no information about the effects of child maltreatment in middle- or upper-socioeconomic environments. Maltreatment clearly transcends social class. Consequently, research on the developmental consequences of child maltreatment and on pathways to resilient adaptation in children raised in non-low-SES environments is important to conduct to discover similarities and differences in the development of resilient functioning across various social class strata. It would be interesting to ascertain whether family and community protective factors are more likely in middle-SES maltreating families than in maltreating families from the low-SES. Would any of the resources that are more common in non-low-SES maltreating families result in different pathways to maladaptive or resilient functioning, or to a significantly higher percentage

of resilient children? Nonmaltreated children in affluent backgrounds are not immune to developing substance abuse or psychopathology (e.g., depression). Indeed, youth from affluent families can even exhibit more problematic functioning than youth from the low-SES (Luthar & Barkin, 2012). Thus, comparison of maltreated children from different SES backgrounds may shed light on differential pathways to resilient functioning.

In view of the paucity of cohesive findings on race and ethnicity, it will be increasingly important for investigators to conduct research with diverse samples. Moreover, rather than simply utilizing demographics on race and ethnicity in a descriptive manner, examining possible differences among individuals with diverse backgrounds will be particularly important. In this regard, it is equally important to conduct multilevel research on the pathways to resilient adaptation in maltreated children from different cultures.

As discussed earlier, although findings on gender and maltreatment are beginning to emerge, this line of inquiry requires much more development. Given the attentional biases with respect to anger that have been identified in maltreated children, it is possible that boys and girls may vary in their reactions to different emotional expressions and that these differences could relate to the type of psychopathology that occurs. In a related vein, it is possible that gender differences may occur with respect to how maltreated children process and understand their abusive experiences and that these processes could vary by gender/subtype interactions. Both of these lines of research could ultimately possess implications for the development of intervention strategies.

Epigenetics, the study of heritable changes in gene function that do not alter the DNA sequence, but instead provide an extra layer of transcriptional control that regulates gene activity and plays an important role in the acute regulation of genes in response to environmental changes, is a promising avenue for both basic and intervention research on child maltreatment. Epigenetic research has the potential to serve as a mechanism to explain how maltreatment experiences confer risk for physical and mental health problems.

DNA methylation has been the most studied epigenetic mechanism in research on child abuse and neglect. Alterations in methylation, which manifest as changes in CpG (a site at which cytosine [C] resides next to guanine [G] in the DNA sequence) motifs, may persist in a stable form over a long time. Alterations in the structure of chromatin influence gene expression. Specifically, genes

are switched off when chromatin is silent, and they are switched on (i.e., expressed) when chromatin is active. These dynamic states of chromatin are controlled by a number of processes, including epigenetic patterns of DNA methylation. Individual differences in DNA methylation thus are a potential biomarker of the contributions that environmental factors make to the divergence in phenotypes of maltreated individuals who possess similar genetic endowments.

Several investigations have used a candidate gene approach to examine the effects of child abuse and neglect on methylation. Epigenetic regulation is a viable candidate mechanism through which caregiving behaviors, including child maltreatment, may exert long-term effects on HPA activity and neuronal function (Szyf & Bick, 2013). Candidate genes utilized in this regard to date include the serotonin transporter gene, the glucocorticoid receptor gene, and FKBP5 (the binding protein 5 gene). These studies have found that child abuse was associated with increased methylation in both the serotonin transporter and the glucocorticoid receptor genes (see Yang et al., 2013, for a review).

For example, Klengel et al. (2013) found that FKBP5, an important functional regulator of the stress hormone system, increased the risk of developing stress-related psychiatric disorders in adulthood through allele-specific (i.e., a particular functional polymorphism), childhood trauma-dependent DNA demethylation in functional glucocorticoid response elements of FKBP5.

Most investigations with humans have employed a candidate gene approach to identify specific sites of DNA methylation changes. Investigations that have utilized a genome-wide approach have found that these methylation changes occur at many gene loci. Research with animals who experience abuse demonstrates that experience-induced changes in DNA methylation occur in brain circuits that have functional relevance to trajectories of normal and abnormal behavior. Accordingly, experience-driven DNA-methylation changes in maltreated individuals also have implications for disruptions in neural circuitry and behavior (Szyf & Bick, 2013). Likewise, using salivary DNA specimens, whole-genome methylation differences have been found between maltreated and nonmaltreated children at 2,868 CpG sites. A substantial number of genes implicated in prostate, colorectal, breast, colon, and ovarian cancer were contained in the set of genes that showed differential methylation between maltreated and nonmaltreated children (Yang et al., 2013). These studies each focused on a site-specific gene and collected DNA from lymphoblasts

(Beach, Brody, Todorov, Gunter, & Philibert, 2011) or from whole postmortem brain tissue in maltreated adults who committed suicide (McGowan et al., 2009). The results of these investigations suggest that epigenetic mechanisms also may be associated with risk for developing major health problems in later life (Yang et al., 2013).

There is nothing that can be done to prevent the DNA sequence variations that eventuate in the emergence of risky phenotypes. On the other hand, DNA methylation changes in response to experiences such as child abuse and neglect could help to bring about the design, implementation, and multilevel prevention and intervention strategies that change the expression of risky genes through reversal or demethylation and thereby promote healthy physical and mental health development. Szyf and Bick (2013) concluded that DNA methylation adaptations early in life are system-wide and that they involve multiple gene circuits. Thus, because responses to social adversity such as child maltreatment are not limited to the brain and also likely affect peripheral tissues, it is also possible to assess the efficacy of an intervention in peripheral cells.

Prevention and intervention strive to alter the environment in order to bring about positive outcomes. Research on epigenetics suggests that prevention and intervention also may change the epigenome and that this also could result in improved outcomes. If researchers are to understand the processes through which early adverse experiences such as child maltreatment impart maladaptation, psychopathology, or resilience, then it is critical that genetic variation (functional polymorphisms) and epigenetic modifications are examined (cf. Klengel et al., 2013).

The knowledge base on the effects of child abuse and neglect has increased exponentially since the early stages of this research were initiated approximately 50 years ago. Technological advances open up more avenues for elucidating the mechanisms and processes that contribute to the deleterious consequences associated with maltreatment, and to the development of resilient functioning in the face of adversity, as well as for shedding light on the development and implementation of exciting and effective prevention and intervention strategies.

Despite vast increases in the knowledge base, far too many children continue to be victimized by child maltreatment and the toll of child maltreatment can last a lifetime. It is therefore critical that knowledge not only continues to increase, but also that the resulting information is disseminated to society more broadly. Only then will scholars have truly succeeded in addressing the lifelong tragedy that all too often accompanies child maltreatment.

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CHAPTER 14

A Social Perspective on Theory of Mind

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The capacity to attribute mental states to others has been studied in various disciplines, under a variety of different names: “folk psychology”; “common-sense psychology”; “mentalizing”; “social understanding”; “mindreading”; and, of course, “theory of mind” (Apperly, 2011; Carpendale & Lewis, 2004; Frith & Frith, 2003; Premack & Woodruff, 1978; Ratcliffe, 2007). Our use of the term *theory of mind* in this chapter does not signal an alliance with a particular theoretical perspective but is, instead, pragmatic. Although the terms “social understanding” and

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“folk psychology” encompass a wide range of psychological constructs, such as the ability to attribute emotions and feelings to an agent (e.g., Hughes, 2011) or to appreciate the influence of traits and biographical details on behavior (e.g., Morton, 1980), the term theory of mind usually refers more specifically to children’s understanding of epistemic and volitional mental states (i.e., beliefs and desires). Research in this field has thus centered on children’s (and, to a lesser extent, adults’) understanding of these two types of mental state; as a result, the understanding of these two types of mental state are key foci for this review chapter. The term theory of mind has, since its introduction to the literature on children’s cognitive development become very widely used in fields as diverse as

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philosophy of mind (e.g., Ratcliffe, 2007), comparative psychology (e.g., Emery & Clayton, 2009), neuroscience (e.g., Frith & Frith, 2003), psychopathology (e.g., Sprong, Schothorst, Vos, Hox, & Van Engeland, 2007), economics (e.g., Gummerum, Hanoch, & Keller, 2008), and literary theory (e.g., Zunshine, 2007). Many different explanations for this breadth of research interest in theory of mind can be offered. For developmental psychologists, young children's acquisition of a concept of mind is intrinsically impressive, in that it implies that children, like psychologists, speculate about the unobservable causes of behavior. Preschool children's awareness of mental states is all the more remarkable when one considers that at this age children can be deceived by the simple physical transformations (e.g., pouring liquid between differently shaped containers or rearranging an array of chocolate treats). Moreover, many preschool children also appear adept at applying their understanding of mind to engage in sophisticated social interactions such as joking, teasing, and cooperative pretend play. For researchers in other disciplines, the concept of theory of mind has been valuable in a variety of other ways. For example, success or failure in anticipating people's reactions to situations is pivotal to accounts of how fortunes are made and lost by players in either financial or the political sectors; likewise, literary success depends upon a writer's ability to enable readers to inhabit fictional characters' mental worlds. Interest in why people differ from one another in their ability to "read minds" and the extent to which these differences matter is therefore not limited to developmental psychology.

Our introductory section begins by outlining how the focus of research on theory of mind has shifted—from developmental changes and impairments associated with autistic spectrum disorder (ASD) to the origins of individual differences, to the integration of findings from different age groups, different cultural groups and a broader array of atypical groups. Next, this section considers corresponding shifts in theoretical accounts of development in theory of mind: the "big three" theories (that is, theory theory, simulation theory, and modularity); the individual differences perspective; and new alternative accounts that attempt to integrate findings from infancy and adulthood.

The second section is quite lengthy and divided into seven parts, devoted to distinct lines of research that provide converging evidence for social influences on children's understanding of mind. These strands of evidence include: investigations into the relative similarity of fraternal and identical twins on tests of theory of mind, studies of deaf children with hearing versus deaf parents, training

studies, longitudinal studies of relations between family discourse and theory of mind, studies of sibling influences on theory of mind, studies of how friends and peers may contribute to children's theory-of-mind skills, and cross-cultural comparisons of children's understanding of mind. The third section then turns to cognitive correlates of theory of mind or, more specifically, to the links between theory of mind and executive function (the set of higher order skills that underpin flexible, goal-directed thought and action) on the one hand and language ability (both semantic knowledge and mastery of different forms of syntax) on the other. Research on these parallel topics has been prolific and there are now meta-analytic reviews that enable researchers to examine the developmental claims more closely. The fourth section summarizes the relatively sparse literature on social and academic outcomes associated with individual differences in children's acquisition of a theory of mind. This is followed by a conclusion in which we identify overarching themes and key questions for future research in this field.

At this point it is worth noting three key ways in which our chapter differs from Carpendale and Lewis's chapter on social understanding, which appears in another volume of this *Handbook* (see Carpendale & Lewis, Chapter 10, Volume 2). First, as described above, we will focus on research into children and adolescents' understanding of beliefs and desires; in contrast, Carpendale and Lewis spread their net more widely to include a more diverse set of skills, including skills (such as gaze-monitoring and pointing) that emerge during infancy. Second, whereas our focus is upon the causes and consequences of individual differences in understanding mind, Carpendale and Lewis focus on normative patterns of development. Third, while Carpendale and Lewis devote considerable space to theoretical debates in this field, our goal is to provide a comprehensive review of the evidence to support a social perspective on individual differences in theory of mind.

Also worth noting is that (unless explicitly stated otherwise) much of the research on theory of mind has been based on middle-class, Western samples. Although there have been efforts to extend the scope of theory-of-mind research beyond these narrow confines (e.g., Hughes et al., 2005; Liu, Wellman, Tardif, & Sabbagh, 2008), this remains a clear challenge for future research in the field.

For consistency, we will use the terms "weak," "moderate," and "strong" to describe effect sizes throughout this chapter. Using the metric of Pearson's *r*, weak effects range

between .10 and .29, moderate effects range between .30 and .49, and strong effects are those greater than .50 (Ellis, 2010). Where available, we will report the actual magnitude of effect sizes from relevant meta-analyses.

HISTORICAL AND THEORETICAL PERSPECTIVES

Before examining historical and theoretical shifts within theory-of-mind research, it is worth considering the origins of developmental psychologists' interest in children's understanding of others' minds. Indeed, research on children's ability to appreciate others' perspectives can be traced back to Piaget's work on children's social egocentrism (Piaget, 1959) and understanding of three-dimensional space (Piaget & Inhelder, 1956). Using children's naturally occurring conversations and experimental tasks (such as the "Three Mountains Task"), Piaget argued that young children struggle to appreciate the perspectives of their conversational partners (Piaget, 1959) and fail to identify what other people can see when looking at the same scene from different vantage points (Piaget & Inhelder, 1956). Later work, undertaken by Flavell and colleagues (e.g., Flavell, Everett, Croft, & Flavell, 1981) brought experimental rigor to the study of children's perspective taking and led to a distinction between recognizing what others can and cannot see (Level 1 perspective taking) and the ability to appreciate that the same object can appear differently to those with different points of view (Level 2 perspective taking). Note that these early investigations focused mainly on children's understanding of others' perceptual mental states, which, arguably, does not require an appreciation of others' mental states. That is, visual perspective taking involves taking someone else's point of view in the literal sense and can simply be achieved using visuospatial skills (e.g., Baron-Cohen, Leslie, & Frith, 1985; Donaldson, 1978) without being able to know or understand that another person is representing something (Gopnik & Wellman, 1992). Although developmental research on theory of mind can be viewed as a continuation of the Piagetian tradition of research on childhood egocentrism (Flavell, 2004), it is not simply "old wine in new bottles" (Carpendale & Lewis, 2006, p. 24). The theory-of-mind research enterprise can be distinguished from what came before by its emphasis on directly testing children's ability to attribute epistemic mental states (as opposed to perceptual mental states), in particular knowledge and beliefs, to others (Baron-Cohen et al., 1985).

Landmark Studies That Launched Theory-of-Mind Research

Premack and Woodruff (1978) first coined the term "theory of mind" in a study of chimpanzees' understanding of mental states. Academic peer commentaries on this study also had a seminal influence on the field. In particular, Dennett (1978) outlined the minimal requirements for an empirical test to demonstrate that a person or animal possessed a theory of mind. In doing so, Dennett drew upon casual observations of young children's reactions to watching "Punch and Judy" shows and in particular their excitement when they knew something that Punch did not know (e.g., when Punch thinks Judy is still in the box but they know she has escaped). In order to rule out alternative explanations (such as habit or association) and so credit a child (or animal) with having beliefs about another's beliefs, Dennett argued that the child must be able to predict or explain the behavior of an agent who has a mistaken (i.e., false) belief about the circumstances and sketched out a scenario in which this ability could be tested. This object-transfer false-belief scenario would become the litmus test for crediting humans (or animals) with having a theory of mind.

Within developmental psychology, the term "theory of mind" first emerged in studies of children's natural language (e.g., Bretherton & Beeghly, 1982) that were directly influenced by the Piagetian tradition (e.g., Piaget, 1959). Two landmark studies provided a crucial departure from this tradition. In the first of these, Wimmer and Perner (1983) developed a child-friendly version of Dennett's (1978) object-transfer scenario in order to establish the age at which children could be credited with attributing beliefs to others. Their story involved a protagonist (Maxi) who placed some chocolate in one location and then departed. During his absence, a second character (Maxi's mother) moved it to another location. Children were asked a test question (Where will Maxi look for the object when he returns?) and two control questions, included to ensure participants were able to remember the original location of the object and had correctly followed the story and so knew the object's actual location. Wimmer and Perner (1983) found that, despite performing similarly on the control questions, 4- to 5-year-olds performed significantly worse than 6- to 9-year-olds on the prediction question, with only 33% of the former group passing compared with 92% of the latter group. Given the strong association between age and task performance, the authors concluded that, between the ages of 4 and 6, children develop the ability to understand another's false beliefs.

The second landmark study provided support for the validity of the false-belief task. Baron-Cohen et al. (1985) gave three groups of children (typically developing children, children with autism spectrum disorder [ASD], and children with Down syndrome), all with a verbal mental age above 4 years, a modified version of Wimmer and Perner's (1983) object-transfer task that involved two child characters: Sally and Ann. These three groups all performed well on the reality and memory control questions, but just 20% of the children with autism (as compared with over 80% of the children with Down syndrome and typically developing children) passed the false-belief test question. These findings provided vital support for the ecological validity of the false-belief task and offered a new cognitive account of the marked social impairments associated with ASD. That is, without the ability to attribute mental states, engaging with others becomes very difficult; as a result, it appeared that a specific impairment in the cognitive architecture needed to attribute mental states might underpin a diverse array of social difficulties.

The “First Wave”: Developmental Changes and Impairments in ASD

In this summary of the key trends in developmental research on theory of mind, we borrow Dunn's (1999) “waves” metaphor. Rather than demarcating discrete historical periods, these waves mark temporally overlapping research trends. The “first wave” of theory-of-mind research within psychology adopted a dual focus on: (a) the age at which a typically developing child could be credited with having a theory of mind and (b) the study of what was later called the “Mindblindness” theory of ASD (e.g., Baron-Cohen, 1995). Addressing the first of these points, Wellman, Cross, and Watson (2001) conducted a meta-analysis of 178 studies (representing > 4,000 participants) of children's performance on a range of different false-belief tasks (measuring children's understanding of others' mistaken beliefs about the contents of a prototypical box, the location of an object, or the apparent identity of a familiar object) that confirmed a dramatic improvement between the ages of 2 and 5 years (regardless of whether children had to attribute false beliefs about an object's location, appearance, or contents). Specifically, the meta-analysis showed that about 50% of children pass the false-belief task at 44 months, as compared with 75% at 56 months, such that the odds of passing the false-belief task increase almost threefold with every year's increase in age. Alongside tests of false-belief comprehension, other studies included

measures of putative “precursors” to theory of mind. These included behavioral measures, such as protodeclarative pointing (i.e., pointing to draw someone's attention to an object of interest as opposed to “protoimperative” or instrumental pointing in which the goal is to obtain a desired object) and experimental tasks designed to tap children's understanding of other mental states such as desires and knowledge (e.g., Carpenter, Nagell, & Tomasello, 1998; Wellman & Liu, 2004). A comprehensive overview of the origins of social understanding in infancy is provided in another volume of this *Handbook* by Carpendale and Lewis (see Carpendale & Lewis, Chapter 10, Volume 2).

The “Mindblindness” account of ASD, although not unchallenged (e.g., Russell, 1997), continues to have a prominent influence on research (e.g., Senju, Southgate, White, & Frith, 2009), galvanizing neuropsychological studies and prompting a reconsideration of other complex disorders such as conduct disorder (e.g., Hughes, Dunn, & White, 1998) and schizophrenia (e.g., Corcoran, Mercer, & Frith, 1995). Research interest in theory of mind in ASD also gave rise to the first attempts to study the neural basis of theory of mind (e.g., Happé et al., 1996). Neuroimaging studies have converged upon a circumscribed set of structures, most notably the medial prefrontal cortex, superior temporal sulcus, and temporoparietal junction, that activate during a range of theory-of-mind tasks (Frith & Frith, 2003). The neuroscientific research on social understanding is also covered in more detail by Carpendale and Lewis (see Carpendale & Lewis, Chapter 10, this *Handbook*, Volume 2).

The “Second Wave”: Individual Differences in Theory of Mind

In a pioneering paper, Dunn, Brown, Slomkowski, Tesla, and Youngblade (1991) argued that the focus on age-related changes in children's theory of mind had led investigators to overlook the potential importance of individual differences as predictors of children's social development. A key feature of this second wave was a shift away from small-scale studies of homogeneous (middle-class) samples of children categorized as theory-of-mind “passers” or “failers” on the basis of performance on a single task. Instead, adopting a psychometric approach, studies began to include both larger and more diverse samples and batteries of tasks. This task-battery approach is more sensitive to variation in performance and enables one to construct aggregate measures that are more reliable than individual task scores (Rushton, Brainerd, & Pressley,

1983). For example, task batteries that include multiple measures of false-belief understanding (e.g., the classic change of location task, the unexpected contents task, belief-emotion tasks, and second-order false-belief tasks) have good internal consistency and test-retest reliability in young children (Hughes et al., 2000; Wellman et al., 2001). Moreover, studies using confirmatory factor analysis have revealed that together these measures load onto a single latent false-belief understanding factor (Hughes et al., 2014; Hughes, Ensor, & Marks, 2011). This approach led to evidence that challenged early “watershed” models (that emphasized dramatic changes in children’s understanding between children’s third and fourth birthdays), documenting instead striking variation in preschoolers’ performance on theory-of-mind tasks that was robustly related to a variety of both cognitive and social factors (described in detail in later sections of this chapter). However, the scarcity of developmentally appropriate theory-of-mind tasks for older children and adolescents has constrained research on the origins and consequences of individual differences in theory of mind beyond the preschool years. Related to this developmental gap is a conceptual gap, regarding the *nature* of individual differences in theory of mind beyond the preschool years (Apperly, 2012).

The “Third Wave”: Expanding the Developmental Scope

Research on theory of mind continues apace and a new trend in this field, which might be called a “third wave,” is an expansion of the developmental scope both downward into infancy (e.g., Onishi & Baillargeon, 2005) and upward into adulthood (e.g., Apperly, Samson, & Humphreys, 2009). Although there is a long history of interest both in testing the lower boundaries of theory-of-mind understanding in young children (e.g., Clements & Perner, 1994) and in exploring whether adults with ASD (e.g., Happé, 1994) or schizophrenia (e.g., Corcoran et al., 1995) display deficits in theory of mind that are similar to those shown by children with ASD, since 2005 research has sought to revise the established timetable for the emergence of theory of mind (e.g., Baillargeon, Scott, & He, 2010). Using paradigms based on classic false-belief tests, researchers have studied children’s spontaneous responses (e.g., using the violation-of-expectations paradigm) and reported that children as young as 15 months look reliably longer when an agent behaves in a way that contrasts with his or her beliefs about the true state of affairs (e.g., an agent reaches to a box to obtain an object despite being unaware that the

object was transferred to that box) (Onishi & Baillargeon, 2005). In a similar departure from the traditional focus on theory-of-mind development in preschoolers, researchers have begun to examine theory of mind in middle childhood (e.g., Banerjee, Watling, and Caputi, 2011), adolescence (e.g., Dumontheil, Apperly, & Blakemore, 2010) and adulthood (e.g., Apperly, 2011). Studies of adults provide both useful information on the end-point of theory-of-mind development and an opportunity to reevaluate theories about the relations between theory of mind and other aspects of cognition (Apperly et al., 2009). The third wave thus opens up exciting new possibilities for extending the developmental scope of theory-of-mind research and reassessing existing theoretical accounts of theory of mind.

Theoretical Accounts of the Development of Theory of Mind

Over the past four decades, researchers have adopted a variety of different theoretical frameworks to explain the development of theory of mind.

The “Big Three”: Prominent Early Theories of Theory of Mind

Early findings within research on theory of mind were discussed in light of three competing accounts: “theory theory,” simulation theory, and modularity theory. According to the first of these camps, human understanding of other minds is “theory-like” in nature in that mental-state concepts are unobservable theoretical entities that can be used to predict behavior (Carruthers & Smith, 1996; Morton, 1980). Moreover, the acquisition of a theory of mind is held to involve a sequence of theoretical or conceptual changes from being able to explain action with recourse to simple nonrepresentational internal states such as desires, to being able to predict behavior on the basis of representational mental states such as beliefs (Gopnik & Wellman, 1992). Researchers have also speculated about the processes underpinning change in children’s theories about the mind, and indeed other aspects of their world; candidate processes include both informal experimentation and the detection of statistical information about event contingencies (Gopnik & Wellman, 2012).

In contrast, simulation theorists argued that the ability to understand others hinges upon being able to apply first-hand experience in order to imagine (or simulate) what another is feeling or thinking (Harris, 1989). That is, rather than resorting to theorizing about the relations between mental states and behavior, children and adults

could use a “like me” analogy to make an imaginative leap into the minds of others based on the mental states they themselves experienced every day (Harris, 1989; 1991; Meltzoff, 2007). Within this perspective, improvements in performance on false-belief tasks reflect children’s growing ability to override their own mental states, to imagine states of affairs that do not correspond to those at hand, and to detect regularities in their experiences of mental states in order to run more complex simulations (Harris, 1991).

During the 1980s and 1990s, simulation theory and theory theory (or some hybrid of the two) were, for most philosophers (and indeed many developmental psychologists), the only games in town (e.g., Carruthers & Smith, 1996). However, as new data about the theory-of-mind impairment in autism emerged, support grew for a modular account of theory of mind (Leslie, 1991; Baron-Cohen, 1995). In contrast to the constructivist position espoused by some theory theorists and simulation theorists, the modular account proposed that the ability to reason about mental states is an innate, domain-specific skill (Leslie, 1991). That is, it proposed that children and adults are hard-wired to track the mental states of others and improvements in understanding mind emerge as a series of specialised, possibly innate modules (capable of processing different types of mental states) come online with age (Baron-Cohen, 1995). From this perspective, the peripheral demands of traditional false-belief tasks mask children’s early emerging ability to reason about mental states (Carruthers, 2013), whereas the failure of children with ASD on such tasks provides evidence for a domain-specific module for mental-state reasoning (Leslie, 1991).

Despite voluminous data on the acquisition of false-belief understanding, the polemical debates about theory theory, simulation theory, and modularity theory have yet to be resolved (e.g., Moses, 2001; Scholl & Leslie, 2001). As we will see later, interest in modular accounts (or at least the early emergence perspective) of theory of mind has remained strong (e.g., Carruthers, 2013). In contrast, some theorists have criticized theory theory and simulation theory on the grounds that the core claims of these accounts, that individuals use either first-person experience or appeal to a theoretical framework when reasoning about others’ mental states, are notoriously difficult to test using behavioral methods (e.g., Hughes, 2011).

Individual Differences in Theory of Mind

Broadly speaking, individual differences in theory of mind can be viewed in two different ways. On the one hand, this variation may simply reflect delays or precocities in

the *onset* of understanding mental state concepts (e.g., Slaughter & Repacholi, 2003). This account hinges on the assumption that “late starters” will eventually “catch up” with their peers and that variation in performance will not differentiate people beyond early childhood (Bartsch & Estes, 1996; Wellman et al., 2001). On the other hand, individual differences in theory of mind may reflect genuine qualitative variation between individuals in their sensitivity, motivation, or capacity to explicitly reason about others’ mental states (Apperly, 2012; Bartsch & Estes, 1996; Hughes, 2011). In support of this “genuine variation account,” individual differences in theory of mind show remarkable longitudinal stability in the preschool and early school years (e.g., Astington & Jenkins, 1999; Hughes et al., 2011) and across middle childhood (Banerjee et al., 2011; Caputi, Lecce, Pagnin, & Banerjee, 2012; Lecce, Zocchi, Pagnin, & Palladino, 2010). Moreover, evidence is accumulating that these individual differences are not trivial and show consistent associations with different aspects of cognition and social adjustment.

Emerging Accounts of the Development of Theory of Mind

As noted earlier, Onishi and Baillargeon (2005) used the violation-of-expectations paradigm to construct a nonverbal variant of the standard false-belief task and found that 15-month-old infants looked reliably longer when an actor reached for an object in a location in which it had not previously been seen. Subsequently, Southgate, Senju, and Csibra (2007) demonstrated that 24-month-old children’s anticipatory looking indicated an awareness of an actor’s mistaken beliefs. Using a variety of looking-based measures and active helping paradigms, numerous studies of infants and young toddlers have revealed similar findings (e.g., Buttelmann, Carpenter, & Tomasello, 2009; Scott & Baillargeon, 2009) that collectively present a paradox: Infants seem to understand others’ false beliefs, whereas preschool children do not.

Despite long-standing criticisms about the appropriateness of looking paradigms for investigating higher-level cognition (e.g., Haith, 1998), these findings have injected new life into previous theoretical debates. The literature in this field can be divided into four camps that highlight: (1) early competence, (2) behavior rules, (3) distinctions between implicit and explicit forms of knowledge, and (4) dual systems. According to early competence theorists, the findings from traditional tasks are, quite simply, misleading and mask a much earlier genuine competence in mindreading (Baillargeon et al., 2010; Carruthers, 2013).

Baillargeon et al. (2010) proposed the “response account” to explain the discrepancy between the performance of infants and preschoolers. According to this hypothesis, standard false-belief tasks require children to: (a) represent another’s false belief, (b) access this representation to select a response, and (c) inhibit their own knowledge about the true state of affairs. In contrast, new minimally verbal looking tasks, or “spontaneous response tasks,” require only the first of these processes to achieve success. This account does not necessarily support a nativist position (Luo & Baillargeon, 2010). Like Baillargeon et al. (2010), Carruthers (2013) explains the gap between infancy and preschool in terms of the demands imposed upon children by traditional measures of theory of mind. For Carruthers (2013) however, early competence on spontaneous response tasks provides compelling support for the modular account of theory of mind and more specifically for an innately specified mindreading mechanism.

The second “behavior rules” camp offers a much leaner interpretation of findings from the new generation of tasks in which success on spontaneous response tasks does not require the ability to represent others’ mental states. Instead, children can rely on causally shallow behavior rules (e.g., people look for objects where they last saw them) that capture statistical regularities in behavior without having to consider mental states as mediators of behavior (Low & Perner, 2012; Perner, 2010; Perner & Ruffman, 2005). Thus performance on spontaneous response tasks reflects early emerging subconscious awareness of behavioral contingencies whereas performance on standard tasks reflects a later developing genuine understanding of mental states (Perner, 2010). Support for the idea that these two types of task tap into distinct abilities comes from the finding (from several different cultures) that 3- to 4-year-olds pass diverse false-belief tasks at the same time and so display considerable flexibility in mental-state reasoning (Perner & Ruffman, 2005). Until studies adopting a within-subjects design can demonstrate a similar flexibility in infants, many existing results can be interpreted quite parsimoniously using behavioral rules (Low & Perner, 2012; San Juan & Astington, 2012).

Within the third camp, the discrepancy in performance between infants and preschoolers on spontaneous response tasks and standard false-belief tasks illustrates a distinction between two distinct *forms* of knowledge: an implicit, tacit sensitivity on the one hand and an explicit, conscious understanding on the other (Clements & Perner, 1994; Perner & Roessler, 2012). For example, Perner and Roessler (2012) have argued that infants’ and toddlers’ performance on

indirect tasks reflects an implicit understanding of belief based upon keeping track of what agents perceive using an experiential record, which is triggered by the agent’s return to the scene. In contrast, experiential records are insufficient for success on standard tasks, which require children to make a deliberate shift to a different perspective.

The fourth and final account builds upon theories from other aspects of cognitive development (e.g., numerical cognition) by positing a two-system solution (Apperly & Butterfill, 2009). That is, separate cognitive mechanisms are held to underpin infants’ performance on spontaneous response tasks and older children’s (and adults’) performance on traditional measures of theory of mind (Apperly, 2011). Specifically, early-emerging, automatic but inflexible processes could underpin success on spontaneous response tasks, but later-emerging, flexible and effortful processes are needed for success on standard measures of theory of mind (Apperly & Butterfill, 2009).

Currently, there is sparse direct empirical evidence available to test these four emerging theoretical accounts, highlighting the close interplay between method and theory. In particular, the hegemony of the false-belief task led to a narrow focus on the preschool years. By expanding the repertoire to include new indirect measures for assessing mental state understanding in infancy and toddlerhood on the one hand and complex or “advanced” measures of theory of mind for school-aged children, adolescents, and adults on the other hand, researchers have opened up the field for testing the validity of existing theoretical accounts across different stages of the life span as well as developing new theoretical accounts that encompass processes underpinning the *use* of theory of mind as well as the acquisition of theory of mind (e.g., Apperly, 2011).

SOCIAL INFLUENCES ON THEORY OF MIND

Two early lines of evidence supported a nativist perspective of theory of mind. First, children with (highly heritable) ASD were found to show marked delays in their understanding of false belief (Baron-Cohen et al., 1985). Second, early experimental studies indicated that typically developing preschoolers make rapid improvements in their understanding of false belief, supporting a “watershed” model in which cognitive structures come “on-line” with little to no support from social factors. However, subsequent studies indicated that different mechanisms are likely to underpin false-belief task performance in atypical

and typically developing preschoolers: although both deaf children and children with ASD often fail false-belief tasks but pass false-photo tasks (which assess children's understanding of nonmental representations by asking them to point out the location of an object in an unseen photograph taken before the object was moved), performance on the false-photo and false-belief tasks is concordant for typically developing preschoolers (Peterson & Siegal, 1998). In addition, over the past two decades, researchers have developed tasks suitable for a wide age range (from infancy through to late adulthood) and the results from this work suggest a much more gradual and protracted pattern of developmental change in children's understanding of mind (e.g., Devine & Hughes, 2013). Together, these findings challenge an entirely nativist account of theory of mind acquisition, such that there is now growing interest in the possibility of social influences on typically developing children's understanding of mind.

In this section, we use the metaphor of the seven pillars of wisdom from the Book of Proverbs to argue that advances in the rigor and scope of research in this field have led to seven lines of evidence that support the importance of social experiences for the development of and individual differences in children's understanding of mind. Before presenting each of these "pillars" it is worth noting that early optimism within research into genetic influences on individual differences has been followed by decades of disappointing results, such that theorists (e.g., Joseph, 2012) have begun to challenge the wisdom of searching for elusive genes, rather than improving the rigor with which environmental influences are investigated. As argued by Bronfenbrenner (1979), development occurs within a nested system of interacting environments extending out from the person's immediate setting (e.g., home, preschool) to the larger cultural milieu. We will demonstrate how research on individual differences in theory of mind has begun to elucidate how these various levels of environmental influence might shape children's understanding of others' minds. Before making developmental claims about the links between children's social environments and the emergence of theory of mind, it is first worth considering the type of evidence needed to make causal claims about development. As argued by Bryant (1990), testing a developmental account about the relation between any two measurable constructs requires both longitudinal data (to assess naturally occurring but not necessarily causal links between earlier and later constructs) and experimental training data (to establish causal but not necessarily naturalistic links between two constructs). On

this account, cross-sectional data alone provide insufficient evidence to make a causal developmental claim and longitudinal and training data can each provide only partial support for a developmental account. However, converging evidence from these three sources can provide a compelling case to support a causal developmental theory. With this point in mind, we will now consider the seven lines of evidence for links between children's social environments and theory of mind.

First, whereas early studies typically administered just one or two tasks to small homogeneous samples, since the year 2000 studies have focused on individual differences by administering task batteries to larger and more diverse samples, including samples of twins. As a result, researchers have been able both to demonstrate striking variation in children's performance on tests of theory of mind and to investigate directly the relative salience of genetic and environmental influences on this variation in performance (e.g., Hughes et al., 2005). *Second*, studies comparing deaf children born to hearing parents versus deaf parents have shown that the former group (but not the latter group) are also markedly delayed in acquiring a concept of false belief. This finding provides compelling evidence that early conversational environments can facilitate children's mastery of an explicit representational understanding of mind (Peterson & Siegal, 1995). *Third*, researchers have begun to conduct training studies that examine the effects of social experiences (such as mental-state discourse) on theory of mind. *Fourth*, the recognition of variation in children's understanding of mind provided a platform for integrating research on socio-cognitive development (with its emphasis on developmental milestones) and research on children's attachment relationships with caregivers (with its emphasis on individual differences). This led to a useful cross-fertilization of ideas—for example, regarding how constructs such as maternal sensitivity might contribute to variation in children's understanding of mind has produced a refinement in our understanding of what is meant by maternal sensitivity, resulting in a new focus on mothers' reflective functions (e.g., Fonagy & Target, 1997) or "mind-mindedness" (Meins et al., 2003). The adoption of longitudinal designs using cross-lagged analyses has permitted researchers to tease apart the direction of effects of these variables on theory of mind (Ensor & Hughes, 2008; Ruffman, Slade, & Crowe, 2002). *Fifth*, the original debate between theorists who adopted observational versus experimental approaches to assessing children's understanding of mind (characterized as a debate between "boosters" versus "scoffers"—Chandler, Fritz, & Hala, 1989) has

been replaced by research in which these two approaches are integrated, providing clear evidence of robust links between variation in children's understanding of mind and individual differences in their relationships with other family members, notably siblings (Dunn, Brown, & Beardsall, 1991; Hughes, Marks, Ensor, & Lecce, 2010) and in the content and quality of family conversations (Jenkins, Turrell, Kogushi, Lollis, & Ross, 2003). *Sixth*, although numerous studies have explored how developments in theory of mind might facilitate children's interactions with friends and peers (e.g., Hughes et al., 2011), a small but growing body of research has investigated how friends and peers may contribute to children's understanding of mind. *Seventh*, early studies were largely restricted to the Western world, but the past decade has seen a marked growth in studies of non-Western populations that suggest significant cultural contrasts in the timing (and perhaps the sequence) of milestones in children's understanding of mind (e.g., Liu et al., 2008).

Before considering each of the above pillars, two theoretical points deserve mention. First, sociocultural perspectives on theory of mind have a long history (Gauvin, 1998). The phrase "folk psychology" was actually coined by Wundt (1900/1921), who argued that higher order functions (e.g., remembering, reasoning, learning—*völkerpsychologie*) emerge from group experiences. Moreover, in their landmark paper outlining the "epistemic triangle" between child, social partner, and object of knowledge and calling on researchers to focus on the social aspects of young children's social understanding, Carpendale and Lewis (2004) drew on the work of three classical theorists: Piaget, Vygotsky, and Wittgenstein (e.g., Piaget, 1928; Vygotsky, 1978; Wittgenstein, 1958). Similarly, in a seminal paper that applied an attachment theory perspective to simulation theorists' accounts of how children acquire a concept of mind, Fonagy and Target (1997) both drew on Cooley's (1902) early work on children's developing sense of self and work conducted in the late 1970s on attachment and children's expectations of behavior (e.g., Lamb, 1981). Second, although researchers have, for many years, focused heavily upon interactions with caregivers (and, more specifically, mothers), there are good grounds for attending to children's interactions with other social partners; in particular, with children both within and outside the family. Again, this approach has a long pedigree, resting as it does on Piaget's (1932) work on children's disagreements with peers as a source of moral development. However, advances in assessing mental state awareness in middle childhood have allowed theorists to begin to

consider whether, as children grow up, relationships with other children come to eclipse relationships with parents as a source of influence on their understanding of mind (Humfress, O'Connor, Slaughter, Target, & Fonagy, 2002). Reflecting this view, the sections below begin with experimental work that provide good evidence for social influences on children's understanding of mind and then, reflecting an ecological systems approach (Bronfenbrenner, 1979), consider evidence not only for maternal influences but also for influences of siblings, friends, and culture.

Studies of Environmental and Genetic Influences on Theory of Mind

Comparing identical and fraternal twins for similarity in any given trait serves as a simple natural experiment for assessing the relative magnitude of genetic and environmental effects. However, within this field of research at least two caveats deserve note. First, environmental influences are often nonlinear in their effects and so the power of a twin study to detect environmental influences depends on type as well as size of sample (e.g., is the bottom end of the scale sufficiently well represented?). This is important because the contrast between neglectful/abusive versus adequate environments is much more important than that between adequate versus high quality environments ("good enough" parenting is, by definition, just that). Second, twin studies provide only a snapshot picture: The same sample may yield different estimates of genetic and environmental influences at different points in development (e.g., if contact with other children is important for children to develop an understanding of mind, then social influences may well increase in magnitude following the transition to school). Together, these factors help to explain why the first two twin studies of theory of mind yielded contrasting results.

Specifically, Hughes and Cutting (1999) gave a battery of theory-of-mind tasks to a volunteer sample of 119 pairs of same-sex 3.5-year-old twins and reported a heritability estimate of .67, suggesting strong genetic influence on variation in task performance. In a later study involving a much larger (and socially much more diverse) sample of 1,116 same-sex pairs of 5-year-old twins, Hughes et al. (2005) found that nongenetic factors accounted for 93% of the variance in total scores. The simplest explanation for this contrast is that the first study was underpowered. However, later findings suggest that the between-study contrast in sample age may also have been important.

Specifically, in a large study of over 5,000 twin pairs followed at ages 2, 3, and 4 years, Ronald, Happé, Hughes, and Plomin (2005) found that individual differences in parent-reported mentalizing (i.e., ratings of behaviors such as joking or lying that require mental-state awareness) showed moderate genetic influence (heritability estimate ranged from .25 to .57). In contrast, a much smaller study ($N = 388$ same-sex twin pairs) of 9-year-olds who completed the Strange Stories test of theory of mind (Happé, 1994) showed that environmental factors accounted for 88% of the variation in task scores (Ronald, Viding, Happé, & Plomin, 2006). Viewed together, the findings from these studies show interesting points of convergence and contrast. For example, the two studies of school-aged children involved different tasks and samples of different ages and yet both showed a robust effect of environment on individual differences in understanding of mind among typically developing children.

Alongside developmental shifts in the relative salience of genetic and environmental influences on children's understanding of mind, it is worth noting that twin studies are open to several different lines of external criticism. Although researchers involved in behavior genetic studies typically rebut some critiques (notably, the assumption that identical and fraternal twins share equally similar environments), there are some limitations that are generally accepted even by behavior geneticists. In particular, twin studies are not informative with regard to the exact processes involved and assume an additive relationship between genetic and environmental influences. This assumption is significant as there is now substantial evidence for genotype–environment interactions (e.g., Caspi et al., 2003). These limitations have led researchers to move beyond twin studies by adopting a molecular genetic approach in order to identify DNA polymorphisms to conduct more detailed examinations of genetic and environmental influences on individual differences in a wide range of traits and abilities (Plomin, DeFries, McClearn, & McGuffin, 2008). As yet however, molecular genetic research in the field of theory of mind is thin on the ground. In one study, Lackner, Sabbagh, Hallinan, Liu, and Holden (2012) found that children with the shorter allele for the dopamine D4 receptor gene (DRD4) outperformed children with the longer allele and so suggested that DRD4 polymorphisms may underpin genetic influences on theory of mind. Challenging this view, however, findings from a separate study indicate that ASD is associated with a polymorphism of the serotonin transporter promoter region but not of the DRD4 gene (Yirmiya et al., 2001). Molecular genetic

research opens up the possibility of examining whether specific functional polymorphisms moderate the effects of environmental experiences on individual differences in theory of mind. Functional polymorphisms in the dopamine receptor gene (DRD4) and the serotonin transporter gene (5-HTTLPR) have been implicated as genetic moderators of parenting and childcare influences on a variety of outcomes in childhood (e.g., behavior problems, internalizing symptoms) (Belsky et al., 2009). It is therefore conceivable that such genetic polymorphisms might result in differential susceptibility to the effect of mental-state talk on individual differences in theory of mind, for example. In seeking to explain how polymorphisms of the DRD4 gene might contribute to individual differences in theory of mind, Lackner et al. (2012) proposed that dopaminergic pathways might regulate children's ability to learn from social experiences. Indirect support for this proposal comes from a study in which children's ability to adapt to a non-social task (smoothly lifting a deceptively heavy object) was found to predict theory-of-mind performance, even when effects of age and executive function were controlled (Sabbagh, Hopkins, Benson, & Flanagan, 2010), suggesting that variations in children's domain-general abilities to revise conceptual structures in response to experience contribute to individual differences in theory of mind.

In sum, studies that have adopted genetically sensitive designs have produced complex findings. First, the relative salience of genetic and environmental influences on theory of mind appears to shift with development. Evidence for environmental influences on theory of mind is stronger in studies of older children. One explanation for this might be that individual differences in social experiences become more marked as children grow up and widen their social horizons. Note also that children's early social experiences are often restricted to interactions with family members, such that genetic and environmental influences co-vary; in contrast, as children spend more time with friends and peers, these two sources of influence become more distinct. Second, although very few studies have examined the molecular genetics of theory of mind, extant findings suggest that distinct genetic influences contribute to normative variation in theory of mind and ASD. This biological contrast adds to the between-group contrast (noted earlier) in profiles of performance on false-photo and false-belief tasks and indicates that researchers should be cautious in extrapolating findings from ASD to typically developing children. Below we turn to another atypical group: children with hearing impairments.

Deafness and Theory of Mind

About one in every 1,000–2,000 children in the United Kingdom is born with a hearing impairment: 96% of these deaf children are born to hearing parents (“DoH”), but a minority are born to deaf parents (“DoD”) who are fluent signers (Mitchell & Karchmer, 2004). Just as twin studies provide a natural experiment for assessing the magnitude of genetic and environmental influences, a comparison of these two groups of deaf children, with their markedly different linguistic experiences, provides an intriguing natural experiment for studying the effects of conversational exposure on children’s understanding of mind. Before reviewing this literature, it is worth noting that delayed mentalizing skills have also been reported for children with *visual* (rather than hearing) impairments (e.g., Minter, Hobson, & Bishop, 1998). However, the literature in this area is much sparser, reflecting the much lower prevalence of congenital visual impairments (e.g., the estimated prevalence in the United Kingdom is 0.1 per 1,000; Gilbert, Anderton, Dandona, & Foster, 1999). It is probably sufficient to note that, although research on deafness provides a valuable spotlight on the importance of conversational influences, nonverbal processes (e.g., initiation of or response to joint visual attention; displays of affect) are also likely to be key contributors to the social scaffolding of children’s understanding of mind but have, with a few exceptions (e.g., Erek-Stevens, 2008; Lillard & Witherington, 2004), received very little research attention to date.

As reviewed elsewhere (see Corina & Singleton, 2009), several studies have shown that, while native-signing DoD children do not differ from typically developing controls in their acquisition of a theory of mind (Schick, De Villiers, De Villiers, & Hoffmeister, 2007), late-signing DoH children are profoundly delayed in their ability to understand false beliefs (e.g., De Villiers & De Villiers, 2000; Peterson & Siegal, 1995). Moreover, even once effects of child age and language are controlled, variation in mothers’ mental-state talk is moderately related to individual differences in DoH children’s theory-of-mind performance (Moeller & Schick, 2006). Together, these three findings support the view that access to rich and fluent conversation (either oral or signed) facilitates children’s understanding of mind. The developmental scope of this work has been extended in two directions.

First, several research groups have begun to examine whether DoH children are also impaired in early appearing milestones in understanding of mind—a question that is of direct relevance for the development of effective

interventions. For example, using an anticipatory looking paradigm designed to investigate awareness of mental states in infancy (described earlier), Meristo et al. (2012) found that DoH toddlers (aged 17–26 months) performed less well than toddlers with no hearing impairments. Conversely, a study by Ketelaar, Rieffe, Wiefferink, and Frijns (2012) has shown that DoH children who receive cochlear implants early in life lag behind peers with normal hearing in their understanding of desire and belief, but show no impairment in their understanding of intentions. Together, these findings suggest that, although conversational access matters even for very early milestones in understanding of mind, early implants of hearing aids reduces the adverse effects of hearing loss (at least with regard to children’s understanding of simple mental states, such as intentions). In addition, extending a previous study demonstrating the same five-step developmental sequence in both DoH and hearing children (Peterson, Wellman, & Liu, 2005), Peterson and Wellman (2009) have reported that the understanding of pretense emerges at an earlier stage in the sequence for DoH children than for their hearing counterparts (for an extension of this work that demonstrates similar divergence in much later milestones for children with ASD, see Peterson, Wellman, & Slaughter, 2012). Thus, providing young DoH children with experience of shared pretense, or structured tasks that elicit pretence, may help to reduce delays in the acquisition of a theory of mind. Related to this finding, De Villiers and De Villiers (2012) have reported that: (a) deaf children who are delayed (relative to hearing peers) in their understanding of false belief show intact performance on deception games; and (b) performance on these two types of task show distinct correlates (in both deaf and hearing children). Specifically, false-belief understanding was more strongly related to syntax than to inhibitory control, whereas deception showed the opposite pattern. Together these findings highlight the value of a fine-grained approach in which distinct aspects of theory of mind (i.e., intentions, pretense, deception, false belief) are treated as separate components of a multifaceted construct.

Second, researchers have also begun to consider whether continuing access to linguistically enriched environments, including school-based opportunities to engage in mental-state discourse, may also contribute to developments in understanding of mind among older children with hearing impairments. Confirming this view, Meristo et al. (2007) not only replicated the contrast between DoH and DoD children in an international study (involving deaf children from Italy, Estonia, and Sweden), but also showed

that variation in theory-of-mind success within the DoD group was related to contrasts in conversational experience at school. Specifically, DoD children attending bilingual schools (i.e., schools that employed both sign and spoken language) outperformed those attending monolingual (i.e., spoken language only) schools. Tomasuolo, Valeri, Di Renzo, Pasqualetti, and Volterra (2013) have reported that deaf children at bilingual primary schools outperformed both deaf children *and* hearing children at monolingual schools. Results from a study of hearing bilingual children (Kovács, 2009) suggest that improvements in executive control may partially mediate the advantage of bilingualism in deaf children; longitudinal work is needed to test this proposal. Further support for the sustained importance of conversational access comes from a study by Pyers and Senghas (2009) who compared two cohorts of deaf adults in Nicaragua: the first cohort (mean age = 27 years) learned a nascent form of Nicaraguan Sign Language (NSL) during childhood, whereas the second cohort (mean age = 18 years) learned a later, more developed form of NSL. Both cohorts attended the same school for the same number of years and had similar-sized social networks. However, when given video clips involving mistaken beliefs and a low-verbal false-belief task, a large group difference was found, with the (younger) second cohort outperforming the first cohort on a series of false-belief tasks and giving more mental state terms in response to the video clips.

In sum, a range of different methods and samples have been used to demonstrate that the mentalizing skills in individuals with hearing impairments show robust associations with the quality of their conversational environments. Whereas the minority of deaf children who are born to deaf parents (who are fluent users of sign language) show intact theory-of-mind performance, deaf children born to hearing parents show delays of similar magnitude to those displayed by children with ASD, but can benefit from exposure to enriched environments (e.g., schools that use both oral and signed language). Although these findings appear to translate very simply to typically developing children, there are also interesting contrasts to note, both in the sequence with which specific milestones are reached and in the likely contribution of other cognitive abilities to children's understanding of mind.

The Effect of Discourse on Theory of Mind: Training Studies

Children with hearing impairments provide interesting opportunities to conduct "natural experiments" on the

impact of conversational environments on children's developing understanding of mind but researchers have also begun to apply direct experimental methods to assess whether enriching children's conversational environments leads to accelerated progress in this domain. These studies are important not only because such interventions provide a real-life application of research that may be valuable for educational practitioners but also, as we noted earlier, because training studies provide particularly compelling evidence for a direct causal impact of conversational input. Correlations between frequencies of family mental-state talk and children's later performance on theory-of-mind tasks can be interpreted in a number of different ways. In particular, children are active conversational partners, such that mothers are likely to adjust their use of mental-state talk for specific children (Jenkins, Rabash, & O'Connor, 2003); as a result, correlations between maternal talk and children's later theory-of-mind performance may reflect stable within-child characteristics rather than causal relations between maternal talk and children's socio-cognitive development.

Thus far, training programs generally involve relatively short (e.g., 2-week) interventions administered to preschoolers who failed standard false-belief tasks at pretest. All studies included in this review included a language-based training and an active control condition, which minimizes the "Hawthorne effect" (i.e., gains accrued via general social contact with experimenters; Landsberger, 1958). Most of the studies examined improvements not just on tasks similar to those used in the intervention but also on related novel tasks. In one of the first training studies, Appleton and Reddy (1996) presented 23 preschoolers with video sequences of a child's display of surprise following the unexpected transfer of an object, followed by a discussion that was designed to provide positive elaboration of children's answers rather than to provide negative feedback as counter-evidence. Relative to the control group, the intervention group performed better on measures of false-belief understanding at posttest and follow-up. At least two further training studies of preschool children have also shown that participation in conversations about mental states can produce moderate gains in false-belief task performance (Lohmann & Tomasello, 2003; Ornaghi, Brockmeier, & Gavazzi, 2011).

In what is, to our knowledge, the only non-Western theory-of-mind training study to date, Lu, Su, and Wang (2008) identified 55 Chinese preschoolers who performed poorly on a pretest battery of false-belief and deception tasks and over an 8-day period gave them four 10-minute

storytelling sessions involving a story with a surprise ending and invitation to retell the story. At the end of each session, half the children (the training group) were asked about the story characters (without any specific mention of mental states) and half received questions about physical aspects of the story (control group). Just 16% of the control group but 58% of the training group showed improved scores at posttest, 3 days later (these children were, on average, older than those in the training group who did not improve their scores). In discussing these findings, Lu et al. (2008) suggested that, for Chinese children, talking about others may serve as a substitute for mental-state discourse as a vehicle for facilitating children's understanding of mind.

The above studies all involved direct training (i.e., children received feedback) and most involved tasks that were structurally quite similar to the false-belief task used at posttest, so that the results show near rather than far transfer. However, in another study, Gola (2012) simply asked preschoolers to watch a series of video clips in which 128 mental verb utterances were presented in conditions that varied in form (statement or question), referent (first person or other person), or style (overheard or direct). Although limited by ceiling effects (many of the children could already pass the pretest theory-of-mind tasks), this study did demonstrate large gains in false-belief understanding for children who simply overheard talk about someone else's mental states. Thus fostering children's attention to differing perspectives appears to be an effective scaffold for theory-of-mind development. The use of simple exposure via video rather than corrective feedback is helpful in at least three ways: (1) it enables training to be administered in a standardized fashion, (2) it does not require experienced adults to administer, making it accessible to a wide range of children, and (3) it provides a useful bridge between the results from training studies and studies involving naturalistic observations of family conversations, which also highlight the benefits of being able to "eavesdrop" on discourse about mental states (Jenkins et al., 2003).

All of the training studies discussed above involved preschool samples, but research has begun to extend this approach to assess whether training can also facilitate social understanding beyond the preschool years. For example, Lecce and colleagues (Lecce, Bianco, Devine, Hughes, & Banerjee, 2014) conducted an intervention study in which groups of 9-year-olds (matched for age, verbal ability, SES, and initial performance on tests of both theory of mind and executive function) were given

either mentalistic or physical vignettes (based on Happé's [1994] Strange Stories task) to discuss in sessions led by a trained researcher. Their results showed that the large posttest group difference (of about one standard deviation) was maintained over 2 months. In a separate study (Goldstein & Winner, 2012), quasiexperimental comparisons of SES- and age-matched groups were used to test the hypothesis that training in acting (which involves "stepping into others' shoes") is more effective at improving empathic accuracy than training in visual arts or music. The predicted group difference was found for adolescents, who completed a more intensive acting program than the younger children (5–9 hours a week, versus 90 minutes a week), suggesting a dosage effect. Together, these two studies suggest that theory-of-mind skills remain plastic well beyond the preschool years.

In sum, although conversation-based training studies remain rather scarce, their findings are consistently positive. Adopting a variety of different training paradigms and involving samples that differ in age (from preschool to adolescence) and cultural background, these studies highlight the benefits of discourse about mental states for children's growing awareness of the representational (and therefore fallible) nature of belief. However, there are still a number of methodological challenges to overcome. In particular, relatively few studies directly compare pre- and posttest performance, or include either a later follow-up or tasks that help to establish the nature of what has improved (e.g., are gains specific to mental state awareness or more general understanding of narratives?) or recruit sufficiently large samples to examine the factors that may moderate the impact of training.

Longitudinal Studies of Parent–Child Conversation

Although the above training studies demonstrate that it is possible to promote children's understanding of mind through exposure to and engagement in rich conversations about mental states, the artificial nature of these studies limits conclusions about whether "real life" conversations about mental states also facilitate children's understanding of mind. Before reviewing naturalistic longitudinal research on predictive relations between linguistic environments and children's understanding of mind, a number of landmark studies deserve mention. In the first of these, Bretherton and Beeghly (1982) used maternal reports to document the emergence of children's conversational references to desires, beliefs, and thoughts within young children's expressive lexicons. This study demonstrated

just how early in life children begin to attend to and reflect on their own and others' mental states, and so set the stage for later experimental research. In a second classic study, Bartsch and Wellman (1995) analyzed more than 200,000 everyday conversations recorded from 10 children in the CHILDES study between the ages of 2 and 5 years and demonstrated that the sequence of emergence of children's talk about these specific mental states closely mirrored the age milestones identified in experimental research. The third landmark study sparked interest in children's *exposure* to talk about mental states; this direct observational research, conducted by Dunn and colleagues (e.g., Dunn, Brown, Slomkowski, et al., 1991), showed that family discourse about mental states predicted children's later success on tests of false belief and emotion understanding over and above effects of child verbal ability and total family talk. The fourth key study, conducted by Ruffman et al. (2002), applied separate (lab-based) measures of mother-to-child and child-to-mother talk about mental states within a cross-lagged design in order to elucidate whether exposure to family talk about mental states independently predicted children's later theory of mind. Individual differences in mothers' mental state discourse were stable across 12 months and children with mothers who frequently referred to mental states at earlier time points scored more highly than their peers on theory-of-mind tasks at the last time-point; the effect size for this relation remained large, even when associations with nonmental discourse were taken into account.

The findings from the separate studies conducted by Dunn and by Ruffman provided compelling evidence for a causal relation between maternal mental-state talk and children's social understanding and led the way for a rapidly growing body of research on this topic—a review (Pavarini, de Hollanda Souza, & Hawk, 2013) noted at least 30 different studies. For reasons of space, we shall focus on a handful of studies that stand apart from the field in various ways. Indeed, a number of studies have shown that maternal references to cognitions are a particularly consistent correlate of children's false-belief understanding (Ensor & Hughes, 2008; Slaughter, Peterson, & MacKintosh, 2007). For example, Ensor, Devine, Marks, and Hughes (2014) have shown that individual differences in the frequencies of mothers' references to cognitive states in their conversations with their children at Age 2 ($N = 105$) were stable across a 4-year period and, even when across-time continuities in both mothers' cognitive references and children's mentalizing skills were taken into account, showed a modest but significant predictive relation with

children's false-belief understanding at Age 6. A subgroup of this sample ($N = 77$) were followed up at Age 10 and again mothers' talk about cognitive states at Age 2 was a modest but significant predictor of children's mentalizing skills—as indexed by success on the Strange Stories task (Happé, 1994). The 8-year span of this predictive relation is a striking illustration of the enduring impact of early conversational environments on children's sociocognitive development.

Findings from earlier time-points in the study described by Ensor et al. (2014) also contribute to an understanding of the nature of conversational influences on children's understanding of mind. For example, by assessing not only conversational *content* (e.g., talk about distinct mental states) but also conversational *quality* (i.e., connected, initiatory, failed, and conflictual turns), these authors (Ensor & Hughes, 2008) were able to examine both the independence and interplay between these two conversational measures at Age 2 as predictors of gains in children's theory of mind from Age 2 to Age 4. Consistent with the findings from Jenkins, Turrell, et al. (2003) study, talk about cognitive states (rather than desire states) was particularly strongly related to children's performance. Interestingly, however, cognitive talk also occurred especially frequently within connected turns, suggesting that it may be the quality (rather than the specific content) of such talk that is the key ingredient. In testing this proposal Ensor and Hughes (2008) found that cognitive talk and connected talk each independently but weakly predicted gains in task performance, but there was also a significant interaction: Connected mother–child conversations about cognitive states appeared particularly fertile as a context for facilitating children's understanding of mind. This finding suggests that the benefits of mental-state talk are maximized when the child has a salient matching internal experience.

This emphasis on the connectedness of mothers' talk to their children's own talk (or actions, more generally) echoes ideas that have emerged from attachment accounts of how children acquire a concept of mind. Specifically, Fonagy and Target (1997) have argued that "the social processes which accelerate the mentalizing quality of self-organization are the very same as those which ensure security of attachment" (p. 687). In turn, this proposal drew on Cooley's (1902) work on the "looking glass self." In describing young children's ability to read other people's minds, Fonagy and Target (1997) offered the term "reflective function," which, they argued: (a) enables children to organize their experiences of their own and others'

behavior in terms of mental states; and (b) is underpinned by caregivers' abilities to communicate an understanding of their children's intentional stance.

Indirect support for the first of the above claims comes from the finding that children who, as infants, were securely attached to their caregivers, typically outperform their less securely attached peers on tests of understanding of false belief and emotion (for a review, see Pavarini et al., 2013). However, the effect sizes in this literature are modest and, when effects of verbal ability are taken into account, the contrast between secure and insecure infants typically only remains significant for tests of emotion understanding). Evidence to support the second claim, namely that maternal "mind-mindedness" (i.e., the propensity for mothers to attribute intentions and goals to their children's activities) facilitates young children's growing mental-state awareness comes from the work of Meins and colleagues. For example, Meins et al. (2003) reported that individual differences in mothers' appropriate comments on their 6-month-old infants' mental states provide the earliest known social predictor of individual differences in theory of mind (explaining 11% of variance in performance at Age 4, even when the 16% accounted for by children's concurrent verbal skills were taken into account). That is, mothers' appropriate comments on their infants' mental states may serve as a linguistic and conceptual scaffold in which infants' attention is drawn to the existence and functional significance of mental states (Meins et al., 2003). By contrast, attachment security at 12 months showed no such independent predictive effect, suggesting that maternal "mind-mindedness" may underpin the association between attachment security and children's theory of mind. That said, findings from another, relatively large ($N = 108$) study highlight the variety of ways in which mothers help infants develop an awareness and understanding of themselves as beings with thoughts and feelings. Erek-Stevens (2008) found that a composite measure of mothers' nonverbal play interactions (e.g., mindful facilitation, joint attention commenting, pacing, and affect catching) with their 10-month-olds, but *not* their mind-related comments, strongly predicted children's understanding of false beliefs at 54 months.

Research has expanded this field in several directions, leading to clear practical implications. For example, Lundy (2013) has shown that preschoolers' success on theory-of-mind tasks shows equally strong associations with *fathers'* mind-mindedness. This finding is open to at least two distinct interpretations. First, what appears to be an environmental effect may well be at least partially

explained by genetic factors (see Sabbagh & Seamans, 2008). Second, given that fathers typically spend much less time than mothers interacting with their infants, this finding suggests that (as for attachment security) it is quality rather than quantity of interaction that matters. This point highlights the need for future research to include parallel observations of children's interactions with fathers (as well as mothers), because fathers are increasingly participating in childcare (e.g., Bianchi, 2011) and appear to differ from mothers in their style of interactions with children (e.g., LaBounty, Wellman, Olson, Lagattuta, & Liu, 2008; Wilson & Durbin, 2013).

Other studies have considerably expanded the developmental scope of this work. For example, arguing that the emotional connections that enable children to draw meaning from their interactions with caregivers are, at least in part, made possible by caregivers' abilities to reflect on their own attachment relationships, Steele, Steele, and Johansson (2002) have reported a strong association between how pregnant women responded in adult attachment interviews about their own childhood and their children's responses to emotional dilemmas 11 years later. Children's responses to these dilemmas were also associated with maternal concurrent beliefs about nurturance, but were unrelated to children's verbal IQ or security of infant attachment (to either mothers or fathers). These results challenge "critical period" models of early interactions and instead support a model in which primary caregivers have an ongoing influence that involves processes beyond attachment security (e.g., family talk about feelings in the postinfancy years).

A third new direction for research in this field concerns interventions for at-risk groups. Meins, Centifanti, Fernyhough, and Fishburn (2013) have found that the relation between low socioeconomic status and preschool problem behaviors is attenuated in the context of high maternal mind-mindedness such that interventions that promote mind-mindedness may help to buffer children from the risks of social adversity. Moreover, Pawlby et al. (2010) have found that, whereas mothers with depressive mood disorders were less likely than healthy controls to make appropriate comments about their infants' mental states, mothers with schizophrenia showed no such impairment. This finding is important because it challenges the assumption that mothers with severe mental illness are necessarily impaired in their interactions with their babies. That said, although other studies have also reported poor theory-of-mind performance among women with depressive disorders (e.g., Lee, Harkness, Sabbagh, &

Jacobson, 2005), moderately *enhanced* theory-of-mind performance has been reported for women with dysphoria (Harkness, Jacobson, Sinclair, Chan, & Sabbagh, 2012) and both depressed and nondepressed women whose own mothers suffered from depression (Harkness, Washburn, Theriault, Lee, & Sabbagh, 2011). These contrasting findings suggest a complex interplay between mental health and mental-state awareness that will require much more work to unravel.

In sum, substantial progress has been made in demonstrating that individual differences in caregivers' propensity to view their children as agents with thoughts and feelings and to engage them in conversations about mental states are robust predictors of later individual differences in children's theory-of-mind performance (even across extended periods of 8 to 11 years). However, existing findings are restricted to Western samples and may not be applicable to other cultures in which parental practices and socialization goals are likely to be quite different. In addition, the specific processes underpinning these associations have yet to be fully elucidated; one challenge for future research is to integrate theory-driven studies of normative samples with studies of at-risk groups that provide both a valuable testing ground for competing theories and the potential for developing evidence-based interventions. Another challenge is to include genetically sensitive designs (e.g., comparisons of the similarity between children and their biological versus adoptive parents or stepparents) to test whether links between parental mind-mindedness or mental-state talk and individual differences in children's theory of mind could reflect shared heredity.

Theory of Mind and Children's Relationships With Siblings

As noted earlier, Piaget's (1932) work on children's moral development highlighted the cognitive benefits of disagreements with peers and set the stage for investigations into whether interactions (and arguments!) with siblings foster children's understanding of minds. Interestingly, however, the first empirical study to note the potential contribution of sibling relationships to young children's understanding of mind focused on *cooperative* interactions between siblings. Specifically, Dunn et al. (1991) found that 33-month-olds who enjoyed frequent cooperative interactions with an older sibling outperformed their peers at 40 months on tests of emotion and false-belief understanding. As these authors acknowledged, this longitudinal association did not allow one to draw any

causal conclusions as early mental state awareness could both foster cooperative interactions with siblings and predict good performance on theory-of-mind tasks. However, the issue of causal direction was resolved in a later study that showed that, on average, children with one or more siblings passed false-belief tasks at least 6 months earlier than children without siblings (Perner, Ruffman, & Leekam, 1994). Subsequent studies have replicated this finding (McAlister & Peterson, 2007; Ruffman, Perner, Naito, Parkin, & Clements, 1998) and identified several distinct potential underpinning processes, including both negative and positive sibling interactions (i.e., siblings as rivals or allies), shared pretend play, and indirect effects of siblings on family interactions.

The juxtaposition of love and hate is a common (and rather unique) feature of sibling relationships. As noted in a review by Hughes (2011), both dimensions might foster early understanding of mind, because the ability to understand mistaken beliefs is central to a variety of social situations, including repairing misunderstandings, avoiding blame, taunting, teasing, and sharing jokes. Citing as an example a 7-year-old's mocking appraisal of her younger sister's play ("Yeah it's stretching; really, really, interesting. You know in fact I am amazed, I wonder if I'll ever, ever, see this again. No I don't think I will because it's just so, so rare, so amazing. Wow I think I'm going to faint"), Hughes (2011) observed that even negative interactions can be rich in reference to mental states and convey a clear contrast between literal and intended meaning; two conversational features that are likely to boost a child's understanding of mental states.

Shared pretend play is also frequently seen in siblings and is likely to show a particularly close association with mental-state awareness, for at least two reasons. First, as noted by Leslie (1987), pretend play and false belief show a striking "structural isomorphism" in their logic of non-entailment (i.e., to know *or* to pretend that X is Y does not entail that that X really is Y, or even that X exists). Second, sustaining a shared pretense narrative requires that children juggle different representations of reality (e.g., is this upturned table a pretend ship or a pretend house?) and so is likely to provide a fertile context for developing and refining an understanding of mind. Observational findings offer indirect support this view: 4-year-olds refer to mental states more often both within pretend than nonpretend interactions (e.g., Hughes & Dunn, 1997) and developmental changes in children's ability to engage in joint pretend play with other children coincide with a developmental shift (between the ages of

33 and 47 months) in preferred conversational partners, such that talk with siblings (and friends) comes to eclipse talk with mothers (Brown, Donelan-McCall, & Dunn, 1996). This shared enjoyment of pretend play is a powerful motivator for children to align their viewpoints in order to initiate or maintain joint pretend play. Although often glad to enter children's imaginary worlds, adults are also quick to tire when the same pretend scenario is enacted time after time, whereas children often relish opportunities for repeat performances. This opportunity to rehearse and practice pretend scenarios may well be an important arena for children's growing mentalizing skills. However, direct attempts to assess the association between individual differences in theory of mind and frequencies of pretend play (usually between peers rather than siblings) have typically produced disappointing results (for a review, see Lillard, 1993). In addition, studies involving socially diverse samples (e.g., Cole & Mitchell, 1998) have typically reported much weaker (and even nonsignificant) associations between number of siblings and false-belief comprehension than those based on middle-class samples. One simple explanation for the inconsistent results in this field is that the quality of sibling interactions matters at least as much as the quantity, and interactional quality is an emergent property of the relationship (i.e., the whole is greater than the sum of its parts). Note that this point applies both directly (e.g., siblings who are very different in age are unlikely to share very similar interests) and indirectly, in that sibling conflict is associated with marital discord (e.g., Stocker & Youngblade, 1999) and negative parent-child interactions (e.g., Volling & Belsky, 1992).

This point brings us to a fourth set of processes that may contribute to the accelerated mentalizing skills shown by children with siblings, namely indirect effects mediated by children's interactions with other family members. For example, having a sibling on whom one can pin the blame may well encourage young children to attempt to deceive their parents. Equally, the presence of a sibling (and perhaps especially an older sibling) provides young children with a valuable opportunity to eavesdrop on conversations between other family members. Importantly, these conversations are often about salient and familiar topics (e.g., discussion of sibling disputes, or shared past events) that fall within their "zone of proximal development" (Vygotsky, 1978) and so are likely to contribute to younger siblings' accelerated development in theory of mind (Ruffman et al., 1998). For example, in the study by Jenkins, Turrell, et al. (2003) noted earlier, children with an older sibling both

produced and overheard more talk about cognitive states (e.g., thoughts, beliefs) than did children without an older sibling. Moreover, cognitive and feeling talk by family members at the first time point predicted change in younger children's cognitive and feeling talk (respectively) 2 years later, after controlling for initial levels of younger children's talk and general language ability.

In sum, it is clear that a variety of processes (both direct and indirect, positive and negative) are likely to moderate the "sibling effect" on individual differences in theory of mind. For example, just as hostile sibling interactions only predict later conduct problems among children who also experience harsh or rejecting parenting (Garcia, Shaw, Winslow, & Yaggi, 2000), the mixed findings from studies of sibling influences on children's understanding of mind indicate that variations in the quality of parent-child relationships may amplify or attenuate the benefits of sibling interactions for children's understanding of mind. It is also worth noting that the evidence for this effect of siblings appears stronger for children from affluent families than for less advantaged children and has yet to be reported for non-Western samples. Indeed, for Chinese children, frequent contact with other children in the family (typically cousins) appears to predict *worse* performance on false-belief tasks (Lewis, Huang, & Rooksby, 2006); in addition, children from Hong Kong (who are much more likely to have at least one sibling) have been reported to perform less well than children from mainland China (Liu et al., 2008). These contradictory findings are both a salutary reminder of the need to adopt an international multicultural perspective and an opportunity to refine theoretical accounts of the exact processes through which the presence of siblings may help children to learn about others' minds.

Friends, Peers, and Theory of Mind

As described above, research into social influences on children's understanding of mind has focused almost entirely on family processes. Although in part explained by the focus on the preschool years, this restricted focus is nevertheless curious, given that early theoretical and observational work (e.g., Murphy, 1937; Piaget, 1932, 1959) clearly highlighted the importance of peer interactions for children's moral and cognitive development. Moreover, research conducted by Dunn and colleagues (Dunn & Cutting, 1999; Hughes & Dunn, 1998) confirmed the potential significance of children's interactions with friends as a fertile context for developing insights into

others' thoughts and feelings. For example, as noted earlier, talk about mental states occurs more frequently within 4-year-olds' conversations with siblings or friends than in their conversations with mothers (Brown et al., 1996).

In a separate study involving a low-income sample of 25 pairs of friends (50% Black) living in London, England, and filmed at three time-points over a 12-month period, Hughes and Dunn (1998) showed that, even with effects of verbal ability taken into account, age-related increases in the frequency and quality of children's references to mental states in their conversations with friends were closely associated with gains in their understanding of belief and emotion. A larger parallel study of preschool friends ($N = 64$ pairs) conducted by Dunn and Cutting (1999), showed remarkable similarity between friends' sociolinguistic skills and behavioral adjustment, suggesting homophily and/or mutual socialization. Each of these sets of measures was also positively associated with cooperative shared pretend and successful communication, providing a direct parallel for the findings (described earlier) from studies of mother-child interactions.

At a theoretical level, the above findings have been influential. For example, Carpendale and Lewis (2004) noted that successful peer interactions might mediate the association between infant attachment security and children's later mentalizing skills. Specifically, the "secure base" provided by the attachment figure may enable children to engage in a variety of social interactions (e.g., shared pretend play, conversations about thoughts and feelings, interactions within peer groups) that are likely to promote theory of mind. Consistent with this view, several studies have reported modest but statistically significant associations between peer status and performance on tests of understanding belief. These studies have involved preschoolers (e.g., Cassidy, Werner, Rourke, Zubernis, & Balaraman, 2003; Slaughter, Dennis, & Pritchard, 2002), school-age children (Banerjee et al., 2011; Devine & Hughes, 2013), and preadolescents (Bosacki & Astington, 1999). Importantly, findings from the only study among these to adopt a longitudinal design demonstrated that (in a sample of 71 children aged 6 years and 138 children aged 9 years followed over 2 school years) there was a reciprocal relationship between sociocognitive skills (indexed by children's understanding of faux pas) and peer status (Banerjee et al., 2011). Later, we outline the evidence that early mastery of theory of mind predicts children's later peer success; here, we summarize findings from another longitudinal study that also suggests a causal influence of peers on children's understanding of mind.

In this study, Dunn, Cutting, and Fisher (2002) adopted a quasi-experimental design that exploited naturally occurring changes in friendship dyads across the transition to school to distinguish the effects of preschool friends from within-child continuity in mental-state awareness. Their results indicated that, over and above within-child associations between preschool theory of mind and insight into the thoughts and feelings of new friends at school, children's insights into their new friends were also associated with the sociocognitive maturity of their preschool friends. This finding suggests that preschool interactions with socially mature peers foster children's understanding of others' thoughts and feelings.

In sum, the findings summarized in this section support three conclusions. First, the similarity in results from studies of preschoolers and older children suggest that interactions with friends and peers are closely related to individual differences in children's understanding of mind across a broad developmental period. Second, although this association appears bidirectional, more longitudinal work is needed to elucidate the nature and magnitude of social influences of friends and peers on children's understanding of mind. Third, existing research has paid very little attention to the potential interplay between social influences within and outside the family on children's understanding of mind. Bridging this gap in future research is important for elucidating how the nature of social influence varies both with age (e.g., with peer influence increasing and perhaps eclipsing parental influence as children move through middle childhood) and with culture (e.g., with differences in parental practices leading to distinct forms of social support).

Cultural Variation in Theory-of-Mind Performance

Having considered some of the more proximal social influences on individual differences in theory of mind, we now examine the ways in which a more distal aspect of the social environment—culture—might shape children's understanding of others' minds. Cross-cultural studies provide an opportunity to test the universality of theories of theory of mind. Early work, including studies of children from China (Flavell, Zhang, Zou, Dong, & Qi, 1983) and Japan (Gardner, Harris, Ohmoto, & Hamazaki, 1988) and from the indigenous and preliterate Baka community in the Cameroon (Avis & Harris, 1991) indicated that mastery of false belief and perspective taking emerges at very similar ages in children from very different cultural backgrounds. Confirming this view, another study (Callaghan et al.,

2005) has reported remarkable synchrony in the developmental trajectory of false-belief understanding across five different countries, namely Canada, India, Peru, Samoa, and Thailand.

However, methodological limitations (concerning both samples and tasks) mean that the above findings need to be viewed with caution. In particular, the early studies in this field did not actually involve any direct comparisons between children in different cultures. In addition, although Callaghan et al. (2005) did compare performance across different groups, the samples were not matched for either language ability or socioeconomic status, which, as noted earlier, are two key predictors of individual differences in task performance. Findings from two further studies highlight the importance of sample effects. In a separate study of children in the Cameroon (involving Mofu rather than Baka children), Vinden (2002) reported that, although all the children showed poor understanding of false belief, those receiving schooling did moderately better than their unschooled counterparts on a task that required understanding evidence for a true belief. In a study involving a large ($N = 300$) sample of Samoan children (ranging in age from preschool to preadolescence), Mayer and Träuble (2013) found that most children younger than 8 (and one third of 10- to 13-year-olds) failed a change of location task and concluded that the ability to use mistaken belief to predict behavior is markedly delayed in cultures in which mental states are not appropriate objects for conjecture.

The early studies that reported similar performances in children from different cultures each also relied on a single task; this factor alone may have limited their sensitivity to variations in performance. Task effects are clearly illustrated in the findings from several other studies. For example, in Vinden's (1996) Peruvian study, while 4- to 8-year-old Junín Quechua children all performed poorly on standard false-belief tasks, the older children performed relatively well on appearance-reality tasks. In addition, challenging their earlier account of synchronous development across diverse cultures, Callaghan, Rochat, and Corbit (2012) have reported that Canadian 5-year-olds (but not 4-year-olds) were more likely to pass a picture-book false-belief task than their age-matched counterparts from either Peru or India.

Findings from the first meta-analysis in this field showed marked international variation in the age at which children acquire an understanding of belief (Wellman et al., 2001). Specifically, compared with children from the United States and the United Kingdom, children from Australia performed somewhat better on the false-belief

task (with 69% of 44-month-old Australian children passing compared to 50% of British and American children) whereas children from Japan performed significantly worse (with 40% of 44-month-old children passing). In a second meta-analysis of studies from China and Hong Kong, Liu et al. (2008) found that children from Hong Kong showed a delay of approximately 2 years in their understanding of false belief, when compared with children from Canada and the United States. Interestingly this lag was not evident among children from mainland China, suggesting that the East–West contrast cannot be explained in terms of simple factors such as China's one-child policy or a Confucian emphasis on the group rather than the individual (Hong, Morris, Chiu, & Benet-Martínez, 2000).

Researchers have begun to adopt comprehensive batteries of false-belief tasks to examine potential East–West differences directly and in more detail. These studies reveal similar contrasts in the ages at which children from the United Kingdom as opposed to Asian countries such as Japan and Korea succeed on false-belief tasks (Hughes et al., 2014; Lewis et al., 2009). Task batteries also allow researchers to adopt a latent variable approach in which “true” scores are estimated by partitioning out measurement error (e.g., Hughes et al., 2011; Devine & Hughes, 2013). In turn, this approach enables researchers to assess (via multiple-groups confirmatory factor analysis) whether contrasts in mean latent factor scores between children from different countries reflect genuine differences in underlying abilities, rather than unrelated factors such as differing response styles, reflecting differences in social norms, inappropriate translations, or contrasts in the definition or meaning of a concept (Byrne & Campbell, 1999; Chen, 2008). Two cross-national comparisons of theory-of-mind performance (Fujita, 2013; Hughes et al., 2014) have assessed measurement invariance, with contrasting results that may reflect a developmental increase in the coherence of theory-of-mind understanding. Specifically, in a study comparing 5- to 6-year-old children from the United Kingdom, Italy, and Japan ($N = 270$), individual differences in the understanding of first- and second-order false belief (and emotions based on false belief) could be indexed by a single latent factor that showed across-country measurement invariance (Hughes et al., 2014). In contrast, a single latent factor showed very poor fit in a separate study of 3- to 6-year-olds from the United Kingdom and Japan ($N = 230$) that included tests of diverse desires, diverse beliefs, knowledge access, and hidden emotions, indicating that these are distinct milestones that do not necessarily cohere as a single construct (Fujita, 2013).

Related to this point, other research groups have begun to examine whether there is across-culture variation in the *nature* of mental state awareness; for example, regarding the importance of mind, the characteristics of mind, and what children understand about the content of the mind (Lillard, 1998). In particular, Wellman and colleagues (Shahaeian, Peterson, Slaughter & Wellman, 2011; Wellman, Fang, Liu, Zhu & Liu, 2006) have conducted a set of investigations that suggest that children from different countries may master distinct aspects of theory of mind in a different sequence. For example, Wellman et al. (2006) reported that children in China and children in the United States and Australia differed in the order in which they succeeded at tasks tapping *thinking* (diverse beliefs) and *knowing* (knowledge access). Specifically, as might be predicted from the greater emphasis placed within collectivist cultures on gaining knowledge, respecting adults, and avoiding conflict, Chinese children understood knowledge access before they understood that different people might hold divergent beliefs. Replicating this finding in another collectivist culture, Shahaeian et al. (2011) found that Iranian (but not Australian) children understand knowledge access before they understand the subjective nature of belief.

Thus existing evidence supports both etic perspectives (which emphasize the cultural universality of milestones in children's understanding of mind) and emic perspectives (which emphasize cultural specificity, both in the nature of mental-state concepts and in social influences upon children's concepts of mind). How should these cultural contrasts be explained? Previously, we have discussed how linguistic factors (e.g., specific wording of questions) can affect children's performance. Although this point holds force with regards to cultural effects (e.g., languages often differ in lexical explicitness of reference to the falsity of a belief), to avoid repetition of material we shall focus on (a) differences in social norms (e.g., with regard to deference to adults); and (b) socialization practices both within and outside the family.

With regards to the potential influence of discrepant social norms, a series of experiments have shown that Japanese children are not simply delayed in their success on false-belief tasks, but actually adopt a different explanatory framework for interpreting human behavior (Naito & Koyama, 2006). Specifically, when asked to justify the behavior of a character that either deliberately or inadvertently changed location, Japanese children often referred to general situational cues, rather than to the person's beliefs or desires. Likewise, in a study of Chinese 3- to

7-year-olds, Wang, Zhu, and Shi (2011) concluded that children's judgments were guided by knowledge of social norms rather than information about beliefs or desires, reflecting the strong emphasis within Chinese culture on obedience to rules and submission to authority.

Contrasting social norms mean that familial influences are also likely to differ between cultures. For example, although (as discussed earlier) numerous Western studies have reported that children with siblings show accelerated success on false-belief tasks, cultural differences in the nature of the sibling relationship mean that this effect may not be evident in non-Western samples. In particular, whereas children in the West often display high levels of playful rivalry toward their siblings and so may be motivated to hone their skills in deception and provocation (Hughes, 2011), siblings in many other parts of the world assume important caregiving responsibilities, constraining opportunities for these kinds of playful interactions. Consistent with the view that the sibling advantage may be specific to Western countries in which children's interactions with siblings are quite distinct from their interactions with other family members, the results from a study conducted in Greece and Cyprus (Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, Berridge, 1996) support a "general apprenticeship" model in which daily interactions with extended adult kin are as effective as sibling interactions in promoting children's understanding of false belief. Interestingly, in a later study, Lewis et al. (2006) found that for children in China (who typically do not have any siblings) contact with other children (e.g., cousins) actually appeared to be *negatively* related to false-belief task performance. This negative association is surprising and may reflect confounding effects of other family variables (e.g., socioeconomic status), but serves as a useful reminder of the likely complexity of social influences. Moreover, even in Western cultures, the benefit associated with having a sibling appears much weaker (or non-significant) for low-income samples (e.g., Cole & Mitchell, 1998). Overall, the impact of contact with other children in the family (siblings, cousins) appears to depend on the quality of interactions, which is likely to vary markedly from culture to culture.

Are other family influences on children's understanding of mind also culture-specific? Although (as described earlier) mother-child interactions are a key predictor of children's false-belief understanding and are known to differ widely across cultures (e.g., Bornstein, 1995), cross-cultural studies of theory of mind have yet to examine directly children's interactions with mothers. However,

a few research groups have examined links between children's performance on diverse theory-of-mind measures and parenting within different ethnic groups living in the United States. In the first of these studies, Korean American and Caucasian American mothers' responses to a Parenting Attitudes Inventory revealed culturally specific links between parental style and children's false-belief understanding (i.e., authoritarian parenting was negatively associated with false-belief understanding in Anglo American but not Korean American children). Doan and Wang (2010) compared children's ability to generate specific situations that would elicit particular emotions and maternal mental-state talk during shared reading of a picture book at home for European American and Chinese American mother-child dyads. Their study showed that European American mothers made more references to mental states (but fewer references to behaviors) than Chinese American mothers. In addition, children's ability to describe situations likely to provoke particular emotions (e.g., sadness) was more advanced in European American children than in Chinese American children and this large contrast was at least partially explained by the group difference in the mothers' emphasis on mental states.

Other researchers have examined the relation between maternal "mind-mindedness" and children's theory-of-mind skills in non-Western samples. For example, in a small-scale longitudinal study of 38 Japanese mother-child dyads, Shinohara (2011) found that maternal mind-mindedness at 6 months weakly predicted children's understanding of mind at Age 4. However, this association was nonlinear and so differed from that reported in a study of British mother-child dyads (Meins, Fernyhough, Russell, & Clarke-Carter, 1998). Specifically, superior emotion understanding in children was associated with moderate (but not either low or high) levels of maternal mind-mindedness. Fujita (2013) has conducted a comparison of British and Japanese mothers' speech samples ($N = 226$) coded for mind-mindedness. Echoing earlier findings reported by Meins and colleagues (1998), maternal mind-mindedness was associated with children's false-belief understanding in the British but not the Japanese sample, suggesting that maternal influences on children's theory-of-mind performance may be culturally specific.

Interestingly, evidence is also emerging for between-country differences in theory-of-mind performance *within* Western cultures. For example, at least two studies (Hughes et al., 2014; Lecce & Hughes, 2010) have shown that Italian children lag behind their British counterparts in their

performance on a battery of theory-of-mind tasks. This (weak) group difference appears, at first glance, rather surprising, but may reflect differences in the age at which children begin formal schooling (between 4 and 5 in the United Kingdom, and around Age 6 in Italy). Formal schooling offers both increased contact with peers and exposure to pedagogical situations that encourage reflective self-awareness and so may be important to theory-of-mind development. Here it is worth noting that Japanese children, like children in Italy, start formal schooling later than children in the United Kingdom. Thus a viable alternative to accounts of cultural differences that focus on general cultural attitudes (e.g., individualism versus collectivism) is that contrasts in pedagogical experiences contribute to cultural differences in children's acquisition of a theory of mind.

Finally, there is clear scope to expand cross-cultural research into children's understanding of mind in two further directions: By going beyond false belief to consider children's understanding of other mental states, particularly emotion; and by going beyond the preschool years to establish whether the lag between children from collectivist as opposed to Western cultures is also evident among older children. With regard to the first of these points, cross-cultural contrasts in children's understanding of emotion appear complex. For example, relative to their Western peers, children from non-Western cultures appear more advanced in certain domains, such as recognizing emotions from facial expressions (e.g., Markham & Wang, 1996), but less advanced in other domains, such as predicting an emotion based on a false belief (e.g., Vinden, 1999).

With regard to the second point, whereas studies of preschoolers' understanding of mind suggest a robust "East-West" contrast that favors children from the West, evidence from studies of older children (involving paradigms that indirectly assess children's awareness of false belief by examining their propensity to tell lies in order to conceal a transgression) is much more equivocal (Evans, Xu, & Lee, 2011; Talwar, Gordon, & Lee, 2007). As children develop, their social horizons widen considerably, such that family influences are likely to decline in importance. Thus cultural contrasts among older children and adults may be quite different from those evident in preschool children. Support for this view comes from at least two studies of adults' perspective taking. In the first of these studies, conducted in the United States, (bilingual) Chinese-American adults appeared more likely than Caucasian-American adults to take another

person's perspective; in that they were less likely to focus on an distractor object that was occluded from the view of a person giving instruction (Wu & Keysar, 2007). In the second study, conducted in Hong Kong, Chinese–English bilingual adults made substantially fewer errors when interpreting game instructions under Chinese rather than Western primes (Luk, Xiao, & Cheung, 2012). Together, these findings provide a striking contrast with the delayed performance on theory-of-mind tasks reported for preschoolers and so highlight the importance of combining developmental and cross-cultural perspectives.

In sum, although findings from several early studies of non-Western samples highlighted universalities in children's understanding of mind, closer inspection reveals a number of methodological issues that constrain the conclusions that can be drawn from this work. Later studies that have adopted a more rigorous approach (e.g., involving task batteries or larger samples matched for verbal ability) converge with meta-analytic reviews in demonstrating contrasts in the rate at which children from different cultures acquire an understanding of mind. That said, this research remains very restricted in its developmental scope, such that more work is needed both with infants (using the new generation of indirect measures described earlier in this chapter) and with older children (to assess whether catch-up effects attenuate the delays reported for non-Western children). However, the most obvious gap in existing cross-cultural research is the scarcity of direct measures of children's environments: To date, very few studies have attempted to address this issue and even these exceptional studies have relied on nonobservational measures (e.g., questionnaires or speech samples). A clear direction for future cross-cultural research is therefore to integrate experimental assessments of theory of mind with direct observations of children's interactions with other children and with adults, both within and outside the family.

Social Influences on Theory of Mind: Converging Themes

These seven strands of research encompass a very broad set of findings, such that it is worth reflecting on whether there are any overarching themes that might draw these distinct bodies of work together. One such theme is the *cumulative* nature of social influences: Although even very short interventions have produced positive gains (e.g., Lohmann & Tomasello, 2003), at least some training studies (e.g., Goldstein & Winner, 2012) reveal dosage effects

(both of quantity of training and of exposure to distinct sources of discourse); likewise enhanced theory of mind has been reported for both typically developing and deaf children growing up in bilingual environments (either two oral languages or oral plus sign). This cumulative effect may explain why studies with genetically sensitive designs suggest stronger environmental influences on theory of mind among older children (who are in regular contact with a broader array of social partners, each of whom may contribute to children's awareness of mind in different ways) than among younger children. Second, findings highlight both the stability of individual differences in theory of mind across an extended developmental period and the similarity of social influences across this broad developmental span, such that a second overarching theme is *continuity*. For example, in early and middle childhood, enhanced performance on tests of theory of mind appears associated with exposure to rich discourse about thoughts, feelings, and intentions.

Alongside these two themes are a few emerging new directions. These include: (a) a focus on social influences on the nature of theory of mind rather than simply on the rate of acquisition (both for typically developing children from different cultures and for children with perceptual impairments); (b) the adoption of more sophisticated statistical methods (e.g., use of confirmatory factor analyses to test for measurement invariance before making comparisons between different groups); and (c) investigations of genotype–environment interactions as a means of elucidating how children play an active part in shaping their environments. As shown in the next section, two cognitive domains have received considerable attention in studies of the correlates of theory of mind—executive function and language.

COGNITIVE CORRELATES OF THEORY OF MIND

As noted, the “second wave” of theory-of-mind research focused on identifying the predictors, correlates, and consequences of individual differences in children's understanding of mind (Dunn, 1999). In this section, we examine two cognitive correlates of theory of mind—executive function and language—and evaluate competing developmental theories about the links between each of these domains and theory of mind. In doing so we also consider how executive function and language might act as a bridge between children's social experiences and individual differences in theory of mind.

Executive Function and Theory of Mind

Research on executive function originated from neuropsychological studies of the functions of the adult prefrontal cortex, which typically involved complex problem-solving tasks. Over the past two decades, new, simplified tests of executive function have been designed, enabling researchers to investigate the development of executive function in the preschool years and across childhood and adolescence (e.g., Garon, Bryson, & Smith, 2008).

Defining Executive Function and Evidence for Links With Theory of Mind

As discussed elsewhere (e.g., Best, Miller, & Jones, 2009), researchers have, over the past few decades, hotly debated whether executive function should be conceived as a unitary construct or as a set of separate but related constructs. The three most widely recognized components of executive function are: (1) inhibitory control (the ability to override a prepotent but maladaptive response; Carlson, Moses, & Breton, 2002); (2) working memory (the ability to hold something in mind in order to guide future action; Baddeley, 2007); and (3) set shifting (the ability to switch from one set of rules for action to another; Garon et al., 2008). Studies using confirmatory factor analysis (CFA) have confirmed the validity of this three-factor model of executive function in middle childhood, adolescence, and adulthood (Huizinga, Dolan, & Van Der Molen, 2006; Miyake, Friedman, Emerson, Witzki, & Howerter, 2000). However, CFAs on data from preschoolers suggest that a unitary model provides the best fit for younger children (e.g., Wiebe, Espy, & Charak, 2008).

Key catalysts for early interest in the relation between executive function and theory of mind were: (a) their striking developmental synchrony, with both domains showing protracted development and notable gains in the preschool years (e.g., Carlson, Moses, & Hix, 1998); and (b) the claim that executive dysfunction rather than meta-representational difficulties might underpin the theory-of-mind deficits displayed by children with autism (e.g., Ozonoff, Pennington, & Rogers, 1991). Following initial work by Russell, Mauthner, Sharpe, and Tidswell (1991) on the relations between inhibitory control and false-belief task performance, a series of studies sought to examine more closely the relation between executive function and theory of mind. This work revealed that, for typically developing children, the association between theory of mind and executive function was independent of maturational variables such as age or verbal ability (e.g.,

Hughes, 1998). In a review of 10 studies, Perner and Lang (1999) reported evidence for a strong correlation between children's executive function and theory of mind (mean $r = .47$). Cross-cultural data from China and the United States suggested that the association between these two constructs was similar across cultures (Sabbagh, Xu, Carlson, Moses, & Lee, 2006); however, subsequent findings have contradicted this claim (e.g., Lewis et al., 2009).

In an effort to synthesize over 20 years of research on the relations between executive function and theory of mind, Devine and Hughes (2014) conducted a meta-analysis of the data from 102 studies from 15 different countries (representing 9,934 children aged 3 to 6) that showed a moderate but geographically stable correlation ($r = .38$) between theory of mind and executive function. This correlation remained significant when effects of age and verbal ability were controlled and did not vary across different measures of executive function. However, the strength of the association between executive function and theory of mind varied according to the type of theory-of-mind task used. Specifically, indirect measures of false-belief understanding exhibited significantly weaker associations with executive function than standard direct measures (which did not differ from each other). Just 10 of the studies in the meta-analysis included longitudinal data, which when pooled in the meta-analysis indicated an asymmetric link: Early individual differences in executive function modestly predicted later theory of mind (even controlling for previous theory-of-mind scores and individual differences in verbal ability) but the reverse correlation was not significant. To explain these meta-analytic findings, we now discuss the competing theoretical accounts of the relation between executive function and theory of mind.

Theories of the Relation Between Executive Function and Theory of Mind

In Shakespeare's *The Merchant of Venice* (c. 1596/2005a), Portia's father sets her suitors a challenge in which they must choose between three sealed boxes of lead, silver, and gold in order to win her hand in marriage. We too are faced with a choice of three possible options to explain the relation between executive function and theory of mind. According to Perner and Lang (1999) the three main accounts (described in more detail below) claim that: (1) there is a peripheral role for executive components within theory-of-mind tasks; (2) executive function is necessary for the development of theory of mind; and (3) theory of mind is a necessary precursor to executive function.

Early theorists (e.g., Russell et al., 1991) noted that success on the classic change-of-location false-belief task hinges on children's ability to track the location of the object, hold in mind the beliefs of the absent character, and override their own correct knowledge in order to attribute a false belief to the character. Thus executive task demands make it difficult for young children to *express* their conceptual understanding of mental states (e.g., Moses, 2005). By this account, the correlation between performance on theory-of-mind and executive function tasks reflects common demands for inhibitory control or working memory but not overlapping conceptual content.

Prima facie, this *expression* account of the link between theory of mind and executive function makes intuitive sense. More importantly, it provides testable hypotheses. Perner, Lang, and Kloo (2002) reasoned that, if the correlations between executive function and theory of mind were simply due to the executive demands of theory-of-mind tasks, then these correlations should attenuate or disappear once the executive demands were reduced or removed. Moreover, the expression account also predicts that children with superior executive function performance should outperform their peers on measures of theory of mind (Moses, 2005). Existing research evidence presents several challenges to the expression account. Firstly, at least two separate studies revealed no difference in the magnitude of the correlation between executive function and performance on the false-belief prediction task (thought to place considerable demands on a child's inhibitory control) and the false-belief explanation task (which conceivably places no such demand on participants) (Hughes, 1998; Perner et al., 2002). Secondly, cross-cultural studies have indicated that, despite superior performance on measures of executive function, children from China showed no gains in theory of mind over age-matched participants from the United States (Sabbagh et al., 2006).

In their meta-analytic review, Devine and Hughes (2014) reported a significant omnibus effect of theory-of-mind task type (i.e., change of location, unexpected contents, second order and indirect false-belief tasks) on the strength of correlation between executive function and theory of mind. Providing some support for the expression account, post hoc analyses revealed that the correlation between executive function and performance on standard direct false-belief tasks was greater than that between executive function and performance on indirect or spontaneous theory-of-mind tasks. That said, as we have noted earlier, precisely what indirect false-belief tasks actually measure remains hotly contested.

How else might the correlation between children's performances on tests of executive function and theory of mind be explained? Several theorists (e.g., Perner & Lang, 2000; Russell, 1996) have proposed a functional relation in which one construct is necessary for the development of the other. Given that, as noted above, just 10 of the studies included in the meta-analysis reported by Devine and Hughes (2014) were longitudinal in design (i.e., included measures of both executive function and theory of mind at two or more time points) it is clear that this research field remains "stubbornly cross sectional" (Bryant, 1990, p. 40). Moreover, to date, there have been just three published training studies focused on the link between executive function and theory of mind (Benson, Sabbagh, Carlson, & Zelazo, 2013; Fisher & Happé, 2005; Kloo & Perner, 2003) and only one of these has tested the causal direction of the relations between executive function and theory of mind in typically developing children. With these gaps in the literature in mind, we now examine the claims of the two functional accounts concerning the relation between executive function and theory of mind.

For some theorists (e.g., Carruthers, 1996; Perner & Lang, 1999, 2000), theory of mind is a necessary precursor to the development of executive function. In his early work, Perner (1991) speculated that gaining an understanding of their own and others' desires would facilitate children's development of self-control. In his later work, Perner (1998) hypothesized that children with a "deficient theory of mind" (p. 278) would experience difficulties with executive function. Elaborating this hypothesis, Perner and Lang (1999, 2000) proposed that, by acquiring an insight into the nature of mental states as entities that cause behavior ("meta-representation"), children develop improved executive function (or "meta-representational control"). That is, the ability to exert greater control over one's thoughts and actions is founded upon a representational understanding of the mind (Pellicano, 2007).

In contrast, others have proposed that executive function is a necessary foundation in the development of an understanding of mental states. This hypothesis was derived from the work of Hughes and Russell (1993) who first argued that, even if the executive demands of theory-of-mind tasks were stripped away, children with autism (who had difficulty with standard theory-of-mind tasks) would still not exhibit a normal conception of the mind because early difficulties with executive function would disrupt the acquisition of mental state understanding. From this perspective, insofar as it contributes to increasing self-reflection and control over one's thoughts

and attention, executive function may be necessary for the *emergence* of theory of mind (Russell, 1996, 1997). That is, executive function provides the foundation for the development of an understanding of mental state concepts (Wellman et al., 2001).

In an effort to investigate the direction of the developmental relation between executive function and theory of mind, Hughes (1998) proposed that longitudinal cross-lagged analyses could be used to assess the strength of the predictive association between individual differences in theory of mind and executive function. Specifically, if theory of mind drives the development of executive function, then early individual differences in theory of mind should predict later performance on measures of executive function. Alternatively, if executive function is implicated in the development of theory of mind, then early individual differences in executive function will predict later performance on measures of theory of mind. In their analysis of the existing longitudinal evidence, Devine and Hughes (2014) found that initial individual differences in executive function modestly predicted later theory of mind (controlling for initial theory of mind and verbal ability) but that the reverse was not true. Interestingly, Pellicano (2010) has found a similar pattern of relations between executive function and theory of mind in a landmark longitudinal study of the relations between these constructs in children with autism. Together, these findings appear to support the emergence hypothesis, that is, that early advances in executive function seem to aid the development of theory of mind in the preschool years.

Are these findings enough to construct a developmental account of the relations between executive function and theory of mind? There are at least two challenges to the longitudinal evidence in favor of the emergence account. First, it may be unreasonable to assume that false-belief tasks provide the only means of measuring children's theory of mind (Perner & Lang, 1999). Meta-analytic data suggest that an understanding of others' desires precedes the awareness of others' beliefs (Wellman & Liu, 2004). It is therefore possible that early advances in understanding desires might underpin the emergence of later executive function. This possibility has not been examined in longitudinal research and thus remains a research priority for proponents of the emergence account. Second, findings from a training study conducted by Kloo and Perner (2003) were equivocal: Training in a rule-shifting task led to gains in both executive function and theory of mind, whereas training in the theory-of-mind condition led to gains in executive function but not theory of mind. These results

can be interpreted as favoring either the metarepresentation account or as providing evidence of a reciprocal relation between these two constructs. No further training studies have directly examined whether a cause-effect relation exists between executive function and theory of mind.

Unlike the choice facing Portia's suitors in the three-caskets lottery, our three choices for explaining the link between executive function and theory of mind are not necessarily mutually exclusive. Instead, longitudinal and meta-analytic evidence from research in the preschool years points to a hybrid account in which executive function is implicated in both the emergence and expression of theory of mind (Carlson & Moses, 2001). Evidence from training studies will provide a further test of the hypothesized developmental relation between executive function and theory of mind. That said, the restricted focus of existing research on the preschool years limits the claims we can make about the relations between theory of mind and executive function beyond this period.

Executive Function and Theory of Mind Beyond the Preschool Years

There is a growing interest in the nature and development of theory of mind in adolescence (e.g., Dumontheil et al., 2010) and adulthood (Apperly et al., 2009). Support for a continued link between executive function and theory of mind beyond the preschool years comes from two sources. First, findings from a series of studies with older adults (e.g., German & Hehman, 2006; Philips et al., 2011) point to a moderate correlation between individual differences in performance on a range of complex theory-of-mind tasks and measures of working memory, inhibitory control, and set shifting. Second, findings from dual-task experiments also indicate a clear association between executive function and theory of mind in adults (e.g., Lin, Keysar, & Epley, 2010; McKinnon & Moscovitch, 2007). Although this evidence from adults provides a useful opportunity to reevaluate theories about the relations between theory of mind and other aspects of cognition (Apperly et al., 2009), its cross-sectional nature precludes any further analysis of *how* these two constructs are related. As for the preschool years, this relation could be developmental (i.e., gains in one predict change in the other) or nonfunctional (i.e., reflecting shared peripheral task demands).

Addressing both the need for longitudinal work and the dearth of research on theory of mind in the period between the preschool years and adolescence, Devine (2013) conducted a 4-year longitudinal study of 137 children who completed batteries of executive function and

theory-of-mind tasks at Ages 6 and 10. Individual differences in theory of mind and executive function were moderately correlated at each of these time-points. However, across-time analyses revealed that, once the substantial temporal stability in each construct was taken into account, longitudinal associations between executive function and theory of mind were not significant. These findings suggest that developmental links between these two constructs do not appear to persist beyond the preschool period. In other words, relations between executive function and theory of mind appear to shift in nature with age, from “emergence” (in the preschool years) to “expression” (in middle childhood).

Note, however, that the lack of a cross-lagged association between executive function and theory of mind in middle childhood does not render the cross-sectional association between these two constructs trivial. In this sense at least, classifying theoretical accounts as “functional” and “nonfunctional” may be misleading. Although further gains in executive function may have no payoff in terms of theory of mind, executive function may nevertheless be an essential component of theory-of-mind performance. Apperly (2011) has argued that executive function may be an integral element of theory of mind, underpinning any or all of the processes of attributing a mental state to another. These processes include inferring what someone else thinks (“inference”), holding this in mind (“storage”), and making a judgment or prediction about that person’s behavior (“use”). In order to disentangle these separate processes, Apperly, Back, Samson, and France (2008) devised a noninferential false-belief task in which adult participants were told about the target character’s mental state and were not required to make a judgment about behavior. Such tasks are valuable in that they open up the possibility of examining the contributions of executive functions to specific processes involved in theory of mind.

In sum, despite more than 20 years of research on the relations between executive function and theory of mind, the links between these constructs have yet to be fully explained and may alter in nature over the course of development. Specifically, executive function appears to be implicated in the *development* of theory of mind in the preschool years and in the *use* of theory of mind beyond the preschool years. Further training studies are needed to test claims about the developmental relations between executive function and theory of mind in the preschool years. Of course, designing an appropriate false-belief training condition presents a number of challenges. For example, as noted by Moses and Tahiroglu (2010), it is difficult to

disentangle whether improvements in task performance or executive function reflect executive or conceptual aspects of training. In addition, more work focusing on middle childhood, adolescence, and adulthood is needed both to confirm whether there is indeed a shift in the nature of the relations between executive function and theory of mind (i.e., from “emergence” to “expression”) and to test Apperly’s (2011) hypothesis about how executive function is involved in our later *use* of theory of mind (e.g., are individual differences in executive function related to some or all of the processes—*inference*, *storage*, *use*—involved in mature mental state reasoning?).

Theory of Mind and Language

Echoing Astington and Baird’s (2005) distinction between individual linguistic ability and linguistic environment, our discussion of relations between language and theory of mind are divided between two sections in this chapter. Earlier, we examined the links between variation in children’s linguistic environments and individual differences in theory of mind. Here, we focus on whether there is a developmental relation between individual differences in language capacity and theory of mind.

Theories of the Relation Between Language and Theory of Mind

Researchers studying language capacities often differentiate between semantics (i.e., lexical knowledge) and syntax (i.e., mastery of grammatical conventions for combining words) (Milligan, Astington, & Dack, 2007). The question of whether theory of mind is related to one, both, or some combination of these aspects of language has preoccupied researchers in the field for almost two decades. In a meta-analysis integrating 104 studies of English-speaking children ($N = 8,891$) Milligan et al. (2007) reported a moderate association ($r = .43$) between multiple measures of language and theory of mind. This association held even after controlling for individual differences in age ($pr = .31$).

That said, the *nature* of the association between language and theory of mind remains a matter of controversy, open to at least three distinct theoretical accounts that directly mirror the explanations for the link between executive function and theory of mind. The first “non-functional” account (analogous to the expression account of the relation between executive function and theory of mind) proposes that a correlation between measures of language ability and theory-of-mind tasks arises quite simply because language might act as “a simple crutch” (De Villiers, 2005, p. 187)

for performance on the false-belief task. This perspective posits no causal relation between an early-emerging, possibly innate theory of mind and the language abilities required to pass the false-belief task (Astington & Baird, 2005; Astington & Jenkins, 1999). In contrast, the next two accounts posit a functional (i.e., causal) developmental relation between theory of mind and language, but differ in the direction of influence. Specifically, the second account proposes that the development of semantic knowledge or syntactic abilities (or indeed both) provides a necessary foundation for understanding mental states (Astington & Baird, 2005; Astington & Jenkins, 1999), while the third account proposes that aspects of language development actually depend upon having a theory of mind (Astington & Jenkins, 1999). Below, we ask: What is the evidence for each of these three accounts?

First, it is generally agreed that standard false-belief tasks do place heavy linguistic demands upon children and it is entirely possible that these demands may mask their early competence in theory of mind. However, a key prediction from the expression account is that reducing or eliminating the linguistic demands of false-belief tasks should attenuate the association between language and theory of mind and “unmask” early competence in theory of mind (Perner & Roessler, 2012). Evidence from three separate meta-analyses challenges this proposal. First, in an early meta-analysis (largely restricted to Western samples) Wellman et al. (2001) reported that neither the phrasing of the false-belief task question (i.e., whether the question used the word “think,” “believe,” “know,” “look,” or “say”) nor the inclusion of a temporal marker (e.g., “first”) in the false-belief question appeared to enhance young children’s ability to pass the false-belief task. Second, a meta-analysis of data (from English-speaking children) on relations between language and theory of mind showed that the strength of the association between theory of mind and language did not alter according to the type of theory-of-mind task used despite the varying linguistic demands of the different tasks (Milligan et al., 2007). Third, a meta-analysis of false-belief task performance among children from China and Hong Kong (Liu et al., 2008) provides an interesting counterpoint to data from Western studies because, unlike English, Mandarin and Cantonese include alternative terms that vary with regard to the veracity of someone’s belief (i.e., neutral versus “think falsely”). Liu et al. (2008) found that, although children tested using the neutral verb form performed less well than those tested using the “think falsely” form, the verb form did not enhance overall performance relative to

children from North America nor did it interact with age. Thus removing one source of linguistic ambiguity from the false-belief task did not affect the age-related improvement in performance. Together, these findings challenge the notion that the relation between language and theory of mind is only skin-deep.

Nevertheless, a growing body of findings from comparative and developmental psychology have led researchers to question the necessity of language for theory of mind and inspired a resurgence of interest in the expression account. For example, researchers have begun to demonstrate that nonlinguistic species are capable of performing tasks that appear to involve being able to reason about the minds of other organisms (e.g., Western scrub jays re-cache food in a way that reduces the chances of it being taken by potential pilferers; Dally, Emery, & Clayton, 2010). In addition, the development of new measures that use children’s eye gaze rather than speech or gesture to assess children’s understanding of others’ minds (discussed earlier) has led some researchers to claim that infants as young as 9 months may have an appreciation of others’ beliefs (e.g., Baillargeon et al., 2010). Given that infants and young children have only limited linguistic abilities, these findings challenge functional accounts of the links between language and theory of mind and bolster the expression account. Related to these points, Milligan et al. (2007) acknowledged that, in their meta-analysis, they were unable to identify any studies that examined the relations between performance on nonverbal false belief tasks and language ability. Since then, Low (2010) has reported that performance on a minimally verbal anticipatory looking false-belief task in preschool children was unrelated to measures of semantic knowledge or syntactic ability.

In raising questions about the necessity of language for theory of mind, the above findings are not without controversy. Specifically, as noted previously, it is, at present, difficult to establish exactly how one should interpret indirect measures of theory of mind in studies of infants and nonhuman animals. Crucially, without clear evidence regarding how individual differences in performance on such measures are related to (or independent from) individual differences in either language ability or in performance on standard theory-of-mind tasks, it is hard to establish whether success on indirect or nonverbal false-belief tasks reflects an early awareness of mental states, an awareness of behavioral rules, or the operation of a separate mindreading system.

Setting aside these controversies, we now return to research findings based on standard measures of theory

of mind in order to examine the evidence for explanatory accounts that posit a causal, developmental relation between language and theory of mind in young children. In their meta-analysis, Milligan et al. (2007) integrated findings from several longitudinal studies to show that the relation between early language ability and later theory of mind ($r = .56$) was significantly stronger than that between early theory of mind and later language ($r = .36$). This asymmetric longitudinal association provides initial support for a developmental association between these two constructs and suggests that theory of mind development builds upon language ability. Researchers are divided over what aspects of language ability might be causally implicated in the development of children's ability to explicitly reason about mental states. To address this issue, Milligan et al. (2007) examined whether the relation between language and theory of mind was specific to any one aspect of language (i.e., general language measures that involve semantic and syntactic subtests, measures of receptive vocabulary, measures of syntactic ability, and measures of complementation syntax). Their findings revealed that, although the correlation between theory of mind and receptive vocabulary was lower than that between theory of mind and general language, each aspect of language ability was associated with theory-of-mind task performance. However, these cross-sectional findings reveal little about the developmental relations between theory of mind and specific aspects of language. Longitudinal and training studies have revealed a rather different set of findings.

One prominent developmental account of the relations between language and theory of mind places central importance on children's mastery of syntax, more specifically, the syntax of mental-state verbs (De Villiers, 2005). Mental-state verbs and verbs of communication are unique (in English) in the kinds of complements they take because the embedded clause can be false while the whole sentence remains true (De Villiers, 2007). Take, for example, the following sentences about some of the events in Shakespeare's *King Lear* (c. 1605/2005b):

1. Edmund said that Edgar wrote the letter.
2. Gloucester believed that Edgar conspired against him.
3. Gloucester was blinded because Cornwall and Regan plucked out his eyes.

In sentences (1) and (2), the proposition in the lower clause (underlined) may be true or false without altering the veracity of the sentence as a whole. In contrast, if the lower

clause in sentence (3) is false, the whole sentence is false. Sentences (1) and (2) contain verbs of communication ("said") and mental states ("believed"), which take tensed complements. According to the "linguistic determinism account" of theory-of-mind development, mastery of the syntax of tensed complements (such as those in sentences (1) and (2)) enables children to represent mental states (De Villiers, 2005, 2007). From this perspective, rather than simply being a crutch for success on theory-of-mind tasks, language is fundamentally implicated in the development of the capacity to reason about mental states (De Villiers, 2005; Hale & Tager-Flusberg, 2003).

In their meta-analytic review, Milligan et al. (2007) reported a robust correlation ($r = .60$) between measures of complementation syntax and performance on false-belief tests. Both training and longitudinal methods have been used to test the causal hypotheses arising from the linguistic determinism account. Training studies were discussed in a previous section of this chapter, but two studies deserve particular mention here because they aimed to establish whether training in sentential complementation is sufficient to improve preschoolers' performance on false-belief tasks. In the first of these studies, Hale and Tager-Flusberg (2003) trained 72 preschool children in one of three conditions: a false-belief task, sentential complementation, and relative clauses. Importantly, none of these conditions involved the use of mental state verbs. Children in both the false-belief and sentential complementation training groups (but not those in the relative clauses group) improved in their false-belief performance, but only children in the sentential complementation training group improved their performance on the sentential complementation task. In a separate study aimed at disentangling the effects of sentential complementation training versus experiences of deception, Lohmann and Tomasello (2003) trained 138 preschoolers in one of four conditions: full training (i.e., the experimenter first showed the child an object that appeared to be a flower but was really a pen and then discussed its deceptive appearance using mental state language and sentential complements), sentential complementation training (i.e., the experimenter discussed an object without referencing its deceptive appearance), discourse-only training (i.e., the experimenter highlighted the deceptive aspects of the object without using mental-state language or sentential complements), and a no-language training condition (i.e., the experimenter highlighted the deceptive qualities of the object with minimal language input). At posttest, although the full training group outperformed all other groups, training in sentential complementation

syntax (without deceptive experience) was sufficient to facilitate false-belief understanding.

Taken together, then, the findings from these two studies offer partial support to De Villiers' (2005) linguistic determinism account, in that they indicate that training in sentential complementation is *sufficient but not necessary* to produce change in false-belief task performance. Other findings that suggest that the mastery of the syntax of mental state verbs is not *necessary* for false-belief task performance come from two longitudinal studies in which mastery of sentential complementation syntax did not predict Time 2 false-belief task performance once effects of age and Time 1 false-belief task performance were controlled (Farrant, Maybery, & Fletcher, 2012; Tardif, So, & Kaciroti, 2007).

Further criticism of the linguistic determinism account comes from studies of non-English speaking children. Meta-analytic evidence shows that English-speaking children come to understand volitional mental states (e.g., desires, intentions) before epistemic mental states (e.g., beliefs, knowledge) (Wellman & Liu, 2004). This finding has been replicated in studies of Mandarin-, Cantonese-, and German-speaking children (Perner, Sprung, Zauner, & Haider, 2003; Perner, Zauner & Sprung, 2005; Tardif & Wellman, 2000). Unlike epistemic mental-state verbs such as "believe" and "think," English verbs denoting volitional mental states (e.g., "want") take an infinitival complement (not a tensed sentential complement), for example: (4) *Edmund wants to take Edgar's land and inheritance.* The linguistic determinism theory originally accounted for the developmental delay between understanding volitional and epistemic mental states in terms of children's ability to use tensed sentential complements, which emerged later than the ability to use infinitival complements (Perner et al., 2003). Unlike English, German verbs of desire must take a "that" complement (Perner et al., 2005). Across two experiments, Perner et al. (2003) demonstrated that despite requiring a "that" complement, German-speaking children performed better on tasks designed to measure the complements of desire statements ("want") than on the complements of verbal communications ("say") and epistemic mental states ("think"). This finding suggests that, in German, the mastery of tensed sentential complements is not a sufficient condition for understanding epistemic mental states.

Whereas linguistic determinism theory privileges the specific role of the syntax of mental-state verbs in the development of theory of mind, others have proposed a more general developmental account in which both

syntactic and semantic aspects of language foster children's growing understanding of mind (Ruffman et al., 2002; Slade & Ruffman, 2005). This assertion is supported by evidence from both cross-sectional and longitudinal research. Specifically, in one cross-sectional study of English-speaking and Cantonese-speaking children, performance on a measure of complementation syntax was no longer correlated with false-belief task performance when individual differences in general language ability were accounted for (Cheung et al., 2004). Longitudinal studies of English-speaking and German-speaking children also demonstrate that no one aspect of language (semantics or syntax) exerts greater influence on false-belief task performance than another (Lockl & Schneider, 2007; Ruffman et al., 2002). This position is undermined somewhat, however, by findings from the training studies reported earlier. Recall that training in relative clause structures (Hale & Tager-Flusberg, 2003) and training that involved discourse about a deceptive object without the use of mental-state verbs or sentential complements (Lohmann & Tomasello, 2003) produced no effect on false-belief task performance. Clearly, further training studies are required to support the claim that general linguistic ability (and not just sentential complementation) plays a causal role in the development of theory of mind.

Language and Theory of Mind Beyond the Preschool Years

Much like the research on executive function and theory of mind, the bulk of what is known about the links between language and theory of mind is derived from research on preschool children. A few studies focused on middle childhood have identified a moderate correlation between measures of language ability and performance on complex theory-of-mind tasks (Banerjee et al., 2011; Devine & Hughes, 2013), but without longitudinal or training evidence it is difficult to determine what role language plays in the development of mental-state reasoning during middle childhood and adolescence.

Several adult experimental studies have begun to shed light on the possible role of language in the fully developed theory of mind. In one study, A. M. Newton and De Villiers (2007) used a dual-task approach to examine the extent to which adults required language to perform a simple nonverbal false-belief task. Simultaneous performance of a verbal shadowing task had a large and negative effect on false-belief task performance when compared to a nonverbal rhythmic tapping task. However, Dungan and Saxe (2012) have argued that this contrast may reflect the

greater working memory demands imposed by the verbal shadowing task because, when working memory load was matched across conditions, performance on the nonverbal false belief was equivalent in both dual-task conditions. Further, in a case study, Apperly, Samson, Carroll, Hussain, and Humphreys (2006) demonstrated that an adult with severe grammatical impairments following stroke (including the inability to use complementation syntax) performed at above chance levels on nonverbal first- and second-order false-belief tasks. This case study raises the possibility that adults with impaired language abilities can reason about others' mental states. Additional work with typically developing adults is needed to elucidate the ways in which language remains part of the fully developed ability to reason about mental states.

In sum, although the evidence reviewed in this section makes it clear that language provides a foundation for the development of false-belief understanding in early childhood, the exact nature of this foundation (e.g., syntax or semantics or some combination of these) remains to be established. Data from longitudinal studies suggest that general language ability, rather than separate aspects of language, is necessary for later theory-of-mind development, but data from training studies suggests that mastery of syntactic complementation is sufficient (but not necessary) to produce change in false-belief task performance. Further work is needed to establish whether language continues to aid the development of theory of mind beyond the preschool years or whether it remains an important aspect of theory-of-mind use. In addition, replication studies within different linguistic contexts are needed to test the universality of specific relations between language and theory of mind. A further promising direction for future work is to test the emergence account by establishing whether language skills are also related to performance on *nonverbal* false-belief tasks.

Theory of Mind, Executive Function, and Language: A Social Perspective?

Our review of the developmental links between theory of mind and two cognitive domains: Executive function and language has been useful in identifying three key lacunae within existing research. Specifically, although the abundance of cross-sectional correlation studies focused on preschool children has been useful in identifying the links between individual differences in theory of mind and other cognitive abilities, progress in testing developmental theories has been constrained both by the scarcity of

longitudinal and training studies and by the narrow focus on the preschool years.

Second, existing studies have typically focused on *either* executive function *or* language ability as a correlate of theory of mind, with only limited attempts to integrate findings from these two strands of research. Because associations between theory of mind and both executive function and language are consistently moderate in magnitude, neither executive function nor language is likely to be a sufficient foundation for the development of theory of mind. That is, although existing theoretical accounts of the development of theory of mind consider the role of language ability and executive function separately, neither construct is likely to show a simple direct causal relation with individual differences in theory of mind. Instead, there is likely to be an interesting interplay between individual differences in these three constructs. One obvious interplay is that language skills foster children's executive function, which in turn promotes the development of theory of mind. This possibility is supported by Vygotsky's (1978) theory predicting that the capacity for language permits children to develop higher-order cognitive processes involved in the control of thought and action (i.e., executive functions). An alternative possibility is that improvements in executive function enable children to engage in more complex forms of discourse that in turn boost their understanding of others' minds. That is, for both language and executive function, the association of one construct with theory of mind may be mediated by the other.

The third obvious gap within existing research is that associations between theory of mind, executive function, and language have typically been examined in a social vacuum. This omission is surprising given the extensive bodies of literature that exist concerning social influences on (a) theory of mind (discussed earlier in this chapter) and (b) both language (e.g., Hoff, 2006) and executive function (e.g., Bernier, Carlson, & Whipple, 2010) as well as a growing body of work demonstrating differential susceptibility to environmental influence (discussed earlier). That is, just as genetic variation has been shown to moderate the impact of both positive and negative environments on diverse child outcomes (Belsky et al., 2009), it is reasonable to suppose that variation in children's language and executive function will also play a moderating role in the association between social environments and children's theory of mind. Reflecting this possibility, Benson et al. (2013) found that individual differences in executive function were a strong predictor of how much preschool children benefited from a short intervention designed

to promote false-belief understanding. Thus the relation between other aspects of children's social environments such as the frequency of parental mental-state talk and individual differences in theory of mind may be greatest for children who are more advanced in their executive functions (and so are better able to control their perceptual experiences). Focusing on the interplay between social and cognitive influences on children's understanding of mind is, we think, an exciting challenge for future research that might act to integrate the various competing theoretical perspectives on the development of theory of mind and elucidate the processes by which social experiences effect individual differences in theory of mind.

THEORY OF MIND: SOCIAL AND ACADEMIC OUTCOMES

In this final section, we turn the tables to examine a central tenet of the "social individual differences" perspective on theory of mind (Apperly, 2012), namely that individual differences in children's understanding of mind matter for children's social lives (e.g., Hughes, 2011). First, we consider links with children's later social competencies and peer relationships because these are not only important outcomes in their own right but also influence children's academic success. Next, we consider four further pathways that may mediate the association between theory of mind and academic success: peer relationships, child-teacher relationships, children's self-perceptions, and meta-cognition.

Theory of Mind: Social Outcomes

More than 30 years of research have produced remarkably few direct tests of whether and how mind-reading matters for everyday social interaction and existing studies have focused heavily on atypical groups. We therefore begin with a brief review of this literature on atypical groups.

Theory of Mind, Social Adjustment, and Atypical Populations

There is now considerable evidence that children with ASD have difficulty with tasks designed to measure theory of mind. Just over 10 years after Baron-Cohen et al.'s (1985) seminal study, a meta-analysis of data from 22 separate studies indicated that performance on such measures was, on average, almost 1 standard deviation ($d = .88$) lower in children with ASD than in typically developing children

(Yirmiya, Erel, Shaked, & Solomonica-Levi, 1998). Challenging earlier views that theory of mind was the crucial and unique defining deficit in ASD, similar findings have also emerged in the field of schizophrenia research. A meta-analytic review of 29 separate studies confirmed that adults with schizophrenia typically performed over 1 standard deviation below ($d = 1.25$) unaffected adults on measures of theory of mind (Sprong et al., 2007). These findings have led some theorists (e.g., Baron-Cohen, 1995; Corcoran et al., 1995) to claim that impairments in theory of mind underpin the social impairments that characterize both ASD and schizophrenia. For children with ASD, this view has at least partial empirical support from studies that have applied parental and teacher ratings of everyday social functioning to distinguish between "interactive" social skills that require mind reading (e.g., ability to respond to hints and indirect cues, or to initiate conversations of interest to others) and nonmentalistic "convention-based" social skills (e.g., sharing, following rules in a game) to compare children who passed or failed false-belief tasks (e.g., Fombonne, Siddons, Achard, Frith, & Happé, 1994; Frith, Happé, & Siddons, 1994; Hughes, Soares-Boucaud, Hochmann, & Frith, 1997). According to Frith et al. (1994) the weakness of the observed association between task performance and everyday social functioning for individuals with ASD may reflect their use of alternative non-theory of mind or "hacking" strategies on false-belief tests. Consistent with this view, two training studies (Hadwin, Baron-Cohen, Howlin, & Hill, 1997; Ozonoff & Miller, 1995) have shown that improvements in the performance of individuals with ASD on false-belief tasks do not lead to improvements in parent- and/or teacher-rated social adjustment.

However, it should be noted that, although all three studies confirmed that group differences were restricted to interactive social skills, effects of verbal ability were not considered in the study by Frith et al. (1994) which attenuated the group differences observed in the other two studies. Adopting a more fine-grained approach, Peterson, Slaughter, and Paynter (2007) reported that, for both children with ASD and typically developing controls, overall scores on a battery of false-belief tasks were moderately related to teachers' ratings of social skills, even when effects of age and verbal ability were taken into account. However, none of these predictors remained significant when diagnostic status was included in the model, indicating that group differences in social skills could not be explained by age, verbal ability, or theory of mind.

Theory of Mind, Social Adjustment, and Typically Developing Preschoolers

Earlier in this chapter, we identified seven strands of research that support the view that social environments influence children's understanding of mind. Far fewer studies have focused on the potential social *consequences* of individual differences in theory of mind (Dunn, 1995; Hughes & Leekam, 2004). The extant evidence suggests only qualified support for the view that theory-of-mind skills matter for our everyday social lives. Addressing this issue, Astington (2003) has argued that theory of mind is sometimes necessary but never sufficient for explaining social competence, highlighting the importance of other factors, such as language and social context. Likewise, Apperly (2011) has argued that, rather than constantly deploying a theory of mind, people often rely on social scripts, behavioral cues, and narratives to guide their behavior in social situations. In a stronger version of this account, Ratcliffe (2007) has proposed that *most* social interactions can be successfully navigated by relying on social norms and roles rather than the attribution of mental states. Below, we outline the evidence that theory of mind contributes to children's social functioning and discuss why different studies have led to contrasting findings.

In one of the earliest studies in this field, Lalonde and Chandler (1995) adopted a similar methodology to that applied in early studies of children with ASD, distinguishing between teachers' ratings of "conventional" and "interactive" (i.e., mentalistic) social behaviors and demonstrating that only the latter were (moderately) related to performance on false-belief tasks in typically developing 3-year-olds. However, a direct replication study (Astington, 2003) that took account of individual differences in verbal ability produced no significant findings and also highlighted the difficulty in reliably distinguishing between conventional and interactive social behaviors. Likewise, although two separate studies (of 5- and 6-year-olds) have reported weak associations between false-belief understanding and teachers' ratings of social skills (Hughes, 2011; Watson, Nixon, Wilson, & Capage, 1999), at least two other studies (E. Newton & Jenvey, 2011; Weimer & Guajardo, 2005) have failed to detect any significant association between theory of mind and social functioning. The evidence then is, at best, mixed.

Findings from the first study to address the issues of causal direction suggest that peer interactions reflect rather than influence children's understanding of mind. At three time-points over a 7-month period, Jenkins and Astington

(2000) gave 20 Canadian preschoolers a set of false-belief tasks and filmed them in dyadic play with a friend. These play sessions were transcribed and coded for quantity and quality of pretend play (e.g., joint planning, explicit role assignment); cross-lagged analyses showed that prior false-belief performance predicted children's joint planning and role assignment during later sessions (even with effects of age, concurrent child language, and prior pretend play taken into account). In contrast, there was no evidence that early social behaviors predicted children's later theory of mind. That said, findings from other studies do suggest a reciprocal association (e.g., Razza & Blair, 2009).

One possible explanation for the inconsistent association between false-belief task performance and adult-ratings of social skills is that the ability to attribute mental states is a socially neutral tool, which can be applied to both prosocial goals (e.g., helping, comforting, explaining) and antisocial goals (e.g., deceiving, manipulating, excluding). This perspective suggests that researchers need to consider potential moderating influences. For example, in a study involving a sample of 120 pairs of same-sex 40-month-old twins, girls' good performance on a battery of false-belief tasks was weakly associated with harmonious and cooperative mother-child interactions, whereas for boys, success on the same battery of false-belief tasks was moderately associated with greater use of parental discipline, suggesting gender differences in *how* children apply their understanding of others' minds (Hughes, Deater Deckard, & Cutting, 1999). Replicating this gender difference, Walker (2005) examined theory-of-mind performance in 111 children aged 3 to 5 years and found that the associations with teachers' ratings of aggressive or disruptive behavior were moderately stronger for boys than for girls.

Differences in how social skills are conceptualized and measured might also contribute to the mixed findings reported in the literature. Whereas some studies have focused on complex or "interactive" social competence skills (e.g. Lalonde & Chandler, 1995; Peterson et al., 2007), others have assessed social adjustment through ratings of prosocial behavior (Cassidy et al., 2003) or peer acceptance (Slaughter et al., 2002).

In addition, as argued by Astington (2003), conclusions regarding the link between theory of mind and social skills are also constrained by the heavy reliance on cross-sectional research. In one exceptional study involving 101 children who completed batteries of false-belief tasks at Ages 3 and 6, Hughes et al. (2011) applied latent variable analyses to demonstrate that individual differences

in false-belief understanding were stable across this 3-year period and showed both distal and proximal associations with frequencies of children's mental-state talk to friends at Age 6. Importantly, this model included both children's overall talk and friends' mental state talk, such that the findings indicate specific and independent longitudinal and cross-sectional associations between children's understanding of false-belief tasks and the frequency of their conversational references to their own and their friends' thoughts and feelings. One possible explanation for these findings is that achieving an early understanding of mind gives children an advantage in forming and maintaining friendships, which in turn leads to greater intimacy and mental-state awareness within these friendship interactions.

Theory of Mind, Social Adjustment, and School-Aged Children

As children grow up, their relationships with friends and peers come to eclipse the importance of family relationships and so one might expect a particularly robust association between individual differences in understanding of mind and peer relationship quality among school-aged children. To date however, findings have been limited by the scarcity of developmentally appropriate tasks for assessing individual differences in older children's understanding of mind. In addition, the findings from the few studies that have investigated this association are rather complex and highlight the importance of informant effects. For example, Bosacki and Astington (1999) found that variation in preadolescents' theory-of-mind skills, although unrelated to teachers' ratings of social competence, was moderately correlated with peers' ratings of social competence even when effects of age and verbal ability were controlled. Here it is worth noting that, by preadolescence, children are taught by a variety of teachers who are therefore less likely than teachers of younger children to be in tune with the social lives of their students.

Rater effects are also apparent in the findings from another much larger study involving 600 pairs of 9-year-old twins who completed Happé's Strange Stories (a series of text-based vignettes in which an actor says something that is not literally true and the child is asked to explain the actor's motives). Scores on this task showed uniformly modest correlations with self-, parent-, and teacher-ratings of children's social and communicative skills (on a checklist for symptoms of ASD) (Ronald et al., 2006); however, only the correlation with self-ratings remained significant once effects of language ability were taken into account. In another study involving 230 children aged 8 to 13 years,

Devine and Hughes (2013) administered both the Strange Stories task and a novel measure of theory of mind (in which children watched brief clips from Harold Lloyd's classic silent film "Safety Last" and were then asked questions about the characters' thoughts and feelings). In this study, poor performance on both tasks was associated with children's self-reported loneliness and social dissatisfaction, even when effects of age, gender, verbal ability, and socioeconomic status were taken into account. These associations were more robust than those reported by Ronald et al. (2006); two possible explanations for this difference are that the two studies adopted different measures (a checklist for symptoms of ASD in Ronald et al.'s [2006] twin study versus a measure of normative variation in loneliness and social dissatisfaction in Devine and Hughes' [2013] study) and involved samples that differed in age range (9-year-olds in the first study, as compared with 8- to 13-year-olds in the second study).

To date, just three studies of the relation between theory of mind and social competence in school-aged children have adopted a longitudinal design. First, Banerjee et al. (2011) used a cohort sequential longitudinal design to follow 210 British children across a 2-year period and reported a weak bidirectional link between individual differences in theory of mind (indexed by performance on a faux pas task) and peer rejection. Second, in a study involving 70 Italian children, Caputi et al. (2012) demonstrated that variation in prosocial behavior (from Ages 5 to 6) mediated the association between theory of mind at Age 5 and peer acceptance at Age 7.

In the third study, Devine (2013) followed up a sample of 137 children who completed batteries of theory-of-mind tasks at Ages 6 and 10; each time point also included child, parent, and teacher ratings of social adjustment. Theory of mind at Age 6 predicted social adjustment at Age 10 (as rated by children, parents, and teachers) even when Age-6 social adjustment and verbal ability were controlled. Interestingly, echoing the findings of Jenkins and Astington's (2000) study of preschoolers, this relation was asymmetric: Early social adjustment did not predict later theory of mind. The similarity of results from two samples of different ages suggests that theory of mind contributes to the success of children's social interactions across a broad developmental span.

In sum, while numerous cross-sectional studies (involving different age groups and diverse measures) have reported associations between theory of mind and various indices of social adjustment, the findings from a small but growing number of longitudinal studies indicate that this

association is asymmetric, with effects of theory of mind on later social success being stronger than the effects of early social competence on children's theory of mind skills. Moreover, this conclusion applies equally across a broad range of ages. However, the reported effect sizes range from weak to moderate in strength. Together, these findings provide some support for the social individual differences hypothesis although the relatively small effect sizes underscore that unqualified assertions about the centrality of theory of mind to children's social lives are unwarranted. Instead, the data support the more nuanced perspective on the relation between social adjustment and theory of mind proposed by Astington (2003). Viewed alongside the positive results from training studies described earlier in this chapter, the findings indicate that improving theory-of-mind skills may be a simple yet effective means of improving children's social adjustment. Thus, an obvious next step for future research is to investigate whether training studies can produce improvements in theory of mind that have a measurable impact on the quality of children's interactions with peers. The mixed findings discussed earlier suggest that this impact may be more evident in the quality and content of children's conversations with friends than in more general markers of behavior.

Theory of Mind: Academic Outcomes

Educational perspectives on children's understanding of others' minds are long overdue such that there is scant data available on the implications of both developmental changes and individual differences in theory of mind for children's real-life experiences at school (Astington, 2003). As a result, we can offer only speculative suggestions for pathways that might link theory of mind to children's academic success. The first of these concerns children's relationships with peers, the second concerns their relationships with teachers, the third concerns children's self-concepts, and the fourth concerns children's meta-cognitive abilities.

Peer Relationships, Theory of Mind, and Academic Success

As well as being important outcomes in their own right, positive peer relationships provide a foundation for children's engagement and motivation at school (e.g., Pianta & Stuhlm, 2004) and so are likely to be important mediators of any relation between theory of mind and children's academic success. For example, in a short-term longitudinal study of 200 kindergarteners, Ladd, Birch, and Buhs (1999)

showed that children's cognitive maturity contributed to their participation and achievement both directly and indirectly, via interactions with peers and teachers. The same research group applied structural equation modeling to longitudinal data on children followed from kindergarten through to fifth grade and reported similar findings. Specifically, teacher-rated chronic peer exclusion mediated the association between early (self-rated) peer rejection and later (teacher-rated) classroom participation, whereas (self-rated) victimization from peers mediated the association between teachers' ratings of early peer exclusion and later engagement in classroom activities (Buhs, Ladd, & Herald, 2006). Viewed alongside the peer problems among children with poor theory of mind described above, these findings suggest that peer relationships play a key mediating role in any associations between early theory of mind and later academic success.

Child-Teacher Relationships, Theory of Mind, and Academic Success

Understanding that other people have thoughts leads very easily to reflecting (and perhaps even ruminating) about the contents of those thoughts, and in particular, about what other people think of you. Thus, just as enhanced theory of mind has been reported for adults with dysphoria (Harkness et al., 2012), it may be that early awareness of others' minds may come at a price. Consistent with this view, findings from at least three separate longitudinal studies demonstrate that early mind-reading predicts later sensitivity to criticism.

The catalyst for this work was a longitudinal study of 46 Pennsylvanian preschoolers, which showed that false-belief understanding at 40 months was a moderately strong predictor of children's ratings of negative experiences in school 2 years later (Dunn, 1995). In a later London-based study, Cutting and Dunn (2002) told 141 preschoolers a puppet story involving a teacher who either praised or criticized a child's attempts at a task (drawing/arithmetic). Children were asked to imagine themselves as the child and to rate their ability and feelings. When effects of age and verbal ability were controlled, sensitivity to teacher criticism (i.e., ratings of low ability and negative feelings in the criticism condition) remained strongly correlated with both concurrent and prior false-belief performance. Similar findings have emerged from studies in which the same puppet paradigm was administered to children in Cambridge (United Kingdom) and Pavia (Italy). In the Cambridge study, Hughes (2011) found that sensitivity to teacher criticism at Age 6

was related to concurrent (but not prior) theory-of-mind performance. Echoing the gender-specific social correlates for theory of mind reported earlier, this association was stronger for girls than for boys. Importantly, however, false-belief performance and sensitivity to teacher criticism were each inversely related to both teachers' and children's ratings of dependency on teachers. Thus despite its negative connotations, sensitivity to teacher criticism may actually reflect a positive aspect of the child–teacher relationship. For example, as noted by Cutting and Dunn (2002): “Children who are more sensitive to criticism may be in a better position to learn from constructive criticism than those who are less affected by critical remarks” (p. 857). Support for this view comes from findings from a mediation analysis conducted in a longitudinal study of 60 Italian children. Specifically Lecce, Caputi, and Hughes (2011) have reported that sensitivity to criticism at Age 6 was a moderately strong mediator of the association between theory of mind at Age 5 and teacher-rated academic success at Age 7. Thus, rather than simply being a “cost” of early mind-reading, sensitivity to criticism may actually drive children's efforts to enhance their academic performance.

A further challenge to the idea that early mind-reading ability may have negative consequences (e.g., leading children to worry about what others think of them) is provided by the finding, reported in two separate studies (Banerjee, 2008; Broeren & Muris, 2009) of a weak inverse relationship between false-belief performance and social anxiety. On balance, then, early mind-reading appears unlikely to adversely affect children's well-being, but may facilitate their grasp of teachers' intentions (Ziv, Solomon, & Frye, 2008) and enable them to form responsive interactions with their teachers (e.g., Garner & Waajid, 2008). This is an important goal, as evidence from a large-scale NICHD study (of 1,304 children followed from birth to 11 years) indicates that child–teacher relationship quality both strongly predicts later achievement and buffers children from the adverse effects of insecure maternal attachment on academic achievement (O'Connor & McCartney, 2007).

Are the above findings limited to studies of young school-aged children, or might individual differences in theory of mind also be associated with variation in the quality of adolescents' relationships with teachers (and hence with their academic performance)? This question has yet to be addressed directly, but the few findings that are available for older children and adolescents are encouraging. For example, at least one study has shown that

preadolescents demonstrate marginally better mental-state awareness when answering questions about hypothetical scenarios involving teachers they like rather than teachers they do not like (O'Connor & Hirsch, 1999); to our knowledge, however, this (weak) contrast has yet to be replicated.

Self-Perceptions, Theory of Mind, and Academic Success

Theorists (e.g., Rutter, 1989) have long argued that children's self-perceptions (e.g., evaluations of their own academic potential) shape their behavior and developmental trajectories. Empirical support for this view comes from longitudinal evidence for a moderate reciprocal association between achievement and academic self-concept (e.g., Marsh, Ellis, & Craven, 2002). That is, while academic success obviously influences children's academic self-concept, a positive academic self-concept predicts academic gains, especially in mathematics (Marsh & Yeung, 1997).

To our knowledge, no published study has directly investigated the relation between theory of mind and children's academic (rather than social) self-concept. However, at least two studies have demonstrated links between theory-of-mind performance and children's global self-worth. One of these studies involved 3-year-old children and demonstrated an interesting interplay between the predictive effects of theory of mind and mother–child relationship quality on children's self-worth. Specifically, the (weak to moderate) association between theory of mind and self-worth was positive for children who enjoyed high levels of maternal warmth, but negative for children exposed to low levels of maternal warmth (Cahill, Deater Deckard, Pike, & Hughes, 2007).

Likewise, in a study of preadolescents, Bosacki (2000) found that, even when variation in language ability was taken into account, the sophistication of participants' accounts of vignettes involving beliefs about beliefs (used as an index of their theory-of-mind skills) showed a moderate to strong association with their justifications for statements about the self. Whereas Bosacki (2000) interpreted this finding from a sociocultural perspective (that is, that the understanding of self emerges through interaction with others), others have offered a more biological view. Specifically, in a review of evidence from neuroimaging studies and from experimental studies of both typically developing children and children with ASD, Happé (2003) has argued that “self-reflection may

be, in one sense, an epiphenomenon—an extraordinary side effect of the crucial ability to read other minds" (p. 142). To date, however, this proposal has yet to be tested. The earlier-described findings of an association between positive self-concept and academic achievement suggest that future research to elucidate the nature of associations between theory of mind and self-concept may be important not just theoretically, but also at a practical level, in developing new strategies to promote children's academic success. That is, interventions that successfully promote theory of mind may also enhance children's self-perceptions and thus indirectly foster their academic achievement.

Meta-Cognition, Trust, Theory of Mind, and Academic Success

According to Harris (2007, 2012), much of what children learn about the world comes from others' testimony. Experimental comparisons of 3-year-old children's attention to visual and verbal information indicate that preschoolers show a specific bias to trust testimony (Jaswal, Croft, Setia, & Cole, 2010). Moreover, an ingenious series of investigations (described below), has shown that young children display selective trust, acting preferentially on information provided by: (a) familiar rather than unfamiliar adults; (b) in-group rather than out-group (e.g., as defined by racial features) adults; (c) adults whose previous testimony has been accurate and reliable; and (d) adults whose previous testimony is endorsed by bystanders.

Interestingly, the above strategies for filtering information vary with children's age and attachment security. Specifically, whereas younger preschoolers show a global preference for information from familiar rather than unfamiliar speakers (Corriveau, Pickard, & Harris, 2011), older preschoolers can moderate this preference according to the accuracy of the speakers' previous statements (Corriveau et al., 2009). Likewise, Corriveau et al. (2009) have shown that securely attached children prefer to act on information provided by a caregiver than by a stranger when no external cues are available, but reverse this preference if the stranger is likely to be better informed; in contrast, insecurely attached children are less flexible and judicious in their preferences for informational sources. Although this research is typically used in accounts of the social origins of children's concepts of mind, it also provides a platform for investigating whether age-related changes in children's understanding of mind contribute to their growing success in learning about the world more generally.

The educational implications of this proposal are clear, making this a valuable direction for future research. For example, it is possible that children with more advanced or fluent mind-reading skills are more likely to attend to information from informed and reliable sources and are, in this way, at an advantage in learning about the world around them.

Links between theory of mind and meta-cognitive skills may also provide another clue to how individual differences in children's understanding of mind might relate to academic outcomes. Take, for example, meta-knowledge about reading strategies (e.g., understanding the benefits of both skim-reading and rereading a text). As argued by Lecce et al. (2010), this meta-knowledge hinges on understanding that texts, like mental states, are representational in nature and can be interpreted in different ways by different people; in addition, understanding that text has an intended meaning is likely to help children understand that texts (like human intentions) can be misinterpreted. To test this proposal and establish the specificity of relations between theory of mind and meta-knowledge of reading, Lecce et al. (2010) conducted two studies of school-aged children (total $N = 277$) that examined whether children's understanding of cognitive states and emotion states predicted children's later meta-knowledge of reading. Their findings demonstrated a weak but specific link between variation in children's understanding of cognitive states and their later meta-knowledge about reading, even controlling for prior meta-cognition scores.

In sum, although the scarcity of research in this field means that we can only offer speculations rather than conclusions, several lines of investigation suggest that early individual differences in theory of mind may contribute to children's academic success via a number of routes. These include the fostering of social skills needed to form and maintain positive relationships with peers; the ability to understand teachers' intentions, enabling children to engage in constructive dialogue when teachers provide feedback on their work; the development of a positive and well-articulated sense of self that motivates children to strive to achieve their full potential; and the ability to reflect on others' perspectives in order to identify reliable sources of information or to reflect on one's own knowledge or cognitive abilities. Much more work is needed, both to draw these different strands of research together in order to test mediation models and to expand the developmental scope of this research in order to examine developmental shifts in the relative salience of each of these putative pathways.

CONCLUSIONS AND FUTURE DIRECTIONS

Each section in this chapter finished with an interim summary of research findings; thus our goal here is to offer a few key conclusions and suggestions regarding useful avenues for future research.

Individual Differences in Theory of Mind Are Not Trivial

Rather than simply reflecting a delay in the emergence of an area of knowledge (with no further consequences for development once acquired) individual differences in theory of mind appear both stable and meaningful. Although much more longitudinal work is needed to construct a life-span perspective on children's understanding of mind and address questions about developmental processes, findings from existing longitudinal studies demonstrate that individual differences in children's understanding of mind exhibit relative stability, even when different tasks are used at time-points that are several years apart.

What is less clear, however, is just what underpins these stable individual differences. Existing studies have controlled for the effects of other cognitive abilities (e.g., language, executive function) and family background, but have not, to our knowledge, controlled for effects of variation in child temperament or personality—some children may be more accurate in their reading of other minds than other children for the simple reason that they are more interested and hence more motivated to understand others. Conversely, contrasts in the ease with which children are able to “tune in” to others' minds may actually lead to individual differences in children's motivation to understand others. Teasing these two competing accounts apart requires designs that enable researchers to distinguish between children's performance and their competence (e.g., studies that give children attractive rewards for successful mind-reading, or assess changes in social orientation following training in mind-reading skills).

Although, as discussed in this chapter, researchers have made considerable headway in extending the developmental scope of investigations both below and above the preschool years, this research has typically involved individual tasks. Thus another important challenge is the development of reliable task batteries that can capture variation in mental-state understanding for use with very young children, or with school-aged children and adolescents. Several new infant paradigms have been developed but these have yet to be applied together as a battery that

might be sensitive to individual differences. Although there are obvious challenges in administering several tasks to infants, the availability of a wide variety of paradigms (e.g., violation of expectation, anticipatory looking, active helping, imitation) should enable researchers to sustain the interest of both infants and caregivers. Equally however, given that infants' attention is a precious resource, an urgent challenge for future studies is to assess the reliability and validity of existing measures. This psychometric work is an important prerequisite for testing competing theoretical accounts of why infants appear able to display an awareness of mental states in their spontaneous behaviors long before they succeed on traditional theory-of-mind tasks.

There is also a variety of paradigms available for older children and adolescents, but these do not share a common focus. Instead, some tasks measure perspective-taking skills (e.g., Dumontheil et al., 2010), whereas others focus on understanding epistemic mental states (e.g., Happé, 1994) or emotion (Baron-Cohen, Jolliffe, Mortimore, & Robertson, 1997). Addressing the lack of convergence in how we define theory of mind beyond the preschool years is a clear challenge for researchers trying to develop task batteries that, combined with the use of statistical modeling, can be used to clarify the structure of individual differences in theory of mind in school-aged children, adolescents, and adults. This modeling approach has already been applied successfully in research on the components of executive function, revealing an interesting contrast between the global or unitary structure of executive function in preschool children (Hughes et al., 2011; Wiebe et al., 2008) and the fractionated structure of executive function in adulthood (e.g., Miyake et al., 2000). Achieving a similar understanding of developmental continuity or change in the structure of theory of mind is important for assessing whether existing theories of young children's developing understanding of mind (e.g., executive accounts, linguistic accounts) can be applied at later stages in the life span.

Individual Differences in Theory of Mind Reflect a Complex Interplay of Social and Cognitive Influences

One impressive feature of existing research on potential social influences upon variation in children's theory of mind is the sheer range of different research strategies that have been adopted. As outlined in this chapter, these include: genetically sensitive designs; quasi-experimental studies of children with hearing impairments growing

up in different communicative environments; training studies involving typically developing children across a broad range of ages; longitudinal cross-lagged analyses of relations between measures of family discourse and children's success on diverse measures of theory of mind; observational studies of children's interactions with siblings, friends, and peers; and cross-cultural comparisons to investigate the potential impact of children's wider social environments. So far, however, these distinct strategies have typically been employed in separate studies. Integrating these diverse perspectives will enable future studies to increase both the rigor of existing research and the variety of questions addressed. For example, applying observational paradigms within cross-cultural studies would enable one to assess (rather than assume) cultural contrasts in specific social influences and therefore test competing hypotheses about the processes that contribute to children's emerging understanding of mind (e.g., cultural contrasts in parental socialization goals or practices versus contrasts in children's pedagogical experiences).

Our review of studies of the social and cognitive correlates of theory of mind highlighted twin limitations: Whereas studies of social influences often fail to consider child-driven effects, studies of cognitive influences often appear to have been conducted within a social vacuum. A second key challenge for future research is therefore to examine the complex interplay that is likely to exist between social and cognitive correlates of theory of mind. For example, as discussed earlier, impairments in executive function or in language development are each likely to constrain children's participation in the kinds of social interactions that might be expected to foster advances in children's understanding of mind (i.e., links between theory of mind and each of these cognitive domains may be socially mediated). Equally, there is growing evidence that family factors (e.g., quality of parent-child relationships, engagement in stimulating activities) contribute to variations in the rate at which children develop both executive function and language skills; thus each of these cognitive abilities might mediate associations between variation in children's social environments and in their understanding of mind. Alongside these bidirectional mediation effects, moderation effects are also worth exploring. For example, the extent to which children benefit from exposure to conversations about mental states is likely to depend both on their executive skills (e.g., to hold information in mind and shift attention in order to track the conversations that they overhear) and on their language skills (e.g., understanding lexical ambiguity is likely to facilitate

both children's awareness of contrasts between literal and intended meaning).

Individual Differences in Theory of Mind May Underpin Variation in Social and Academic Outcomes

Understandably, studies of the social impact of theory of mind have focused on atypical groups (such as adults with schizophrenia or children with ASD) for whom social interactions are often very difficult. For normative variation in theory of mind, associations with social success appear modest in size and are often inconsistent across different studies. One challenge for future research is therefore to identify which dimensions determine the salience of theory-of-mind skills. Two obvious candidates are familiarity and complexity: Whereas attempts to deceive or manipulate unfamiliar others place obvious demands on theory-of-mind skills, simple routine interactions with familiar others may require very little in the way of mind-reading (e.g., Ratcliff, 2007). To test these proposed nuanced relationships between theory of mind and social behavior, future studies could incorporate paradigms from game theory and economics (e.g., tasks that invite children to share rewards in situations that either do or don't involve material consequences) and systematically vary the familiarity and identity of the other protagonist (e.g., Guth, Shmittberger, & Schwarze, 1982). This approach might also be useful in elucidating potential cultural contrasts in children's understanding of mind. For example, in a comparison of young school-aged children from the United Kingdom, Italy, and Japan, we found that Italian children were particularly unwilling to accept a vignette in which a mother was trying to keep her son's birthday gift a surprise; many of these Italian children stated categorically that mothers always tell the truth (Hughes et al., 2014).

Also adding to the complexity of findings in this field is the likelihood of developmental shifts in how theory of mind affects social interactions. Among preschoolers, for example, variation in understanding of mental states may be most salient for individual differences in joint pretend play, or in the ability to appreciate simple humor, whereas among school-aged children understanding mental states is likely to be a prerequisite for negotiating complex group interactions or for developing intimacy within friendships (e.g., underpinning children's ability to appreciate the unspoken significance of an utterance). Elucidating developmental shifts in the social functions of theory of mind is an important goal, both in its own right

and as means to constructing more effective interventions for clinical groups who experience difficulties in reading others' minds. In this way training studies can provide us with useful insights for applied psychological work in community and clinical samples.

The modest and fluctuating relation between theory of mind and social behavior is likely to reflect not just moderation effects (such as those outlined above) but also mediation effects. Here, our review highlighted the paucity of direct empirical studies but also outlined four possible mediation paths. These included mediating effects of children's social relationships within the classroom (with both peers and teachers), their self-concepts and their meta-cognitive skills. The time has come for the field to make a concerted effort to use *developmental* research designs to test causal hypotheses about the antecedents and consequences of theory of mind across the life span.

In sum, we hope this chapter has convinced the reader that individual differences in theory of mind: (a) are stable and can be reliably measured across a broad range of ages; (b) reflect a complex interplay of social and cognitive factors; and (c) show meaningful associations with a variety of both social and academic outcomes. We also hope that this chapter has demonstrated the value (for both theory and practice) of expanding both the developmental and conceptual scope of existing research on theory of mind.

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CHAPTER 15

Prosocial Development

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Prosocial behavior—voluntary behavior intended to benefit another—is of obvious importance to the quality of dyadic and group interactions and was a popular topic of research in the 1970s and 1980s. Then attention to the topic declined dramatically for over a decade. However, research on prosocial behavior and related emotional responses (e.g., empathy) has been reenergized in the past decade, in part due to a growing interest in topics such as: (a) the biological correlates and bases of prosocial behavior and empathy-related responding, including heredity; (b) the neurological bases for understanding and responding to others' affective states; (c) the development of sociocognitive skills that play a role in the early emergence of prosocial behavior

and empathy-related responding; and (d) empathy and helping in bullying contexts.

Prosocial behaviors can be performed for a host of reasons, including egoistic ones (Eisenberg, 1986). Of particular importance to the study of prosocial behavior in many (but perhaps not all) cultures is the subgroup of prosocial behaviors labeled altruism, sometimes defined as intrinsically motivated voluntary behavior intended to benefit another—acts motivated by concern for others or by internalized values, goals, and self-rewards rather than by the expectation of concrete or social rewards or the avoidance of punishment (Eisenberg, Fabes, & Spinrad, 2006). However, because it is often impossible to

differentiate between altruistic actions and those prosocial behaviors based on other motives, it is necessary to focus on the broader domain of prosocial behaviors.

Empathy-related emotions frequently are viewed as contributing to the performance of other-oriented prosocial behaviors. Definitions of *empathy* vary; we define it as an affective response that stems from the apprehension or comprehension of another's emotional state or condition, and which is identical or quite similar to what the other person is feeling or would be expected to feel (Eisenberg et al., 2006). Empathy often is differentiated from related vicarious emotional responses, including sympathy and personal distress.

Sympathy is an affective response that frequently stems from empathy, but can derive directly from perspective taking or other cognitive processing including retrieval of relevant information from memory. It consists of feeling sorrow or concern for the distressed or needy other (rather than feeling the same emotion as the other person is experiencing or is expected to experience). *Personal distress* also may stem from exposure to another's state or condition; however, it is a self-focused, aversive emotional reaction to the vicarious experiencing of another's emotion (e.g., discomfort, anxiety; see Batson, 1991). Because empathy and sympathy have been strongly implicated in prosocial development and action, they are discussed throughout the chapter.

In the initial section of this chapter, we briefly present a general framework for integrating factors that contribute to prosocial responding (see Eisenberg [1986] and Eisenberg & Fabes [1998] for a review of relevant philosophical theories and grand theories in psychology). Then the empirical literature related to the development of prosocial behavior, with an emphasis on the emerging literature on early development and development during adolescence, is reviewed. In the following section, we review literature on the origins of prosocial responding, including potential biological, cultural, familial, and peer/school factors. Next we address sociocognitive correlates of prosocial responding and the relations of both temperamental/personality and social-behavioral individual differences (e.g., aggression) to prosocial behavior and/or empathy-related responding. Because there have been relatively few recent studies on the role of situational factors such as cost and benefits, situational skills, or mood inductions on prosocial behavior, these topics are not reviewed (see Eisenberg & Fabes, 1998). In the final sections of the chapter, gaps in the field and future directions for scholarship and research are discussed.

Due to space constraints, we often build on previously published reviews and focus more on recent than older publications (see Eisenberg & Fabes, 1998, and Eisenberg et al., 2006, in prior editions of the *Handbook* for older citations). We focus disproportionately on topics of central importance to prosocial development and issues that have been foci of interest in the decade prior to the time of this writing. Furthermore, we have confined our coverage to a somewhat narrow definition of prosocial responding. For example, the literature on cooperation, personality agreeableness, or the allocation of rewards generally is not emphasized. In addition, although people can empathize with others' positive emotions, we focus primarily on empathy with others' negative emotions or conditions of need because such empathy-related responding with negative emotions is of greater conceptual relevance to prosocial behavior.

A HEURISTIC FRAMEWORK

In our view, there are several major ways to approach the study of prosocial development: (a) examining normative developmental change in relevant behaviors and affect, (b) studying factors that might affect relatively enduring individual differences in prosocial responding (e.g., genetics, culture, socialization in the home or school), (c) delineating processes underlying the unfolding of prosocial action (or the lack thereof) in context, and (d) examining the role of contextual factors in situational prosocial behavior or empathy-related responding. All of these are represented to some degree in the heuristic model in Figure 15.1.

In Figure 15.1, we propose that prosocial action in a given context (or the lack thereof) is indirectly affected by individual differences in biology; socialization in the culture, family, and community; and in individuals' sociocognitive and dispositional (temperamental/personality) characteristics, along with antecedent temporary affective states and specific characteristics of a given situation (e.g., costs, who is the recipient). Specifically, such factors influence individuals' attention and how they interpret specific situations, if they identify helping actions and believe they are capable of engaging in relevant prosocial actions, how they make choices among conflicting goals in a specific situation, the intention to benefit another, and engaging in prosocial behavior. However, aspects of individuals' biology, socialization, and sociocognitive/dispositional

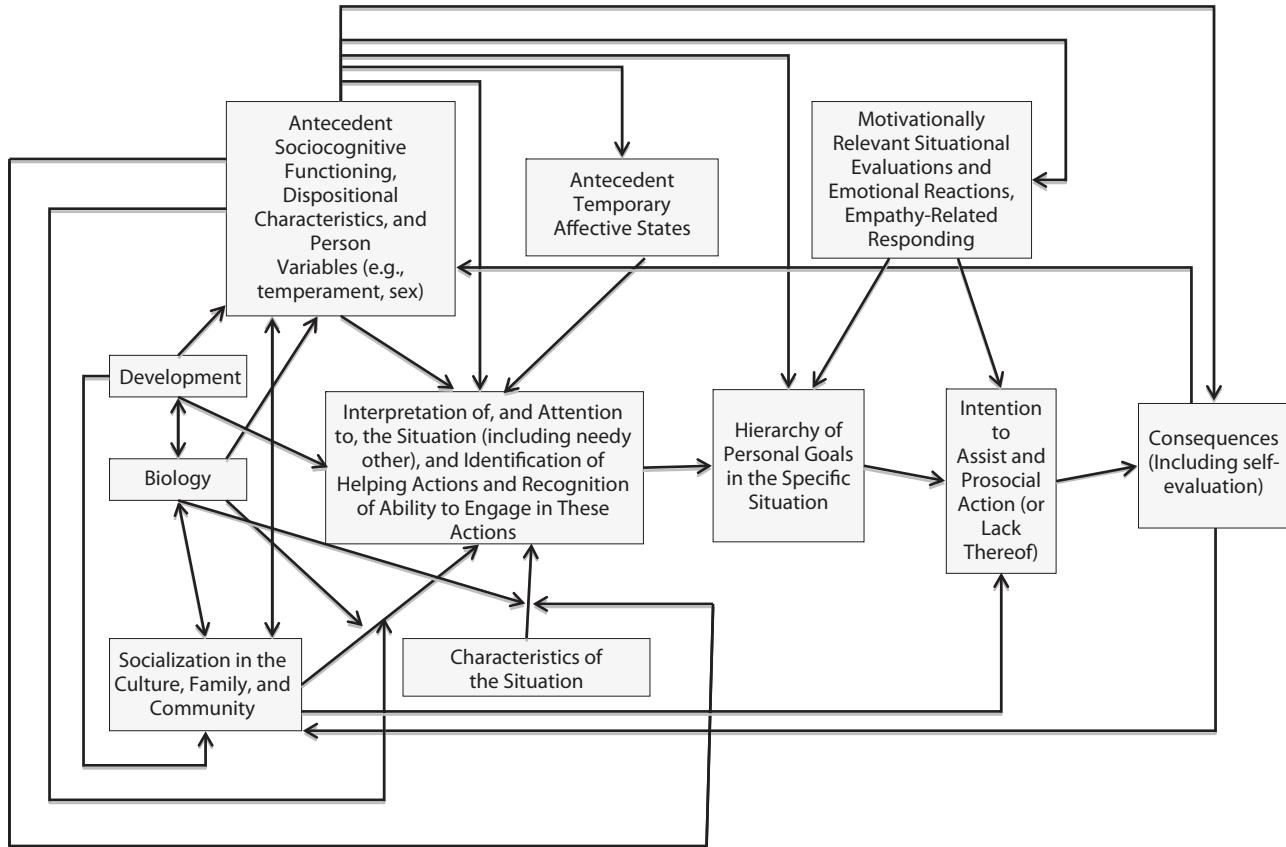


Figure 15.1 Heuristic model of prosocial behavior.

Source: Adapted from *Altruistic Emotion, Cognition, and Behavior*, by N. Eisenberg, 1986, Hillsdale, NJ: Erlbaum.

characteristics are likely to affect one another. Moreover, biological factors such as heredity, as well as antecedent sociocognitive and dispositional differences, likely interact with both *socialization within culture/family/community* and *characteristics of a given situation* in predicting behavior in a specific contexts. In addition, environmental and internal self-evaluative consequences of acting (or not acting) in a prosocial manner are expected to affect dispositional characteristics and socialization over time. Furthermore, development can affect antecedent sociocognitive/dispositional characteristics, biology, socialization, and interpretation of, and attention to, the situation.

Research focused on processes involved in the execution of prosocial behavior in context was popular and especially characteristic of the research in the 1970s and 1980s (see Eisenberg, 1986; Eisenberg & Fabes, 1998). However, such a focus has been more in the domain of social psychologists than developmentalists in the past two decades (with the exception of some work on situational factors that affect infants' abilities to perform prosocial actions). Thus,

in this chapter, we focus primarily on normative development as well as sociocognitive and dispositional factors that might affect individual differences in prosocial behavior and emotions (e.g., empathy/sympathy). We suggest that these factors jointly predict, at least to some degree, individual differences in prosocial behavior, albeit perhaps only certain types of prosocial behavior and prosocial emotion, depending on the relevance of the sociocognitive/dispositional variable for the specific aspect of prosocial functioning.

THE DEVELOPMENT OF PROSOCIAL TENDENCIES

As is evident in Figure 15.1, we believe development plays a multifaceted role in prosocial development. Prosocial behavior and empathy emerge early in life. Hoffman (2000) was one of the first theorists or researchers to discuss this process in depth. He argued that young infants have not acquired a sense of self-other differentiation and

cannot differentiate their own distress from that of another; thus, they tend to experience self-distress in response to another's distress, as evidenced in their reactive crying in response to the sound of another's cry (viewed as a simple form, or precursor, of global empathy). He further argued that, beginning around the end of the first year of life, infants begin developing a sense of self as separate from others; however, they cannot fully differentiate between their own distress and that of another so they often respond to empathic and self-related distress situations in the same way (labeled *egocentric empathic distress*). As a consequence, infants are thought to seek comfort for themselves when exposed to others' distress.

Hoffman (2000) further proposed that, in the second year of life, toddlers clearly differentiate between self and other, although they still do not distinguish well between their own and another's internal states. Nonetheless, toddlers can experience empathic concern for others (labeled *quasi-egocentric empathic distress*), rather than solely seek comfort for themselves. They sometimes try to comfort other people, but such prosocial behavior is likely to involve giving the others what the toddlers themselves find comforting. In Hoffman's theory, in the second and third years of life, as children become increasingly aware of other people's feelings and are capable of understanding that other people's perspectives and feelings can differ from their own, prosocial actions reflect an awareness of the other person's needs and they experience *veridical empathic distress*. Moreover, with the development of language, children are able to empathize and sympathize with a wider range of emotions than previously, but younger children's empathic responses are restricted to another's immediate, or situation-specific, distress.

Hoffman's (2000) theory has been helpful in identifying some of the early limitations in children's empathy and prosocial behavior and some of the skills that contribute to the development of prosocial responding. However, it is evident from other research that infants have more sophisticated empathic and sociocognitive capacities than suggested by Hoffman. This body of work can appear contradictory but is more consistent if one differentiates between the affective and top-down (higher-level) cognitive components of empathy-related responding and between empathy and prosocial behavior.

Infancy and Toddlerhood: Empirical Findings

The affective component of empathy appears to emerge quite early. Newborn infants exhibit what might represent

a rudimentary capacity for global empathy: They often exhibit more distress (reactive crying) in response to another infant's crying than to their own crying (Dondi, Simion, & Caltran, 1999). At around 6 months of age, infants sometimes respond to the spontaneous cry of another infant by crying, but they more typically orient toward the crying peer without showing self-distress (Hay, Nash, & Pederson, 1981). In a study of 8- and 10-month-olds, Roth-Hanania, Davidov, and Zahn-Waxler (2011) documented modest levels of affective and cognitive concern (i.e., hypothesis testing) for others, but the infants exhibited virtually no helping behavior in the first year of life. Infants' affective responses increased only gradually (nonsignificantly) into the second year; in contrast, their prosocial behaviors and cognitive attempts to understand others' states increased from 8 to 16 months of age. Accordingly, Davidov, Zahn-Waxler, Roth-Hanania, and Knafo (2013) argued that during the first year of life, infants' empathic repertoire includes not only self-distress, but affective concern for others that is based on simply comprehending that another person is upset or unwell rather than a more sophisticated understanding of the other's predicament. They further suggested that this early affective core of empathy does not change much with age (albeit others report change in the early years; see below), although cognitive empathy and prosocial behavior do.

Consistent with Hoffman's (2000) theory, researchers often have found that toddlers who demonstrate self-recognition—often on a mirror self-recognition task administered in the latter part of the second year of life—tend to be relatively empathic and prosocial in the early years (Bischof-Köhler, 2012; Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). Nonetheless, other research suggests that rudimentary self-other differentiation develops prior to success on the typical mirror self-recognition task (see Davidov et al., 2013), which would allow for the emergence of empathy in the first year. For example, Rochat and Striano (2002) found that 4-month-olds smiled more and looked longer at the mirror image of someone imitating them than at a mirror image of themselves, indicating that they discriminated between self and other. Moreover, the level of self-other differentiation required for mirror self-recognition has not been found to relate to prosocial behavior in India, suggesting that cultural views on the self may affect the relation between self-conceptions and prosocial responding (Kartner, Keller, & Chaudhary, 2010).

Other work indicates that infants consider others' motives, intentions, and internal states, which supports the capacity for self-other differentiation and empathy.

For example, Hamlin and colleagues found that infants as young as 3 months of age preferred a helpful puppet over a nonhelpful one (e.g., Hamlin & Wynn, 2011; Hamlin, Wynn, Bloom, & Mahajan, 2011) and were more likely to direct positive behavior toward the helpful puppet in the second year of life (Hamlin et al., 2011) or toward someone who intentionally helped another (Dunfield & Kuhlmeier, 2010). Moreover, 18- and 25-month-olds are more likely to express concern for and to help someone who has been harmed than someone who has not, even if the harmed individual did not express any emotion, suggesting that children sometimes can sympathize with a victim in the absence of overt emotional cues of distress (Vaish, Carpenter, & Tomasello, 2009). Furthermore, toddlers' understanding of internal state words and self-understanding (as reported by mothers) have been associated with their prosocial behavior with nonfamilial adults (Brownell, Iesue, Nichols, & Svetlova, 2013; Brownell, Svetlova, & Nichols, 2009).

Given the early development of empathy-related responding, it should not be surprising that children can perform simple prosocial behaviors early in life, especially if emotional cues of distress or need are very clear and the behaviors are simple. Empathy and sympathy, as well as empathy- or need-based prosocial behavior, appear to increase over the second year of life (e.g., Knafo, Zahn-Waxler, Van Hulle, Robinson, & Rhee, 2008; Liew et al., 2011; Zahn-Waxler, Radke-Yarrow, et al., 1992), at least for some potential recipients (e.g., for empathy directed at parents; van der Mark, van IJzendoorn, & Bakermans-Kranenburg, 2002), and such prosocial behavior also increases from 2 to 4 years of age (Dunfield & Kuhlmeier, 2013). In addition, even 12-month-olds frequently share objects with parents in their interactions (which do not usually involve empathy) and release objects they are holding to peers (see Hay & Cook, 2007). Such sharing seems to emerge around 8 months of age and is increasingly evident during the next year (Hay & Rheingold, 1983).

Moreover, 14-month-olds can provide simple instrumental helping (handing objects to a nonfamilial adult who was unsuccessfully reaching for the objects), but do not help reliably in situations involving more complex goals (Warneken & Tomasello, 2007). By 18 months of age, infants often perform a variety of simple helping behaviors, even when an adult does not verbally ask for help (Warneken & Tomasello, 2008; also see Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013; Svetlova, Nichols, & Brownell, 2010). A high percent of children provide simple instrumental help by 2 years of age—so

many that instrumental helping does not improve from 2 to 4 years of age (Dunfield & Kuhlmeier, 2013). Such instrumental helping does not require encouragement or external motivation (Warneken & Tomasello, 2008).

Helping behaviors that require an understanding of subtle cues take time to develop. Svetlova et al. (2010) found that helping requiring inferences regarding specific helping acts needed to meet an adult's needs (e.g., giving a woman a hairclip when the woman was upset by hair in her eyes or handing the woman a blanket when she exhibited signs of being cold) was unlikely among 18-month-olds without extensive prompts but was more frequent and required less communication by 30 months. Eighteen-month-olds tend to require more explicit cues regarding an adult playmates' need for toys or food than do 24- or 25-month-olds (Brownell et al., 2009; Brownell, Iesue, et al., 2013). Moreover, Svetlova et al. (2010) found that sharing of one's own possessions (e.g., a toy or the child's blanket) in the situations discussed above (requiring complex inference) was uncommon at both 18 and 30 months of age, and giving up material objects is infrequent even in 2- and 4-year-olds (Dunfield & Kuhlmeier, 2013). Thus, both the degree of cognitive processing required and cost to the self seem to affect toddlers' sharing behavior.

Some discrepancies across studies in regard to age of performing prosocial behaviors may be due to differences in the recipients. For example, toddlers are more likely to help and show concern for their mothers than strangers (Knafo, Zahn-Waxler, Van Hulle, Robinson, & Rhee, 2008; Spinrad & Stifter, 2006; van der Mark et al., 2002). Toddlers and preschoolers (Caplan & Hay, 1989; Howes & Farver, 1987) are relatively unlikely to respond with concern and prosocial behavior to the distress of peers, perhaps because young toddlers evidence very little understanding of peers' emotions or affective messages (Nichols, Svetlova, & Brownell, 2010). Thus, both the nature of the task and the recipient's identity may moderate relations of age to empathy-related responding and prosocial behavior.

Childhood and Adolescence: Empirical Findings

At least some types of prosocial behaviors increase in frequency across the preschool and childhood years. Eisenberg and Fabes (1998), in a meta-analysis, found significant increases in prosocial behavior within both the infant (less than 3 years) and the preschool years (3 to 6 years). There was no difference between the infancy and preschool periods, due perhaps to the small number of relevant studies. However, children (7 to 12 years) and adolescents (13 to

17 years) were higher in prosocial behavior than preschoolers, and adolescents were higher than children.

Despite general increases in prosocial responding in the early years, Hay and Cook (2007) argued that prosocial behaviors become more selective during the preschool years because they are increasingly governed by display rules, gender roles and norms, and friendships. Consistent with their general argument, Hepach, Vaish, and Tomasello (2012) showed that 3-year-old children tended to sympathize with a person when their distress was justified (e.g., a lid closes on the experimenter's fingers) but not when the distress was unjustified (e.g., a lid closes on the experimenter's sleeve). Similarly, young children showed more concern and prosocial behavior toward a person who was harmed than toward an unharmed victim, even when the victim did not express negative emotion (Vaish et al., 2009). Children also have been found with age to increasingly favor prosocial behavior directed at members of the in-group rather than the out-group (Weller & Lagattuta, 2013; see Eisenberg & Spinrad, 2014). Thus, it is likely that, in some circumstances, children become more discriminating with age about whom to help and show declines in rates of helping. At the same time, due to growth in sociocognitive understanding, older children may perceive more opportunities to act prosocially.

Although Eisenberg and Fabes (1998) found a general increase in prosocial behavior across childhood to early adolescence, this was not true for all types of prosocial behaviors. For example, adolescents tend to be higher in prosocial behavior than children aged 7 to 12 years on sharing/donating, but not instrumental helping or comforting. Age changes in prosocial behavior also may vary as a function of the cost of the behavior. In a study of allocation behavior by children in six cultures (House et al., 2013), including Los Angeles and five traditional hunting/gathering, horticultural, and/or marine foraging cultures, allocation choices that benefited another but did not cost the child anything increased in a similar linear manner from 3 to 14 years of age in all cultures. However, when there was a cost to the child of giving the other person more, prosocial choices declined from 3 years to approximately 7 to 9 years in all six cultures and then increased considerably to 14 years in most, but not all, cultures.

Moreover, findings appear to differ based on the informant (see Eisenberg et al., 2006). For example, teacher-reported prosocial behavior has been found to be relatively stable or to decline from 6 to 12 years of age, at least at schools in Canada (Côté, Tremblay, Nagin, Zoccolillo, & Vitaro, 2002; Kokko, Tremblay, Lacourse, Nagin, & Vitaro,

2006). Teachers also report a decline in prosocial behavior from 10 to 14 or 15 years of age for Canadian boys and for girls and boys in Italy. However, mothers' reports and self-ratings of prosocial behavior evidence primarily mean-level stability rather than declines (Nantel-Vivier et al. 2009). Veenstra et al. (2008) found that teachers and parents used different criteria for rating children's prosocial behavior. Academic performance and the quality of peer relationships were related to teachers' judgment of prosocial behavior whereas problems at home were related to mothers' ratings; these associations might be due to causal relations between these aspects of functioning and prosocial behavior or could reflect a halo effect.

In meta-analyses, there is little evidence of change in mean level of prosocial behavior in adolescence (Eisenberg & Fabes, 1998), although personality agreeableness, which includes prosocial tendencies, appears to increase from early to later adolescence (Klimstra, Hale, Raaijmakers, Branje, & Meeus, 2009). However, only a few investigators have examined change in adolescence with longitudinal data. Using growth-curve modeling, Carlo, Crockett, Randall, and Roesch (2007) found that the self-reported prosocial behavior of adolescents significantly declined on average beginning in 7th grade (12–13 years of age), although there was a small increase in 12th grade (17–18 years of age). Kanacri, Pastorelli, Eisenberg, Zuffianò, and Caprara (2013) obtained a quadratic growth curve for Italian adolescents' self-reported prosocial responding, with a decline from 13 years of age to approximately 17 years and a slight rebound until 21 years of age. Eisenberg, Cumberland, Guthrie, Murphy, and Shepard (2005) found that self-reported helping increased from 15–16 to 17–18, decreased from 17–18 to 21–22, was stable from 21–22 to 23–24, and increased from 23–24 to 25–26 years. Using cross-sectional data, Soto, John, Gosling, and Potter (2011) reported a decline in the altruism facet of personality agreeableness from 10–12 to 13–17 years of age but an increase from 13–17 to 18–25 years of age (for both sexes). In contrast to the aforementioned nonlinear patterns, Jacobs, Vernon, and Eccles (2004) found an increase in volunteering behavior in adolescence. In regard to sympathy, Taylor, Barker, Heavey, and McHale (2012) reported no change in self-reported sympathy from 17 to 19 years of age, Eisenberg et al. (2005) found no change from 15–16 to 25–26 years, and Davis and Franzoi (1991) found an increase from 10th grade to 12th grade (approximately 16 to 18).

Thus, the findings are inconsistent with regard to age-related changes in adolescents' prosocial responding.

However, it appears that, with the exception of volunteering, prosocial behavior (but not sympathy) declines in adolescence but starts to rebound somewhat in late adolescence or early adulthood. Developmental level and associated experiences or hormones may be more closely associated with sympathy in early adolescence than is age. Masten, Eiesenberger, Pfeifer, Colich, and Dapretto (2013) found that pubertal development from 10 to 13 years of age was related to increases in empathic concern and personal distress. In addition, they reported that increases in self-reported sympathy and personal distress from 10 to 13 years of age were related to greater activity in neural regions linked to both mentalizing and affective pain activity. (Masten et al.'s [2013] findings did not change when controlling for sex.)

Sociocognitive Processes and Age-Related Change in Prosocial Responding

For some theorists, the primary source of the increase in prosocial and altruistic behavior across age is sociocognitive development. Indeed, it is commonly assumed that perspective-taking skills increase the likelihood that individuals will identify, understand, and sympathize with others' distress or need (e.g., Eisenberg, 1986; Hoffman, 2000; see Figure 15.1). Information about others' internal states can be obtained by imagining oneself in another's position or through processes such as accessing stored knowledge, mental associations, and social scripts or deduction. Children also may have "theories" about others' internal states that they use to infer how others feel that are relevant to morality (e.g., theory of mind; Lane, Wellman, Olson, LaBounty, & Kerr, 2010).

Throughout infancy and childhood, children develop an increasingly refined understanding of others' emotional states and cognitive processes and are better able to decode other people's emotional cues, and such perspective taking and related sociocognitive skills are associated with prosocial responding. Moreover, with age, children are more likely to have the social experience necessary to perceive another's need in social contexts where overt cues of distress are ambiguous or subtle. Research, reviewed above, supports the role of advances in young children's socioemotional skills in their prosocial development (e.g., Brownell et al., 2009; Brownell, Iesue, et al., 2013), and research concerning associations between perspective-taking/emotional understanding and prosocial responding is discussed shortly.

Moreover, numerous researchers have suggested that the quality of children's motivation for assisting others changes with age. Bar-Tal (1982) proposed that children's helping behavior develops through six stages that differ in quality of motivation. The first three stages involve helping behaviors that are compliant and in which the child anticipates the gain of material rewards (or the avoidance of punishment). The next two stages involve compliance with social demands and concern with social approval and generalized reciprocity. The final stage represents true altruism in which helping is an end in itself. Although it is unclear whether all their proposed stages actually emerge in the specified order (see Eisenberg, 1986), researchers generally have found a decrease with age in self-oriented, hedonistic reasons for helping and an increase in other-oriented, internalized, and altruistic motives and reasons for prosocial behavior (see Bar-Tal, 1982; Eisenberg, 1986).

Age-related changes in children's evaluative processes and prosocial-relevant goals and motives are also reflected in changes in children's prosocial moral reasoning (i.e., reasoning about moral dilemmas in which one person's needs or wants conflict with those of others in a context where authorities, laws, rules, punishment, and formal obligations play a minimal role). In research on prosocial moral reasoning, individuals typically are presented with hypothetical moral conflicts (e.g., about helping an injured child rather than going to a party) and their reasoning about resolving the conflicts is elicited.

Based on cross-sectional and longitudinal research, Eisenberg and colleagues (e.g., Eisenberg, Carlo, Murphy, & Van Court, 1995; Eisenberg et al., 2005; Eisenberg, Miller, Shell, McNalley & Shea, 1991; Eisenberg et al., 1987; see Eisenberg, 1986) identified an age-related sequence in children's prosocial reasoning. Preschool and early elementary school children tend to use primarily hedonistic reasoning or needs-oriented (primitive empathic) prosocial reasoning. Hedonistic reasoning decreases sharply in elementary school and increases slightly in adolescence, especially for males, declining again in early adulthood for men. Needs-oriented reasoning increases until mid-childhood, declines somewhat in adolescence, and is stable in early adulthood. In elementary school, children's reasoning begins to reflect concern with others' approval and enhancing interpersonal relationships, as well as the desire to behave in stereotypically "good" ways. However, approval-oriented reasoning during interviews appears to fluctuate somewhat in adolescence and then stabilizes, although adolescents and young adults tend

to clearly reject approval-oriented reasoning on pencil-and-paper measures of prosocial moral reasoning. When using interview measures, stereotypic reasoning peaks and then declines somewhat (at least proportionally) in adolescence, but shows a modest increase in proportional use in the 20s (Eisenberg et al., 1995; Eisenberg, Hofer, Sulik, & Liew, 2013).

Beginning in late elementary school (approximately 12 years of age or older) or thereafter, children begin to express reasoning reflecting abstract principles, internalized affective reactions (e.g., guilt or positive affect about the consequences of one's behavior for others or living up to internalized principles/values), and self-reflective sympathy and perspective taking (e.g., explicitly acknowledging concern or perspective taking), although such reasoning generally is not the dominant mode (Eisenberg et al., 1995, 2005). Some of these more sophisticated modes of moral reasoning tend to increase across adolescence and appear to stabilize across the 20s (Eisenberg et al., 1995, 2005, 2013). Specific trends differ somewhat across studies, depending on the index of prosocial moral reasoning (frequency of reasoning in a category versus proportional use of a given category) and measure of reasoning (interview versus pencil-and-paper measure).

As discussed later, individual differences in prosocial moral reasoning—an aspect of socio-cognitive functioning (in Figure 15.1)—are associated with prosocial and empathy-related responding. Thus, the processes reflected in children's moral reasoning likely play some role in the age-related changes in the quantity and quality of prosocial behavior (Eisenberg, 1986).

Summary

Although prosocial behavior seems to increase with age from infancy until adolescence (with no consistent pattern in adolescence), the results vary considerably across studies, samples, measures, and other study features. Nonetheless, even though Eisenberg and Fabes (1998) found that type of prosocial behavior (instrumental help, sharing/donating, comforting, aggregated across multiple types) was related to effect sizes for age prior to controlling for a variety of study characteristics, effect sizes for age were not affected by type of prosocial measure after doing so. However, Eisenberg and Fabes (1998) did not differentiate, for example, between teachers' and mothers' reports of prosocial behavior. Nor did they differentiate between variables such as costliness of the prosocial behavior for the

child, which may be at least as important a consideration as the type of behavior (see Eisenberg & Fabes, 1998). Thus, a task for future work is to delineate the developmental trajectories of various modes of prosocial behavior that vary in cost, recipient, cognitive complexity, and other important characteristics, as well as the source of the data (teacher report, observations, etc.). Moreover, there is a need to identify the reasons for the apparent decline in prosocial behavior in adolescence in certain settings (e.g., school as reported by teachers) and for certain kinds of prosocial behavior.

The developmental factors involved in age-related changes require more attention, including sociocognitive development. As noted by Hoffman (2000), the development of perspective taking must play a role in prosocial development. Moreover, although children and adolescents sometimes verbalize immature modes of reasoning, children's moral reasoning becomes more abstract, somewhat less self-oriented, and increasingly based on values, moral principles, and moral emotions with age, at least into the 20s. The next wave of research might include studies devoted to identifying when and how age-related changes in sociocognitive capabilities, in combination with the skills needed to act on one's social understanding (e.g., a sense of efficacy, regulation; see below), jointly affect or predict prosocial responding, especially after the first few years of life (considerable work on this topic has been conducted with infants). Moreover, although a number of the studies cited have been conducted outside of North America, more research is needed in non-Western cultures to determine whether results obtained in Western societies are generalizable to non-Western groups.

ORIGINS OF PROSOCIAL RESPONDING

Dispositional prosocial tendencies appear to be affected by heredity and related biological processes, cultural values and practices, parenting, peers, and experiences at school (see Figure 15.1). Findings related to their potential influences are discussed in turn.

Genetic and Biological Influences on Prosocial Tendencies

Evolutionary Perspectives

Prosocial actions have frequently been noted among nonhuman animals (e.g., E. O. Wilson, 2004). Social insects often

sacrifice their own lives to protect their nest. Similarly, costly helping and rudimentary forms of empathy have been observed in rodents (Bartal, Decety, & Mason, 2011; Langford et al., 2006), and consoling and helping appear in chimpanzees and bonobos (e.g., Warneken & Tomasello, 2009). Such behaviors, as well as very early signs of prosocial tendencies in human infants (Hamlin & Wynn, 2011), are unlikely to rely on direct socialization or moral considerations and require a biological explanation. Such explanations may then be extended to human behavior, although humans differ from other animals in the nature and extent of prosocial behavior (reviewed by Silk & House, 2012).

To explain how prosociality evolved despite the evolutionary price accrued by sharing or helping, several approaches have been proposed, most notably direct reciprocity, indirect reciprocity, network reciprocity, kin selection, and group selection (Nowak, 2006). Reciprocity explains the evolution of altruism to the extent that the behavior is reciprocated, either directly or through reputation. Toddlers' prosocial behavior involves both direct and indirect reciprocity (Vaish & Tomasello, 2014).

In kin selection, through self-sacrificing or cooperative actions, the prosocial animal increases the probability that its relatives, who share its genes, will survive and reproduce (E. O. Wilson, 2004), and evolution promotes altruism through promotion of genes, not survival of individuals. Humans share more resources with those genetically close to them, and are more willing to risk their lives for relatives (e.g., Graziano, Habashi, Sheese, & Tobin, 2007), although it is hard to distinguish between closeness based on genetic relatedness, geographic proximity, or emotional closeness, which often co-occur.

Group selection approaches posit that altruism among group members may benefit the survival of the group (D. S. Wilson, 1975). This idea has been hotly debated (e.g., Pinker, 2012), although there is evidence that highly cooperative groups survive better than do other groups (Bowles, 2006). The idea of multilevel selection implies that although evolution at the individual level (within groups) favors nonaltruists, selection at the group level favors altruism (Nowak, 2006).

The competing group-level and individual-level selection forces may be one reason for diversity in behavior within groups. Similarly, because empathy and prosocial behavior provide benefits to the person performing them, but also increase the likelihood they will be taken advantage of (Nettle, 2007), variation in genes related to individual differences in prosociality should emerge.

Importantly, although evolutionary principles explain ultimate, long-range causation, they do not directly explain the behavior of each individual. Human empathy may have evolved as a mechanism promoting infant–mother bonds (de Waal, 2008), but it can now be extended to other conspecifics and even to pets. At the group level, altruism may be seen as a tool for outperforming other groups (Choi & Bowles, 2007), but such consideration of group needs can be extended to overall, within-group cooperation (Vaish & Tomasello, 2014).

Genetic Effects on Individual Differences

Research estimating the genetic contribution to individual differences in prosocial responding (heritability) typically relies on the twin design. In this design, if the covariance between scores on prosocial responding is higher for identical (monozygotic) twins than for fraternal (dizygotic) twins, the difference is attributed to genetic effects to the degree that common environmental sources are assumed to be shared to roughly equal degrees by the two types of twins.

Most twin studies involving adults' self-reported prosocial tendencies have found that genetic factors accounted for a substantial portion of the variance in altruism, empathy, and nurturance (typically, 40%–60%). Most of the remaining variance was accounted for by idiosyncratic differences in the environments of the twins (nonshared environment) rather than by their shared environment (see Knafo & Israel, 2009, for review). Despite this consistency, the estimated contribution of genetics and the environment varies from study to study, reflecting the diversity in measures and conceptualizations of prosociality (see Fortuna & Knafo, 2014, for review). Studies using experimental measures of prosocial behavior are few and tend to show lower heritabilities. For example, in a Swedish twin study, moderate but significant heritability (22%) was found for donations to a charity, with a small (9%) shared environment effect on giving (Cesarini, Dawes, Johannesson, Lichtenstein, & Wallace, 2009).

Most genetically informative studies of prosocial behavior and empathy in children have used parents' reports of children's behavior; sometimes teachers' and self-reports have been used as well. These studies tend to converge on substantial heritability estimates and meaningful nonshared environment contributions, whereas shared environment estimates vary by age, measure, and culture (see Knafo & Israel, 2009). For example, American adolescents' self-reported empathy showed moderately significant heritability (.28) and no shared environment effects (Davis, Luce, & Kraus, 1994). Using parents' reports of prosocial behavior,

a South Korean study of 2- to 9-year-old twins reported 55% heritability and no shared environment effects (Hur & Rushton, 2007). A cross-cultural (United Kingdom, South-Korea, and Israel) comparison of parent-reported prosocial behavior found similar heritability estimates, accompanied by differences in the importance of shared environment effects (Knafo & Israel, 2009). Among German preadolescents, values focusing on the welfare of others as opposed to the self showed substantial (49%) heritability and no shared environment effects (Knafo & Spinath, 2011).

Only a handful of studies have tested genetic and environmental effects on empathy and prosocial behavior using observational measures. One small study (91 pairs of 7-year-old Dutch twins) found a strong (45%) shared environment effect, but no heritability for willingness to donate to a charity (Van IJzendoorn, Bakermans-Kranenburg, Pannebakker, & Out, 2010). In a study of 3.5-year-old Israeli twins, Knafo, Israel, and Ebstein (2011) estimated heritability at 34% for a combined set of three experimentally observed compliant prosocial behaviors, and at 43% for a set of three self-initiated prosocial behaviors; they found no shared environment effects.

The other observational studies of empathy and prosocial behavior all relied on twins' reactions to others' simulated distress. Among American twins (aged 19–25 months) watching their mother feign distress, monozygotic correlations were higher for hypothesis testing (the cognitive aspect of empathy) and empathic concern, but not for helping behavior, and evidence for shared environment effects was also found (Volbrecht, Lemery-Chalfant, Aksan, Zahn-Waxler, & Goldsmith, 2007). A study of 3.5-year-old Israeli twins showed a small, nonsignificant genetic effect for empathic concern towards an examiner (19%) and a significant effect for hypothesis testing (44%). No evidence for shared environment effects was found and the nonshared environment and error accounted for the rest of the variance (Knafo, Zahn-Waxler, et al., 2009).

The largest genetic study of children's empathy involved 400 pairs of Colorado twins tested at 14, 20, 24, and 36 months of age, reacting to their mothers' and an experimenter's simulated distress. Empathy toward an examiner showed modest heritability at 14 and 20 months, but a common empathy factor (combining mother and examiner observations) showed no heritability at 14 and 20 months. At 24 months, a genetic effect on the common factor (34%) emerged, which increased to 47% at 36 months. In contrast, shared environment effects on the common factor were very large at 14 months (69%) and decreased steadily to 0% at 36 months (Knafo et al., 2008).

This pattern of heritability increasing with age accompanied by decreasing shared environment effects was found in a meta-analysis of twin studies of empathy (Knafo & Uzefovsky, 2013). In a large British twin study (Knafo & Plomin, 2006a), heritability of mother-reported prosocial behavior increased from 26% for girls and 37% for boys at 2 years of age, to 60% and 62%, respectively, at 7 years of age (teacher reports at 7 years also showed high heritability estimates, 51% for girls and 72% for boys). In contrast, shared environment effects decreased from 43%–50% to 0%–6% during this period. Another British study of teacher-rated prosocial behavior found a similar pattern when comparing (cross-sectionally) 5- to 10-year-old and 11- to 16-year-old twins (Scourfield, John, Martin, & McGuffin, 2004), although a longitudinal British twin study using self-reports did not report a further increase from 13–17 to 14–19 years (Gregory, Light-Hausermann, Rijsdijk, & Eley, 2009). One reason for this increase in heritability is that novel genetic effects emerge with age (Knafo et al., 2008), perhaps reflecting maturation or adjustment to the changing social environment. However, genetic effects also contribute to stability (Knafo & Plomin, 2006a).

A process of evocative gene–environment correlation, in which children's genetically influenced behavior affects the input they receive from the environment (Scarr & McCartney, 1983), can account in part for this increase in heritability. For example, maternal negativity (puniteness, negative emotions) correlated negatively with prosocial behavior, an effect accounted for in part by an overlap with the genetic effects on prosocial behavior (Knafo & Plomin, 2006b). When children's genetically influenced behavior (e.g., low prosociality) affects their environment (e.g., parental negativity), the environment can feed back to the child, further affecting their behavior, and thus the environmental input can increase the observed heritability (Beam & Turkheimer, 2013).

One way to control for the presence of evocative gene–environment correlations in understanding parents' influence on children is by comparing monozygotic twins. In a study involving only monozygotic preschool-age twins, Deater-Deckard et al. (2001) obtained evidence of the role of nonshared environment (e.g., twin differences in maternal supportive and punitive behaviors) in predicting children's prosocial behavior. Thus, although genetics appear to contribute to children's prosocial tendencies, genetically informed studies also provide evidence for the role of the environment in the origins of prosocial behavior.

Although the role of genetics in prosocial behavior has been established, direct evidence for specific genes has

started to accumulate in the past decade, mainly for genes involved in dopamine, serotonin, oxytocin, and vasopressin activity (see Fortuna & Knafo, 2014). Several studies have focused on a variation in the third exon (coding region) of the dopamine receptor D4 gene (DRD4-III). DRD4-III predicted young adults' self-reported altruism (Anacker, Enge, Reif, Lesch, & Strobel, 2012; Bachner-Melman, Gritsenko, Nemanov, Zohar, & Ebstein, 2005), and twin children's observed sharing with their siblings, although not with their peers (DiLalla, Elam, & Smolen, 2009). Two other experimental studies also did not find that DRD4-III related to children's prosocial behavior outside the family (Bakermans-Kranenburg & Van IJzendoorn, 2011; Knafo, Israel, et al., 2011). Thus, this polymorphism may relate to prosocial behavior in age-specific ways, and may also interact with situational and environmental factors, as noted below (see Figure 15.1).

Research on the genetics of empathy and prosocial behavior has largely focused on genes related to vasopressin and oxytocin, two neuropeptides involved in social behavior (Ebstein, Knafo, Mankuta, Chew, & Lai, 2012). Knafo, Israel, et al. (2008) found that the length of the promoter region of the arginine vasopressin 1A receptor (AVPR1A) gene related to university students' money donations in the dictator game (in which participants decide how to split a fixed amount of money between themselves and a stranger) and self-reported altruism. In a similar task, 3.5-year-old Israeli twins donated fewer stickers if they were carriers of the 327-bp allele of this gene (Avinun et al., 2011). Poulin, Holman, and Buffone (2012) did not find a main effect of AVPR1A but did find that this gene (and the oxytocin receptor gene) interacted with perceived threat to predict adults' prosocial behavior.

In two studies, variation in the oxytocin receptor gene (OXTR) related to empathy, either self-reported or indexed by a test involving the identification of emotional expressions (Chakrabarti et al., 2009; Rodrigues, Saslow, Garcia, John, & Keltner, 2009). The same OXTR single-nucleotide polymorphism (SNP, a variation of one base pair in the DNA) reported by Rodrigues et al. (2009) for empathy predicted adults' prosociality as rated by observers (Kogan et al., 2011). Other OXTR SNPs predicted dictator game donation and self-reported prosocial preferences in two Israeli adult samples (Israel et al., 2009), but not in a Swedish twin sample (Apicella et al., 2010).

Several additional studies have linked genes to prosocial behavior (e.g., the COMT gene [Reuter, Frenzel, Walter, Markett, & Montag, 2010]; the serotonin transporter gene [Stoltenberg, Christ, & Carlo, 2013]) and other

genes might also be important. The results often do not replicate, perhaps reflecting the use of different populations and methods across studies. Additionally, different variants of a specific gene may have diverse impacts in different populations or ages (as in the AVPR1A studies described above). Moreover, genetic contributions to the normal-range variance often reflect the accumulative, additive, and interactive contributions of many polymorphisms, each with small effects (Benjamin et al., 2012).

One important limitation to genes' effects concerns the need to consider gene–environment interactions (G × E). Most of the relevant G × E research has pertained to variation in the DRD4-III polymorphism as a moderator of the association between environmental variables and prosociality. In DRD4-III, individuals differ in the number of repeats of the same sequence. Four repeats are the most common, and two and seven repeats often show increased susceptibility to environmental influences (Jiang, Chew, & Ebstein, 2013). Among DRD4-III 7-repeat carriers, but not among other individuals, a negative correlation was found between maternal negativity and preschoolers' observed empathy towards an examiner (Knafo & Uzefovsky, 2013), and prosocial behavior related positively to secure attachment and positive parenting (Bakermans-Kranenburg & van IJzendoorn, 2011; Knafo, Israel, et al., 2011; but see DiLalla et al., 2009).

To summarize, there is substantial evidence for heritability of empathy and prosocial behavior, which varies by measurement and probably increases with age. All twin studies demonstrate the importance of the environment, especially the environment not shared by children growing up together. There is evidence for the involvement of specific genes, although these results do not always replicate. Genes, and environmental variables such as parenting, do not operate in isolation. More research on gene–environment correlations and interactions is needed to understand their combined contributions.

Neurophysiological Underpinnings of Prosocial Responding

Panksepp (1986) asserted that all mammalian helping behavior arises from the “nurturant dictates of brain systems that mediate social bonding and maternal care” (p. 44). This view is consistent with that of MacLean (1985), who argued that the basis for altruism lies in maternal behavior, affiliation, and play, which are mediated in part by the limbic system of the brain. MacLean further suggested that the prefrontal neocortex, which developed

relatively recently in evolution and is most distinctive in humans, provides the basis for concern for others and a sense of responsibility and conscience.

There has been an explosion of neuroscientific studies on empathy, and to a lesser extent prosocial behavior and prosocial motivations. Most of these studies were performed on adults (for reviews, see Bernhardt & Singer, 2012; Zaki & Ochsner, 2012; for a developmental perspective, see Hastings, Miller, Kahle, & Zahn-Waxler, 2014; for a meta-analysis, see Fan, Duncan, de Grecq, & Northoff, 2011).

Most brain studies of empathy focused on reaction to others' distress, particularly pain. There is no single "empathy" brain region; rather, empathizing with others' pain involves a network of several regions also involved in the experience of pain to the self: anterior midcingulate cortex (aMCC), anterior insula (aINS), supplementary motor area (SMA), and periaqueductal gray (PAG) (Decety & Knafo, *in press*). These regions are activated when children (7–12 years) watch others in pain (Decety, Michalska, & Akitsuki, 2008). This overlap in networks for self-pain and other-pain suggests that empathy involves experiences shared by the person in distress and the perceiver (e.g., Bernhardt & Singer, 2012), providing a strong signal that can promote empathic concern. It has been proposed that vicariously experiencing emotions other than pain, such as disgust and anxiety, also activates the aINS and the cingulate cortex, with aINS involved in perception of positive emotions in others (Bernhardt & Singer, 2012).

The overlap in neural systems involved in experiencing and empathizing has been proposed to reflect mirroring processes at the single-cell level, which involve mirror neurons (Iacoboni, 2009). The role of the mirror-neuron system has been debated, and although its involvement in simulation of others' emotions is referred to as the basis for empathy (Oberman & Ramachandran, 2007), it has been pointed out that mirror neurons have been found only for actions, not emotions (Decety, 2010a), and that there is little overlap in brain regions involved in experience as compared to perception of emotion (see meta-analysis by Wager et al., 2008). There is a debate whether self–other overlap in brain activation reflects only the intersection of adjacent and partially distinct processes or also the actual activation of identical neural populations (Bernhardt & Singer, 2012; Morrison & Downing, 2007).

Much research on the neuroscience of empathy has differentiated between emotion-sharing processes involved in the more affective aspects of empathy, and other processes involved in mentalizing, or the cognitive aspects

of empathy (Fan et al., 2011). Lesion studies show a link between dorsolateral frontal system lesions and deficits in cognitive aspects of empathy, whereas lesions in the orbitofrontal system relate to deficits in the more emotional aspects (Eslinger, Eastin, Grattan, & Van Hoesen, 1996). In experimental designs designed to distinguish between affect sharing and mentalizing, the latter involves a different brain network (e.g., temporoparietal junction, temporal pole, posterior cingulate cortex, precuneus, and the medial prefrontal cortex), although there are reasons to expect overlap of the two processes in more naturalistic settings because the cognitive and affective aspects of empathy are correlated (Zaki & Ochsner, 2012).

Despite the early appearance of certain aspects of empathy, the brain processes involved in emotional sharing, empathic concern, and prosociality continue to develop throughout childhood, adolescence, and possibly beyond (Decety, 2010b). For example, one study showed that early adolescents (10–12 years old), mid-adolescents (14–16), and young adults (19–23) all show increased activation in the posterior superior temporal sulcus when trying to infer emotions from photographed eyes. However, only early adolescents also showed involvement of the medial prefrontal cortex, the inferior frontal gyrus, and the temporal pole (Moor et al., 2012). Another study exposed 7- to 40-year-olds to situations involving either a person whose pain was accidentally caused (referred to as empathy-eliciting, leading to feeling as the other) or a person whose pain was intentionally inflicted by another (sympathy-eliciting, increasing concern for the other). In empathy situations, age was negatively correlated with neural responding in the amygdala, SMA, and posterior insula activation, and positively correlated with activation in the left inferior and right superior frontal gyri. In contrast, in sympathy-eliciting situations, younger age was associated with greater medial orbitofrontal and fusiform gyrus activity. Within the same region, activity changed with age, such that with age, activity in the medial orbitofrontal cortex decreased, whereas orbitofrontal cortex activity increased (Decety & Michalska, 2010).

Another developmental study examined age changes in response to intentional versus accidental harm in participants aged 4 to 37 years (Decety, Michalska, & Kinzler, 2012). In all participants, perceiving intentional harm to people (as opposed to accidental harm) was associated with increased activation in brain regions such as the right posterior superior temporal sulcus (pSTS), which are sensitive to the perception, prediction, and interpretation of others' intentions. Furthermore, increased activation was found in

regions known to process the affective consequences of these actions, namely, the insula, ventromedial prefrontal cortex (vmPFC), and amygdala. Participants' personal distress in response to harmful actions was correlated with increased activity in the amygdala. Age was negatively correlated with empathic sadness for the victim of harm, with the youngest participants exhibiting the greatest personal sadness. Ratings of sadness for the victim correlated with increased activity in the insula and subgenual prefrontal cortex, the latter part of which has extensive connections with circuits implicated in emotional behavior and response to stressors (Decety et al., 2012).

This differential activity of brain regions therefore depends on the situational context in which others' suffering happens. Brain empathic responses vary in amplitude also by the intensity of the displayed emotion, and by characteristics of the suffering person (e.g., perceived fairness, relationship with victim; Hein & Singer, 2008). In addition, prosocial motivation and behaviors involve separate processes, and although they have been studied to a lesser extent than empathy, it is safe to say that the former involves a different neural system whose activity overlaps with cognitive and affective aspects of empathy (Zaki & Ochsner, 2012). For example, the subjective value of adults' voluntary donations to charity correlated with activation of the vmPFC (Hare, Camerer, Knoepfle, O'Doherty, & Rangel, 2010). This activity overlapped with that of regions encoding for reward value, suggesting the involvement of the brain's reward system in donations (see also Harbaugh, Mayr, & Burghart, 2007). Similarly, vmPFC activity correlated with other networks, such as the aINS and posterior superior temporal cortex, that are thought to be involved in social cognition (Hare et al., 2010), thus showing further connection between different aspects of empathy and prosociality at the neural level.

In addition to the central nervous system, the autonomic nervous system (ANS) is important for empathic response. Sympathetic and parasympathetic responses (e.g., blood pressure, heart rate, skin conductance, pupil dilation, respiration) are important not only because they are indicators of a person's affective state (e.g., accelerated heart rate indicates change in arousal), but also because they could serve as clues for self-perceiving one's emotion states, in a bottom-up feedback process (e.g., a person learns about their affective state from their autonomic reactions).

Most studies show that heart-rate deceleration accompanies empathic reactions (e.g., Zahn-Waxler, Cole, Welsh & Fox, 1995; see Eisenberg et al., 2006). It is important to note that some studies do not support this association, and

that results vary by situation (Eisenberg et al., 1990). This could be due to different processes, including self-distress, arousal, and caring for others, each potentially associated with a different physiological response, all operating simultaneously (Hastings et al., 2014) and measuring heart rate across different time periods (e.g., right at an especially evocative moment versus across a longer time period).

It is also important to distinguish between global processes affecting all normally developing children and those implicated in individual differences. For example, in one study, researchers exposed 7-year-old children to two episodes designed to elicit feelings of empathy/sympathy (a child losing his dog and a mother upset over the child's grandfather's illness). Based on maternal interviews and structured observations of children's reactions to others' pain, children were classified as (a) showing concern, (b) showing passive disregard (little or no concern), and (c) active disregard (anger/hostility and antisocial behavior). All groups showed deceleration of heart rate when exposed to others' distress, but there were no between-group differences, indicating a global change in ANS activation involved in empathizing, rather than individual differences. Such individual differences were evident as the active disregard group showed lower heart rate than the other two groups (Van Hulle et al., 2013). However, all three groups showed deceleration of heart rate when exposed to others' distress, indicating a global change in ANS activation involved in empathizing.

Considerable research on children's ANS in relation to empathy has involved skin conductance and respiratory sinus arrhythmia (RSA, indexing heart rate variability). This research tends to show mixed results, depending on children's age and sex, as well as aspects of the situation (e.g., home versus lab; Hastings et al., 2014). Both skin conductance and RSA tend to show different patterns of association with the more emotional aspects of prosociality, that is, empathic concern, and more behavioral aspects such as prosocial behavior (reviewed by Hastings et al., 2014). This, again, attests to the need to view prosociality with all its complexity, with different, sometimes competing, biological substrates operating on various components of prosociality.

The activity of the brain regions and the ANS system involved in empathy and prosociality is affected by the neurotransmitters and hormones carrying messages between adjacent neurons and between parts of the neurophysiological system. Of particular interest are dopamine, oxytocin, and vassopressin. For example, brain regions in the reward system (e.g., ventral striatum, periaqueductal gray)

are characterized by enhanced presence of dopamine, oxytocin, and vasopressin receptors (Hastings et al., 2014). One hormone showing meaningful relations with prosociality is testosterone. Both correlational and experimental studies suggest that this masculine sex hormone is associated with reduced prosociality (e.g., Hermans, Putman, & van Honk, 2006).

The role of two neuropeptides, oxytocin and vasopressin, is increasingly acknowledged. These two closely related molecules have been shown in animal studies to control social behaviors (Donaldson & Young, 2008). In human mothers, naturally occurring oxytocin levels related to infant–mother bonding (Feldman, Weller, Zagoory-Sharon, & Levine, 2007) and increasing oxytocin levels (e.g., following watching emotional video clips) were positively associated with empathy, especially for women (Barraza & Zak, 2009). Intranasal administration of oxytocin is reported to increase generosity, cooperation, and affective empathy (Kosfeld, Heinrichs, Zak, Fischbacher, & Fehr, 2005; Zak, Stanton, & Ahmadi, 2007). However, oxytocin does not increase positive interpersonal behavior indiscriminately. For example, it has been shown to increase in-group favoritism and, perhaps also out-group derogation (De Dreu, Greer, Van Kleef, Shalvi, & Handgraaf, 2011). The effect of oxytocin depends both on contextual factors such as prior contact with the other person, and on individual differences in prosocial motivation (Declerck, Boone, & Kiyonari, 2014). There is great need for oxytocin research on children, in order to understand the developmental role it plays in empathy and prosociality. One study of 6-year-olds found that salivary oxytocin levels correlated positively with children's social engagement (e.g., social gaze, positive affect, and creative-symbolic play; Apter-Levy, Feldman, Vakart, Ebstein, & Feldman, 2013). In this study, affective resonance to others' distress, an aspect of empathy, related positively to children's oxytocin levels (Ruth Feldman, personal communication, August 28, 2013).

Vasopressin has received less attention, but it may also play a role in prosocial development. Evidence from animal studies (Donaldson & Young, 2008) shows the important role of vasopressin in social behavior. Research on humans, thus far, has concentrated on adults. Men and women may be differently affected by vasopressin administration (reviewed by Hastings et al., 2014), although there is too little research to draw conclusions.

In summary, a surge in research on the neurophysiological components of prosocial responding has yielded a vast amount of data, and the challenge now is to better

conceptualize how different aspects of prosociality (e.g., empathy and prosocial behavior) are associated with these neurophysiological factors. There is still a need to integrate research on central and autonomous nervous system on empathy and prosociality. In addition, there is a need to distinguish between factors involved in the prosociality and empathy of humans, as a species, and those involved in individual differences. The role of vasopressin and oxytocin in empathy and prosocial behavior suggests a good place to start in studying the influence of genes on prosociality.

Summary

Both the overall human tendency for prosocial behavior and empathy and individual differences reflect biological characteristics. Some of these characteristics may be common to humans and other species. Biological influences are meaningful at the genetic, brain, and physiological levels, although research combining these different levels is scarce. In addition, neuroscientific research on empathy and prosociality has largely focused on adults, but the existing evidence from this research and from the genetic research suggests that processes may be age-dependent, and a stronger developmental approach is needed. The effects of these biological factors likely vary across situations and interact with other social factors. More studies from non-Western cultures are needed to establish the role of culture as a potential moderator of the biological substrates of prosociality and empathy.

Cultural Determinants of Prosocial Behavior

Research on the cultural bases of prosocial responding provides insight into the role of the social environment in prosocial development. People in different cultures may differ somewhat genetically from one another, but these differences are unlikely to fully account for any large cultural differences found in human social behavior.

Prosocial Behavior and Empathy-Related Responding

Research in non-Western cultures suggests that societies vary greatly in the degree to which prosocial and cooperative behavior are normative. In ethological studies of individual cultures, writers have described societies in which prosocial and communal values and behaviors are (or were in the past) especially valued and usually common, such as the Aitutaki (a Polynesian island people; Graves & Graves, 1983) and the Javanese (e.g., Williams, 1991; see de Guzman, Do, & Kok, 2014; Eisenberg & Fabes, 1998, for reviews).

In one of the few cross-cultural studies involving observational data, Whiting and Whiting (1975) found that prosocial behavior—operationalized as offering helping (including food, toys, and helpful information), offering support, and making helpful suggestions—was more frequently observed among children in Kenya, Mexico, and the Philippines than in Okinawa, India, and the United States. In prosocial cultures, people tended to live together in extended families, women made major contributions to the economic status of the family, work was less specialized, the government was less centralized, and children tended to be assigned chores and responsibilities for the welfare of family members and their economic well-being at an early age (also see Graves & Graves, 1983).

It is possible that children in the more traditional societies would not have been higher in prosocial behaviors directed toward strangers or people that the child did not know well. In a study of adults in 23 countries, those in cultures that regard the family or extended in-group as the key social unit were less likely to provide low-cost helping to strangers than were those in cultures that view the autonomous person as the key social unit (Knafo, Schwartz, & Levine, 2009). Moreover, children from the Philippines generally were more prosocial toward relatives whereas U.S. children, especially those 5.5 to 10 years of age (rather than less than 5.5 years), generally were more prosocial toward people who were not relatives (de Guzman, Carlo, & Edwards, 2008). It was not clear if the absolute amount of helping of nonrelatives differed across the two groups.

Much of the work on cross-cultural and subcultural variation in prosocial behavior is embedded in the research on cooperation, competition, and reward-allocation behavior. Researchers generally have found that children from traditional rural and semiagricultural communities and from relatively traditional subcultures/cultures (e.g., Mexican American children), in comparison to children from urban or Westernized cultures, are more cooperative and tend to give more to peers on tasks involving the distribution of objects when sharing does not change the child's own yield (Graves & Graves, 1983; see Eisenberg & Fabes, 1998; Knight & Carlo, 2012). However, this has not always been found, especially when children are asked to help in noncompetitive contexts or simply share objects (see Eisenberg et al., 2006). For example, House et al. (2013) found no difference between 3- to 14-year-old children from Los Angeles and from more traditional cultures in prosocial allocation of rewards to another person when there was no cost to the child. When there was a cost, the number of prosocial choices declined from 3 years of age

to about 7 to 9 years of age in all groups, and increased for some groups thereafter. The children from Los Angeles and the Aka from Africa were the groups that showed the most dramatic increase in early adolescence and made the most prosocial choices at the older ages.

In studies of cross-national or cross-cultural differences in sharing or helping that do not use allocation tasks, few consistent differences have been found among Western, industrialized countries (e.g., Russell, Hart, Robinson, & Olsen, 2003; Yagmurlu & Sanson, 2009), although some minor differences have been found (Kumru, Carlo, Mestre, & Samper, 2012). In contrasts between Western and Asian cultures, findings differ considerably across measures of prosociality. A common view is that Asian children are more likely to engage in prosocial behavior than are Western Caucasian children due to the greater focus on maintaining good relationships with group members in at least some Asian cultures. Moreover, Stevenson (1991) and others have argued that Chinese and Japanese societies generally put great emphasis on socializing children to be responsible and prosocial toward others in their group (e.g., the family, the classroom, and the society). Consistent with that view, several researchers have found that East Asian elementary school children, compared to Western counterparts, were more likely to donate gifts for participating in the study to other children (S. M. Stewart & McBride-Chang, 2000), share food with a peer (Rao & Stewart, 1999), or spontaneously share an attractive toy with peers (French et al., 2011; also see Suzuki & Greenfield, 2002). Moreover, Stevenson (1991) found that the observed incidence of sharing, comforting, and helping was lower in kindergarten classes in the United States than in Taiwanese or Japanese classes (albeit relatively high in all groups).

However, there is some evidence that Asian children may be lower in prosocial behavior in emotional (and possibly empathy-inducing) contexts and more distressed by others' distress and sadness than are Western children. Trommsdorff (1995) did not find a difference between German and Japanese 5-year-olds' prosocial behavior with a distressed peer and Kartner et al. (2010) found no difference between Delhi and Berlin toddlers' prosocial behavior in response to an adult's sobbing. However, Trommsdorff, Friedlmeier, and Mayer (2007) found that preschoolers from Indonesia and Malaysia displayed more self-focused distress and less prosocial behavior than children from Germany and Israel in response to an adult's sadness; there were no differences in sympathy, which was infrequent. Similarly, Friedlmeier and Trommsdorff (1999) reported that 2-year-old Japanese girls displayed more distress and

were less able to regulate their distress reaction than were their German peers (they did not code sympathy). In a study of high school and undergraduate students in western Canada (mean age of 19), those born in Asia and with an Asian identity reported higher levels of personal distress and lower sympathy than their Western peers. Bicultural Asians (born in Canada but identified with an East Asian ethnicity) did not differ from Asian-identified youth in personal distress (but differed from Westerners) and were between Asian-identified youth and Western youth in sympathy (and did not differ from either group; Cassels, Chan, Chung, & Birch, 2010). Trommsdorff et al. (2007) suggested that the stronger self-focused distress observed in Asian children could be the result of a higher overarousal due to culturally based differences in shyness with adults and the greater acceptability of inhibited behavior in Asian cultures than in the West. However, this explanation would not seem to fully explain the self-reported differences for adolescents and young adults.

A growing body of work on subcultural differences in the United States has examined the role of acculturation and cultural variables in prosocial behavior. Researchers have found that Mexican American immigrant children are more cooperative and prosocial than Mexican Americans born in the United States (Knight & Carlo, 2012), suggesting that acculturation is associated with a decline in prosocial tendencies. Consistent with the latter finding, de Guzman and Carlo (2004) found that acculturation was negatively related to Latino-American adolescents' self-reported prosocial behavior. Moreover, Mexican American children with a stronger ethnic identity have been found to display more concern with others' outcomes on allocation tasks that can involve a cost to the self (Knight, Cota, & Bernal, 1993; also see Schwartz, Zamboanga, & Jarvis, 2007). However, in a study of Latino-American adolescents, both acculturation and a Latino-American orientation (perhaps indicating biculturalism) were positively related to higher levels of youths' self-reported prosocial behavior (Schwartz et al., 2007). Some scholars have argued that traditional values in the Mexican culture (e.g., familism; being *acomendidola*, defined as alert to surrounding events and ready to contribute spontaneously to the group) foster some forms of Mexican American children's prosocial behavior (e.g., helping within the family or community; see Knight & Carlo, 2012; Lopez, Najafi, Rogoff, & Mejía-Arauz, 2012). Participation in the community involves collaboration and helping and children in traditional Mexican communities are expected to contribute to the group and are provided with opportunities to do so (Lopez et al., 2012).

Moral Reasoning, Values, and Beliefs

About Social Responsibility

It is assumed that cultural values and norms in regard to issues such as the importance of interpersonal harmony and interdependence contribute to observed differences across groups in prosocial responding. Clearly, there are some differences in cultural beliefs and values related to prosocial behavior. For example, J. G. Miller and Bersoff (1992) found that Hindu Indians held a broader and more stringent duty-based view of social responsibility than did people in the United States. Hindu Indians, school-age and adult, tended to focus more than North Americans on responsiveness to others' needs when discussing moral conflicts, and viewed interpersonal responsibilities as at least as important as justice-related obligations. In contrast, consistent with a focus on individual rights and autonomy, people in the United States tended to view interpersonal responsiveness and caring as less obligatory and more of a personal choice, particularly if the other's need was moderate or minor, or if friends or strangers (rather than parents and children) were potential recipients (J. G. Miller, Bersoff, & Harwood, 1990).

Cross-cultural comparisons are difficult because cultures differ in the degree that they value various types of prosocial action. Hindu Indians view prosocial behavior performed because of reciprocity considerations as more moral than do American adults (J. G. Miller & Bersoff, 1994). Further, Jacobsen (1983) found that Middle Eastern third graders (7–8-year-olds) in Israel seemed to value requested acts of consideration more, and spontaneous acts less, than did Israeli Jewish children of Western heritage. Thus, Westerners may value prosocial acts based on endogenous motivation more than do people from traditional cultures whereas people from traditional cultures value prosocial actions that reflect responsiveness to others' stated needs and reciprocal obligations.

Summary

Culture appears to affect how much, when, and with whom children experience empathy or sympathy and engage in prosocial behavior. Cultures seem to vary in which types of prosocial behaviors they value most and may differ in regard to beliefs about who is deserving of help and caring. Before we can truly understand the cultural differences, more information on the types of prosocial behaviors most valued and to whom they are extended (e.g., in-group versus out-group members) is needed. Moreover, how such differences are inculcated in different cultures is an important question to address in the future.

Socialization in the Family

Consistent with Figure 15.1, although there is a substantial genetic contribution to children's prosocial behavior, there is a large body of work suggesting that socializers play an important role in fostering prosocial behavior. In this section, the associations between parental socialization styles or practices and children's prosocial behaviors and empathy/sympathy are reviewed. Due to space constraints, we do not cover the associations between prosocial behavior and demographic features of families, and we cite primarily references since 2006 (see Eisenberg et al., 2006, for more in-depth review and older references).

Parental Socialization Style and Practices

The majority of research on socialization has focused on mothers' potential influence on children's prosocial behaviors and empathy-related responding, although researchers have begun to include fathers in their research (Attili, Vermigli, & Roazzi, 2010; Garner, 2012; Hastings, McShane, Parker, & Ladha, 2007; Nickerson, Mele, & Princiotta, 2008). Findings generally suggest that mothers contribute more to children's prosocial behaviors and empathy than do fathers (Hastings et al., 2007; Nickerson et al., 2008; Padilla-Walker & Christensen, 2011), but examining how mothers and fathers differentially predict children's and adolescents' prosocial behaviors is an area for further research. Moreover, the contributions of mothers' and fathers' parenting to children's prosociality may be interconnected. For example, in one investigation, coparenting practices (i.e., behaviors used by parents to support or undermine each other's parenting) predicted children's affective discomfort, a measure that included empathy (Groenendyk & Volling, 2007).

Parental Warmth and Quality of the Parent–Child Relationship. Parental warmth and the quality of the parent–child relationship are thought to promote children's sense of connection to others. Consistent with this notion, a positive relation between maternal warmth or support (often versus negativity) and prosocial or empathic/sympathetic responding has been obtained in childhood and adolescence (e.g., Carlo, Mestre, Samper, Tur, & Armenta, 2011; Kuppens, Grietens, Onghena, & Michiels, 2009; Miklikowska, Duriez, & Soenens, 2011). However, a number of investigators have found no (or negative) relations between parental warmth (or rejection) and children's prosocial behaviors or empathy/sympathy (e.g., Davidov & Grusec, 2006;

see Eisenberg et al., 2006) or findings that vary depending on the type of analysis performed (Soenens, Duriez, Vansteenkiste, & Goossens, 2007). Sometimes the relation of parental warmth to children's prosocial responding has been weak and only significant through mediation by other parenting factors such as parental expressivity (see Eisenberg et al., 2006).

Similar to the construct of warmth and nurturance, parental responsiveness, reflecting sensitive, child-centered, and emotionally available parenting, has been found to predict children's empathy/sympathy or prosocial behavior (Bronstein, Fox, Kamon, & Knolls, 2007; Davidov & Grusec, 2006; Moreno, Klute, & Robinson, 2008; Newton, Laible, Carlo, Steele, & McGinley, 2014; Spinrad & Stifter, 2006; Tong et al., 2012). Moreover, several other related constructs have been shown to predict children's prosocial behaviors and empathy. For example, a construct dubbed "evolved developmental niche," reflecting maternal responsiveness as well as other practices such as breastfeeding, constant touch, and cosleeping, has been found to predict mothers' reports of children's empathy/prosocial behavior in a Chinese sample (Narvaez et al., 2013). Parenting that reflects high parental involvement and parent–adolescent connection also has directly predicted prosocial behaviors toward family members, as well as prosocial behaviors toward strangers and friends, through children's self-regulation and empathy (Padilla-Walker & Christensen, 2011). In a long-term longitudinal study, Feldman (2007a, 2007b) showed that mother–infant synchrony in the first year of life predicted empathy in Israeli adolescents. Bidirectional relations between children's prosocial behavior and maternal sensitivity also have been found (Newton et al., 2014).

There is also evidence that children and adolescents with secure attachments to parents are more sympathetic and/or prosocial (Diamond, Fagundes, & Butterworth, 2012; Ma, Cheung, & Shek, 2007; Nickerson et al., 2008; Padilla-Walker, Harper, & Jensen, 2010; Yoo, Feng, & Day, 2013). Because securely attached children tend to have sensitive and warm parents, these findings provide some indirect support for an association between parental warmth and children's prosocial development. Further, the relations between parent–child relationship quality and children's prosocial behaviors or sympathy have been found to be mediated by factors such as emotion-regulation abilities (Padilla-Walker et al., 2010; Panfile & Laible, 2012), emotional expressiveness (Laible, 2007), or emotion understanding (Ensor, Spencer, & Hughes, 2011).

It is likely that the degree of association between prosocial behavior and parental warmth/attachment is

moderated by a number of factors (Eisenberg et al., 2006). Padilla-Walker and Nelson (2010) found that high maternal attachment was related to prosocial behavior for boys lower on fear, demonstrating that for fearless boys, the quality of the relationship with mothers may be particularly important. In a sample of children and mothers in China, mothers' encouragement of connectedness (behaviors supporting emotional closeness and proximity) predicted later helping and sharing for children who displayed high initial connectedness but not for children who were low in connectedness (Liu, Chen, Zheng, Chen, & Wang, 2009). Moreover, other socialization practices, such as discipline strategies, control, and modeling, have been shown to moderate the relations between parental warmth and children's prosocial behavior, and such moderation may partly account for the inconsistent findings regarding parental warmth (see Eisenberg et al., 2006).

Inductions and Preachings. A disciplinary practice of particular importance to prosocial behavior is parental inductions, characterized as attempts to provide explanations or reasons for requiring the child to change his or her behavior, and a focus on another's emotional reactions or on the consequences of the child's behavior. Parental inductions are thought to induce an optimal level of arousal for learning (i.e., elicit the child's attention, but are unlikely to disrupt learning; Hoffman, 2000). Over time, these messages are believed to be internalized by children because they play an active role in processing the information and the focus is on one's own action and its consequences rather than on the parent as the disciplinary agent.

There is support for an association between parental use of inductions and children's prosocial behavior and sympathy (Carlo, Knight, McGinley, & Hayes, 2011; Hastings et al., 2007; Laible, Eye, & Carlo, 2008; see Eisenberg et al., 2006). Parenting that encourages perspective taking seems to enhance children's perspective-taking abilities, which are associated with prosocial behavior (Farrant, Devine, Maybery, & Fletcher, 2012; see below). Furthermore, parental inductions have been positively related to sympathy and to various types of prosocial behavior (i.e., dire, compliant, public) in adolescents in Mexican American and European American families (Carlo, Knight, et al., 2011).

Relations between inductive discipline and empathy-related responding or prosocial behavior may depend on various factors such as the children's sex, age, or socio-economic status, the tone in which inductions are delivered, and whether such practices co-occur with other parenting

practices (Eisenberg et al., 2006). For example, inductions delivered with no affect or high degrees of anger may be ineffective or may be associated with low prosocial behavior (Denham, Renwick-DeBardi, & Hewes, 1994). Similarly, the effectiveness of inductions may be reduced when parents also use power-assertive strategies (see Eisenberg et al., 2006).

In addition to inductive discipline, adults' preachings about why one should assist those in need in nondisciplinary contexts have been studied. Although findings for preachings have been somewhat inconsistent, depending on who is preaching (i.e., adults with or without direct power over the children), empathy-inducing preachings that emphasize the emotional consequences for recipients of aid have been found to enhance children's prosocial behaviors, whereas preachings that simply state norms for giving have not (see Eisenberg et al., 2006).

Power-Assertive, Punitive Techniques of Discipline.

Power-assertive practices are thought to evoke fear of punishment resulting in children's overarousal and self-focus (Hoffman, 2000). Researchers generally have found that socializers' use of power-assertive techniques, such as physical punishment or deprivation of privileges, are negatively related to children's prosocial behavior, empathy, or sympathy (Cornell & Frick, 2007; Knafo & Plomin, 2006b; Laible et al., 2008), although no relations also have been reported (Garner, 2012; see Eisenberg et al., 2006). It is possible that the association between such parenting practices and children's empathy-related outcomes varies by age. That is, negative relations may increase with age as children develop more cognitive skills and understanding of the meaning of such messages (Garner, 2012). At the extreme level of parental negative control, physical abuse of children has been linked to low levels of children's empathy and prosocial behavior (Anthonysamy & Zimmer-Gembeck, 2007; see Eisenberg et al., 2006).

Although power assertion and punitive discipline may induce immediate compliance with socializers' expectations, these practices are generally thought to be problematic styles of parenting in relation to children's prosocial behaviors over the long term. However, this assertion may be less true in non-Western cultures, particularly for those in which punitive or controlling practices are considered normative. For example, Yagmurlu and Sanson (2009) found that parental obedience-demanding behavior was related to higher prosocial behavior in Turkish preschool-aged children living in Australia, but a similar relation was not found in Anglo-Australian children.

Further, the relations of harsh parental discipline strategies to empathy or prosocial behavior may differ depending on children's temperamental characteristics. For example, Cornell and Frick (2007) reported that inconsistency in parental discipline (e.g., threaten to punish child but do not actually punish child) was negatively related to parent-reported empathy for behaviorally uninhibited children, but not for inhibited children. Moreover, there appears to be more detrimental effects of parental power assertion on fearful children's moral self (a construct that includes empathy) than for children who are relatively fearless (Kochanska, Aksan, & Joy, 2007). This finding is consistent with Hoffman's (2000) notion that children need to experience optimal arousal levels for effective socialization messages.

Further complexities may be found when considering both parents' discipline style. Garner (2012) reported that maternal power assertion was negatively related to children's sympathy only at high levels of paternal power assertion, suggesting that when both parents use such disciplinary strategies, children are at greater risk than when receiving harsh discipline from just one parent. Thus, parental negative control tends to be related (albeit somewhat weakly) to low levels of children's empathy and prosocial behavior, but these relations are likely moderated by aspects of children's temperament and some aggravating family factors.

Appropriate Versus Inappropriate Parental Control. Perhaps the critical issue when thinking about parental punishment and control is whether the degree of power asserted by the parent is excessive and arbitrary rather than reasonable. Parental demands and expectations for socially responsible and moral behavior (often as expressed in an authoritative parenting style) have been associated with socially responsible and prosocial behavior (Frensch, Pratt, & Norris, 2007; Hastings et al., 2007; Kuppens et al., 2009; Padilla-Walker, Carlo, Christensen, & Yorgason, 2012; Soucie, Lawford, & Pratt, 2012; S. M. Stewart & McBride-Chang, 2000) and moral affect (Laible et al., 2007). For example, parental monitoring has been associated with relatively high prosocial behavior in 10- to 15-year-olds (Elgar, Mills, McGrath, Waschbusch, & Brownridge, 2007).

Parental Emphasis on Prosocial Values. Parents who hold prosocial values would be expected to teach and model prosocial behavior to their children. Indeed, children's and adolescents' perceptions of their parents' prosocial values have been associated with adolescents'

prosocial behavior (Eisenberg et al., 2006), sometimes through adolescents' own prosocial or personal values (Hardy, Carlo, & Roesch, 2010; Padilla-Walker, 2007). Parent-child discussions about moral issues that emphasize values of compassion and empathy have been found to predict relatively high sympathy in adolescents, and in turn, high prosocial behavior (Carlo, McGinley, Hayes, Batenhorst, & Wilkinson, 2007). Some investigators, however, have found no relations between parental prosocial values and children's prosocial behavior or empathy or have found mixed or positive relations (see Eisenberg et al., 2006).

There is no question that cultural differences in prosocial values are substantial. Indeed, European American parents have been shown to attribute less importance to altruistic behaviors and compassion than do Mexican American, African American, or Chinese American parents (Suizzo, 2007). A related value of familism (a value of importance on the family, including responsibilities for one another) central to Latino-American families is thought to foster helping and prosocial behaviors (Knight & Carlo, 2012). Despite the likelihood of mean differences in prosocial values across cultures, researchers need to examine whether culture moderates the relations between such values and children's prosocial behaviors.

Modeling. Numerous researchers have examined whether children's prosocial behavior varies as a function of exposure to prosocial models. Much of the research in this domain involves laboratory studies in which children earn prizes by winning a game, view or do not view a model, and then are provided an opportunity to donate to needy children. In general, researchers have shown that children who view a generous model or helpful model are more generous or helpful than those exposed to a control condition (Williamson, Donohue, & Tully, 2013; see Eisenberg & Fabes, 1998).

Investigators have also examined whether children appear to model real-life socializers, such as parents. For example, McGinley, Lipperman-Kreda, Byrnes, and Carlo (2010) found that parental encouragement and modeling of volunteer work predicted adolescent volunteering, and this relation was mediated by adolescents' sympathy and helpfulness. Parents who model relatively high levels of sympathy or empathy are likely to have children who are sympathetic and willing to help others (Eisenberg et al., 2006; Farrant et al., 2012). In addition, children model adults' prosocial behaviors, such as volunteerism, helping,

and political activism, although most research in this area is correlational and often retrospective (Eisenberg et al., 2006). There are limited longitudinal data on the impact of modeling on children's prosocial behavior, and the relations between parental prosocial behaviors or empathy and children's prosocial behaviors may be due to parents' general parenting style rather than modeling per se.

Prompts, Directives, and Reinforcement for Pro-social Behavior. Children who are instructed or prompted to help or share tend to do so, although evidence suggests such simple, direct requests often may not be needed, even for very young children (Svetlova et al., 2010; Warneken & Tomasello, 2006). There is some debate regarding whether parents should reinforce children's prosocial behaviors. Based on social learning ideas, praising and reinforcement should increase children's sharing and helping; however, it is possible that offering such rewards undermines children's intrinsic motivation to behave prosocially and in turn, induces extrinsic motivation for engaging in prosocial activities. In a series of experimental studies with toddlers, Warneken and Tomasello (2013) showed that reinforcements (i.e., parental presence, parental/adult encouragement) are unnecessary to promote instrumental helping (i.e., helping an adult obtain an out-of-reach object) in young children, and material rewards for helping may deter future prosocial behavior (Warneken & Tomasello, 2008). Consistent with this view, Carlo, McGinley, and colleagues (2007) showed that when parents used material and social rewards to promote prosocial behavior, their adolescents were less likely to report altruistic behaviors and more likely to report public prosocial behaviors (when others are watching), supporting the notion that rewards undermine intrinsic motivation to help others (see Eisenberg et al., 2006, for further review).

Other studies have shown that nonmaterial reinforcements increase children's prosocial behavior, at least in the immediate context (Hastings et al., 2007; see Eisenberg et al., 2006). In a sample of African American preschoolers, mothers' social approval and praise, but not material rewards, were positive predictors of prosocial behavior (Garner, 2006). It is likely that the impact of reinforcement varies as a function of age and type of reinforcement, such as rewards, communication of internal versus external attributions for prosocial behaviors, and praise. For example, children are likely to behave prosocially when provided with internal attributions (a type of verbal praise) for their prosocial behavior (see Eisenberg et al., 2006).

Learning by Doing (and the Foot-in-the-Door Effect). Simply participating in prosocial activities appears to foster future prosocial behavior (see Eisenberg et al., 2006). Indeed, Carlo, McGinley, and colleagues (2007) found that parents who provide hands-on experience and involvement in prosocial activities have adolescents who report higher sympathy and prosocial behaviors. Further, youths' participation in organized youth activities has been linked to their contribution to families and communities (Zarrett et al., 2009).

Researchers have argued that participation in prosocial activities fosters a sense of responsibility and social identity. Telzer and Fuligni (2009) found that adolescents who provided assistance to their families (e.g., household chores, caring for siblings) reported relatively high levels of happiness and a sense of role fulfillment. Further, Grusec, Goodnow, and Cohen (1996) found that routine (but not requested) participation in household chores was related to 9- to 14-year-olds' prosocial behavior in the family, but primarily for older youth and girls. Routine participation in chores was not related to helping strangers. Thus, if chores benefit a delimited group of individuals, any prosocial tendencies fostered may not extend to those beyond that group.

Recall that Whiting and Whiting (1975) found that children were more prosocial in cultures in which they were expected to contribute to the welfare of the family. The degree to which adolescents are involved in household helping undoubtedly varies by culture. Asian American and Latino American adolescents spend more time helping and assisting their families than do their European American counterparts (Hardway & Fuligni, 2006). In some cultures, children are socialized into prosocial activities through what is known as "learning through intent community participation" (see Lopez et al., 2012; Rogoff et al., 2007). Using examples from children from indigenous and indigenous-heritage communities of Mexico, Lopez and colleagues (2012) argued that helpfulness and collaboration are the norm in such communities. Children are thought to learn prosocial skills and goals through their participation in every-day activities in their community.

Participation in both voluntary as well as school-required community service also provides experiences that appear to promote a sense of civic responsibility and contribution (see Eisenberg et al., 2006). Hart, Donnelly, Youniss, and Atkins (2007) reported that participation in community service in high school, as well as participating in extracurricular activities, predicted volunteering in communities and in youth organizations as young adults (8 years after

high school). Thus, it appears that even mandatory service participation increases prosocial responding (see Eisenberg et al., 2006).

Emotion Socialization and Prosocial Tendencies

Parental practices that help children to cope with their negative emotion in a constructive fashion tend to be associated with children's sympathy (rather than personal distress) and prosocial behavior. Presumably, this is partly because children who cannot adequately cope with their emotions tend to become overaroused and, consequently, experience a self-focused, aversive response (i.e., personal distress) when confronted with another's distress (Eisenberg et al., 1996, 2006).

In particular, parental expression of emotion is likely to teach children when it is acceptable to experience and express emotions and can provide opportunities for learning about others' needs. Parental expression of positive emotion and shared positive affect tend to be positively correlated with children's prosocial tendencies in U.S. (Lindsey, Colwell, Frabutt, Chambers, & MacKinnon-Lewis, 2008; Michalik et al., 2007) and Chinese samples (Wang, Chen, Chen, Cui, & Li, 2006), a finding that is consistent with the modest associations between prosocial behavior and parental support and warmth. The expression of positive emotion has been mostly unrelated to children's sympathy, possibly due to quadratic relations in the early years (Valiente et al., 2004) or potential moderating factors, such as temperament and culture (see Eisenberg et al., 2006). Culture may moderate the relation between parental expression of positive emotion and children's sympathy such that the relation is positive only in cultures that value the expression of relatively intense positive emotions (Eisenberg, Liew, & Pidada, 2001).

The relations of parental negative expressivity to children's sympathy and prosocial behavior have been somewhat mixed (Eisenberg et al., 2006). In a number of studies, negative expressivity has been related to lower prosocial behaviors and sympathy (Eisenberg et al., 2006; Eisenberg et al., 2001). For example, parental negative behavior, reflected in parents' use of criticizing, hostility, and ignoring, has been negatively related to prosocial behavior (Attili et al., 2010). Similarly, Michalik and colleagues (2007) showed that observed negative expressivity when interacting with children predicted low prosocial behavior in adolescence. However, in the same study, parental reports of negative expressivity (negative dominant emotion) in the home more generally were negatively related to boys', but not girls', sympathy in childhood

and were unrelated to boys' sympathy in adolescents. There was a positive relation between parents' reports of negative expressivity in childhood and girls', but not boys', sympathy in adolescence. These findings might indicate that some exposure to negative dominant emotions in the home, if not excessive, may foster daughters' awareness of and attention to negative emotions. Further, the relation between parental expression of negative emotion in the family and young schoolchildren's sympathy appears to be quadratic (a moderate level was associated with their sympathy) and also moderated by children's regulation; negative relations have been found only for children low in regulation (Valiente et al., 2004).

When anger is directed at the child, negative emotionality is perhaps most likely to be detrimental to children's prosocial development. Consistent with the findings of Michalik et al. (2007), Batanova and Loukas (2012) reported that for middle-school-aged (mean age of about 11 to 12 years) girls, but not boys, parent-child conflict predicted a decline in empathic concern across a 1-year period.

Reviewing research on troubled families (i.e., depressed mothers, marital distress), Zahn-Waxler and Van Hulle (2012) discussed "pathological altruism" in children, particularly girls. In such troubled families, children may be likely to engage in comforting and prosocial behaviors toward family members. Such prosocial behavior may serve to minimize self-related negative emotional (and physical) consequences of conflict but likely does not foster the capacity for sympathy or other-oriented (rather than self-oriented) prosocial behavior beyond that directed toward family members. Indeed, prosocial behavior toward playmates is lower for children exposed to maternal depression and conflict involving one or both parents (see Zahn-Waxler & Van Hulle, 2012). McCoy, Cummings, and Davies (2009) demonstrated that, even after controlling for prior levels of children's prosocial behavior, destructive marital conflicts (i.e., those that are hostile and angry) predicted lower prosocial behavior through children's lower emotional security.

In addition to parental expression of emotions, the socialization of emotion involves parental responses to children's emotions. Mothers' appropriate responses to their children's negative emotions have been related to children's sympathy, prosocial behavior, and personal distress reactions (Garner, 2006; see Eisenberg et al., 2006). For example, Davidov and Grusec (2006) found that maternal responsiveness to children's distress was positively associated with empathy and prosocial behavior, and, as predicted, this relation was mediated by children's

ability to regulate their negative affect. Eisenberg, Fabes, Schaller, Carlo, and Miller (1991) found that parents (mostly mothers) who emphasized to their sons the need to control their own negative emotions (i.e., sadness and anxiety) had sons who showed facial and physiological signs of distress when viewing a sympathy-inducing film but were likely to report experiencing no distress in reaction to the film. On the other hand, when boys had parents who encouraged their children to deal with emotions in instrumental ways, they were likely to experience sympathy rather than personal distress. Interestingly, when same-sex parents restricted emotional displays that could be hurtful to others (i.e., gasping at a disfigured person), children tended to show relatively high levels of dispositional and situational sympathy. Thus, parents' restrictiveness may foster prosociality when in regard to the display of hurtful emotions but may undermine it for the display of children's own experiences of emotion.

Emotion socialization also involves parental discussion of emotion. Mothers' discussions of their own and their children's emotions appear to relate positively to children's vicarious emotional responding and prosocial behaviors (Brownell, Svetlova, et al., 2013; Garner, Dunsmore, & Southam-Gerow, 2008). However, the positive association between mothers' discussion of emotion and prosocial tendencies has not been found in all studies and may be dependent on the manner in which mothers talk about emotional events (see Eisenberg et al., 2006). Moreover, little is known about differences in mothers' and fathers' discussion of emotions and their effects.

Siblings

The role of the sibling relationship in children's prosocial behaviors and empathy-related responding has received surprisingly little attention. Because siblings spend considerable time together and are familiar and relatively uninhibited with one another, they would be expected to play a considerable role in the development of children's social understanding and social skills. In fact, even young children show relatively high levels of comforting behaviors to their distressed siblings, although they are less likely to show such behavior with peers (see Eisenberg et al., 2006).

Positive sibling relationships may provide children with opportunities to learn about others' needs and how to care effectively for others, and such relationships are likely to provide a buffer from stress and negative emotionality. Sibling warmth/low conflict was related to higher empathy over time in a sample of young adolescents (Lam, Solmeyer, & McHale, 2012). Similarly, sibling affection

was positively related to prosocial behavior, even after controlling for the impact of parent-child relationship quality, and this relation was mediated by children's self-regulation skills (Padilla-Walker et al., 2010). Morgan, Shaw, and Olino (2012) reported that although sibling relationship quality did not directly predict boys' social skills (a composite that included some indices of prosocial behavior/cooperation), higher destructive sibling conflict related to lower social skills for boys high (but not low) in negative emotion (girls were not studied). Thus, children's temperament may moderate the impact of the sibling relationship on their social behavior.

The child's ordinal position in the sibling dyad likely affects opportunities and expectations for prosocial behavior. Older children are more likely to enact prosocial behaviors directed toward younger siblings, and younger siblings accept reciprocal roles by displaying high rates of compliance and modeling (see Eisenberg et al., 2006). In one of the few studies to consider the role of sibling composition in adolescents' empathy, Tucker, Updegraff, McHale, and Crouter (1999) found that young adolescents' (10–12 years old) empathy was positively associated with their younger sisters' (2–3 years younger) empathy, whereas older brothers' empathy was positively related to younger brothers' empathy, indicating that younger siblings may model their older siblings' behavior.

Because sibling relationships are embedded in the family, it is not surprising that mothers' behaviors are linked to prosocial behavior between siblings. For example, when mothers discussed their newborn's feelings and needs with an older sibling, the older child was more nurturing toward the infant. Furthermore, friendly interest in the infant persisted and predicted prosocial behavior toward the younger sibling 3 years later (Dunn & Kendrick, 1982). Thus, sibling interactions are clearly an important context for learning caregiving behaviors, perspective taking, and social skills, although little is known about ways in which the larger familial context, children's characteristics, and culture moderate the relations of prosocial development to aspects of the sibling relationship.

Summary

A number of parenting practices and beliefs, as well as the emotional climate of the home and sibling relationships, are related to prosocial development. The findings are generally consistent with the notion that the development of prosocial behavior and empathy/sympathy is enhanced by a sense of connection to others (i.e., attachment, exposure to parental warmth), positive discipline and guidance, and

participation in prosocial activities. Furthermore, the ways in which parents respond to and teach about emotions have been related to children's sympathy and prosocial behaviors. Sibling relationships also provide a context for learning and practicing prosocial capacities.

Researchers typically ignore the role of children's characteristics in the socialization process. Yet, as was demonstrated by Padilla-Walker and colleagues (2012), youth are as likely to influence parenting as the reverse. Moreover, as is illustrated in Figure 15.1, relations of parenting behaviors to children's prosocial development undoubtedly are affected and/or moderated by a number of factors, including culture, children's age and sex, sex of the parent (although there is little research on fathers), children's dispositional characteristics, and other parenting behaviors. Relatedly, children's heredity likely affects the degree to which they are responsive to socialization efforts, what kinds of socializing behaviors they respond to, and the socialization-relevant behaviors they evoke from family members.

Extrafamilial Socialization

Of course, people and institutions outside the family are potential socializers of children's prosocial actions. Research on the role of nonparental influences is still limited, and researchers seldom have simultaneously studied multiple family socializers or multiple types of potential socializers (e.g., peers and the school context).

Peer Influences on Prosocial Development

Peers are likely important and unique socializing agents for children. Being affiliated with prosocial peers appears to encourage prosocial and positive behaviors in youth, perhaps through modeling. Adolescents who are prosocial or who volunteer are likely to have friends who also engage in these activities (Barry & Wentzel, 2006). In one of the few studies with young preschool and kindergarten-aged children, Fabes, Hanish, Martin, Moss, and Reesing (2012) found that greater affiliation with prosocial peers was related to enhanced positive emotional responding and a decrease in negative emotionality in subsequent peer interactions, even after controlling for earlier levels of emotionality and classroom-level prosocial behavior.

Peers can also reinforce prosocial behaviors. Fujisawa, Kutsukake, and Hasegawa (2008) showed that Japanese preschoolers tended to reciprocate prosocial behaviors in dyads. Peers may also promote adolescents' prosocial behavior when they communicate expectations for

prosocial behaviors (Wentzel, 2014; Wentzel, Baker, & Russell, 2012; Wentzel, Battle, Russell, & Looney, 2010). Indeed, in one study, peers' expectations about prosocial behavior predicted adolescents' prosocial behavior, and this relation was mediated by adolescents' personal prosocial values (Padilla-Walker & Carlo, 2007).

Furthermore, warm and close relationships with peers might offer opportunities to develop reciprocal relationships that involve empathy and prosocial behavior. Children tend to behave more prosocially toward friends than nonfriends (Fujisawa et al., 2008) and having at least one reciprocated friendship (rather than having no such friendship) has been related to higher levels of prosocial behavior (Wentzel, Barry, & Caldwell, 2004). In addition, Sallquist, DiDonato, Hanish, Martin, and Fabes (2012) reported that mutual positive expressivity among preschool-aged peers, but not children's overall positive expressivity, was positively related to children's social adjustment—a construct that included cooperation and prosocial behavior with peers. Thus, the quality of peers' relationships may foster perspective taking and empathy, even in early childhood.

Research with adolescents also supports an association between quality of peer relationships and prosocial tendencies. Attachment security with peers in adolescence has been related to higher prosocial behavior and sympathy, even after controlling for attachment with parents (Laible, 2007), and adolescent empathy has been related to higher friendship quality (Soenens et al., 2007). Moreover, adolescents' sympathy has been related to the quality of their friendships (e.g., intimacy and conflict management; Chow, Ruhl, & Buhrmester, 2013; de Wied, Branje, & Meeus, 2007). Of course, quality of peer relationships could affect prosocial tendencies or vice versa, or both may stem from a third variable.

Peer social status (being liked by peers) also has been positively related to empathy and prosocial behavior (Caputi, Lecce, Pagnin, & Banerjee, 2012; Gorman, Schwartz, Nakamoto, & Mayeux, 2011; Mouratadis & Sideridis, 2009; see Eisenberg et al., 2006). Kuppens et al. (2009) found that elementary school children's prosocial behavior predicted boys' (but not girls') social status 2 years later when controlling for initial social status; there was less evidence of the reverse relation. Also suggesting an association, Closson (2009) found that members of perceived popular cliques were relatively prosocial toward their friends, whereas unpopular cliques were characterized by lower levels of prosocial behavior toward clique members. Similarly, centrality in peer groups has been

found to predict prosocial behavior (Ellis & Zarbatany, 2007). However, some researchers have found no relations between peer social status and sympathy/prosocial behavior (e.g., Ellis, Dumas, Mahdy, & Wolfe, 2012).

Teachers and Schools

Based on the literature on the role of parents as socializers of prosocial behavior and empathy, it is not surprising that teachers play an important role in children's social behaviors (see Jennings & Greenberg, 2009; also see subsequent section on school-based interventions). Teachers' warmth has been positively associated with children's empathy/sympathy and prosocial behavior (Eisenberg et al., 2006; Luckner & Pianta, 2011). Further, teacher-child relationship quality (high closeness and low conflict) has been positively related to prosocial behavior (Palermo, Hanish, Martin, Fabes, & Reiser, 2007). The majority of the work in this area has focused on early childhood settings; further research is needed on these associations with older children (Bergin, 2014). Longitudinal and experimental research also is needed to identify the likely direction of causality.

In addition, aspects of the school and classroom may be important considerations. For example, school connectedness (e.g., a sense of belonging to school) may promote involvement and prosocial activities. Indeed, Batanova and Loukas (2012) found that school connectedness was related to increases in males', but not females', sympathy and perspective taking over 1 year. Similarly, Barr and Higgins-D'Alessandro (2007) reported that positive perceptions of the school culture were related to relatively high levels of adolescents' sympathy. Youths' perceptions of experiences of cooperative learning in the classroom also have been positively related to their prosocial behaviors (Choi, Johnson, & Johnson, 2011).

Experiences outside of the classroom also could facilitate prosocial skills. Youths who participate in after-school sports and youth development programs, such as 4-H, YMCA, Boys & Girls Clubs, as well as youths who participate in sports and religious-based youth groups, report higher positive youth development than do students who are not involved in such activities (Zarrett et al., 2009). Thus, school settings likely play an important role in fostering children's positive social development.

School-Based Interventions

Based on the previously described literature concerning the socialization of prosocial attitudes and behavior, some investigators have attempted to design school-based programs for fostering prosocial responding. For example,

Solomon, Watson, Delucchi, Schaps, and Battistich (1988) implemented a whole-school intervention program designed to promote prosocial values and positive teacher-child relationships. Teachers were trained in child-centered approaches (e.g., inductive discipline), students participated in rule setting and decision making and mutual problem solving, and the program provided children with opportunities to participate in collaborative activities, such as rule-setting and engaging in different roles in the classroom. The program was implemented for 5 consecutive years (kindergarten through Grade 4, or approximately 5–6 years of age to 9–10 years of age). Evaluation of the program indicated improvements in spontaneous prosocial behavior and observed friendly and helpful behavior (Solomon et al., 1988). It appears, however, that the impact of the program on children's sympathy was not long-term. One report indicated that by middle school (in grades 6 to 8, typically 11–12 years to 13–14 years of age), even for the subsample of schools that implemented the program well, there were no differences between children in the program and control groups in concern for others (Battistich, Schaps, & Wilson, 2004).

A number of smaller programs (in few schools) targeting prosocial behavior and/or empathy/sympathy appear to have had some positive results. Caprara et al. (2014) focused on prosocial behavior and reported effects of the *Promoting Prosocial and Emotional Skills to Contrast Externalizing Problems* curriculum directed to middle-school students (mean age of about 12). The program was designed specifically to promote prosocial skills by addressing perspective taking, emotion regulation, and the promotion of prosocial actions. Those in the intervention group increased in helping and decreased in physical and verbal aggression across three time points (6 months apart) and also got higher grades than the children in the control group.

In a small study of preschool-aged children, Ramaswamy and Bergin (2009) trained teachers in Head Start classrooms to use "victim-centered" inductive discipline when students misbehaved (involving teaching students to focus on others' well-being), reinforcements for prosocial behavior (e.g., hug, pat, compliment), or both induction and reinforcements. Although teachers only modestly changed their behaviors, the children's prosocial behavior significantly increased from pretest to posttest in all interventions groups, but particularly for students who were in the induction-only group.

Another program designed specifically to improve prosocial behavior is the *Roots of Empathy* program (ROE).

This program, directed to fourth- through seventh-grade classrooms (nearly 9 to nearly 13 years old, with a mean age of 10 to 11 years), involved monthly classroom visits by an infant and his or her parent(s) and bimonthly visits from a program instructor who provided lessons designed to foster empathy, emotional understanding, and sensitivity. The students were also required to engage in lessons designed to benefit the infant (e.g., create a recording of nursery rhymes and songs for the infant), with the goal of promoting altruism and prosocial values. Children in the ROE group, compared to control children, increased on peer-nominated prosocial behaviors (i.e., sharing, cooperating, helping others) and decreased in teacher-rated aggression (Schonert-Reichl, Smith, Zaidman-Zait, & Hertzman, 2012).

A number of other intervention programs have not focused specifically on prosocial skills but have measured them, often in combination with other positive behaviors. In one program, emotional skills were integrated into literature teaching by using “affective teaching” to encourage fifth- and sixth-grade students (typically 10–11 and 11–12 years; age was not specified) to think about characters in stories, and teachers asked “feeling questions” about the characters and their own personal experiences. Students in the program group improved in their positive behavior (which included prosocial behavior) and were more supportive of each other than were children in traditional teaching classrooms (Shechtman & Yaman, 2012).

The *Second Step* program was designed as a violence prevention program that involved lessons about anger and emotional management, empathy, and impulse control for third- and fourth-grade children, typically 8–9 and 9–10 years old (Cooke et al., 2007). In addition to the school-based curriculum, there also were components aimed at involving parents and other members of the community in modeling and reinforcing children’s positive behavior. Students’ self-reported caring/cooperative behavior and self-reported consideration of others significantly improved from pre- to posttest; however, observed prosocial behaviors did not increase.

The *Fast Track Project* involved multiple components, including parents and schools to improve social skills for children at-risk for antisocial behavior. Children in the intervention group engaged in more prosocial activities with peers and showed more improvement in aggressive-disruptive behavior than did children in the control group (Conduct Problems Prevention Research Group, 1999, 2002).

Another school-based intervention program, the *Social Aggression Prevention Program*, was designed to improve

girls’ social problem solving and social skills. This program was delivered to small groups of 5th grade girls (mean age of 10.5 years) and involved social-skills training and activities designed to enhance emotional awareness. For girls with relatively high social aggression at baseline, this training was linked to increases in teachers’ ratings of prosocial behavior and marginally higher ratings of empathy. There were no differences between the intervention and control group in peers’ prosocial ratings (Cappella & Weinstein, 2006).

Many of the aforementioned programs focus on the importance of building social and emotional skills. In a meta-analysis, Durlak, Weissberg, Dymnicki, Taylor, and Schellinger (2011) found that such programs have small but positive effects on positive social behavior. It is important to note, however, that these programs tend to focus on general positive and socially competent behaviors and do not necessarily focus specifically on improvements in prosocial behavior or empathy. Further, many of the interventions emphasize reducing negative behaviors rather than focusing on positive behaviors.

Summary

Extra-familial socializers probably influence children’s prosocial development. In particular, high-quality relationships with peers and teachers are likely to promote children’s prosocial behavior and empathy/sympathy. In brief, peer interactions seem to provide unique opportunities for prosocial behavior, and peer responses in such contexts might influence the type and degree of potential prosocial responses. However, the direction of relations between peer competence and prosocial behavior is not clear (although prosocial tendencies likely affect peer status and quality of friendships); longitudinal research controlling for initial levels of prosocial behavior is needed. Further, little is known about the degree to which the effects of peers are moderated by other variables (e.g., the nature of interactions with other socializers and characteristics of the child, the peer group, or the context) or the exact processes that underlie potential peer influences.

School-based programs designed to enhance prosocial values, behaviors, and attitudes in children can be effective (albeit not always are) in fostering children’s prosocial attitudes and behaviors. However, these programs are often difficult for schools to implement given their cost and a number of policies in the U.S. educational system that require teachers to focus on academic testing, rather than on socioemotional learning. Additional research is needed to examine the types of programs that are most effective and who should be targeted in such interventions.

SOCIOCOGNITIVE CORRELATES OF PROSOCIALITY

As already discussed, the emergence of sociocognitive skills appears to be correlated with the emergence of sympathy and prosocial behavior. In addition, theorists have frequently argued that sociocognitive skills such as perspective taking and moral reasoning foster prosocial responding (Batson, 1991; Eisenberg, 1986; Hoffman, 2000). Because cognitive abilities may underlie the ability to discern others' needs or distress as well as the capacity to devise ways to respond to others' needs, it would be logical to also expect some relation between measures of intelligence and prosocial responding, particularly prosocial behavior involving sophisticated sociocognitive skills.

Indeed, often investigators have obtained modest to moderate positive correlations between measures of intelligence (e.g., IQ, vocabulary or reading skills, language development, developmental level) or grades and prosocial behavior or sympathy (e.g., Carlo, Hausmann, Christiansen, & Randall, 2003; Moreno et al., 2008; Rhee, Boeldt, et al., 2013; van der Mark et al., 2002; see Eisenberg et al., 2006). The contribution of these cognitive skills probably is partly through their contribution to sociocognitive abilities, which might have a more direct relation to empathy/sympathy and prosocial behavior. However, prosocial behavior and sympathy might also affect cognitive and academic outcomes (e.g., Romano, Babchishin, Pagani, & Kohen, 2010) due to their effects on variables such as relationships with peers and teachers at school and children's liking of school (Palermo et al., 2007). Moreover, prosocial behavior and sociocognitive development may be associated due to environmental variables (e.g., life events, neighborhood environment, parenting quality) contributing to both variables.

Understanding of Others' Cognitions and Emotion

Numerous investigators have examined the decoding of others' emotions and an understanding of others' mental states as predictors and correlates of children's prosocial behavior and empathy-related responding. For convenience, and because it generally is difficult to identify the processes underlying performance on perspective-taking and related tasks, the term *perspective taking* is used to refer to the ability to engage in any of these processes when they result in knowledge about others' internal states.

Researchers often but not always have found a positive association between perspective taking (broadly defined)

and prosocial behavior (including defense of victims of bullies and empathy/sympathy) (e.g., Caputi et al., 2012; Caravita, Di Blasio, & Salmivalli, 2010; Eggum et al., 2011; Ensor et al., 2011; Espelage, Green, & Polanin, 2012; Nichols, Svetlova, & Brownell, 2009; see Carlo, Knight, McGinley, Goodvin, & Roesch, 2010; Eisenberg et al., 2006), as well as young children's other-oriented prosocial moral reasoning (e.g., Lane et al., 2010). In a meta-analysis, Carlo et al. (2010) found relatively larger associations in studies involving comforting behavior (rather than volunteering or donating/sharing), school children (including adolescents) as opposed to older or younger individuals, and affective (rather than social/cognitive or visual/spatial) perspective-taking measures (overall weighted mean correlation was 0.22). This association does not seem to be due merely to the correlations between age and both perspective taking and prosocial behavior; sometimes the age range of study participants was narrow or findings were maintained when age was controlled (e.g., Nichols et al., 2009; see Carlo et al., 2010). The relation is stronger when there is greater similarity between the type of perspective-taking skills assessed and the type or level of understanding likely to promote prosocial behavior in the given context (e.g., when both require an awareness of another's emotional state, the target is similar in the two tasks) and/or the level of assessment (global versus specific) is similar. Children with specific perspective-taking skills are likely to apply those same skills when engaging in prosocial tasks that prime or activate cognitive, affective, or motivational scripts similar to those required in the perspective-taking tasks (Carlo et al., 2010).

In some circumstances, perspective-taking skills may be unimportant because prosocial actions are enacted in a relatively automatic fashion due to either their low cost or the compelling, crisis-like nature of the situation (Eisenberg, 1986). Moreover, in some contexts, prosocial behavior is likely motivated by factors other than knowledge of another's internal states. Furthermore, contexts vary in the degree of sociocognitive skills required to help, which can affect the relation between such skills and prosocial behavior. Knafo, Steinberg, and Goldner (2011) found that children with low levels of affective perspective-taking ability (but not general cognitive skills) had difficulty inferring the need for prosocial action and were low in self-initiated prosocial behavior when there were relatively subtle social cues, but did not differ from their peers when specific social cues or requests were provided by adults.

Because sociocognitive skills can be used for good or ill (Eisenberg, 1986; Sutton, Smith, & Swettenham, 1999),

it is not surprising that their relation to prosocial behavior sometimes has been mediated or moderated by other morally relevant variables. In one study, for example, children who donated money to help a child who had been burned were those who not only evidenced relatively sophisticated perspective-taking skills, but also were sympathetic and understood units and value of money (Knight, Johnson, Carlo, & Eisenberg, 1994). In another investigation, there was no direct relation between perspective taking and prosocial behavior, only mediated relations through sympathy or prosocial moral reasoning (Eisenberg, Zhou, & Koller, 2001).

In summary, sociocognitive skills related to understanding of others' internal states of situations may be involved in discerning others' needs, evoking the affective motivation for prosocial action (i.e., sympathy, empathy, or guilt), and providing sensitive help. Consistent with this argument, children with higher perspective-taking skills generally are somewhat more prosocial, particularly if their perspective-taking abilities are relevant to the prosocial task. However, it is also likely that children with well-developed perspective-taking abilities have more opportunities to be prosocial (e.g., parents may be more likely to allow children to care for and assist their younger siblings if they are relatively advanced in perspective taking; R. B. Stewart & Marvin, 1984).

Moral Reasoning and Attributions

If, as argued by Eisenberg (1986), moral reasoning reflects the hierarchy of an individual's values, needs, goals, and motives in a given situation, within the constraints of the individual's cognitive and sociocognitive capabilities (which may be limited due to age), one would expect some relation between moral reasoning and prosocial tendencies. Of course, prosocial actions can be motivated by a range of considerations, including altruistic, pragmatic, and even self-oriented concerns; nonetheless, prosocial behavior motivated by a particular type of factor (e.g., sympathy) is likely to be correlated with the types or levels of reasoning reflecting that factor, although not necessarily with an individual's overall level of reasoning. Similarly, one would expect moral attributions regarding one's own and others' moral behaviors to reflect individuals' values, needs, and motives.

Moral Reasoning

Children's prosocial behavior has been inconsistently related to aspects of Piaget's (1965) scheme of moral judgment (e.g., intentionality, distributive justice), but

generally (albeit not consistently) positively related to Kohlberg's (1981) prohibition- and justice-oriented moral reasoning (or modified versions thereof) (see Eisenberg, 1986; Eisenberg & Fabes, 1998). Moreover, in general, children's moral reasoning about dilemmas involving helping or sharing behavior has been modestly associated in the predicted manner with at least some measures of prosocial behavior, within and outside North America (e.g., Carlo, Mestre, et al., 2011; Eisenberg et al., 1995; Eisenberg, Zhou, et al., 2001; Kumru et al., 2012; S. M. Stewart & McBride-Chang, 2000; see Eisenberg, 1986, and Eisenberg & Fabes, 1998, for reviews). In addition, types of reasoning that reflect an other- versus self-orientation or are developmentally mature for the age group are most likely to predict prosocial responding, whereas immature types of reasoning (e.g., hedonistic reasoning) tend to be negatively related (e.g., Carlo et al., 2003; Carlo & Randall, 2002; Eisenberg et al., 1995; Eisenberg, Miller, et al., 1991; Kumru et al., 2012; see Eisenberg et al., 2006).

The degree and valence of the relation between prosocial moral reasoning and prosocial behavior vary with the type of prosocial behavior. Higher-level, self-reported internalized prosocial moral reasoning tends to be positively correlated with adolescents' reports of altruistic prosocial actions and helping in emotional and anonymous situations, whereas lower-level reasoning (i.e., approval-oriented or hedonistic) tends to be related positively to reported public helping (only for approval) and/or negatively to altruism or helping in emotional or dire circumstances (Carlo et al., 2003; see Carlo, Knight, et al., 2011, for a weaker pattern, especially for Mexican American youth). In laboratory studies, prosocial moral reasoning more frequently has been associated with prosocial actions that incur a cost (e.g., donating or volunteering time after school) than with those low in cost (e.g., helping pick up dropped paper clips; Eisenberg et al., 1987; Eisenberg & Shell, 1986). In observational studies, higher prosocial moral reasoning most often has been positively related to preschoolers' spontaneous sharing behaviors in comparison to helping behaviors (which, in these studies, generally entailed little cost) or prosocial behaviors performed in compliance with a peer's request (Eisenberg-Berg & Hand, 1979), although spontaneous and compliant prosocial preschool behaviors relate to different types of moral reasoning in adulthood (more needs-oriented for the former and stereotypic or internalized for the latter; Eisenberg et al., 2013).

Other variables sometimes moderate the relation between moral judgment and prosocial behavior. For example, P. A. Miller, Eisenberg, Fabes, and Shell (1996) found that preschoolers who reported sympathy for hospitalized

children and who also were relatively high in use of needs-oriented reasoning were especially likely to help hospitalized children at a cost to themselves. Affective motivation such as sympathy (and perhaps guilt) often may be necessary to spur the individual to action. Thus, it is important to identify other moderators and mediators of the relation between moral reasoning and prosocial responding.

Moral Emotion Attributions

Children's attributions of emotions such as guilt, remorse, or happiness when considering situations involving moral transgressions or prosocial acts also have been associated with individual differences in prosocial behavior. In a typical study, children are presented with vignettes in which some morally relevant behavior is performed and are asked how the story protagonist or they would feel. Malti and Krettenauer (2013) argued that individual differences in moral emotion attributions reflect morally relevant behavioral dispositions. Consistent with this argument, in a meta-analysis, they found a modest overall relation between emotion attributions (e.g., attributing guilt or sadness to a story protagonist or the self) and prosocial behavior (.26). This relation was not moderated by age. Although various characteristics of coding and study design did moderate the size of the association, overall the findings supported the view that how children think they or others feel when they behave in morally relevant ways is relevant to their prosocial behavior in other contexts.

Summary

Research on moral reasoning, especially prosocial moral reasoning, and attributions about moral behaviors and emotions tend to be modestly related to children's prosocial behavior, suggesting that moral cognitions often contribute to prosocial behavior. However, moral reasoning/attributions may simply reflect motives, values, goals, and needs that contribute to moral reasoning/attributes and to prosocial behavior, and engaging in prosocial behavior may help to shape moral cognitions (Laible, McGinley, Carlo, Augustine, & Murphy, 2014). Longitudinal research examining potential causal pathways and experimental research manipulating development or availability of particular levels of moral judgments or cognitions would be useful in identifying causal pathways.

THE RELATION OF PROSOCIAL BEHAVIOR TO EMPATHY-RELATED EMOTIONAL RESPONDING

A causal relation between empathy or sympathy and prosocial behavior has been presumed to exist both within

specific contexts and at the dispositional level (i.e., people with a dispositional tendency toward empathy/sympathy are expected to be relatively altruistic in general). Empathy may often evoke sympathy, and sympathetic concern is expected to motivate other-oriented behavior, including altruism (e.g., Batson, 1991; Eisenberg, 1986; Hoffman, 2000). In contrast, personal distress is viewed as involving the egoistic motivation of alleviating one's own distress; therefore, it is expected to motivate prosocial behavior only when the easiest way to reduce one's own distress is to reduce the other's distress (e.g., when one cannot easily escape contact with the empathy-inducing person; Batson 1991).

In a meta-analytic review of the literature, Eisenberg and Miller (1987) found significant positive associations with prosocial behavior for a variety of measures of empathy-related responding; however, some types of measures were infrequently used prior to 1987 (e.g., facial and physiological measures) and one commonly used measure appeared to lack validity. Moreover, in the early studies of empathy, investigators often did not differentiate among empathy, sympathy, and personal distress.

Since the 1980s, it has become clear that it is essential to differentiate among empathy-related emotional reactions. Consistent with his theorizing, Batson (1991), in laboratory studies with adults, found that sympathy is more likely to be positively associated with helping than is personal distress when it is easy for people to escape contact with the person needing assistance. In a series of studies, Eisenberg, Fabes, and their colleagues (see Eisenberg & Fabes, 1998; Eisenberg et al., 2006) obtained similar findings with children, using facial and physiological measures, as well as self-reports of sympathy and personal distress. In regard to physiological measures, Eisenberg et al. (1989) argued that people tend to experience personal distress when they are physiologically overaroused, whereas they feel sympathy when they experience moderate vicarious arousal. Thus, they hypothesized that in evocative empathy-inducing contexts (but not less evocative ones), high levels of autonomic arousal would be associated with personal distress, whereas the reverse would be true for sympathy (although, in response to a mildly evocative stimulus, low arousal could be an index of no empathy-related responding). In addition, heart rate deceleration tends to occur when individuals are oriented to information in the environment outside the self, so they predicted an association between experiencing sympathy and heart rate deceleration at the time of the sympathetic response. Across studies in which children were shown empathy-inducing videotapes, children who exhibited facial or physiological (i.e., heart

rate deceleration or lower skin conductance) markers of sympathy tended to be relatively prosocial when given an opportunity to assist someone in the film or people similar to those in the film (e.g., hospitalized children). In contrast, children who exhibited evidence of personal distress (higher heart rate or skin conductance) tended to be less prosocial. Self-report measures in these studies were less consistently related to children's prosocial behaviors (e.g., Eisenberg et al., 1989; Eisenberg et al., 1990; see Eisenberg et al., 2006, for a review).

Other investigators have found an association between expressions of empathy/sympathy and prosocial behavior in observational studies (e.g., Zahn-Waxler, Robinson, & Emde, 1992; Knafo, Zahn-Waxler, et al., 2008; Trommsdorff & Friedlmeier, 1999; Trommsdorff et al., 2007; Vaish et al., 2009), although self-distress in reaction to another's emotion has been inconsistently related to young children's prosocial behavior (Liew et al., 2011; Zahn-Waxler, Radke-Yarrow, et al., 1992; Zahn-Waxler, Robinson, et al., 1992; also see Trommsdorff, 1995). Consistent with Eisenberg's work, Zahn-Waxler et al. (1995) found children's heart rate deceleration during exposure to sadness (at the peak interval) was associated with three of four measures of prosocial responding, and behavioral/facial measures of concerned attention were positively related to prosocial behavior directed toward the target of concern. Gill and Calkins (2003) found that heart rate acceleration was positively related to toddlers' empathy, but they used mean level of heart rate rather than looking at change in heart rate during a short evocative episode.

Consistent with the findings in studies of situational sympathy, questionnaire measures of empathy or sympathy frequently have been found to be positively related to diverse measures of prosocial behavior (Malti, Gummerum, Keller, & Buchmann, 2009; see Eisenberg et al., 2006), including helping victims of bullies (e.g., Bellmore, Ma, You, & Hughes, 2012; Caravita et al., 2010; Espelage et al., 2012). Relations between dispositional sympathy and prosocial behavior seem to be most consistent for self-reported or relatively costly prosocial behavior (Eisenberg, Miller, et al., 1991; Eisenberg et al., 1987). Findings for self-reported empathy (rather than sympathy) are not highly consistent (e.g., see Eisenberg et al., 2006). However, empathy questionnaires often contain items that may reflect personal distress or sympathy in addition to empathy. Preschoolers' personal distress reactions have been positively related to the children's tendency to engage in compliant, requested prosocial behaviors (Eisenberg et al., 1990; Eisenberg, McCreathe, & Ahn, 1988). However,

self-reported personal distress tends to be inconsistently and often unrelated to prosocial behavior (e.g., Eisenberg, Miller, et al., 1991; Eisenberg et al., 1995), although relations consistent with expectations have been found in early to mid-adolescence in some (Carlo, Eisenberg, & Knight, 1992; also see Eisenberg et al., 2002) but not all (e.g., Eisenberg et al., 1995) studies. It may be that questionnaire measures of personal distress, which have been adapted from work with adults, are not optimal for children.

In summary, research findings are consistent with the conclusion that sympathy and sometimes empathy (depending on its operationalization) are positively related to prosocial behavior. In contrast, personal distress, particularly when assessed with nonverbal measures in an evocative situation, is negatively related to prosocial behavior (and often unrelated for self-reported personal distress). Moreover, children with a sympathetic disposition appear to be somewhat more prosocial in general than are other children. Because there is evidence that the relation of sympathy to prosocial behavior is moderated by dispositional perspective taking (Knight et al., 1994) and moral reasoning (P. A. Miller et al., 1996), it is important to identify other dispositional and situational factors that influence when and whether empathy-related situational reactions and dispositional characteristics are related to prosocial behavior.

RELATIONS OF PROSOCIAL RESPONDING TO TEMPERAMENT/PERSONALITY CHARACTERISTICS AND DISPOSITIONAL DIFFERENCES IN SOCIAL BEHAVIOR AND VALUES

Although findings differ considerably across measures of prosocial responding, there is evidence of modest consistency across situations and stability across time (see Eisenberg & Fabes, 1998). Nonetheless, distinct types of behaviors (helping versus sharing) tend to be at best weakly interrelated and consistency in general likely increases with age (Eisenberg et al., 2006). Given the diversity of motives likely to be associated with prosocial and empathy-related responses, it is impressive that investigators frequently have found significant relations across situations or time, even if many are modest in size. These associations suggest that there are individual differences in children's prosocial tendencies that can be predicted by variables related to children's temperament, aspects of personality (besides prosociality), and characteristic styles of behavior.

In this section, we briefly review some dispositional and behavioral individual differences that have been examined as predictors/correlates of prosocial tendencies.

Self-Regulation

In studies involving adult-reported or behavioral measures of self-regulation (often defined in terms of processes involved in modulating one's own emotional states and behaviors), prosocial children tend to be relatively well-regulated (e.g., Beauchaine et al., 2013; Carlo, Crockett, Wolff, & Beal, 2012; Laible, Carlo, Panfile, Eye, & Parker, 2010; Padilla-Walker & Christensen, 2011; Padilla-Walker et al., 2010; Yagmurlu & Sanson, 2009, for Australian but not Turkish children; see Eisenberg et al., 2006). Similarly, sympathy has been associated with high levels of children's self-regulation (Eisenberg et al., 1996; Eisenberg, Liew, et al., 2001; Eisenberg et al., 2007; Trommsdorff & Friedlmeier, 1999) whereas personal distress sometimes has been associated with low regulation (Geangu, Benga, Stahl, & Striano, 2011; Ungerer et al., 1990; Valiente et al., 2004). Relations between regulation and sympathy sometimes have been found when controlling for sex (e.g., Valiente et al., 2004) or in a single-sex sample (e.g., Eisenberg et al., 1996; Trommsdorff & Friedlmeier, 1999), suggesting that this relation is not due solely to girls being higher on both self-regulation and sympathy.

The association between regulation and prosociality is not surprising because engaging in prosocial actions likely often requires controlling one's own negative emotion, sustaining attention (Dickert & Slovic, 2009; Trommsdorff & Friedlmeier, 1999), controlling the tendency to focus on one's own wants and needs, and suppressing tendencies to avoid contact with distressed or needy others (see discussion of sociability and shyness, below). However, it is also possible that the same socialization practices that foster self-regulation also foster prosocial behavior and sympathy.

There is also some supportive evidence from physiological data for an association between self-regulation and prosocial behavior. For example, Telzer, Masten, Berkman, Lieberman, and Fuligni (2011) found that neural regions associated with self-control tended to be recruited during prosocial behaviors directed at family members. In addition, baseline RSA, a measure of parasympathetic influence on the heart that is often viewed as an index of physiological emotion regulation, frequently (but not always; e.g., Gill & Calkins, 2003) has been positively related to sympathy or prosocial behavior. Findings for RSA suppression (change in RSA in response to an evocative event) are less consistent

and suggest a positive relation for helping behaviors but not sympathy (Beauchaine et al., 2013; see Hastings et al., 2014, for a review). In some situations, greater suppression followed by augmentation (less RSA)—a pattern of flexible responding to task demands—has been associated with helping behavior (Hastings & Miller, 2014).

Emotionality

Children's positive emotionality or intensity of positive emotions has been positively associated with sympathy (e.g., Eisenberg et al., 1996), empathy with positive emotions (Sallquist, Eisenberg, Spinrad, Eggum, & Gaertner, 2009), and prosocial behavior (Fabes et al., 2012; Volbrecht et al., 2007). These relations may, however, be confounded with children's general social competence.

The data pertaining to negative emotionality are somewhat mixed. In general, children's negative emotionality has been negatively associated with sympathy (Bandstra, Chambers, McGrath, & Moore, 2011; Carlo, Crockett, et al., 2012; Eisenberg et al., 1996) or prosocial behavior (e.g., Laible et al., 2010; Liew et al., 2011). However, positive or nonsignificant relations between negative emotionality or anxiety and sympathy or prosocial behavior have also been found (Broeren, Muris, Diamantopoulou, & Baker, 2013; Laible et al., 2008, 2010; Panfile & Laible, 2012). In studies with toddlers, temperamental fear has been positively associated with personal distress reactions (Liew et al., 2011; Spinrad & Stifter, 2006), but fear also has sometimes positively predicted sympathy reactions in very young children (Spinrad & Stifter, 2006).

In addition, the intensity of the emotion may be related to whether people experience sympathy or personal distress; that is, some degree of negative emotionality may be important in predicting appropriate responses to others' distress (Carlo, Crockett, et al., 2012). If people can maintain their emotional reactions within a tolerable range, perhaps they are more likely to vicariously experience the emotion of needy or distressed others, but are relatively unlikely to become overwhelmed by the emotion and, consequently, self-focused. In contrast, people who are overaroused by vicarious negative emotion are expected to experience that emotion as aversive and as a distressed, self-focused reaction (personal distress). Based on this line of reasoning, the combination of a tendency to experience at least moderate negative emotionality and effective emotion-regulation abilities is thought to contribute to the experience of sympathy and, hence, relate to prosocial behavior. Although the evidence to support this notion has

been complex (see Eisenberg et al., 2006), children who are emotionally reactive but well-regulated are especially sympathetic (e.g., Eisenberg et al., 1996).

Current work on the role of temperamental emotionality in children's empathy and prosocial behavior is limited by the tendency of researchers not to differentiate between different negative emotions (i.e., anger, sadness, fear) and to ignore potential nonlinear relations between prosocial tendencies and emotionality. Moreover, the interaction between regulation and emotionality when predicting empathy-related responding might vary as a function of age, type of negative emotion, and evocativeness of an empathy-inducing stimulus.

Sociability and Shyness

Sociability and shyness appear to influence if and when children assist others. In preschool and beyond, children who are sociable and low in shyness, social anxiety, or social withdrawal are somewhat more empathic/sympathetic and likely to help than are other children (Broeren et al., 2013; Findlay, Girardi, & Coplan, 2006; Howes & Farver, 1987; Inglés, Hidalgo, Mendéz, & Inderbitzen, 2003; Russell et al., 2003; see Eisenberg et al., 2006; contrast with Batanova & Loukas, 2011). Moreover, behavioral inhibition and shyness in toddlerhood have been associated with lower empathy and prosocial behavior toward someone in distress/need, especially strangers (Liew et al., 2011; Young, Fox, & Zahn-Waxler, 1999), whereas social anxiety has been positively correlated with youths' dispositional personal distress but not sympathy (Davis & Franzoi, 1991).

Sociability is particularly likely to be associated with the performance of prosocial behaviors that are spontaneously emitted (rather than in response to a request for assistance; Eisenberg, Cameron, Tryon, & Dodez, 1981; Eisenberg, Pasternack, Cameron, & Tryon, 1984; Eisenberg-Berg & Hand, 1979) or directed toward an unfamiliar person in an unfamiliar setting (rather than a familiar person at home; Stanhope, Bell, & Parker-Cohen, 1987; Young et al., 1999)—situations involving social initiative and social interaction. For example, extroversion (which includes an element of sociability) was related to elementary school children's helping in an emergency when another peer was present (but not when the child was alone) and to helping that involved approaching the other person; introverts tended to help in ways that did not involve approaching the injured individual (Suda & Fouts, 1980). The association between prosocial behavior and both sociability and

shyness can account for part of the genetic influence on prosocial behavior (Knafo & Israel, 2012).

Consistent with the findings for shyness, assertive children (e.g., those who issue commands or defend their possessions) are relatively high in sympathy as opposed to personal distress reactions (Eisenberg et al., 1990) and prosocial behavior (Inglés et al., 2003; Larrieu & Mussen, 1986), particularly spontaneously emitted (unrequested) prosocial behavior (Eisenberg et al., 1984). In contrast, nonassertive, nondominant children tend to be prosocial in response to a request, probably because they receive more requests than their peers and therefore, apparently due to compliance and lack of assertion, respond to a higher frequency (but not proportion) of requests (Eisenberg et al., 1981, 1984, 1988).

Social Competence and Aggression/Externalizing Problems

Because sympathy and prosocial behavior are socially appropriate in many contexts, it is not surprising that children's prosocial behavior and sympathy are related to indexes of socially appropriate behavior, including reports of socially appropriate behavior, peer status and high-quality peer relationships, and coping and problem-solving skills (Caputi et al., 2012; Caravita et al., 2010; Carlo, Mestre, et al., 2012; Gorman et al., 2011; Lansu, Cillessen, & Bukowski, 2013; Malti, Gummerum, Keller, Chaparro, & Buchmann, 2012; Rodkin, Ryan, Jamison, & Wilson, 2012; see Eisenberg et al., 2006). Degree of social competence or peer status may also affect the types of prosocial behavior children prefer to perform (or vice versa). Hampson (1984) found that popular prosocial adolescents tended to engage in peer-related prosocial behavior, whereas less popular helpers preferred non-peer-related tasks.

Especially when considering studies without problematic measures of empathy (see Eisenberg & Miller, 1987), children who are prosocial and/or sympathetic tend to be low in aggression (including bullying) and other externalizing problems (Carlo, Mestre, et al., 2012; Jolliffe & Farrington, 2011; see Eisenberg et al., 2006). Moreover, children's observed disregard for others at 14–36 months in empathy-inducing contexts predicted antisocial behavior in childhood and adolescence (Rhee, Friedman, et al., 2013). Also suggesting an association between low empathy-related responding and externalizing problems, juvenile offenders with psychopathic traits tend to exhibit atypical neural dynamics of pain empathy processing (Cheng, Hung, & Decety, 2012; Lockwood

et al., 2013) and children/youth with disruptive problems or conduct disorders tend to exhibit reduced physiological responding when viewing empathy-inducing stimuli (see Anastassiou-Hadjicharalambous & Warden, 2008; de Wied, van Boxtel, Matthys, & Meeus, 2012). In longitudinal research, aggression/externalizing and empathy or sympathy predict each other over time (e.g., Stavrinides, Georgiou, & Theofanous, 2010), although studies examining bidirectional relations or controlling for prior levels of both variables are difficult to find.

In a meta-analysis, Card, Stucky, Sawalani, and Little (2008) found that, although both direct aggression (physical and overt verbal aggression) and indirect aggression (damaging the target's social position through indirect or covert means; e.g., gossip) were negatively related to prosocial behavior (e.g., helping, sharing, cooperation), when controlling for the effect of the other kind of aggression, the unique relation of direct aggression was negative whereas the unique relation of indirect aggression was positive. Thus, when controlling for level of direct aggression, children and adolescents who tended to use indirect aggression were also those who were more prosocial than other children. This may reflect a high degree of social skills involved in both indirect aggression and prosocial behavior.

The relation between aggressiveness and prosocial behavior is more complex in the early years than at older ages. Gill and Calkins (2003) found a positive relation between aggression and empathy/sympathy in 2-year-olds. The lack of regulation reflected in aggression may allow young children to approach and exhibit concern toward an unfamiliar adult (the measure of concern used in the study). Moreover, Yarrow et al. (1976) found a positive correlation between prosocial and aggressive behavior for preschool boys (but not girls) below the mean in exhibited aggression, and a negative relation for boys above the mean in aggression. For young children who are relatively nonaggressive overall, aggression often may be indicative of assertiveness rather than hostility or the intent to harm another. In contrast, Rhee, Friedman, et al. (2013) found no relation between sympathy at 13–36 months and antisocial behavior in childhood and adolescence, suggesting that early sympathy may not be very predictive of later aggression.

The negative relation between aggression (especially direct aggression) and prosocial tendencies may consolidate with age. Although Hastings, Zahn-Waxler, Robinson, Usher, and Bridges (2000) did not find a relation between concern for others and the behavior problems of 4- to 5-year-olds, children with clinical behavior problems

decreased in their concern and were reported to be relatively low in concern by 6 to 7 years of age. Moreover, greater concern at 4 to 5 years predicted a decline in the severity of externalizing problems over the 2 years.

The inverse relation between prosocial tendencies and externalizing problems found after the early years may reflect, in part, an overlap in the variables contributing to both. Consistent with this possibility, Waldman et al. (2011) found an overlap between the genetic influences on conduct disorder and prosocial tendencies.

Values and Goals

An important component of the self is one's values. Hart and Fegley (1995) found that adolescents who demonstrated exceptional commitments to care for others were particularly likely to describe themselves in terms of moral personality traits and goals and to articulate theories of self in which personal beliefs and philosophies were important (see Walker, 2014, for similar findings). Moreover, adolescents who were more actively involved in community helping activities reported closer agreement with parents about the importance of moral values for the self 2 years later than did their less-involved peers (Pratt, Hunsberger, Pancer, & Alistat, 2003).

More generally, there is evidence that prosocial behavior is positively associated with measures of moral functioning, including other-oriented values and beliefs, social responsibility, guilt or need for reparation, and low levels of moral disengagement (Barry, Padilla-Walker, Madsen, & Nelson, 2008; Cornell & Frick, 2007; Hyde, Shaw, & Moilanen, 2010; Silfver, Helkama, Lönnqvist, & Verkasalo, 2008; see Eisenberg et al., 2006). Furthermore, adolescents sometimes cite moral values and responsibility for others as reasons for enacting prosocial behaviors (e.g., Carlo et al., 1992; Eisenberg et al., 1995). Thus, it appears that older children and adolescents who have internalized moral (including altruistic) values and who view morality as central to their self-concept are particularly likely to be altruistic.

Summary

In general, aspects of temperament/personality and individual differences in social behavior and values are somewhat consistently related to children's and adolescents' prosocial behavior and empathy-related responding. Although associations frequently have been found, they are not

highly consistent and are probably moderated by numerous factors, including type of prosocial behavior (e.g., compliant, spontaneous, egoistically motivated, or altruistic) or empathic response (sympathy, empathy, or personal distress), the context (i.e., the particular situation and recipient, as well as cultural features), other characteristics of the child (e.g., age, sociocognitive abilities, sex), and socialization history. Much more research is needed to delineate both moderating and mediating processes and how they change with age. Moreover, the associations that have been identified may not always be causal; heredity and environmental factors (e.g., parenting, experiences with peers) may affect both children's prosocial tendencies and their functioning in other domains. Future work with genetically sensitive and/or experimental designs is needed to better understand the reasons for these associations.

SEX DIFFERENCES IN CHILDREN'S PROSOCIAL BEHAVIOR

Based on stereotypic gender roles, females generally are expected and believed to be more responsive, empathic, and prosocial than males, whereas males are expected to be relatively independent and achievement oriented. Eisenberg and Fabes (1998), in a large meta-analysis, found a modest sex difference in prosocial behavior favoring girls. Sex differences were greater when prosocial responding was measured with self-reports or reports from others than with observational methods, and were larger for indices reflecting kindness/consideration than for indices reflecting instrumental help, comforting, or sharing. Instrumental help was less predictive of sex differences in prosocial behavior than were other types of prosocial indices when controlling for other study variables. Although sex differences in prosocial behavior tended to get larger with increasing age, this effect was eliminated once other study qualities were controlled.

Gender differences continue to be found in numerous studies since 1998 (e.g., Bellmore et al., 2012; Carlo, Crockett, et al., 2012; Carlo, Mestre, et al., 2012; Malti et al., 2009; Nantel-Vivier et al., 2009; Padilla-Walker & Christensen, 2011; Padilla-Walker et al., 2010; see Eisenberg et al., 2006) and have been found across diverse cultures (e.g., Whiting & Edwards, 1973). To some degree, sex differences in self- and other-reported prosocial responding may reflect people's conceptions of what boys and girls are supposed to be like rather than how they actually behave. Peers, parents, and teachers may tend

to perceive girls as more prosocial than behavioral data indicate (e.g., Shigetomi, Hartmann, & Gelfand, 1981). Moreover, Zarbatany, Hartmann, Gelfand, and Vinciguerra (1985) argued that measures used to evaluate children's prosocial tendencies include a disproportionate number of sex-biased items (pertaining to feminine activities) favoring girls. Nonetheless, there is a modest sex difference favoring girls even in observational studies of prosocial behavior (Eisenberg & Fabes, 1998), so there likely is some truth to the stereotype.

In three separate meta-analyses, investigators found an overall gender difference in empathy/sympathy favoring girls (Chaplin & Aldao, 2012; Eisenberg & Fabes, 1998; Eisenberg & Lennon, 1983), although, as for prosocial behavior, findings vary as a function of method. In the two meta-analyses that examined effect sizes by method (Eisenberg & Fabes, 1998; Eisenberg & Lennon, 1983), large differences favoring girls were found for reports by adults and self-report measures of empathy/sympathy, especially questionnaire indices. No gender differences were found when the measure of empathy was either physiological or unobtrusive observations of nonverbal behavior in experimental contexts (also see Michalska, Kinzler, & Decety, 2013). In work in which sympathy and personal distress have been differentiated, investigators have also found differences in observational studies, many of which involved young children (e.g., Knafo, Zahn-Waxler, et al., 2008; Rhee, Friedman, et al., 2013; see Eisenberg & Fabes, 1998). Eisenberg and Lennon (1983) suggested that the pattern of results was due to differences among measures of empathy in the degree to which both the intent of the measure was obvious and people could control their responses. Thus, when gender-related stereotypes are activated and people can easily control their responses, they may try to project a socially desirable image to others or to themselves. Sex differences in reported empathy increase with age (Eisenberg & Fabes, 1998), as children become more aware of, and are perhaps more likely to internalize, gender-role stereotypes and expectations into their self-image (a finding consistent with the emergence of sex differences in prosocial moral reasoning in adolescence; Eisenberg, Miller, et al., 1991).

In summary, although girls appear to be more prosocial than boys, it is difficult to determine the degree to which the sex difference reflects a difference in moral factors or an other-orientation versus other factors (e.g., self-presentation). Moreover, it seems likely that sex differences change with age for only some aspects and/or measures of prosocial and empathic responding. In future

research, there is a need to better assess the developmental trajectories of the sex differences and to investigate the origins of sex differences in different modes of prosocial responding.

CHALLENGES AND FUTURE DIRECTIONS

There is now considerable research on antecedents and correlates of children's prosocial responding. This research has provided a rudimentary understanding of the factors that may foster prosocial action, although for most environmental influences (with the exception of some experimental interventions), it is premature to confidently assume causation. Many questions remain and the existing body of research cannot adequately address a number of the critical issues regarding development and change in prosocial tendencies.

Many of the deficiencies in the research on prosocial development noted in 1998 and 2006 still exist. Although there is much more research on some topics than a decade ago (e.g., the early emergence of prosocial responding; genetic contributions and the neurological correlates of empathy), the field would benefit from more attention to longitudinal methods and conceptual frameworks, including issues related to process and moderating variables.

Content Areas in Great Need of Attention

A number of content areas require much more attention. For example, researchers' understanding of the role of siblings and peers, as well as the role of the family as a unit involving multiple individuals, is rudimentary. Moreover, mothers, rather than fathers, have usually been studied, so little is known about the role of fathers in prosocial development. In addition, the inconsistent findings on normative trajectories of development for prosocial behaviors and empathy/sympathy indicate that much more work is needed to chart the development of different aspects of prosocial responding and how they vary with the method of assessment. Further work on the earliest indications of empathy or sympathy in infancy is also needed. In addition, although a number of the studies cited in this chapter were from outside North America, there is a need to test the generalizability of many of the findings in non-Western cultures and to identify influences on prosocial development that might be unique to different cultures.

A topic that we believe is of particular importance but has been neglected is the boundary conditions for the

enactment of prosocial behavior or the experience of prosocial emotion and factors that affect these boundaries. There are individual differences in the degree to which various prosocial behaviors and empathy/sympathy are extended to people one knows and cares about, people one does not like, strangers, people in one's social in-group (i.e., groups someone belongs to), and/or people not in the in-group. Eisenberg (1983) reported that elementary school children and adolescents who verbalized higher-level prosocial moral judgment were less likely to differentiate among potential recipients of aid in regard to whom they thought should be helped when in need. Moreover, the motives for prosocial behaviors extended to various groups may differ; for example, prosocial actions directed to members of an out-group or disliked others might tend to be more motivated by internalized moral values (although they could also be motivated by self-protective, reciprocity, and other reasons) than are prosocial behaviors directed at family members and friends. For example, in one study, adolescents' sympathy was related to helping friends and strangers, but not to helping family members, which was related only to supportive mothering (Padilla-Walker & Christensen, 2011). In addition, as was discussed, cultures may differ in their tendencies to help in-group versus out-group members (Knafo, Schwartz, & Levine, 2009).

Although in-group–out-group distinctions in prosocial responding have frequently been examined in social psychology research (see Eisenberg & Spinrad, 2014), there is much less relevant research with children. There is research suggesting that an in-group bias in regard to prosocial behavior increases from 3 to 8 years of age (Fehr, Bernhard, & Rockenbach, 2008) and that 5- to 13-year-olds believe that other children feel more positive about, and more obligation to help, in-group members (Weller & Lagattuta, 2013). Thus, it seems important to examine the early emergence of these biases and factors that affect the degree to which children extend their prosocial tendencies to people beyond the in-group.

Conceptual Models and Methodological Issues

Generally, there is a need to differentiate among different types of prosocial behaviors that involve different motivations and also may differentially rely on empathy, sympathy, or moral values. It only makes sense that the antecedents, sequelae, and correlates of prosocial behaviors that vary in motivation will differ. As one example, although prosocial actions that involve a positive affective response to an individual and those not motivated by

personal gain tend to be negatively related to adolescents' reports of aggression (and their belief that aggression is acceptable), reports of prosocial actions performed for personal gain have been positively related to reported aggressive actions and the acceptance of aggression (Boxer, Tisak, & Goldstein, 2004). Moreover, there is evidence that different modes of prosocial behavior relate differently to different socialization practices (e.g., Carlo, Knight, et al., 2011; Carlo, McGinley, et al., 2007; see Eisenberg & Spinrad, 2014) and differentially predict sympathy, costly prosocial behaviors, and prosocial values across decades (Eisenberg et al., 1999, 2002, 2013). In addition, not all prosocial behaviors are socially appropriate or result in benefits for recipients; indeed, some types of prosocial behavior may even be pathological (e.g., Zahn-Waxler & van Hulle, 2012). Thus, there is a need to better identify the motives, affective states, and values associated with various types of prosocial behaviors, as well as examine the origins, correlates, and consequences of different modes of prosociality.

In this chapter, we discussed a few of the mediators and moderators of relations of various predictors to measures of prosocial responding obtained in the empirical literature. However, as noted in the 2006 chapter of this *Handbook* (Eisenberg et al., 2006), a greater focus on mediation would enhance the field's understanding of the processes related to prosocial development and behavior. For example, little is known about factors that mediate the relations between parental inductions or assignment of responsibilities to children and the children's prosocial behavior or empathy-related responding. Consistent with Hoffman's (2000) thinking, inductions may affect perspective taking and empathy, which then foster prosocial action. Additionally, certain types of interactions with peers or teachers may enhance children's understanding of others' emotions and mental states which, in turn, fosters sympathy. Dispositional emotionality and regulation, or perhaps agreeableness, may mediate the relation between socialization or genetic predispositions and children's sympathy and, hence, their other-oriented prosocial behavior. Examination of such mediational processes requires that investigators refine their conceptual explanations and go beyond looking at global associations to focus on process-oriented explanations.

In contrast, a focus on moderation forces investigators to think about the ways in which predictors of prosocial responding interact in their potential influence. As discussed, genetic contributions to prosocial tendencies are likely often moderated by environmental factors such as

parenting or supportiveness of the social environment more generally. The strength of many predictors of prosocial responding (e.g., perspective taking or parental use of inductions) probably varies depending on factors such as sex, age, general parenting style, cultural experiences, personality predispositions, or children's susceptibility to experience empathy or sympathy. Prosocial behavior in specific situations and even more generally is undoubtedly determined by numerous additive and interacting factors. In addition, it is important to go beyond moderational models to examine the ways in which configurations of numerous variables (e.g., childrearing practices, several personality traits) predict prosocial outcomes.

Most of the research on prosocial development continues to be correlational. To better examine issues of causality, longitudinal designs and structural equation modeling can be used to provide stronger tests of causal hypotheses (although structural modeling with longitudinal data does not prove causality). Longitudinal data are especially important for testing mediated relations. Furthermore, experimental research designs could be used more frequently to test causal assumptions. Although experimental designs usually (but need not) require relatively artificial laboratory situations, researchers have tended to shy away from experiments in the past decade or two. Yet experiments, especially those performed in more natural settings (e.g., at school), can be valuable in testing ideas about causality. Experimental interventions and prevention programs provide a rigorous test of causal relations, and implementing programs that are both cost-effective and impactful is an obvious goal for researchers and policy makers.

A multimethod approach in the design of studies is necessary because different methods address somewhat different questions, including questions about causality. Moreover, all methods of measurement have limitations, but these differ for different measures. Thus, the convergence of findings across methods increases one's confidence in the veracity of the findings. In addition, as illustrated by the results of the Eisenberg and Fabes (1998) meta-analyses, certain types of methods tend to be used with certain ages of children, and this may undermine researchers' ability to understand the development of prosocial behavior.

As illustrated in this chapter, advances in the neuroscience and in genetics are beginning to provide novel methods and data that can inform the field's understanding of prosocial development. Developments in brain-scanning procedures are providing new venues for studying emotion, attention, and decision making and, hence, processes

related to sympathy and prosocial behavior. This technology may provide new insights into the role of emotion and attentional processes in prosocial decision making. Research on the neuroscience and genetics of prosocial behavior and empathy has developed in two separate, almost parallel strands. As genetic effects on prosociality are likely to operate through individual differences in brain structure and function, and possibly also differences in ANS activity, studies combining these methods are highly desirable. For example, in a study of adults' thinking about others' emotions, variation in the gene ZNF804A related to neural activity in the medial prefrontal cortex and left temporoparietal cortex (Walter et al., 2011).

Similarly, it would be important to study the biological aspects of prosocial and empathic responding from an early age, due to the accumulating evidence for the early emergence of relevant behaviors (e.g., Hamlin et al., 2011; Roth-Hanania et al., 2011). There is little developmental research on the neural bases of such behaviors, and we located no longitudinal study covering meaningful developmental ground on the topic. The developmental changes in genetic effects on prosocial behavior and empathy reviewed above also suggest the need to pay attention to different genetic variables and how they affect behavior directly or in conjunction with environmental variables at different stages.

Finally, although the study of prosocial responding has broadened in the last decade in terms of its outreach to related topics in psychology (e.g., peer relationships, the study of regulatory processes) and also neuroscience and genetics, more attention to related domains of study would enrich developmental research on the topic. In addition, investigators studying other issues (e.g., psychopathology, information processing, peer relationships, academic success) would benefit from attending to processes involving prosocial behavior and empathy/sympathy. The broader field of developmental sciences would profit if the boundaries among content areas, as well as across disciplines, were more permeable.

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CHAPTER 16

Development of Achievement Motivation and Engagement

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OVERVIEW

Work on the development of children's achievement motivation and engagement has flourished since the sixth edition of this *Handbook*. In this chapter we update and extend Wigfield, Eccles, Schiefele, Roeser, and Davis-Kean's (2006) chapter on motivation in that edition, adding a particular focus on student engagement. Due to space limitations, we focus on the developmental processes involved in motivational changes in diverse groups of

children and include relatively little on the current theories of achievement motivation; for discussion of these theories see Harris, Graham, and Urdan (2012); Wentzel and Wigfield (2009); and Wigfield, Eccles, et al. (2006).

Broadly, motivational psychologists study what moves people to act and why people think and do what they do. Motivation is most directly observable in the level of energy in individuals' behaviors, as well as in the intensity of their engagement. Historically, drives, needs, and reinforcements were proposed as the primary sources

of this energy (see Eccles, Wigfield, & Schiefele, 1998; Schunk, Meece, & Pintrich, 2014), and both needs and related emotions continue to be prominent in some current motivational theories and research. Much current theory and research on motivation, however, focuses on individuals' beliefs, values, and goals as primary influences on motivation (Eccles & Wigfield, 2002; Wigfield, Eccles, et al., 2006). This implies that some of the processes influencing motivation are cognitive, conscious, affective, and often under control of the individual. Due to limited space, we focus primarily on these aspects of motivation. We note in the conclusion of this chapter that there is increasing interest in the biological underpinnings of motivation, and also on unconscious aspects of it; these topics will likely be more prominent in the next edition of this *Handbook*. Because much of the work on motivation in the developmental and educational psychology fields has focused on achievement motivation, we emphasize that in this chapter. Achievement motivation refers specifically to performance on tasks at which one could objectively succeed or fail.

Children and adolescents' motivations relate to their choices about which tasks and activities to do in school and other achievement settings (sports, music, social, etc.), the persistence with which they pursue those activities, the intensity of their engagement in them, and their performance on them. Depending on their motivation, some individuals approach activities in different areas with great persistence and enthusiasm, whereas others seek to avoid these activities. Once engaged in an activity, motivation can influence how diligently the activity is pursued, and the ways in which it is pursued. Fundamentally, then, many achievement motivation theorists and researchers work to understand the motivational predictors of choice, persistence, effort, and engagement on achievement-related tasks and activities (Eccles et al., 1998).

There are important changes in children's motivation as they grow up. The prevailing pattern of change with respect to achievement motivation for many children around the world is a decline with increasing age in children and adolescents' motivational beliefs and values. We discuss the reasons for this decline in this chapter, and also discuss new work showing that the decline varies across different groups of children and do not occur for all children. There are also important individual and group differences in the development of achievement motivation, which we summarize, paying particular attention to the new work on culture, ethnicity, and motivation. Finally, we also summarize work on the influences of different socialization agents, such as parents and teachers, and various contexts on the

development of achievement motivation. Indeed, there has been increasing concern for how different contexts influence motivation or even determine it (Nolen & Ward, 2008).

In the first major section, we focus on the development of different aspects of achievement motivation, primarily focusing on the belief, value, interest, and goal constructs prominent in many current models of motivation (Eccles & Wigfield, 2002). The next section considers gender, cultural, and ethnic differences in motivation, with a special focus on the importance of looking within different groups, as well as how motivational processes in the groups may differ. The next two sections summarize how children's motivation is socialized in the home and school. We conclude with a brief assessment of the field and make suggestions for future research. Because of the large volume of work in the field and the restricted length of this chapter, this review is selective.

Our own theoretical perspective is expectancy-value theory (EVT), particularly the expectancy-value model of achievement choice developed by Eccles and her colleagues (Eccles, 2005, 2009; Eccles-Parsons et al., 1983; Wigfield & Eccles, 2000). This model focuses on the cultural, social, and other influences on the development of children's achievement motivation and its impact on choice, performance, and persistence. The model is presented in Figure 16.1. We assume that the positive and negative components of expectancies and values directly influence performance, persistence, and task choice. We also assume that expectancies and values are influenced by task-specific beliefs such as perceptions of competence, perceptions of the difficulty of different tasks, and individuals' goals and self-schema. We assume that these social cognitive variables are, in turn, influenced by individuals' perceptions of other peoples' attitudes and expectations for them, and by their own interpretations of their previous achievement outcomes and affective reactions to them. Finally, we assume that individuals' task-perceptions and interpretations of their past outcomes are influenced by the socializers' behavior and beliefs, contextual factors, cultural milieu, and unique historical events.

We believe this model provides a strong conceptual framework for thinking broadly about the development of achievement motivation and engagement for the following reasons. First, it includes many of the belief, values, and goal variables that are included in a variety of theories in the field. Second, it focuses directly on how different socializers, such as parents and teachers, influence the development of achievement motivation. Third, broad cultural influences are an essential part of the model, affecting both the processes of the socialization of motivation as

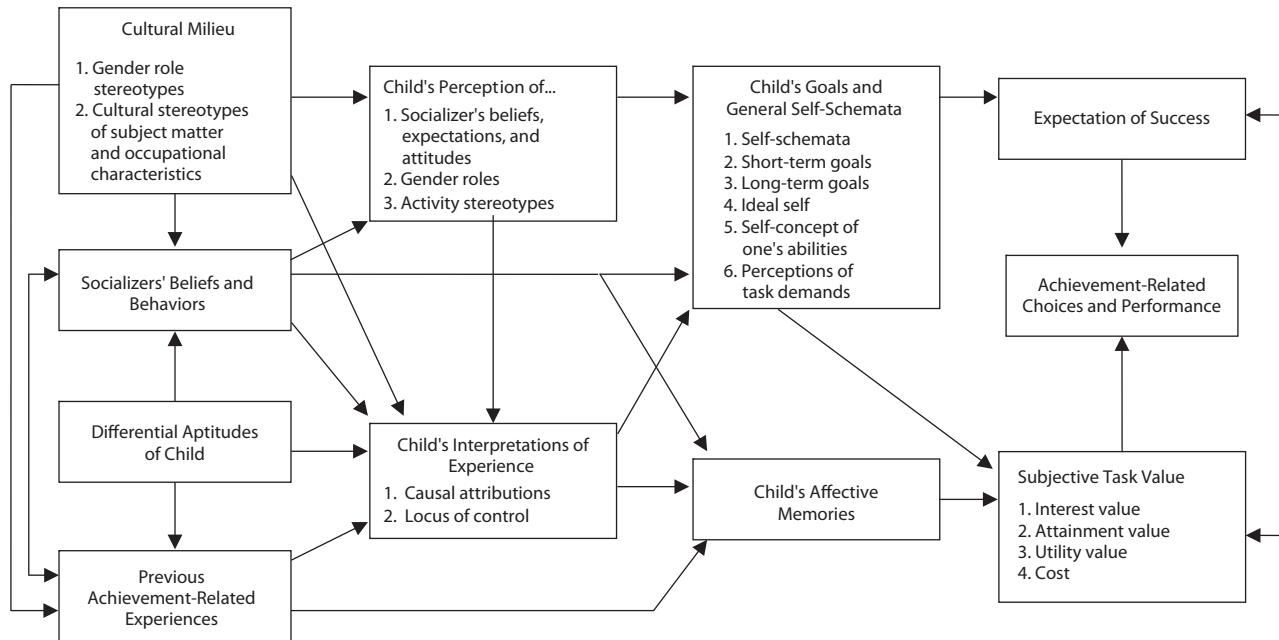


Figure 16.1 Eccles and colleagues' motivational model of achievement performance and choice.

Source: In "Development of Achievement Motivation" (p. 938), by A. Wigfield, J. S. Eccles, U. Schiefele, R. W. Roeser, and P. Davis-Kean, in *Social, Emotional, and Personality Development*, N. Eisenberg (Ed.), 2006, Vol. 3 of the *Handbook of Child Psychology*, W. Damon and R. M. Lerner (Eds.-in-Chief), 6th ed., Hoboken, NJ: Wiley.

well as how individuals' beliefs, values, and goals develop over time and affect performance and choice.

Along with expectancy-value theory, many current social-cognitive achievement motivation theories emphasize children's beliefs, values, and goals as prominent influences on achievement motivation in academic, physical, and social domains (Eccles et al., 1998; Wentzel & Wigfield, 2009; Wigfield, Eccles, et al., 2006). Central constructs of interest to motivation theorists include self-efficacy, expectancies for success, and other competence-related beliefs; the goals (both specific and general) children have for learning and other activities; children's interest and intrinsic motivation for learning; and children's valuing of achievement (Bandura, 1997; Eccles, 2005, 2009; Maehr & Zusho, 2009; Schiefele, 2009). Although the study of beliefs, goals, and values remains strong, both Eccles and the Self-Determination theorists continue to emphasize the role of the basic psychological needs of competence, autonomy, and relatedness and how they influence motivation (Deci & Ryan, 2012; Eccles, 2009; R. M. Ryan & Deci, 2009). As noted above, there also has been a greater emphasis on contextual influences on motivation; that is, on how children's motivation is affected by different classroom and school environments (Nolen & Ward, 2008). We believe our expectancy-value framework provides a good perspective from which to discuss these issues.

As Eccles et al. (1998) and Wigfield, Eccles, et al. (2006) did, we organize our discussion of the development of motivation around three broad motivation-related questions children can ask themselves: “Can I do this task?” “Do I want to do this task and why?” and “What do I have to do to succeed on this task?” The first two questions are primarily motivational and reflect the ability beliefs, values, and goals in expectancy-value theory and other major motivation theories. The third question merges cognitive and motivational variables crucial to the regulation of achievement behavior.

Competence-related beliefs, including individuals' beliefs about their competence, self-efficacy, and expectancies for success; attributions for success and failure; and beliefs about intelligence relate directly to the question "Can I Do This Task?" and remain prominent in theory and research on achievement motivation in different domains of achievement (e.g., Wentzel & Wigfield, 2009). In general, when children answer this question affirmatively, they try harder, persist longer, perform better, and are motivated to select more challenging tasks.

Although theories dealing with competence-related beliefs provide powerful explanations of individuals' performance, they do not address the second question: Do I want to do this task or activity? Even if people are certain they can do a task, they may not want to engage in

it, and so they may not be strongly motivated to approach it (E. Anderman & Wolters, 2006; Eccles-Parsons et al., 1983; Fredricks, Blumenfeld, & Paris, 2004). Furthermore, individuals often have different purposes or goals for doing different activities, which also affect their motivation for doing so (Maehr & Zusho, 2009). The primary constructs researchers have studied reflecting this question are subjective task values, achievement goals and goal orientations, intrinsic motivation, and interest (Wigfield, Eccles, et al., 2006).

The question “What do I have to do to succeed?” deals with how motivation is translated into action and how individuals’ regulate their achievement behavior (Zimmerman & Schunk, 2011). This work has integrated motivation and cognition to a greater extent than before (Kreitler, 2012). A related topic is how children become engaged or disengaged in their schoolwork or other activities; we present work on that topic after discussing self-regulation. We begin the chapter with discussion of the various components of motivational beliefs, values, and goals and their development. We then discuss the social influences on the development and expression of achievement motivation in both home and school environments.

THE DEVELOPMENT OF ACHIEVEMENT MOTIVATION

Psychologists studying children and adolescents’ motivation examine how the achievement related beliefs, values, and goals develop and differ due to growth and maturation in cognitive and emotional processes, and both individual and group characteristics (such as the, gender, cultural, and ethnic groups to which the individual belongs). Some also focus on socially mediated developmental changes resulting from systematic age-related changes in the social contexts children experience at home, in school, and among peers¹ as they grow up; and socially mediated influences that differ across individuals and contexts. Many researchers take a domain-specific approach in their work, studying the development of children’s beliefs, values, and goals in different achievement domains. We organize our discussion of both the development of achievement motivation and individual differences in achievement motivation and engagement around these broad categories of influence. We begin with a brief discussion of how

very young children begin to evaluate their achievement outcomes in different areas.

Very Early Development of Self-Evaluation in Achievement-Related Activities

How do young children react to accomplishments and failures? It was originally believed that preschoolers would not react to failures in the same way as older children. However, although children younger than 22 months were neither concerned with others’ evaluation of their performance nor self-reflective in their evaluations, they did show positive emotional reactions to accomplishing a task and negative emotions when they did not (Stipek, Rechchia, & McClintic, 1992). At 2 years of age, children do react to success and failure by both seeking approval when they do well and turning away when they do poorly. At 3, preschool children are able to evaluate their successes and failures without adult confirmation and react more strongly to winning and losing than do younger children. Furthermore, Dweck and her colleagues (see Dweck, 2002; Dweck & Master, 2009, for reviews) have shown that some preschool children react quite negatively to failure and suggest that reactions reflect exposure to overly harsh and controlling parenting that includes excessive personal criticism of children when they do not do well. Dweck (2002) argued that children do not have a clear sense of ability as a characteristic that determines outcomes during the preschool years and into kindergarten even though they react emotionally to success and failure. Instead, Dweck and her colleagues (e.g., Heyman, Dweck, & Cain, 1992) found that children believe that success and failure reflect the actions of a good or bad person in a moral sense, arguing that conceptions of goodness and badness rather than competence and incompetence are primary at this time. These early reactions to success and failure can set children on different motivational pathways moving forward.

Competence-Related Beliefs: Can I Do the Task?

Competence Beliefs, Performance, and Choice

Studies in Asia, Europe, and the United States show that children’s competence-related beliefs predict their subsequent performance in different areas as well as their choice of activities to pursue, their levels of engagement, and their persistence (Bong, 2001; Denissen, Zarrett, & Eccles, 2007; Simpkins, Davis-Kean, & Eccles, 2006). Children’s ability beliefs are often a stronger predictor of actual performance than are children’s values, at least in the relatively short term (Meece, Wigfield, & Eccles, 1990;

¹Due to space limitations we do not discuss peer influences on motivation; see A. M. Ryan and Shim (2012) and Wentzel, Baker, and Russell (2009) for reviews of relevant research.

Spinath, Spinath, Harlaar, & Plomin, 2006). Furthermore, differences in these beliefs measured in elementary school predict school course, college major, and occupational choices made many years later (Eccles, Vida, & Barber, 2004; Musu-Gillette, Wigfield, Harring, & Eccles, 2014; Simpkins, Davis-Kean, & Eccles, 2006).

Change in the Mean Level of Children's Competence-Related Beliefs

A hallmark of work since the previous edition of this *Handbook* is the use of advanced longitudinal data analytic approaches such as growth curve modeling to examine change in children's competence beliefs, values, goals, and interests. Generally, current and earlier work show that children's competence beliefs for different tasks decline across the middle childhood and early adolescent years (see Wigfield, Eccles, et al., 2006). On average, young children (Ages 2–8) from many different Western industrialized countries are quite optimistic about their competencies in a wide range of skills; this confidence declines, beginning around Age 7 or 8, on average. In part, these declines reflect increasing realism (that is, stronger correlations with objective indicators of one's relative performance levels) and in part the declines reflect a growing pessimism among children of all abilities levels (Fredericks & Eccles, 2002; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Spinath & Spinath, 2005; Watt, 2004). Finally, researchers in the United States have found a second period of steep average levels declines at the transition from elementary to middle school at around 10 to 11 years of age (Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991).

There are four important caveats about this general "optimism early and realism later" pattern. First, as noted earlier, some preschoolers react quite negatively to failure. The connection between these reactions and children's level of ability beliefs likely begins to develop early in the school years (Ages 4–6), and children reacting negatively to failure early on may be more likely to be pessimistic about their abilities later. Second, there are both individual and group differences in the patterns of change in children's competence beliefs with stronger rates of general decline among those children who perform the most poorly. However, in some studies, low math performers' math self-concepts actually went up when they moved at around Age 12 into tracked math classes in the seventh grade, whereas the math self-concepts of the high performers went down (e.g., Marsh, Trautwein, Lüdtke, Baumert, & Köller, 2007; Wigfield et al., 1991; see Chmielewski, Dumont, & Trautwein, 2013, for similar patterns across school transitions throughout the world). Archambault, Eccles, and Vida (2010)

found seven different trajectories of change in students' competence beliefs in reading. Although these trajectories generally indicated decline in children's competence beliefs, they were markedly different and some showed increases across the high school years. Students whose literacy competence beliefs declined most strongly included boys and lower-SES students. Third, there are cultural differences in change in children's competence beliefs. For example, looking across the middle-school transition (around Age 12), Q. Wang and Pomerantz (2009) found declines in early adolescent American students' but not in Chinese students' beliefs. Fourth, Eccles (2014) reported that finer-grained analyses of the changes show many different patterns, including increases for some children.

In summary, many children's competence beliefs continue to show a pattern of decline. However, there is more variation in this pattern than was once believed. The major processes involved in the changes include the following:

1. Because older children become much better at understanding, interpreting, and integrating the evaluative feedback they receive, and engage in more social comparison with their peers, children become more accurate or realistic in their self-assessments, leading many to become relatively more negative (see Eccles et al., 1998; Nicholls, 1984; Wigfield, Byrnes, & Eccles, 2006).
2. Because school environments in the United States, Europe, and Asia change in ways that make evaluation more salient, frequent, and significant, and competition between students more likely, some children's self-assessments decline as they get older due to increased rates of negative evaluations of their competence (see Wigfield, Byrnes, & Eccles, 2006). Such school environments also lead children to conclude that individual differences in achievement-related abilities are stable, leading children to develop more entity-like beliefs about their own abilities (Dweck, 2006b). These beliefs can lead these children to give up hope of success when they start having difficulty mastering their school work. In school environments where such changes do not occur, children's competence beliefs can remain more positive (we discuss some of these school environment differences later).
3. Because school and home environments differ across cultural groups, the rates of these changes vary across different cultural groups. More research is badly needed to understand these cultural differences.

Another important developmental issue is how stable children's competence beliefs are. Longitudinal studies in

both Germany and the United States looking at relations of children's competence beliefs over time also show that these beliefs become increasingly stable as children get older (e.g., Eccles et al., 1989; Spinath & Steinmayr, 2008; Wigfield et al., 1997). Even by middle childhood, children's competence beliefs correlate quite highly across a 1-year period, with the correlations reaching as high as .74. Thus by early adolescence these beliefs are quite stable, making interventions more difficult. In addition, children's competence-related beliefs correlate more strongly with their achievement as they get older (Wigfield, Byrnes, & Eccles, 2006).

***Changes in Children's Understanding
of Competence-Related Beliefs and the Causes
of Success and Failure***

Several developmentalists have proposed and studied developmental changes in children's understandings of the concept of achievement-related ability (e.g., Dweck, 2006b; Nicholls, 1978). Nicholls and his colleagues (Nicholls, 1978; Nicholls & Miller, 1984) studied children in New Zealand and the United States and were the first to document a developmental progression between Ages 5 and 12 with respect to children's beliefs about ability, effort, and performance. They found four relatively distinct levels of reasoning: At level one (Ages 5 to 6), effort, ability, and performance are not clearly differentiated in terms of cause and effect. At level two (Ages 7 to 9), effort is seen as the primary cause of performance outcomes. At level three (Ages 9 to 12), children begin to differentiate ability and effort as causes of outcomes, but they do not always apply this distinction. Finally, at level four, adolescents clearly differentiate ability and effort, and understand the notion of ability as capacity. They also believe that ability can limit the effects of additional effort on performance, that ability and effort are often related to each other in a compensatory manner, and, consequently, that success requiring a great deal of effort likely reflects limited ability. Folmer et al. (2008) replicated many of these findings in a study of children's understanding of effort and ability when they experience negative outcomes (see also Stipek & Gralinski, 1996). Heyman and her colleagues (Heyman & Compton, 2006; Heyman, Gee, & Giles, 2003) studied how preschool children understood the relations between ability, effort, and task difficulty. They found that even the 3-year-olds could make some inferences about others' ability if given information about how hard they tried, how difficult the task was, or both. Thus Nicholls' (1978) levels may underestimate children's understanding

of ability. The universality of these developmental patterns is not known, and so more studies of them are needed in different countries.

Inherent in Nicholls' (1978) levels of ability is the notion that a developmentally mature view of ability is characterized by the belief that individual differences in abilities represent stable capacities that individuals bring to the task at hand (although see Nicholls, 1984, for discussion of how ego versus task-focused achievement situations can impact children's views of ability). Dweck and colleagues (Dweck, 2006b; Dweck & Master, 2009) argue that this notion of ability (or intelligence, in their terminology) represents only one of two potential views of the essence of ability, one that is fixed and entity-like. They argue that there is another equally mature view of intelligence—one that assumes that current levels of intelligence are changeable. Dweck (2006b) further argued that children and adolescents' motivation to persist at difficult achievement-related tasks, like schoolwork, would depend on how modifiable they believed their current intelligence level is. Children who believe that intelligence can continue to grow and that they can control this growth through their own efforts will persist on achievement tasks even when they are not doing well at the moment. In contrast, children who believe that a particular ability, like math, reflects a stable personal characteristic or entity are likely to give up when they start to experience difficulty succeeding at tasks requiring this ability (see Pomerantz & Saxon, 2001, for a similar argument). An interesting question for future research that would add theoretical clarification in this area is whether children of different ages define "intelligence" and "ability" as the same thing.

Closely related to Dweck's (2006b) distinction between entity and incremental beliefs about one's intelligence is the work on causal attributions. According to attribution theory, people try to explain the causes of their achievement-related successes and failures and these explanations determine their subsequent emotional reactions and success expectations. Attributing one's success to ability and effort and failure to lack of effort are adaptive attributions in that they foster high expectations for future success and feelings of pride in the moment (Graham & Williams, 2009). In contrast, attributing one's failures to lack of ability is particularly debilitating to children's motivation, particularly if one believes that it is impossible or very difficult to increase one's ability level so that one does not continue to fail.

Attribution theorists classify causal attributions into three dimensions—stability, controllability, and internality—and argue that variations on these dimensions

influence the impact of the attributions on subsequent motivation (Graham & Williams, 2009; Weiner, 1985). If individuals attribute their failures to stable, internal, and uncontrollable causes, then their expectations for future success should go down and their motivation for engaging in the tasks on which they are failing should drop. As proposed by Dweck (2006b), the belief that academic abilities are entities could lead to just this type of causal attribution and its associated motivational consequences. In contrast, attributing one's academic failures or difficulties to unstable, internal but controllable causes (like lack of sufficient effort) coupled with a belief that academic abilities are incremental and modifiable (similar to Dweck's mastery-oriented mind-set) should lead to continued efforts to master the material.

Two important developmental questions emerge within this framework, as well as within Dweck's (2006b) framework: Do children's views of the nature of intelligence change with age and do the causal attributions children make for their successes and failures change with age? Both Flammer and Schmid (2003) and Normandeau and Gobeil (1998) found evidence of both types of developmental changes. For example, Normandeau and Gobeil (1998) found that 7-, 9-, and 11-year-old children differ in their understanding of different attribution categories. Eleven-year-olds saw effort and strategy as more internal, controllable, and less stable than did younger children (a result that appears to go against the work showing that young children see effort and ability as less stable).

In sum, work on children's understanding of ability shows that younger and older children have different ideas about the nature of ability and its relations to effort and performance. As noted above, these changes in children's understanding of ability help us understand the negative changes in ability beliefs. One methodological implication of this work is that using the same questionnaire to measure perceived ability at different ages may be problematic given the apparent differences in how younger and older children understand ability.

Development of Self-Efficacy Beliefs

Closely related to beliefs about one's competence are self-efficacy beliefs (Schunk & Pajares, 2009). Over the past 10 years, greater attention has been paid to different types of self-efficacy beliefs (e.g., general self-regulatory efficacy beliefs versus specific skill-mastery efficacy beliefs, etc.). Researchers have found declines in self-regulatory efficacy beliefs. Deatrick et al. (2013) studied the confidence of children in middle childhood and early adolescence in both

their ability to perform certain math skills and their ability to self-regulate their engagement in math learning tasks. Only the latter declined with age; Caprara et al. (2008) obtained similar results in a study of Italian adolescents. These results are similar to results from work on ability beliefs reviewed above, and likely are explained by the same processes. It is unfortunate that aspects of students' self-efficacy decline, but intervention studies have shown that self-efficacy can be increased and positively affect students' academic performance (Schunk & Pajares, 2009).

Usher and her colleagues (e.g., Usher, 2009; Chen & Usher, 2013) studied the information sources children and adolescents use to form their self-efficacy in different subject areas, and also examined how it relates to other constructs. Their findings indicate that the four sources initially defined by Bandura (1997) as determining self-efficacy (previous performance, vicarious experience, verbal persuasion, physiological reactions) are prominent in both children's and adolescents' self-efficacy, with previous performance or mastery relating most strongly to self-efficacy.

At all ages, self-efficacy is a strong predictor of children's and adults' persistence, effort, and self-regulation of their achievement activities. It also predicts performance on different kinds of tasks, and choices of activities to pursue. Klassen and Usher (2010) reviewed evidence showing that self-efficacy also enhances the use of deep cognitive strategies, which can foster students' engagement. However, there are age differences in self-efficacy's relations to performance; the correlations are higher for older than younger children, as is the case for competence beliefs more generally (Davis-Kean et al., 2008).

Schunk and Pajares (2009) discussed processes influencing the development of self-efficacy. These include early mastery experiences that foster a rudimentary sense of personal agency, the growing sense of the self as causing outcomes, and the evaluative information children receive in school and other places. Parents are especially important in fostering mastery experiences and a sense of agency. Schunk and Pajares (2009) stressed the importance of school environments for developing and supporting a high sense of efficacy, or possibly undermining it if support is not provided. We return later in the school influences on achievement motivation section to a discussion of how this can occur.

In summary, important advances over the past 10 years in the understanding of changes in children's competence beliefs and self-efficacy include the discovery that there are different patterns of change in different groups of children, and that children and adolescents utilize the same sources of information to judge their self-efficacy. Researchers

need to understand further changes in competence-related beliefs in children from different cultures, in order to see whether the pattern of decline found in many studies is culture specific or general.

Subjective Task Values: Do I Want to Do the Task?

Values, Performance, and Choice

Students' subjective task values refer to their desire to do different tasks (Eccles-Parsons et al., 1983; Wigfield & Eccles, 2000). Eccles and her colleagues distinguished four value components: interest, importance, utility, and cost (see Eccles-Parsons et al., 1983, and Wigfield & Eccles, 2000, for detailed discussion of these components). Consistently, children's expectancies and values have been shown to predict their performance and choice on different activities; values often predict intentions and choice more strongly than performance (see Wigfield, Eccles, et al., 2006). The most important findings concerning these relations are that values (and competence beliefs) measured when children are young predict their choices much later. Durik, Vida, and Eccles (2006) found that 10-year-old children's values and self-concepts of ability in reading predicted these same beliefs and values in middle adolescence as well as how adolescents' engagement in leisure-time reading and plans to have careers that involve much reading. Similarly, in Simpkins, Davis-Kean, and Eccles' (2006) study, students' math values and ability beliefs measured at Age 11 predicted these beliefs and values at Age 17, as well as the students' enrollment in advanced high school math courses.

Wigfield, Eccles, et al. (2006) concluded from their review of extant research that children's ability beliefs are more predictive of subsequent performance, whereas children's values are predictive of task choice. Subsequent studies looking at these relations over time show that both constructs predict both performance and choices. The relations of values and performance begin quite early: Viljaranta, Lerkkanen, Poikkeus, Aunola, and Nurmi (2009) found that 5- and 6-year-old Finnish children's interest in math early in the school year predicted math achievement measured in the following spring. The relationship was reciprocal: Higher performing children early in the school year reported higher math interest later in the year.

Trautwein and his colleagues (Nagengast et al., 2011; Trautwein et al., 2012) have examined the effects of expectancies, different aspects of values, and the interaction of expectancies and values on the math and English performance of a large sample of German high school students. Both expectancies and the different aspects of value

(interest, attainment, and utility) predicted performance. When students' values were entered into the model after expectancies, values were no longer a significant predictor of performance. However, the expectancies by values interaction term was a significant predictor in both models with value increasing the positive effect of expectancies (although the interaction effects generally are small in size). Nagengast et al. (2011) found this same interaction in studies of students' engagement in science and intentions to pursue science careers, in a sample of nearly 400,000 students from 57 countries. The findings generalized across the countries.

Another important aspect of values is the anticipated cost of engaging in any particular activity. Cost includes anticipated negative emotional experiences as well as the loss of time and energy to undertake other activities. For example, choosing one major in college means that other majors cannot be pursued. Conley (2012), in a study of variables from expectancy-value theory and goal-orientation theory, found that cost differentiated students with positive motivation patterns from those with negative patterns. Other work showed that cost negatively predicts adolescents' achievement, plans to take AP courses, and plans to pursue science careers (Kirkpatrick, Chang, Lee, Tas, & Anderman, 2013; Safavian, Conley, & Karabenick, 2013). These findings show the power of cost in predicting different outcomes.

Anxiety is the most commonly studied psychological cost associated with academic learning tasks. Both general anxiety and test anxiety interfere with children and adolescents' learning and performance in evaluative situations, with these findings occurring across the world (Zeidner, 2007; Zeidner & Matthews, 2011). The problem of anxiety gets worse as evaluation and accountability become more emphasized in schools (Deci & Ryan, 2002b; Zeidner, 2007). Furthermore, anxiety increases across the school years as children and adolescents face more frequent evaluation, social comparison, and (for some) experiences of failure (Deci & Ryan, 2002b; Zeidner, 2007; Zeidner & Matthews, 2011). Interventions to alleviate anxiety focus on either the emotional/physiological part of anxiety, the cognitive or worry part, or both (Zeidner & Matthews, 2011). Programs focused on emotionality utilize relaxation and desensitization techniques. Those focused on worry work to alleviate the negative, self-deprecating thoughts of anxious individuals and replacing them with more positive, task-focused thoughts. This latter kind of program has been more successful both in lowering anxiety and improving performance than those focused solely on emotionality (Zeidner, 2007).

Mean Level Change in Subjective Task Values

As with competence-related beliefs, studies done in the United States, Australia, and Germany generally show age-related decline in children's valuing of certain academic tasks. Jacobs et al. (2002) found that children's valuing of the domains of math, language arts, and sports declined. As was the case for competence beliefs, children's valuing of language arts declined most during elementary school and then leveled off. By contrast, children's valuing of math declined the most during high school (see also Fredericks & Eccles, 2002, and Watt, 2004). Researchers have begun to address different patterns of change in students' valuing of activities in different domains. Archambault et al. (2010) found seven different trajectories of change in students' valuing of reading; all trajectories showed decline, although the patterns were markedly different.

The Relation of Subjective Task-Value Beliefs and Competence Beliefs

An important developmental question is how children's developing competence beliefs relate to their developing subjective task values. According to both Eccles-Parsons et al.'s (1983) expectancy-value model and Bandura's (1997) self-efficacy theory, ability self-concepts influence the development of task values. Bandura (1997) argued that interests emerge out of one's sense of self-efficacy and that children should be more interested in challenging than in easy tasks. Taking a developmental perspective, Wigfield (1994) proposed that initially young children's competence and task-value beliefs are likely to be relatively independent of each other. This independence would mean that children might pursue some achievement activities in which they are interested regardless of how good or bad they think they are at the activity. Over time, particularly in the achievement domains, children may begin to attach more value to activities on which they do well. One important process here is that children may lower the value they attach to activities that they have difficulty with in order to maintain positive ability beliefs and self-esteem (Covington, 2009; Eccles, 2005; Harter, 2012). In support of this view, Jacobs et al. (2002) found that changes in competence beliefs predicted changes in children's valuing of the activities, accounting for as much as 40% of the variance in change in children's valuing of the activities (see Denissen et al., 2007, for similar results). These results suggest that the causal direction in this relation goes from competence beliefs to values, but more longitudinal work is needed to assess the strength of these relations. Indeed, longitudinal studies in Germany by Spinath and Steinmayr (2012) show that competence

beliefs and intrinsic motivation relate positively to one another at each measurement point but do not show causal relations over time. This work is especially important for understanding how beliefs and values may work together to affect motivation, and how children's competence beliefs potentially are the driving force in this relationship.

Children's Understanding of the Components of Task Value

It seems likely that a 6- or 8-year-old will have a different sense of what it means for a task to be "useful" than an 11-year-old does. Further, it also is likely that there are differences across age in which components of achievement values are most dominant. Wigfield and Eccles (1992) suggested that interest value may be especially salient during the early school grades with young children's activity choices being most directly related to their interests (see also Hidi & Renninger, 2006). Young children likely will try many different activities for a short time each before determining which activities they enjoy the most. As children get older the perceived utility and personal importance of different tasks likely become more salient, especially for achievement activities that have implications for their futures and also as they develop more stable self-schema and long-range goals and plans. Eccles (2009) has argued repeatedly that processes related to identity formation and enactment are directly related to the relative subjective value of various activities. Because identity processes become more salient during adolescence and early adulthood, these aspects of subjective task value should become more important determinants of task choice and engagement during these years (see Oyserman & Fryberg, 2006, for a similar argument). Unfortunately, researchers have not addressed changes in children's understandings of the components of task value identified by Eccles-Parsons et al. (1983) and thus these developmental predictions need to be tested.

Interest

Closely related to the idea of subjective task value is the idea of interest. Much of the research on interest development has focused on age-related changes in the specificity and the sources of interest. In general, this work (done primarily in the United States and Germany) suggests that young children have quite general or universal interests that become more specific relatively quickly as they mature (see Eccles et al., 1998; Schiefele, 2009). This early differentiation eventually leads to individual differences in interests in a variety of different activities.

The next phase of interest development—between 3 and 8 years of age—is characterized by the formation

of gender-specific interests. The acquisition of gender identity leads to gender-specific behaviors, attitudes, and interests. Children strive to behave consistently with their gender identity, and, thus, evaluate activities or objects consistent with their gender identity more positively than other activities or objects. As a consequence, boys and girls develop gender-role stereotyped interests (see Eccles, 1994, 2013; Ruble, Martin, & Berenbaum, 2006).

At the next stage (Ages 9–13), the emerging self-concept is assumed to be linked more directly to social group affiliation and cognitive ability, leading to occupational interests consistent with one's social class and ability self-concepts. The final stage (occurring after Age 13 or 14) is characterized by an orientation to the internal, unique self leading to more differentiated and individualized vocational interests, based on abstract concepts of self (e.g., of personality). Thus, the development of vocational interests is a process of continuous elimination of interests that do not fit the self-concepts of one's gender, social group affiliation, ability, and personal identity (Eccles, 2009). This process is assumed to depend both on the general cognitive development as well as shifts in social roles, scripts, and demands.

It is also likely that changing needs or motives across the life span can influence the development of interests. A good example is early adolescents' increasing interest in biology and psychology during puberty. The need to know oneself and to cope with rapid bodily and psychological changes seems to foster interest in biological and psychological domains of knowledge at this age.

Hidi and Renninger (2006) and Renninger and Su (2012) proposed a model that addresses the development of specific interests. First, like others (Schiefele, 2009), they distinguish between situational or short-term interests and personal or well-developed and long-term interests. They posited that the development of such interests occurs over four phases. The first phase, *triggered situational interest*, is a state of heightened attention, curiosity, and positive affect. Typically, situational interest is initiated by aspects of the learning environment (e.g., an exciting lesson in which the teacher conveys novel and surprising information). The second phase, *maintained situational interest*, involves the repeated and increasingly persistent experience of situational interest. Personally meaningful and involving tasks, for example, facilitate this phase of interest development. The third phase, *emerging individual interest*, is the initial phase of a relatively enduring individual interest. Based on the emerging formation of stored valence beliefs, the person tends to reengage

with particular tasks or topics. Finally, the fourth phase, *well-developed individual interest*, is characterized by stronger valence beliefs and higher amounts of knowledge than an emerging interest. According to Hidi and Renninger, individuals with a well-developed interest more often than others choose interest-related activities, sustain long-term constructive and creative endeavors, and persist when interest-related tasks or activities are difficult; thus there are strong parallels in this work and expectancy-value theory. A crucial point related to our overall discussion of change in motivation, of course, is what kinds of personal interests grow in children, and how many of them relate to school and academic performance?

In summary, as with competence-related beliefs, research in the past 10 years has established that there are different patterns of change in children's achievement values. We also have learned more about how children's competence beliefs influence their values, an important process that has implications for their self-esteem. As we noted above, value and interest are related constructs, and Hidi and Renninger (2006) discussed how children's personal interests lead them to do valued tasks. Theoretically it would be interesting to define more clearly the interplay between these two constructs.

Intrinsic Motivation Versus Extrinsic Motivation: Why Do I Want to Do the Task?

There is a fundamental distinction in the motivation literature between *intrinsic* motivation and *extrinsic* motivation. When individuals are intrinsically motivated, they do activities for their own sake, based on their own volition and out of personal interest in the activity. When extrinsically motivated, individuals do activities for instrumental or other reasons, such as receiving a reward (see R. M. Ryan & Deci, 2009). A great deal of research in motivation, particularly in the area of Self-Determination Theory (SDT), has focused on the relative benefits and costs of these two different motivational orientations.

SDT is a comprehensive theory of motivation and well-being; reviews of its many different aspects can be found in Deci and Ryan (2002a, 2012) and R. M. Ryan and Deci (2009). These authors have proposed that humans have three basic needs that are universal: autonomy, competence, and relatedness. When these needs are met, children and adolescents have a stronger sense of well-being. Both parents and teachers can help children meet their needs by supporting them as they try to do things autonomously, helping them develop a sense of competence, and helping

them build relations with others. Various researchers have studied specific ways in which parents can support children; see Grolnick, Gurland, Jacob, and Decourcey (2002) and further discussion below in the section on socialization of motivation in the family for what the research says about positive parenting practices for meeting children's needs. Similarly, the ways teachers relate to students can help them fulfil their needs, or impede their development, depending on the ways instructional practices are structured. The claim that needs are universal has, of course, led to research exploring whether they indeed are; this research often has focused on the need for autonomy because it is not clear whether that need is as prevalent in cultures defined as collectivist (Markus & Kitayama, 2003). To date, the research has shown that each need is prevalent in a wide variety of countries, but may be expressed somewhat differently (see Chirkov, Ryan, & Sheldon, 2011, for review).

Intrinsic and extrinsic motivation are major aspects of the theory that are most directly relevant to this chapter. Deci and Ryan (2012) stated that extrinsic and intrinsic motivation lie on a continuum rather than comprising a dichotomy. At one end of the continuum are amotivation and externally regulated motivation (motivation controlled by rewards), and at the other, intrinsic motivation. R. M. Ryan and Deci (2009) proposed that healthy development involves moving from extrinsic to intrinsic motivation. This model is not explicitly developmental because individuals can cycle through the motivation continuum at different points and on different activities, but R. M. Ryan and Deci (2009) argued that being intrinsically motivated relates strongly to well-being, and so is an important developmental outcome. When individuals are intrinsically motivated, they are in control of their own actions (autonomous), believe they can accomplish things (competence), and are connected to others (relatedness). Thus satisfaction of the needs ties directly to becoming intrinsically motivated.

Unfortunately, studies of the developmental course of intrinsic motivation suggest that it declines as children grow up. In a longitudinal study of children in the United States, Gottfried and Gottfried found a general pattern of decline in children's intrinsic motivation for math and general school from Ages 10 to 17 (Gottfried, Fleming, & Gottfried, 2001; Gottfried, Marcoulides, Gottfried, Oliver, & Guerin, 2007; see also Corpus, McClintic-Gilbert, & Hayenga, 2009). Interestingly, this decline is less pronounced for higher achievers (Gottfried et al., 2007; Marcoulides, Gottfried, Gottfried, & Oliver, 2008). Further,

the decline in intrinsic motivation predicted declines in academic attainment. Another important finding research is that children's intrinsic motivation is quite stable in children aged 13 and above; Gottfried et al., 2001). The greater stability means that the decline in children's intrinsic motivation likely becomes more difficult to change as children get older.

Similar patterns have been shown in longitudinal European studies, particularly for the natural sciences and mathematics (e.g., Hedelin & Sjöberg, 1989) and particularly during the early adolescent years. Researchers have explained these findings by pointing to particular aspects of instruction such as high achievement pressure and low levels of clarity of presentation, classroom management, supportive behavior, and cognitively stimulating experiences that may contribute to declining interest in school subjects (e.g., Eccles & Midgley, 1989; Kunter, Baumert, & Köller, 2007; Wigfield, Eccles, et al., 2006).

SDT researchers also have extensively studied and debated the effects of rewards on intrinsic motivation, noting conditions under which rewards actually undermine intrinsic motivation. Due to space limitations we cannot discuss that work here; see Deci, Koestner, and Ryan (1999) and Wigfield, Eccles, et al. (2006) for reviews. Overall, we concur with their conclusions about the detrimental effects of some kinds of external rewards on intrinsic motivation.

Achievement Goal Orientations: Why Am I Doing the Task?

Goal orientations refer to the approaches students take to their learning. Researchers initially defined three primary goal orientations: mastery orientation, performance orientation, and work-avoidant orientation (Maehr & Zusho, 2009). Mastery goals reflect an orientation focused on learning material and seeking improvement. Performance goals involve the demonstration of ability; students who are performance-oriented want to show they are able and (in some views of performance goals) that they can outperform others. Researchers have distinguished approach and avoid goals for both of these types of goal orientations. Performance approach goals refer to the demonstration of one's ability and (in some views of this construct) the desire to outperform others; whereas performance avoid goals are the desire to not appear incompetent (Elliot & Murayama, 2008; Hulleman & Senko, 2010; Murayama, Elliot, & Friedman, 2012). Mastery approach goals involve learning and improvement; mastery avoid goals involve working to

avoid losing abilities, and perfectionism. Work-avoidant goals are the desire to do as little as possible in school. Elliot, Murayama, and Pekrun (2011) reconceptualized the extant goal-orientation models to distinguish between the standards of information people use to judge their competence under mastery and performance orientations. They distinguished self standards, or individuals' sense of how their performance relates to the trajectory of their competence growth; task standards that come from characteristics of the tasks being done; and other standards, or how one's performance compares to that of others. There are approach and avoidance aspects of each of these information standards. The model is therefore a three (standard of evaluation) by two (approach/avoid) model of goal orientations. Ongoing research is assessing this model.

The association of mastery, performance, and work avoidance goal orientations with motivation and achievement has been researched extensively over the past 25 years (see Hulleman & Senko, 2010; Maehr & Zusho, 2009, for reviews). There is growing evidence of the positive consequences of mastery orientation (particularly mastery approach goals) for self-efficacy, use of deeper cognitive strategies, and intrinsic motivation to learn (Hulleman & Senko, 2010). It is less clear, however, if mastery approach goals relate to achievement; they do in studies of U.S. children aged 5 to 17, but not as much in college students (Keys, Conley, Duncan, & Domina, 2012). Interestingly, in Senko and Miles' (2008) study, mastery-oriented college students got lower grades than other students in part because they focused on their own interests in the course rather than the course requirements.

The evidence regarding performance goals also depends on whether performance approach or performance avoid goals are assessed. By and large, performance avoid goals have strong negative consequences for student motivation and learning, relating to poorer performance, willingness to cheat, higher anxiety, and so on (e.g., A. H. Anderman & Murdock, 2007; Middleton & Midgley, 1997; see Hulleman & Senko, 2010; and Murayama et al., 2012, for review). In contrast, performance approach goals relate positively to academic self-concept, task value, and performance (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Murayama et al., 2012; Senko, Hulleman, & Harackiewicz, 2011). Finally, work avoidant goals relate negatively to other aspects of motivation and performance (Meece & Miller, 2001; Wigfield, Cambria, & Ho, 2012; Wigfield & Guthrie, 1997).

Short-term longitudinal studies done primarily in the United States show low to moderate stability in children's

mastery and performance goals from Ages 11 to 16 (Meece & Miller, 2001; Wolters, Yu, & Pintrich, 1996), with less stability across the elementary to middle school transition (Ages 10 to 11) than during the last year of elementary school, which occurs around Age 10 for most students in the United States (E. M. Anderman & Midgley, 1997; Meece & Miller, 2001). Interestingly, students also reported that teachers emphasized performance goals more in middle than in elementary school, suggesting that students' performance goals may increase during middle school.

Researchers have examined how children's achievement-goal orientations relate to the other constructs we have discussed so far. Pintrich and Wolters did early work in this area, looking at relations of task values, self-efficacy, achievement-goal orientations, and self-regulation in middle-school students (Pintrich, Ryan, & Patrick, 1998; Wolters et al., 1996; see Wigfield & Cambria, 2010, for review). This work shows that children's mastery goals, task values, and self-regulation are positively related. Wolters, Fan, and Daugherty (2013) found that 14- to 17-year-olds holding performance approach goals attributed success more to ability and failure less so. Somewhat surprisingly, students holding mastery goals were less likely to explain failure as due to lack of effort. Finally, Conley (2012) found seven clusters of students' goals, values, and competence beliefs. Interestingly, the cost aspect of subjective task value was the variable that differentiated students with positive patterns of goals, values, and competence beliefs from those with less positive patterns. We anticipate more integrative research of this sort will occur.

In studies in both the United States and Europe, there are declines in both mastery and performance goals from about Age 10 to 14 (Meece & Miller, 2001; Shim, Ryan, & Anderson, 2008). These declines appear to stabilize after Age 14 in Finland (Tuominen-Soini, Salmela-Aro, & Niemivirta, 2011). These results run somewhat contrary to the prediction that, due to increasing evaluative pressure in high school, performance goals should take precedence over mastery goals.

The Role of Social and Academic Goals in Achievement

Researchers also have studied other types of goals that might motivate behavior in academic achievement settings (see Wentzel, 2013, for review). This work differs from that of the achievement goal orientation theorists in that it focuses on the *content* of children's goals to guide and

direct behavior, rather than the criteria they use to define success or failure (i.e., mastery versus performance). In this sense, these goals are like the goals and self-schema that relate to attainment value hierarchies in the Eccles-Parsons et al. (1983) expectancy value model. Wentzel (2002, 2013) often has focused on both academic and social goals in her work.

Research on children's social goals (e.g., Urdan & Maehr, 1995; Wentzel, 2002) shows that both social and academic goals relate to adolescents' school performance and behavior. Higher-achieving students have higher levels of both social responsibility and achievement goals than lower-achieving students. A. M. Ryan and Shim (2008) studied 12-year-old students' social development goals, or goals focused on developing social competence, and social demonstration approach and avoid goals (wanting to be popular, or avoid negative judgments from others). They found over the course of a school year that the students with social development goals were better adjusted than those with social demonstration avoid goals. Further, A. M. Ryan and Shin (2011) found that students holding social demonstration avoid goals were less likely to seek academic help when they needed it. More broadly, Rodkin and Ryan (2012) reviewed research showing that, in the United States, adolescents seeking popularity at the expense of academic goals are more likely to engage in risky behaviors and less likely to engage academically. Thus an overly strong focus on social goals appears to have a negative impact on students' engagement and achievement when these goals conflict with academic goals (see also Wentzel, 2005).

In summary, work on achievement goals over the past 10 years has defined these goals with greater precision and identified additional dimensions of them. There is a strong need to examine more closely how children's goal orientations develop over time, and relate to the other motivation constructs we discuss in this chapter. The same is true for the work on children's social and academic goals.

Self-Regulated Learning: What Do I Need to Do to Succeed?

What are some processes that translate motivational beliefs, values, and goals into action? One is self-regulated learning. For instance, higher-achieving U.S. middle adolescents use more self-regulated learning strategies than do average or low achievers. Furthermore, students with higher self-efficacy regulate their behavior more strongly to attain their goals (Zimmerman & Schunk, 2008). Similarly,

children who value their achievement and are intrinsically motivated are more likely to regulate their behavior in order to accomplish what is valuable and interesting to them (R. M. Ryan & Deci, 2009). Children with mastery goals and performance approach goals also engage in more self-regulatory strategies, as discussed earlier. There is also some evidence that the relations between children's motivational beliefs and their self-regulated learning and achievement increase as they get older (Pintrich & Zusho, 2002; Wolters, 2003). How does self-regulated learning develop?

Eccles et al. (1998) reviewed the early work on how young children learn to regulate their impulses and delay gratification (see also McClelland, Geldhof, Cameron, & Wanless, Chapter 14, this *Handbook*, Volume 1; and Thompson, Chapter 6, this *Handbook*, this volume, for discussion of self-regulation).

Turning to self-regulated learning, Zimmerman (2000) proposed a four-step developmental sequence to describe it. First, children learn effective regulatory strategies by observing successful models and focusing on process goals. Second, children imitate the strategies, following what the model did relatively closely. Third, they learn to use the strategies apart from the model; Zimmerman (2000) called this self-controlled learning. Although children do the strategies on their own, they still are dependent on the model. Finally, in the self-regulated learning phase, children begin to both use the strategies in different situations and tailor them to their own purposes. They also focus more on outcome goals.

Knowing when to seek help is one important part of self-regulation (Newman, 2002). There are developmental differences in help seeking; in the United States, younger children are more likely to ask for help than are older children (Marchand & Skinner, 2007); older children are also more likely than younger students to engage in help avoidance (A. M. Ryan, Shim, Lampkins-Uthando, Kiefer, & Thompson, 2009). A. M. Ryan and Shim (2012) found that 11-year-old children's adaptive help seeking from peers decreased as they made the transition to middle school, but that this was moderated by students' perceptions of classroom goal structure. When students perceived teachers emphasizing mastery goals, their adaptive help seeking increased. Thus contextual factors are an important determinant of children's willingness to seek help. It is unfortunate that students who likely need more help are less likely to seek it; research indicates that lower achievers are often less willing to ask for help than high achievers (Newman, 2002).

Engagement in Learning and Other Achievement-Related Activities

Another way that motivation influences achievement is through engagement. The topic of children's engagement has received increasing attention in the past 10 years, with a major handbook on engagement published in 2012 by Christenson, Reschly, and Wylie. There has been a long-standing tradition within sociology of studying how school disengagement predicts dropping out of school (Rumberger & Rotermund, 2012). The models in this area focus on demographic variables such as risky school and family characteristics, risky psychological characteristics and behavior such as self-control difficulties, and low school achievement as predictors of drop out. These scholars argue that these factors lead students to disengage gradually from school, and then ultimately to drop out (see also Wehlage, Rutter, Smith, Lesko, & Fernandez, 1989).

Developmental and educational psychologists have also become interested in the nature of engagement, and its relations to motivation and achievement. In a seminal article, Fredricks et al. (2004) concluded that engagement is a multidimensional construct that includes behavioral, cognitive, and emotional attributes associated with being deeply involved in an activity. They defined behavioral engagement as positive conduct, involvement in academic tasks (as indicated by effort and persistence), and participation in various school activities. Cognitive engagement was defined as the active use of cognitive strategies and other cognitive resources in learning activities; this aspect of engagement relates closely to the self-regulatory processes just discussed. Emotional engagement encompasses the ways in which students react affectively to classroom activities (see Pekrun & Linnenbrink-Garcia, 2012, for a broader discussion of motivation and emotion). Reeve (2012; Reeve & Tseng, 2011) modified Fredricks's typology by adding what they call agentic engagement—"students' constructive contribution into the flow of the instruction they receive" (Reeve & Tseng, p. 258). This interesting construct needs further research before it is considered a component of engagement. Both Reeve and Tseng (2011) and Fredricks et al. (2004) consider engagement to be a metaconstruct, meaning that it is broader than many other constructs (such as motivation) and encompasses a variety of these constructs.

Both Reeve and Tseng (2011) and M. T. Wang, Willett, and Eccles (2011) documented the multidimensional factor structure of these components of engagement and showed that the factor structure is invariant across gender and

race in adolescents within the United States and Taiwan. Further, M. T. Wang and Eccles (2012a) found a decline in all three of these components of engagement from Ages 12 to 16, with both the sense of school belonging (one of the indicators of emotional engagement) and behavioral engagement declining to a greater extent than self-regulated learning (a component of cognitive engagement). Similar declines have been documented in Finnish adolescents (see Upadyaya & Salmela-Aro, 2013). These findings mirror the declines in motivational beliefs and values discussed earlier.

Fredricks et al. (2004) and Upadyaya and Salmela-Aro (2013) reviewed research showing that various forms of engagement relate positively to adolescents' academic achievement and well-being. Similarly, when students attend school regularly, work hard in their class, and become involved in extracurricular activities, they are less likely to drop out (see also Rumberger & Rotermund, 2012). Furthermore, in M. T. Wang et al.'s (2011) study, the rates of decline in both cognitive and behavioral engagement predicted declines in GPA and declines in all three components predicted declines in educational aspirations. In Reeve and Tseng's (2011) study, all four components of engagement mediated the relationship between motivation and academic achievement among adolescents. Using a person-centered approach, M. T. Wang and Peck (2013) identified five engagement prototypes: highly engaged, moderately engaged, and minimally engaged (each of these three prototypes showed consistent levels of engagement across all three types of engagement), emotionally disengaged, and cognitively disengaged. They showed that these groups differ in their educational and psychological functioning with the minimally engaged being most likely to drop out of high school and least likely to go on to college (exactly the opposite pattern was evident for the highly engaged). Similarly, the minimally engaged and the emotionally disengaged showed the highest levels of depressive affect and the highly engaged showed the least. These findings show the importance of maintaining students' engagement in school.

Skinner and her colleagues (see Skinner, Kindermann, Connell, & Wellborn, 2009; Skinner & Pitzer, 2012) presented another model of the development of engagement and its effects on different outcomes. They argued that engagement is the instantiation of motivation. Like Fredricks et al. (2004), Skinner et al. (2009) distinguished behavioral, cognitive, and emotional aspects of engagement and discussed antecedents of engagement. Importantly, like Salmela-Aro and colleagues (see Upadyaya & Salmela-

Aro, 2013), they distinguished between engagement and disaffection; disaffection is the opposite of engagement and consists of a variety of behaviors, emotions, and cognitions. For instance, engagement implies effort and exertion; disaffection implies giving up and withdrawal. Engagement means goal strivings, enthusiasm, and interest; disaffection means boredom, disinterest, and resignation. Skinner and her colleagues (Furer & Skinner, 2003; see Skinner et al., 2009) have documented the predictive role of both engagement and disaffection in predicting the academic achievement of children in middle childhood and early adolescence.

Eccles, Fredricks, and Baay (in press) discussed the relation between EVT and the work on engagement, stressing the processes by which engagement is fostered. Eccles and Wang (2012) discussed how the distal and proximal influences in the Eccles-Parsons et al. (1983) expectancy-value model presented earlier influence engagement. They also pointed to the importance of affect in determining engagement: positive affect stems from success experiences and pleasurable participation in activities heightens engagement, whereas negative affect reduces it. In support of these suggestions, M. T. Wang and Eccles (2012b) showed that social support from parents, teachers, and peers increased several aspects of school engagement, as well as the subjective task value of learning (see Upadyaya & Salmela-Aro and Skinner & Pitzer, 2012, for review of additional kinds of support).

In summary, self-regulation and engagement have to do with translating motivation into effective action. Over the past 10 years, the work on engagement has played a more central role in the motivation field. There are a number of challenging issues with respect to it, however. As Fredricks et al. (2004) initially noted, definitions of engagement are not yet clear, and the different aspects of engagement often are not clearly distinguished conceptually or operationally (see Reschly & Christenson, 2012, and Eccles & Wang, 2012, for further discussion). Along with clearer definitions, Eccles and Wang (2012) note that the different levels of engagement need to be more clearly defined and separated: Individual, classroom, school, and community levels of engagement each have unique characteristics that need to be reflected in definitions and measures. Measurement remains a problem because there are a variety of measures in the literature that do not necessarily operationalize engagement in the same ways. Additionally, Eccles and Wang (2012) discussed the thorny problems of distinguishing between engagement and motivation. Somewhat similarly, there is conceptual overlap between

cognitive engagement and self-regulation; for theoretical clarity researchers should investigate the relations of these constructs. Finally, a clearer understanding is needed of the development of engagement and the different forms that it takes.

GENDER, CULTURAL, AND ETHNIC DIFFERENCES IN ACHIEVEMENT MOTIVATION

There has been considerable interest for at least the past 60 years in group differences in achievement motivation. Wigfield, Eccles, et al. (2006) reviewed the empirical evidence for such differences extensively so we focus here primarily on important work done since then on such differences. But the most important shift on this topic over the past 10–15 years has been the movement from a focus on between-group mean-level differences to a much greater focus on within-group heterogeneity, coupled with an increasing sensitivity to the difficulty of interpreting mean-level group differences in precise, theoretically meaningful, and policy-relevant ways. In addition, there is an increasing sensitivity to potential risks associated with the misuse of information on group-level differences by policymakers and practitioners—misuse that can further the inequities in educational experiences and outcomes for various groups.

There has also been greater attention to the question of whether one should focus on mean-level differences on various constructs or group differences in the nature of the relations among the constructs themselves. It could be that group differences in the outcomes of motivated behavior such as school achievement result from group differences in the mean levels of the various constructs, or in-group differences in the ways in which these various constructs interact with each other, or both. For example, Eccles-Parsons et al.'s (1983) expectancy-value model was originally developed to guide research into gender differences in various fields of study and occupational niches with a particular focus on gender differences in participation in scientific and technological fields (Eccles, 2009). This model focused attention on gender differences in specific aspects of motivation rather than on whether the model fitted equally well for females and males. That is, in this model, Eccles-Parsons et al. assumed that gender differences in achievement-related choices result primarily in gender differences in the various motivational constructs discussed thus far. They assumed that the underlying model would be equally applicable for females and males. With

the availability of structural equation modeling (SEM) techniques, researchers have now begun to test whether models such as those specified in EVT are equally appropriate for different populations or groups. It is not yet clear what will emerge from these types of studies and it is even less clear what the developmental implications of such work are. But, right now there is not strong evidence of any systematic group differences in the applicability of the various models that have been studied. Furthermore, it is also quite likely that the relative importance of these different options in explaining behavior vary over ages and larger social contexts. Given these theoretical and methodological complexities, we will keep our discussion of group differences themselves relatively brief, highlighting some differences in achievement-related outcomes that might be related to the types of motivational processes we have discussed thus far and the nature of the debates currently guiding research efforts on these central topics.

Gender Differences in Motivation and Achievement

As noted above, Eccles-Parsons et al.'s (1983) expectancy-value model was originally designed to guide research on the development of gender differences in achievement-related motivational constructs and achievement-related behaviors. Although there have been major changes in females' participation in a wide range of achievement-related activities including substantial increases in participation in competitive sports, professional music, and all formerly male-dominated college majors and careers, stereotypic gender differences in many fields continue. Females in most countries still dominate in fields such as primary and secondary school-teaching, nursing, and other health-related support fields and remain underrepresented in professional sports in general, the most male-dominated sports more specifically, and college majors in the physical sciences, engineering, computers, and technology, as well as philosophy and economics (Schoon & Eccles, in press; Watt & Eccles, 2008). Furthermore, in most Western industrialized countries, females now outnumber males in secondary and tertiary school completion with males being more likely than females to drop out of school early and to perform more poorly in the course work (DiPrete & Buchmann, 2013). Finally, although there are small and inconsistent gender differences in performance on various standardized tests of academic achievement, particularly with males outperforming females in math and science, these differences have become smaller over the past 50 years and differ across countries, with the differences

favoring boys being largest in countries with the lowest levels of gender equity, the highest levels of implicit gender stereotyping, and the biggest power differentials between social status groups (Hamamura, 2011). There is a long history investigating the motivational influences on these types of gender differences in achievement and occupational choices (Eccles, 1994, 2013). Existing evidence, reviewed next, supports the conclusion that gender-role socialization and internalization are likely to lead to gender differences in each of the broad motivational constructs discussed thus far, which, in turn, contribute to gender differences in both rates of participation and performance in many achievement-oriented occupations and activities (Wigfield, Eccles, et al., 2006).

Gender Differences in Competence-Related Beliefs

Gender differences in competence beliefs, are often reported, particularly in gender-role stereotyped domains and on novel tasks, and these differences are apparent as early as Age 5 or 6, if not before (Wigfield, Eccles, et al., 2006). For instance, girls have more positive competence beliefs in reading and music, and boys in math and sports (Jacobs et al., 2002). However, the size of these differences (which are typically quite small), the ages at which they first emerge, and the consistency across childhood and adolescence depend on the gender-role stereotyping of the activity, the specific activities being considered, the country in which the research is conducted, the subpopulations within each country being studied, and the historical period in which the data were gathered. For example, in studies done in Australia, Europe, and the United States, boys hold higher competence beliefs than girls for math and sports, even after all relevant skill-level differences are controlled; in contrast, girls have higher competence beliefs than boys for reading, English, and music (e.g., Watt, 2004) but the magnitude of these differences varies across country (Jerrim & Schoon, in press). With regard to developmental changes in these patterns, gender differences in math-related competence beliefs of European American students decrease during the secondary school years, but those for English competence remain consistent across the primary and secondary school years (Jacobs et al., 2002). Few researchers have looked at these developmental patterns in various subgroups within any countries. Further, the extent to which children endorse the cultural stereotypes regarding which sex is likely to be most talented in each domain predicts the extent to which girls and boys distort their ability self-concepts and expectations in the gender-stereotypic direction (Eccles & Harold, 1991).

Gender differences in causal attributions, mind-sets, performance anxiety, and susceptibility to stereotype threat have also been studied. Some findings suggest that girls attribute failure more to lack of ability, particularly in gender-stereotyped areas such as math, although these differences are not always found (see Wigfield, Eccles, et al., 2006). Similarly, some studies suggest that girls are more likely to believe that difficulty mastering math reflects deficits in innate abilities (Dweck, 2006a) but again these differences are not consistently found and very little is known about the developmental nature of such gender differences.

Gender differences emerge regularly in studies of performance anxiety with females from a very young age reporting higher levels than males (e.g., Zeidner & Matthews, 2011). However, it has been suggested that boys may be more defensive than girls about admitting anxiety on questionnaires and that anxiety may actually undermine their performance more than girls (Wigfield, Eccles, et al., 2006). In support of this suggestion, Lord, Eccles, and McCarthy (1994) found that test anxiety was a more significant predictor of poor adjustment to junior high school for boys even though the girls reported higher mean levels of anxiety.

Closely related to the anxiety findings, several scholars have documented gender differences in stereotype vulnerability/stereotype threat (see Steele, 2010). In the late 20th century, Steele and his colleagues (e.g., Steele, 1997; Steele & Aronson, 1995) hypothesized that members of social groups (such as females or African Americans) stereotyped as being less competent in a particular subject area (such as math) will become anxious when asked to do difficult problems because they are afraid the stereotype might be true of them. This vulnerability is also likely to make them respond more negatively to failure feedback, lowering their expectations and their confidence in their ability to succeed. Evidence has supported this hypothesis for children as young as 9 or 10 and in many countries (Steele, 2010). Some of the most interesting work in this area was done by Shih and her colleagues (e.g., Shih, Pittinsky, & Ambady, 1999), who showed that prompting Asian identity increased the performance of Asian American females on a math test whereas prompting female identity decreased their performance.

Gender Differences in Achievement Values

As with competence beliefs, researchers have found gender-role stereotypic differences in both children's and adolescents' valuing of sports, social activities, and English that begin quite early in the course of development

(e.g., Eccles et al., 1989; Eccles, Wigfield, Harold, & Blumenfeld, 1993; Spinath & Spinath, 2005; Wigfield et al., 1991). Earlier work showed gender differences in math value favoring boys emerging during adolescence (Eccles, 1984), but other studies show that boys and girls value math equally during adolescence (Jacobs et al., 2002). Although boys and girls now appear to value math equally, girls are less interested in the physical and computer sciences, as well as engineering, than boys, and still enroll much less frequently in these majors in college (see Eccles, 2013; M. Wang, Eccles, & Kenny, 2013, for discussion of the psychological processes that underlie some of these sex differences in children's achievement values). These processes include gender-role socialization, the internalization of gender-role stereotypes, the absence of same-sex role models in various activities and fields, as well as the processes associated with both identity development and disidentification (e.g., Betz & Sekaquaptewa, 2012; Simpkins, Fredricks, & Eccles, in press). Interestingly, gender differences in the valuing of various achievement domains differ across countries (Jerrim & Schoon, in press) and these national differences in math achievement on a standardized test are largest in countries with the greatest social status power differential and the most gender-typed workforce participation (Hamamura, 2011).

Disidentification: The Intersection of Competence Belief and Values

Earlier we discussed the relation between values and competence-related beliefs. Drawing on the writings of William James (1892/1963), we suggest further that children will lower the value they attach to particular activities or subject areas if they lack confidence in these areas in order to maintain their self-esteem (see also Harter, 2012). Spencer, Steele, and Quinn (1999) suggested a similar phenomenon related to stereotype vulnerability. They hypothesized that women disidentify with those subject areas in which females are stereotyped as less competent than males. By disidentifying with these areas, the women not only lower the value they attach to these subject areas, but are also less likely to experience pride and positive affect when they are doing well in these subjects. Consequently, these subjects should become irrelevant to their self-esteem. Interestingly, as noted above, research shows that adolescent girls in many countries say they value math as much as boys do, while still believing they are not as good at math as boys believe about themselves and continue to be less likely to aspire to careers in physical science, computers, and technology (Jerrim & Schoon,

in press). Perhaps the gender differences in the perceived value of knowing math has disappeared but females remain less likely to aspire to such careers because they are less certain they can succeed without more effort than they believe they are willing or capable of exerting.

In summary, gender-stereotypic differences continue to exist in several of the motivational constructs linked to the questions “Can I succeed?” and “Do I want to succeed?” Research is needed on how these gender differences vary across culture. We discuss more about the possible origins of these differences in the sections on families and schools. Ruble et al. (2006) discuss the developmental processes and outcomes linked to gender (see also Hines, Chapter 20, this *Handbook*, this volume).

Culture, Ethnicity, Immigration, and Motivation

As is the case in many areas of psychology (see Graham, 1992), less is known about the motivation of children from different cultural, racial, and ethnic groups than about European Americans. However, work in this area is growing quickly; for instance, researchers are examining motivational characteristics of children in different Asian and European cultures (e.g., Bong, 2009; Nagy et al., 2010; Stanat & Christenson, 2006; Q. Wang & Pomerantz, 2009). Much of the work in the United States has focused on differences and disparities in motivation, engagement, and achievement among African American, Latino American, Asian American, and European American children and adolescents, and look to motivation as an important factor in understanding these differences (see Bingham & Okagaki, 2012; Meece & Kurtz-Costes, 2001; Murdock, 2009). Motivation theorists are increasingly interested in the applicability of their theoretical models to diverse groups of children. For instance, in a volume edited by McInerney and Van Etten (2004), theorists representing many of the theoretical perspectives reviewed in this chapter discussed the role of culture in their theoretical views. There were important similarities in how the principles from each theory applied to different groups, but differences as well. In the United States and in European countries where immigrant populations are growing rapidly, a major challenge for motivation researchers is to understand the motivational influences on both the within- and between-group differences in achievement and motivation among various ethnic, racial, and SES groups of immigrant and nonimmigrant children (Bingham & Okagaki, 2012; Graham & Hudley, 2005; Murdock, 2009; Urdan, 2012; Wigfield, Eccles, et al., 2006; as well as

Marks, Ejesi, McCullough, & García Coll, Chapter 9, this *Handbook*, this volume; and McLoyd, Purtell, & Hardaway, Chapter 10, this *Handbook*, this volume). We noted a number of these issues earlier.

The work on ethnic/racial/immigrant group differences in academic achievement is related more broadly to questions regarding how culture, motivation, and achievement are interconnected. The following tentative conclusions have now received substantial empirical support: (a) culture informs the development of identity, motives and behavioral scripts associated with achievement (e.g., Eccles, 2009; Markus & Kitayama, 2010); (b) culture shapes group members’ construal of the meaning of success and failure before and after achievement experiences (e.g., Grant & Dweck, 2001); (c) culture influences how universal and individual psychological needs are expressed in home and school (e.g., Jang, Reeve, Ryan, & Kim, 2009; Reeve & Assor, 2011); and (d) culture influences the enactment of engagement in the classroom (e.g., Bingham & Okagaki, 2012; Cobb & Hodge, 2011). We focus on the first three of these in this section. It is critical to reiterate that families and children from different cultural groups experience quite different challenges and opportunities in most countries. They live in different types of communities with different resources and dangers, they attend different quality schools, and they have differential access to all types of resources and opportunities. The impact of such inequities begin before birth, continue throughout these individuals’ lives, and have a cumulative impact on children’s motivation and achievement (Duncan & Murnane, 2011). These sources of individual and group differences are discussed more fully in other chapters of this *Handbook* (see Marks, Ejesi, McCullough, & García Coll, Chapter 9, this volume; and McLoyd, Purtell, & Hardaway, Chapter 10, this volume).

Contemporary cultural psychology in relation to education focuses on how variations in identity, due to culture-specific socialization practices, can shape students’ school motivation and achievement (Eccles, 2009; see also Spencer, Swanson, & Harpalani, Chapter 18, this *Handbook*, this volume). A major distinction in this work is made between socialization practices anchored in more individualistic (priority placed on goals and preferences of the self) cultural traditions and those anchored in more collectivist (priority placed on needs and norms of the group) cultural traditions (Triandis & Suh, 2002). Markus and Kitayama (2003) developed the notion of “cultural frame” as a way of describing how cultural socialization practices literally come to inform the self. Cultural frames

are meaning systems comprised of language, tacit social understandings, and scripts for enacting these social understandings in daily life. Individuals' self construals (i.e., the individual's understandings about what it means to be a person in the world) are a critical component of these cultural frames. Markus and Kitayama (1991) outlined two different cultural frames: independence and interdependence. In the independent construal of self, individuals come to see themselves as autonomous, self-contained, unique from others, and assertive in pursuing personal goals and desires; such construals are more prevalent in Western societies. In contrast, in the interdependent self-construal, individuals assign primary significance to others in defining the self, feel a fundamental sense of connectedness to others, and attend, first and foremost, to social roles, in-group norms, and obligations and responsibilities to others; such construals are more prevalent in African and Eastern societies (see Oyserman, Coon, & Kemmelmeier, 2002, for a comprehensive review of different strands of research on these two construals; Killen & Wainryb, 2000, discuss work showing within group variance and complexities of the expression of these construals in different countries, suggesting they are not at all monolithic within a given culture). Self-construals are assumed to be the zero-order beliefs from which more explicit goals and motives, including one's achievement-related goals and motives, arise (a similar argument is inherent in Eccles-Parsons et al.'s, 1983, Expectancy-Value Model of Achievement-Related Behavioral Choices). For instance, some research shows that, in more individualistic countries such as the United States, extrinsic motivation is associated with lower academic achievement (e.g., Deci & Ryan, 2002a) but this is not necessarily so in more collectivistic cultures like Hong Kong, where receiving rewards from others may be seen as more positive (Moneta & Sui, 2002).

Although just beginning, research relating culture to achievement motivation tends to examine how (culturally informed) self-construals influence: (a) the kinds of motivations that are prevalent for members of different cultural groups (the issue of approach and avoidance motivation), (b) the kinds of values and goals that are taken up into the self by members of different cultural groups (the issue of diversity in goal content), and (c) the kinds of meanings that individuals from different cultural groups make both before and after engaging with an achievement task (issues of meaning and appraisal). For example, Elliot, Chirkov, Kim, and Sheldon (2001) hypothesized that individualistic self-construals should promote approach motivation in which goals associated with self-assertion are focal; in

contrast, interdependent self-construals should promote avoidance motivation in which goals associated with the reduction of group discord are focal. They found some support for these hypotheses in a cross-cultural study of college students. Among non-Asian college students, small correlations exist between self-as-independent and approach goals and between self-as-interdependent and avoidance goals. Both Asian American college students and students from more collectivistic societies (Korea and Russia) report higher levels of avoidance motivation than European American college students.

These findings are consistent with studies suggesting that both the level and impact of avoidance motivation on achievement may be greater among individuals from cultural groups that emphasize interdependence and group membership. For instance, Eaton and Dembo (1997) found that the fear of failure (an avoidance motive) best predicted 13-year-old Asian and Asian American students' performance on an intellectual task; in contrast, non-Asian students' performance was best predicted by their beliefs about the incremental nature of intelligence, the importance of effort, and their self-efficacy. The authors interpreted these findings in relation to cultural dimensions of Asian cultures such as collectivism in which avoidance motives serve the function of maintaining group harmony. However, Bong, Hwang, Noh, and Kim's (in press) study of Korean adolescents showed that those who had socially perfectionist tendencies (wanting to be perfect to please others) were more anxious and procrastinated more compared to those who were perfectionists for themselves, perhaps indicating that social perfectionism also involves not wanting to disappoint group members. Bong et al. argued that different kinds of perfectionism are a more meaningful and valid construct than fear of failure when thinking about Korean adolescents' motivation.

Looking more directly at the association between culture and individuals' views of such basic universal needs as autonomy, Jang and colleagues (2009) found that high school students in collectivistically oriented South Korea benefit from classroom experiences of autonomy support and psychological need satisfaction. The extension of this work to examine how such cultural orientations and practices, and their level of internalization with regard to hypothesized needs, affect young people's goals and values in relation to education is still only beginning. Even more important for this chapter, very little research has focused on the developmental ontogeny of cultural variations in motivational constructs and their links to actual achievement. When do children's behaviors begin

to reflect variation in cultural construals, and how does this affect their motivation, and ultimately, achievement? Much work needs to be done to address these issues.

With respect to the specific motivational beliefs and values on which we focus in this chapter, earlier research done in the United States on children's competence beliefs showed that African American students reported slightly higher ability self-concepts and domain-specific self-efficacy beliefs than did European American children. However, the correlation between these competence related beliefs and actual indicators of school achievement were lower among African American students' competence than among European American students (see Graham, 1994, and Graham & Taylor, 2002, for further discussion). Other work in the United States does not find consistent ethnic/race differences in efficacy beliefs (Fuligni, Witkow, & Garcia, 2005; Wigfield, Cambria, & Ho, 2012). There are also mean differences in competence beliefs across other groups; Asian and Asian Americans often are modest in their competence beliefs despite their generally high achievement (Jerrim & Schoon, *in press*).

Perceptions of different racial and ethnic groups in the United States and other countries reflect pervasive stereotypes about these groups' abilities, with some groups (e.g., Asians) viewed as high-achieving and others as low-achieving. More problematic, members of the different groups can incorporate these stereotypes into their own self-representations. These views appear in children's implicit beliefs but not necessarily their explicit statements about different groups' abilities (Murdock, 2009). As discussed above with respect to gender differences, these kinds of group stereotypes can produce stereotype threat in individuals from traditionally low-performing groups, such that when they are told an achievement task reflects on their ability, they do less well than when told it is a problem-solving task (Steele, 2010). Much of this work has been done with African American college students, but it is being extended to other groups and to children (see Murdock, 2009, for review).

Although it is not completely clear how stereotype threat influences individuals' competence beliefs, researchers are learning more about the development of this susceptibility. Two possibilities are an increase in anxiety and a lowering of expectancies for success. According to Ambady, Shih, Kim, and Pittinsky (2001), children's susceptibility to stereotype threat varies over the elementary and middle-school years (Ages 6–14) with the greatest susceptibility to both positive and negative stereotypes occurring among 6- to 8-year-olds and 11- to 14-year-olds.

Interestingly, in Cimpian and Erickson's (2012) study, telling children that either boys or girls are really good at a task led 4- to 7-year-old children to work more slowly and solve fewer problems than either telling them nothing or telling them that a particular boy or girl was good at the task. This was true for both boys and girls. Cimpian and Erickson (2012) concluded that just telling that a particular group of children are good at a task is sufficient to elicit an entity-like belief in competence needed for the task, which then undermines the children's performance regardless of their membership in the group. It seems that this susceptibility would become more differentiated by the gender of the participants as they get older.

How might culture affect individuals' answers to the question, "Do I want to do this task?" There is evidence that European American, Latino American, and African American early adolescents perceive that *other* European American children value school more than do Latino American or African American children, especially Latino American and African American boys (Graham, Taylor, & Hudley, 1998); however, their *own* values do not differ in these ways across groups (Harris, 2006). These different findings need to be disentangled.

One explanation of the findings regarding stereotype threat is that children from some groups come to devalue school as a way to protect their self-worth. This process might start with the devaluing of certain activities, but can end up with students in groups who are stereotyped to do poorly fully disidentifying with school, in order to protect their self-worth; self-worth is enhanced when children value those activities at which they perform well (Eccles-Parsons et al., 1983; Harter, 2012). This process helps explain the finding mentioned earlier that African American children's school competence beliefs relate less highly to their performance. This may occur because many of these children are investing in other activities besides school, and so their sense of competence does not relate to their school performance.

Children's perceptions of the cost of achievement activities likely have an influence as well. Due to stereotype threat, discrimination, and other related issues, some children may decide that it is too costly to continue to try to succeed in school. They then make choices to engage more fully in other activities. Although these choices help them maintain self-worth, if children disengage from school in order to do other activities, their school achievement (if not their self-worth) can suffer.

Murdock (2009) discussed how stereotype threat could influence children's achievement goals. Recall our earlier

discussion of the benefits of mastery goals relative to performance goals for students' self-efficacy and intrinsic motivation. Researchers have suggested that stereotype threat can activate performance goals, especially performance avoid goals, which are deleterious to motivation and achievement (K. E. Ryan & Ryan, 2005). The findings with respect to whether various minority groups adopt different kinds of achievement goals are not entirely consistent, but Murdock suggests that there is evidence that group status moderates the adoption of approach as opposed to avoidance goals. These predictions need to be tested developmentally.

Another impact on children's goals is their possible selves. These beliefs are shaped in part by children's cultural backgrounds. Lower-income youth appear to have higher hoped-for selves than their anticipated selves, with respect to amount of education and resources required to attain the hoped-for selves (see Oyserman & Fryberg, 2006). This discrepancy between hoped-for and anticipated selves may be less apparent in other groups.

We have focused primarily on psychological factors that affect children from different cultural backgrounds' competence perceptions and values. In concluding this section, we turn to broader factors such as the discrimination children from some groups feel. Discrimination occurs in the United States and also in many other countries in the world where there are ethnic minority groups that have not attained full acceptance into their new society; examples are Turkish immigrants in different countries in Europe and Korean immigrants to Japan. When children from these groups receive discriminatory treatment from teachers and peers, they lower the value they attach to school (Wong, Eccles, & Sameroff, 2003). Interestingly, however, in their analysis of the PISA 2003 study of early adolescent immigrants living in 17 countries in Europe and Asia, Stanat and Christensen (2006) found that, in nearly every case, the immigrant adolescents had higher competence beliefs and interest in math than did the native adolescents, even though the immigrant adolescents performed much less well in math. As noted at the beginning of this section, the processes behind these complex patterns, and how they develop, require much new research. We return to the topic of discrimination in the section on school influences on achievement motivation.

On a more positive note with respect to both the influences of discrimination and stereotype threat on children from different groups, a growing body of work indicates that African American adolescents and adolescents from other groups who develop a strong racial or ethnic identity

are more likely to stay engaged in school and achieve well (see Murdock, 2009, for review). The implication is that a strong sense of identity with one's group can buffer effects of discrimination and stereotype threat. Developing a strong sense of racial identity often involves the understanding that one's group is discriminated against in the larger society. Thus racial identity can buffer effects of discrimination on school engagement even though the individual knows that his or her group is likely to experience that discrimination. There is a need for developmental work in this area. We return to the impact of discrimination on motivation below, in the section on school influences on achievement motivation.

In summary, there have been tremendous advances over the last 10 years in the field's understanding of the development of motivation in different groups. To date, much of this work focuses on different ethnic groups in the United States. Extending this work to other countries, and studying the motivation of immigrants in different countries, are important priorities for future research.

THE SOCIALIZATION OF MOTIVATION: FAMILY INFLUENCES

In the previous versions of this chapter, Eccles et al. (1998) and Wigfield, Eccles, et al. (2006) reviewed the existing literatures on family influences on motivation organized around the broad socialization model illustrated in Figure 16.2. Although this specific model was originally proposed and elaborated by Eccles and her colleagues (see, e.g., Eccles, 1993; Eccles-Parsons et al., 1983), similar social-cognitive mediational models of parental behavior and influence continue to be proposed by many family influence researchers and research designed to investigate these types of integrative models has continued to proliferate over the past 10 years (e.g., Bugental & Grusec, 2006; Parke & Buriel, 2006). Given the very limited space for each chapter in this *Handbook*, we focus on this model and highlight research findings directly related to the socialization of motivation. Bornstein (Chapter 3, this *Handbook*, Volume 4) and Golombok and Tasker (Chapter 11, this *Handbook*, this volume) focus on other outcomes of parenting.

Although there is extensive work on some components of this model, it is still the case that very few studies include the several components underlying parenting behaviors outlined in Box E. Much of this literature focuses on the association of the exogenous characteristics (Boxes A

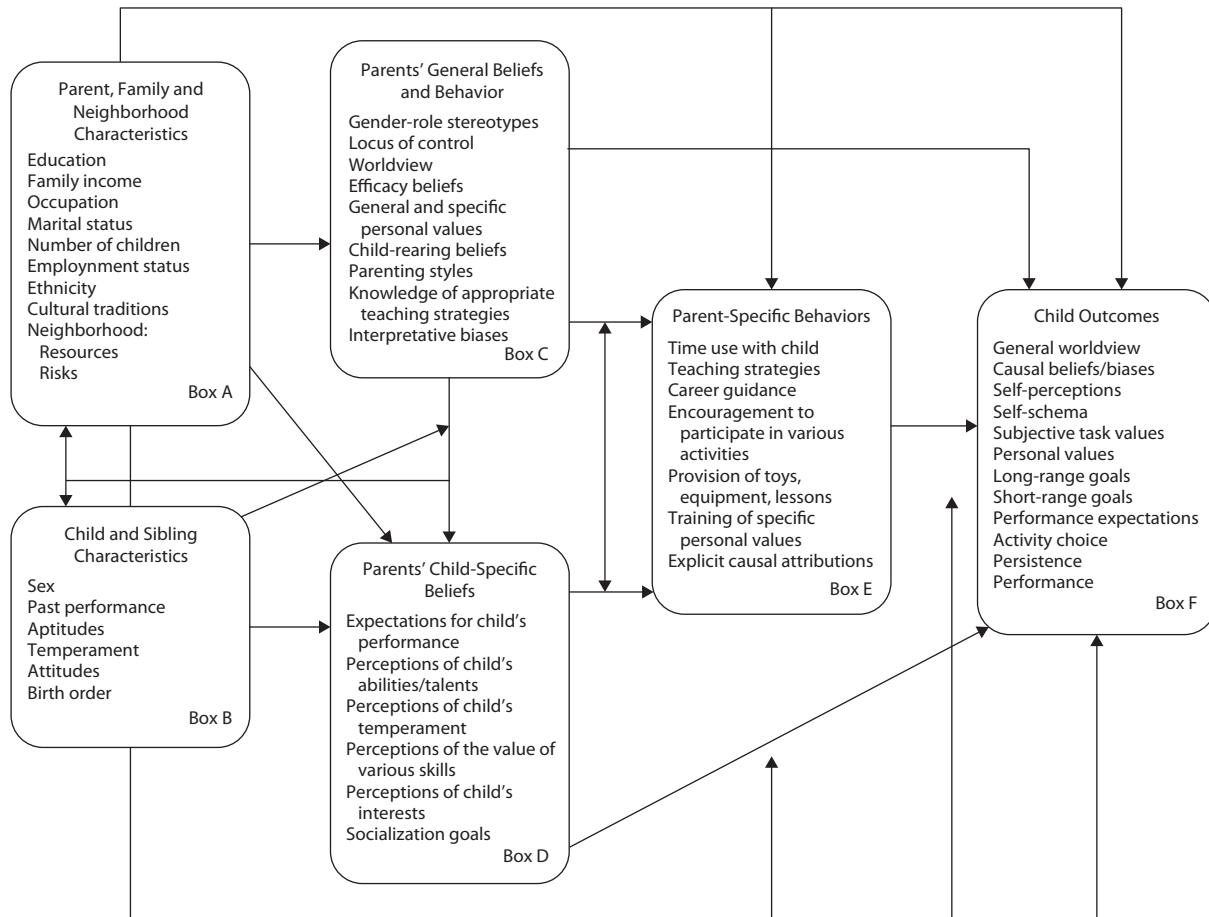


Figure 16.2 Model of parental influences on children's motivation and achievement.

Source: In "Development of Achievement Motivation" (p. 969), by A. Wigfield, J. S. Eccles, U. Schiefele, R. W. Roeser, and P. Davis-Kean, in *Social, Emotional, and Personality Development*, N. Eisenberg (Ed.), 2006, Vol. 3 of the *Handbook of Child Psychology*, W. Damon and R. M. Lerner (Eds.-in-Chief), 6th ed., Hoboken, NJ: Wiley.

and B) with parents' beliefs (Box C) or child outcomes (Box F; e.g., linking family socioeconomic status and/or ethnicity with parents' child-specific beliefs [Box D], specific parenting practices [Box E], and children's academic outcomes [Box F]). Much of the research examining the mediating and moderating hypotheses implied in Figure 16.2 has focused on academic achievement rather than on motivation itself (e.g., Corwyn & Bradley, 2003; Davis-Kean, in press). This work has clearly documented the mediational processes linking the exogenous family and neighborhood or cultural characteristics outlined in Boxes A and B to parenting practices in Box E and then to children's engagement and performance in achievement-related settings in and out of school outlined in Box F (see Bugental & Grusec, 2006; Cabrera & Tamis-LeMonda, in press; Parke & Buriel, 2006; Wigfield, Eccles, et al., 2006, for extensive review). We do not have the space to review these studies here. Instead, we focus on those

studies directly linked to the socialization of motivation as outlined in the previous sections of this chapter.

In general, this research has focused on the role that parent beliefs and behaviors may play in the socialization of achievement motivation in individual children. This research indicates that parents' beliefs and behaviors are critical in setting a climate for children's motivation development by providing various activities or resources in the home environment that may provide stimulation to pursue various activities across time. For example, research on activity involvement suggests that parents play a role in promoting certain types of involvement in academic and sports domains in the early elementary years and that this emphasis translates into greater interest and motivation to continue with these activities over time and to choose course work and extracurricular activities consistent with these activities in adolescence (Simpkins, Fredricks, Davis-Kean, & Eccles, 2006). It is only in the

past few years that this specific research has started to develop and for the most part the research remains quite general; for example, linking family SES and general family socialization styles to general school achievement, achievement motivation, and other general motivational constructs such as mastery orientation, learned helplessness, and school engagement. Very little work looks at these influences for different age groups but it seems quite likely that different parental behaviors will be key at different ages.

Child and Family Demographic Characteristics (Boxes A and B)

Child gender continues to be a widely studied child-level demographic influence on achievement motivation and engagement, particularly in sports and science, technology, engineering, and mathematics (STEM)-related academic fields. Both the early onset and the longitudinal consistency of these gender differences suggest that families are at least one important source of influence (Wigfield, Eccles, et al., 2006). For example, parents rate children's math and sports abilities higher for boys than girls from early on and provide boys and girls with different opportunities to engage in various gender-typed achievement-related activities (Fredricks, Simpkins, & Eccles, 2005; Herbert & Stipek, 2005; Simpkins, Davis-Kean, & Eccles, 2005; Simpkins, Fredricks, & Eccles, *in press*). These differences likely are more pronounced in countries where parents have very rigid gender-typed beliefs; we discuss this issue further below.

The influence of family-level demographic characteristics also continues to be studied, particularly in light of the fact that the demographic landscape of families in many countries has become much more diverse over the last 50 years. Attention has focused on illuminating how such characteristics as family socioeconomic status (SES), ethnicity/race, immigration, and culture shape the values, goals, aspirations, and behaviors of various family members (Benner, Graham, & Mistry, 2008; Van Horn et al., 2009). For example, culturally associated values such as familism have been shown to predict parents' warmth; in contrast, neighborhood characteristics often linked with family SES, such as neighborhood crime, predict parents' behavioral control and family communication patterns (Ceballo et al., 2008). Furthermore, researchers have become aware of the fact that these kinds of family demographically related characteristics often co-occur within families, complicating and magnifying their unique effects. For example, many immigrant families have a

lower SES than their U.S.-born counterparts (Yoshikawa, 2011). Scholars have struggled with how best to investigate these complexities over the past 10 years.

By and large, studies show that children growing up in high-SES families do better academically, evidence higher levels of almost all of the indicators of achievement motivation discussed earlier, and are involved in more organized activities and skill-based informal activities during the after-school hours (e.g., Mahoney, Vandell, Simpkins, & Zarrett, 2009). Why? Family SES could affect children's motivation indirectly through the opportunity structures in the child's surrounding environments as well as parents' beliefs and practices. For children to engage and succeed in a domain, they need to have available opportunities and a family that has the knowledge and ability to take advantage of those opportunities—both of which are often limited in low-SES families (Archer et al., 2012; Simpkins, Delgado, Price, Quach, & Starbuck, 2013). Not only do parents in low-SES families have limited resources to implement whatever strategies they think might be effective, they also have to cope with more external stressors than middle-class families living in stable, resource-rich neighborhoods (Furstenberg, Cook, Eccles, Elder, & Sameroff, 1999; McLoyd, 1990). For example, low-SES parents' jobs are often characterized by long hours, nonstandard shifts, and high physical demands (Updegraff, Crouter, Umaña-Taylor, & Cansler, 2007), which can limit the time and energy parents have to devote to their children (Parra-Cardona, Cordova, Holtrop, Villarruel, & Wieling, 2008; Yoshikawa, 2011). Furthermore, Lareau (2003) and Eccles et al. (1998) suggested that SES differences are not simply a function of resources, but that family norms, goals, and motivational belief systems vary by social class.

Immigration status in the United States and other countries is a second family demographic characteristic that has received a great deal of attention in the last 10 years. In 2011, approximately 40 million people in the United States were immigrants (Pew Hispanic Center, 2013). Furthermore, despite the fact that many first-generation immigrant youth often live in quite poor families, these first-generation youth often fare better than second- or third-generation youth in terms of physical health, academic achievement, and social well-being even after controlling for differences in resources at the family and neighborhood levels (e.g., Suárez-Orozco, Rhodes, & Milburn, 2009). Why? Many families immigrate to provide a better life for their families and more opportunities for their children (Suárez-Orozco et al., 2010). Parents' high valuing of education and children's sense of obligation to the family are two mechanisms that could help explain

the “immigrant paradox” (Fuligni & Fuligni, 2007). However, immigrant families’ efforts to be involved in their children’s lives outside of the home are often impeded by the “linguistic or cultural distance with social institutions” (Glick, 2010, p. 505) in the host country. In their analysis of the PISA 2003 data, Stanat and Christenson (2006) noted that language and culture differences were major factors explaining the achievement gap between immigrant and native adolescents in Europe and Asia. Furthermore, immigrant families often experience more instability in terms of periods of time where the family unit is split between two countries and in terms of mobility within and outside of those countries (Menjívar & Abrego, 2009). Yoshikawa’s (2011) work highlighted the profound implications of parents’ documentation status on children’s early achievement. Parents in the United States who lack documentation have poorer work conditions, receive less pay, and have more stress than similar parents who are citizens. These conditions continue to cascade down and influence the quality and enrichment of the environments in which children develop, including the home environment and childcare settings. It remains to be determined how these same factors influence the ontogeny of children’s motivation for achievement and engagement.

Culture is an even more general characteristic that is likely to influence children’s motivation through its impact on and association with family-level processes and dynamics. In many ways, culture influences which activities and goals (e.g., educational and career choices) are valued and for whom; it also influences general parental childrearing beliefs, theories, and goals (Fuligni & Fuligni, 2007; Rogoff, 2003). For instance, traditional gender-role values and familism are two core aspects of Latino cultures (Knight et al., 2010). Latino daughters in families with highly traditional gender roles are less likely to engage in masculine activities (e.g., sports) and often find it challenging to attend organized after-school activities because they are given less independence and have more family duties than sons (McHale, Updegraff, Kim, & Cansler, 2009; Simpkins et al., in press). Cultural values can also shape the general childrearing environment (Calzada, Tamis-LeMonda, & Yoshikawa, in press). Among Latino families, familism predicts higher parental warmth and lower levels of harsh parenting in the face of neighborhood disadvantage (White, Roosa, & Zeiders, 2012). With respect to education, Asian parents (both in Asia and the United States) are more involved in their children’s education, often believing their children’s educational success is their own responsibility (Pomerantz, Kim,

& Cheung, 2012). Such beliefs and involvement likely affect their children’s motivation and achievement and are quite different from the emphasis on fostering children’s autonomy in many U.S. parents.

In summary, there are many ways for family demographic characteristics to directly or indirectly affect the development of children’s achievement motivation. It is important to note, however, that even though family demographic characteristics have been linked repeatedly to children’s school achievement, their effects are almost always indirect, mediated by their association with parents’ beliefs, practices, and resources (e.g., Benner et al., 2008). In addition, parents’ beliefs and psychological and social resources can override the effects of even the most stressful circumstances (Van Horn et al., 2009).

General Childrearing Climate

Historically, researchers studying parental influence have focused on the impact of the general patterns and philosophy of childrearing on children’s overall orientation toward achievement (Eccles et al., 1998; Wigfield, Eccles, et al., 2006). Researchers have related a set of general behaviors and beliefs to the development of self-esteem, achievement motivation, locus of control, sense of personal efficacy, and so on. The variables investigated have included the general emotional warmth and supportiveness in the home, valuing of achievement, general parental childrearing beliefs and theories, values and goals, as well as sex-typed goals and cultural beliefs. In addition, researchers have examined the influence of parents’ general childrearing style as well as family authority structure, discipline tactics, and general interaction patterns, parental locus of control and personal efficacy, and communicative style and teaching style. Similarly, researchers have documented the benefits of active involvement with, and monitoring of, children’s and adolescents’ schoolwork (e.g., Wigfield, Eccles, et al., 2006).

Several investigators have stressed an integrated view of how these various parenting characteristics work together to produce optimal motivational outcomes. For example, Grolnick et al. (2002) stressed the interplay of three components of general parenting in promoting self-determination in children and adolescents: involvement and interest in the child’s activities, support for autonomous behaviors, and adequate structure. Grolnick et al. (2002) suggest that these parenting behaviors are important in helping children form a sense of autonomy and interest in activities that leads to greater achievement performance and a reduction

in learning problems. For example, autonomy-supportive parents allow children to explore their own environment, to initiate their own behavior, to take an active role in solving their own problems, and to express their points of view (Raftery, Grolnick, & Flamm, 2012). Autonomy support seems to be particularly important for low-achieving children (Ng, Kenney-Benson, & Pomerantz, 2004), especially if mothers stress the importance of effort and learning strategies as they help their children with homework (Pomerantz, Grolnick, & Price, 2005). Such practices may help low-achieving children feel both competent and socially supported.

Similarly, Eccles et al. (1998) stressed the importance of emotional support, role models, and the right balance between structure, control, challenge, and developmentally appropriate levels of support for autonomy. This balance depends on cultural systems, on the specific context in which the family is living, the age of the child, and other individual characteristics. Although the magnitude of effects varies by race/ethnicity, sex, social economic class, and nationality, there is consensus that these general parental practices influence a variety of quite general indicators of children's achievement motivation and motivated achievement behavior (e.g., Benner et al., 2008).

The results are consistent with three general principles: appropriate levels of structure, consistent and supportive parenting, and observational learning. Parents who know enough about their children to provide the right amount of challenge with the right amount of support seem more likely to produce highly competent and motivated children. These parents are also likely to be able to adjust their behavior to meet the changing developmental needs and competencies of their children. Families that provide a positive emotional environment are more likely to produce children who want to internalize the parents' values and goals and therefore want to imitate the behaviors being modeled by their parents. Consequently, children growing up in these homes are likely to develop positive achievement orientation if their parents provide such models and value those specific tasks, goals, and means of achieving one's goals valued by their parents. In contrast, if parents overly control and put excess pressure on their children to succeed at particular activities, this is likely to undermine the children's intrinsic interest in the activity, reduce the children's confidence in their ability to succeed, and lead to negative affective associations with the activity due to classical conditioning (Eccles et al., 1998; Grolnick, 2003). For example, mothers' academic support actually had

negative consequences for youth with whom they did not share warm relationships (Simpkins, Weiss, McCartney, Kreider, & Dearing, 2006).

How Parents Translate Their General Beliefs Into Specific Beliefs and Practices

Parents' general beliefs, such as the valuing of achievement and gender-typed ideologies and goals, are linked to parenting behaviors concerning school achievement (see Wigfield, Eccles, et al., 2006). Two pathways by which general beliefs are translated into specific beliefs by their direct influence on parents' child-specific beliefs (see Boxes C and D in Figure 16.2) and by shaping parents' interpretation of previous performance and aptitude of youth (see the moderating role of Box C on the relation between Boxes B and D).

As outlined in Figure 16.2, parents' general beliefs should directly influence their child-specific beliefs and, therefore, their children's motivation. Some research in the United States focuses on the potential implication of mothers' gender-stereotypical beliefs in mathematics. Mothers with more traditional gender-stereotyped beliefs about math had lower confidence in their daughters' math abilities than mothers with less traditional beliefs (Bleeker & Jacobs, 2004). In addition, such mothers had early elementary school-aged girls who were more susceptible to stereotype threat than mothers with less traditional beliefs (Tomasetto, Alparone, & Cadinu, 2011). In one randomized control trial, Harackiewicz, Rosek, Hulleman, and Hyde (2012) demonstrated that teaching parents about the value of STEM high school courses and careers via computer based materials produces a significant increase in the likelihood that their daughters would take additional course in math and science during their last 2 high school years.

Parents' general beliefs should also influence how children's characteristics (Box B) influence their child-specific beliefs (Box D). In a review, Yamamoto and Holloway (2010) argued that parents' educational expectations would be closely tied to their children's previous achievement only if parents believed ability was innate (rather than malleable or due to hard work), trusted the school and the feedback the school provides, and had high self-efficacy beliefs. Several of these themes are consistent with Dweck's (2006b) ideas linked to growth versus entity mindsets: If parents believe that math aptitude is a stable entity, then they will be likely to interpret their children's successes and failures in math class as indicative of their children's math aptitude,

which in turn should influence how they respond to their children's successes and failures in many ways.

Parents' Child-Specific Beliefs, Values, and Perceptions

According to Figure 16.2, parents can hold many child-specific, domain-specific beliefs, such as the importance of math or sports for their children and how skilled they believe their children are in math or sports. Because these beliefs are domain- and child-specific, parents may believe that their children are much more able in math than in reading and music. Evidence is beginning to emerge showing that such specific beliefs are consistent, powerful predictors of the motivation and achievement of youth (e.g., Simpkins et al., *in press*; Wigfield, Eccles, et al., 2006). Furthermore, such predictive effects hold even when independent estimates of children's actual competence (e.g., teachers' ratings and scores on standardized tests) and demographic characteristics are controlled.

One of the most consistent links is between parents' educational expectations for their children and their children's subsequent academic motivation and performance (e.g., Davis-Kean & Sexton, 2009; W. Fan, Williams, & Wolters, 2012). Parents' beliefs about specific academic subjects, such as science, are even stronger predictors of children's outcomes in these subjects (Archer et al., 2012). Parents' perceptions of children's competence and their valuing of a subject or domain predict children's subsequent self and task beliefs in math, reading, and sports (e.g., Shumow & Lomax, 2002; Simpkins et al., *in press*).

Parental beliefs also predict longer-term outcomes. As noted earlier, the confidence of many youth in their own achievement-related abilities decline from Ages 5 through 17. The confidence parents have in their children's math, reading, and sports abilities while the children are in early elementary school moderate these declines in a positive direction (Fredricks et al., 2005). Both the rate of change and the magnitude of the decline are reduced for children whose parents have higher estimates of their children's abilities. In fact, mothers' prediction of children's success in math-related careers when children were in seventh grade (12 or 13 years old) predicted the beliefs of youth about careers and actual career choices 12 years later (Bleeker & Jacobs, 2004).

Parents as Socializers

Parents socialize children through both direct parent-child interactions and the ways in which they manage and design

their children's environments (Eccles, 1993; Furstenberg et al., 1999; Parke et al., 2003). Researchers have documented the benefits of active involvement with, and monitoring of, schoolwork and time spent by youth on other achievement-related activities such as sports and instrumental music (e.g., Archer et al., 2012; Wigfield, Eccles, et al., 2006). For example, researchers have shown that reading to preschool children predicts children's later reading achievement and motivation (e.g., Davis-Kean & Eccles, 2003; Linver, Brooks-Gunn, & Kohen, 2002). However, it is not essential that parent-child activities focus on skill instruction in order to have an impact. Parents can also support children through games, by being leaders of their organized activities, and by attending community events together. In early elementary school, playing games together that involve math, such as board games with dice, was one of the stronger, consistent family predictors of children's math knowledge and fluency (LeFevre et al., 2009). Such experiences likely influence both children's skill level and interest in doing these activities. Interestingly in W. Fan et al.'s (2012) study, parental advising and parent-school communications had different predictive associations with their children's intrinsic motivation and self-efficacy for different school subjects depending on whether the families were Latino American or Asian American. Other studies have also shown cultural differences in the association of parents' practices at home and with the school with their children's achievement motivational beliefs and behaviors (X. Fan & Chen, 2001). Clearly one needs to think very carefully about the meaning of these behaviors in different cultural contexts.

Parents also structure their children's learning experiences by providing specific toys, materials, and role models in the home environment, as well as by making decisions about the environments children engage in outside of the home (Jacobs, Davis-Kean, Bleeker, Eccles, & Malanchuk, 2005). Many parents try to organize and arrange their children's social environments in order to promote opportunities, to expose their children to particular experiences and value systems, and to restrict dangers and exposure to undesirable influences (Eccles, 1993; Parke et al., 2003). One core aspect of parents' designing of the home environment are the materials provided in the home, such as books, puzzles, and musical instruments. Children who have greater access to activity-related materials in the home have more positive attitudes, spend more time, and have higher achievement in academics, reading, sports, and music than their peers (e.g., McPherson, 2009; Simpkins, Fredricks, & Eccles, 2012).

Summary

The studies reviewed suggest a multivariate model of the relation between antecedent childrearing variables and the development of achievement orientation that depends on the presence of several variables interacting with each other. Specifically, proper timing of achievement demands creates a situation in which children can develop a sense of competence in dealing with their environment. An optimally warm and supportive environment with the minimal necessary control creates a situation in which children will choose their parents as role models and will feel autonomous in that choice. The presence of high yet realistic expectations creates a demand situation in which children perform in accord with the expectancies of the parents. Finally, children's ability levels must be such that attainment of the expected level of performance is within capacity. All these factors are essential for children to develop positive achievement orientations.

Few researchers, however, have adopted such an integrated view of family influences in their work. One promising method is the creation of indexes that include a variety of parental indicators theorized to influence particular outcomes. These indexes often include a heterogeneous set of indicators that may have a low inter-item reliability, but nevertheless, should be combined in a singular construct because they are all theorized to produce the same outcome (Bradley, 2004). Classic examples include research on cumulative risk (Sameroff, Bartko, Baldwin, Baldwin, & Seifer, 1998), the HOME observational scale (Bradley, 2004), and family involvement in children's education (Jeynes, 2007). Researchers have used these frameworks to capture parents' beliefs and behaviors with respect to children's achievement and activities (Fredricks et al., 2005; Simpkins et al., 2012). These studies documented a linear relation between the index of parental beliefs and behaviors and achievement-related outcomes of youth in math, science, sports, and music, suggesting that socialization factors have a cumulative positive impact on motivation. In contrast, when all family predictors were entered into a regression model, parents' expectations for child performance trumped all other potential sources of influence, suggesting that parents' behaviors did not matter. Clearly this was not the case when using an overall index. Researchers should consider the use of indexes, latent variables in SEM (Simpkins et al., 2012), or cluster analysis to provide a more holistic view of parental influences which complement the knowledge gained using traditional regression analysis.

Not only do studies typically have a more narrow focus on family influences, but most studies are limited to a single area of achievement. Simpkins et al. (2012) examined the parental correlates of the beliefs of youth and outcomes in math, reading, sports, and music. Inclusion of all four domains led to some interesting comparisons across domains. For instance, the relations between parenting and youth variables were stronger in the leisure (sports and music) domains than in the academic domains. This may be because sports and music are increasingly occurring outside of the traditional curriculum and are therefore less influenced by school factors than are math and reading. Parents also play a large number of roles in leisure domains, such as driving children to practices and lessons; cheering at games and recitals; paying for equipment, uniforms, and camps; and watching sports and music together. Furthermore, according to Marsh's I/E model (Möller, Pohlmann, Köller, & Marsh, 2009), people's beliefs and behaviors in one domain are likely to affect other domains. For example, parents' strong endorsement of math may have negative consequences for reading. Moving forward, it will be critical for scholars to include multiple domains within a study to allow for cross-domain comparisons and influences.

Further research on parenting and children's motivation needs to address two other important topics. First, researchers should address systematically how the influences discussed in this section vary across children of different ages. It is quite likely that the impact of parents on children changes as children get older; for instance, many parents get less involved in school once their children reach middle school, which likely affects their influence on children's motivation. Second, additional work is needed on culture's impact on parenting practices and the differential relations of these practices to children's motivation and achievement.

SCHOOL INFLUENCES ON ACHIEVEMENT MOTIVATION

In this section, we provide a brief overview of the research on school influences on achievement motivation and engagement. More extended reviews can be found in Eccles and Roeser (2010, 2011), Fredricks (2014), Hattie (2009), and Wigfield, Byrnes, & Eccles (2006), and in this *Handbook* (see Crosnoe & Benner, Chapter 7, Volume 4). Given the limited space, we focus on only four sources of influence: social dimensions (i.e., teacher-student relationships and classroom climate), classroom instruction, racial

and ethnic discrimination, and two aspects of the larger school environment (i.e., curricular tracking and extracurricular activities). We have selected these as examples of the kinds of dimensions of school experiences that are likely to influence individual, group, and developmental differences in achievement motivation in academic settings. Most of the research reviewed is directly related to the assumption that motivation is optimized in learning settings that meet individuals' basic and developmental needs, some of which are universal and some of which are a function of individual differences in aptitudes, temperament, interests, and socialization histories (Eccles & Midgley, 1989; R. Ryan & Deci, 2002). For example, as reviewed earlier, Deci and Ryan (2012; R. Ryan & Deci, 2009) focus on the importance of classroom and schools' impact on three fundamental psychological needs: competence (e.g., experiencing oneself as effective in social interactions), relatedness (e.g., experiencing oneself as connected to other people), and autonomy (e.g., experiencing oneself as a source of action) (R. Ryan & Deci, 2002). Similarly, Eccles and her colleagues (Eccles, 1993; Eccles & Midgley, 1989; Eccles & Roeser, 2010; Wigfield, Byrnes, & Eccles, 2006) focus attention on the various components of school and classroom characteristics that might explain changes in motivation and engagement as students move from elementary school into and then through secondary school. They argued that systematic changes in various classroom and school characteristics can lead to poor person–environment fit, which, in turn, can lead to the average level declines often found in studies of the transition into and through secondary school. They labeled this phenomenon stage–environment fit (see also Juvonen, 2007). Finally, Fredricks (2014) discussed how aspects of teacher-student relations, classroom practices, teacher beliefs, student diversity, and peer relations can impact children's engagement in classrooms in positive and negative ways.

Social Dimensions of Schooling: Teacher–Student Relationships

The quality of students' relationships with their teachers plays a critical role in enhancing motivation and engagement (Eccles & Roeser, 2011; Fredricks, 2014; Wentzel, 2009). Students who believe they share a good relationship with their teacher and feel emotionally supported by their teachers are more motivated and engaged than their peers who believe they do not have good relationships (Hattie, 2009; M. T. Wang & Eccles, 2012b). Teachers

who are trusting, caring, and respectful of students provide the kinds of socioemotional support students need to approach, engage in, and persist with academic learning tasks (Burchinal, Roberts, Zeisel, & Rowley, 2008; Hattie, 2009; NRC/IOM, 2004; Wentzel & Wigfield, 2007). Caring teachers are also attuned to and sensitive to the needs of students in their classroom and adjust their instruction in response to students' need (Pianta, Hamre, & Allen, 2012).

Close, supportive relationships with teachers are particularly important for academically at-risk students (Fredricks, 2014; NRC/IOM, 2004). Unfortunately, students who would benefit most from positive relationships with their teachers are also those that are least likely to get this support (Baker, Grant, & Morlock, 2008). There is also evidence that teachers hold differential expectations for various individuals within the same classroom. Although the effects of negative expectations are fairly weak and short-lived, there are small but fairly consistent negative effects of low teacher expectations on minority children, on children from lower social class family backgrounds, on low achievers, and on girls for math and science (Jussim, Robustelli, & Cain, 2009).

This link between the quality of teacher–student relationships and motivation and engagement is reciprocal over time (Skinner & Pitzer, 2012). High-quality relationships with teachers serve to bolster students' perceptions of their competence, autonomy, and relatedness, which in turn, elicit further teacher support. In contrast, unsupportive interactions between teachers and students make it more likely that students will perceive themselves as unwelcome, incompetent, and pressured. In turn, these negative self-perceptions will lead to further withdrawal of support from the teacher.

Wentzel and colleagues (Wentzel, 2012; Wentzel, Battle, Russell, & Looney, 2010) also have studied the role of perceived social support in classrooms. For example, in sixth through eighth grade middle-school classrooms in the United States (i.e., classes for 10- to 12-year-olds), even though students' perceived social supports differed across age, gender, and teacher, perceived social support predicted both European American and Latino American students' interest in their classroom activities and the Latino American students' grades (Wentzel, Russell, Garza, & Merchant, 2011). Furthermore, the Latino American students perceived more teacher caring and help but less parent help than the European American students had in their earlier studies. In another study of Latino American children, Wentzel, Baker, and Russell (2012) reported that these

students' perceptions of social and academic expectations of their peers predicted their social and academic goals.

Social Processes: Classroom Social Climate

General classroom social climate is also important for motivation and engagement. Researchers interested in SDT, for instance, have investigated the associations between dimensions of the classroom climate to adolescents' motivation, engagement, and socioemotional development (Deci & Ryan, 2002b). These scholars argued that motivation, engagement, learning, and well-being are highest in classrooms and schools in which the climate and culture stress and provide opportunities for the students to feel autonomous, competent, and emotionally supported. Such classrooms and schools would: (a) provide the students with voice in how the classroom is run and what kinds of assignments are made, (b) allow all students to be successful at the required academic and social tasks, and (c) provide emotional support to all students. Both longitudinal correlational and randomized trial intervention studies support these predictions (Zimmer-Gembeck, Chipuer, Hanisch, Creed, & McGregor, 2006).

Over the last decade, several researchers have looked more specifically at the association between classroom climate and students' emotions in the classroom, and in turn students' motivation and learning (Frenzel, Pekrun, & Goetz, 2007; Hattie, 2009). These researchers argue that emotional reactions to experiences in the classroom have a large impact on student engagement and learning; and have separated individual emotional reactions to classroom experiences from shared emotional reactions. Findings suggest that shared emotional reactions across students within the same classroom are influenced by shared perceptions of teachers' enthusiasm and enjoyment (Frenzel et al., 2007). Furthermore, these shared positive and negative emotions are linked to the general level of achievement in the classroom: as a group, students in high-achieving classrooms reported more positive emotions (pride and enjoyment) and less-extreme negative emotions (anxiety, shame, and hopelessness).

Instructional Dimensions

The nature of the academic work students are asked to do can affect not only what students come to know about themselves and their world, but also their capacities to pay attention, their interests and passions, and their morals and

ethics (Eccles & Roeser, 2010, 2011). Two key aspects of academic work are particularly important for adolescents' development: (1) the content of the curriculum in terms of its intellectual substance and its consideration of global social-historical realities (e.g., Noddings, 2005); and (2) the design of instruction to cultivate interest, meaningfulness, and challenge, as well as deep cognitive, emotional, and behavioral engagement with the material (Fredricks et al., 2004). Both of these characteristics vary in terms of their relative match or mismatch with the developmental needs and capacities of students of different ages, cultures, and social background. Cross-sectional and longitudinal correlational evidence support the notion that academic work that is meaningful to the developmental interests and cultural reality of adolescents' experience promotes motivation to learn and helps to "bond" young people to the institution of school (Burchinal et al., 2008; Roeser, Eccles, & Sameroff, 2000). For instance, boredom in school, low interest, and perceived irrelevance of the curriculum predict diminished engagement and learning and withdrawing from school (Finn, 2006; Fredricks, 2014; NRC/IOM, 2004). Minority students in particular report greater interest in courses in which voices, images, role models, and historical experiences of traditionally underrepresented groups are represented (Graham & Taylor, 2002). Nonetheless, providing curricula that address developmentally and culturally meaningful topics to a diverse and large school population is an ongoing challenge in both the United States and many developed nations today and little attempt has been made to evaluate curricular materials in terms of their meaningfulness for students.

The nature of instruction can also influence adolescents' motivation, engagement, and learning (Eccles & Midgley, 1989; Fredricks et al., 2004, Hattie, 2009; Wigfield, Eccles, et al., 2006). Choosing materials that provide an appropriate level of challenge for a given class, designing learning activities that require diverse cognitive operations (e.g., opinion, following routines, memory, comprehension), structuring lessons so they build on each other in a systematic fashion, using multiple representations of a given problem, and explicitly teaching children strategies that assist in learning (e.g., asking oneself if one has understood what was just read) are but a few of the design features that can scaffold learning and promote interest, engagement, and learning. Work on the role of interest in learning, engagement, and intrinsic motivation highlights the important role of the design of academic tasks (Renninger, 2000). Increased interest is associated with

greater engagement in the task and higher levels of mastery of the material (Fredricks et al., 2004; Hattie, 2009; Wigfield, Eccles, et al., 2006). Even more importantly, interesting tasks increase intrinsic motivation to do well (Deci & Ryan, 2002b) and increase the odds that students will develop a strong personal identity as committed school students (Eccles, 2009).

From a developmental perspective, there is evidence that the content and design of academic work may not change over time in ways that reflect the increasing cognitive sophistication, diverse life experiences, and identity-linked motivational needs of children and adolescents as they move from the elementary into the secondary school years (Eccles, 2009; Wigfield, Eccles, et al., 2006). As one indication, middle-school children in the United States report the highest rates of boredom when doing schoolwork, especially passive work (e.g., listening to lectures) and in particular in classes such as social studies, mathematics, and science (Larson, 2000). Academic work becomes less, rather than more, complex in terms of the cognitive demands as children move from elementary to junior high school (Juvonen, 2007). It may be that declines in adolescents' motivation during the transition to secondary school in part reflects academic work that lacks challenge and meaning commensurate with children's cognitive and emotional needs. For instance, Roeser et al. (2000) found that perceived curricular meaningfulness was a positive predictor of longitudinal changes in early adolescents' valuing of and commitment to school from the beginning to the end of middle school.

The level of structure in the classroom is also important. Providing opportunities for autonomy and for loosely structured peer interactions support motivation and engagement but not if the classroom is chaotic and poorly managed (Hattie, 2009; NRC/IOM, 2004). Teachers in well-managed classrooms use behavioral management strategies and organizational strategies that encourage students to do the work and be active participants in classroom activities (Bohn, Roehrig, & Pressley, 2004). In these classrooms, students display less disruptive behavior and higher engagement in learning (Pianta et al., 2012). The optimal balance between structure and autonomy support changes as students grow older and desire more opportunities for autonomy (Eccles, Midgley, et al., 1993). One reason for the decline in achievement motivation over time is that many students do not experience changes in the balance between structure and opportunities for autonomy, self-regulated learning, and cooperative peer interactions as they progress through the school years. The

appropriate balance between structure and autonomy for different-aged students likely varies by culture; little is known about this.

Racial and Ethnic Context

Ethnicity and race are two demographic factors that can influence achievement motivation and school engagement through social processes, including stereotypes, discrimination, and prejudice, as discussed earlier (Eccles & Roeser, 2011; Juvonen, 2006; see also Marks, Ejesi, McCullough, & García Coll, Chapter 9, this *Handbook*, this volume). Here, we focus in more detail on one very critical aspect of race/ethnic related school experiences: discrimination.

Frequent experiences of racial/ethnic discrimination from students and teachers at school are common (Hudley & Irving, 2012) and influence various aspects of students' academic motivation, engagement, and feelings of school belonging (Wong et al., 2003). The major sources of this perceived discrimination in the United States are European American classmates, teachers, and neighbors. However, research suggests that the impact of discrimination varies depending on key elements of the students' own racial/ethnic identities. Wong and colleagues (2003), for example, found that the predictive association between daily experiences of racial discrimination and declines in school engagement, confidence in one's academic competence and the subjective task value of school achievement, and grades was moderated by having a strong and positive African American identity. Similarly, Rodriguez, Umaña-Taylor, Smith, and Johnson (2009) showed that having a strong, positive racial/ethnic identity can help buffer the negative effects of perceived daily racial discrimination on school-related motivation and achievement for ethnic youth.

The racial and ethnic experiences of youth may be dependent on the larger school context. The transition to middle or high school can be particularly challenging for ethnic minority youth, as middle and high schools tend to be larger, more stratified by race and class, and more performance-oriented (Juvonen, 2007; Juvonen, Nishina, & Graham, 2006; Roeser, Urdan, & Stephens, 2009); this is true not only in the United States but in other countries as well (Stanat & Christensen, 2006). African American and Asian American adolescents reported increasing levels of discrimination from adults (and peers in the case of the African Americans) as they moved through high school but Latino American students did not (Greene, Way, &

Pahl, 2006). One factor that may be especially relevant to this transition is the ethnic composition of the school. Benner and Graham (2007) found that African American students who experienced more racial incongruence from middle to high school had a larger decline in feelings of belonging over time. Being in a context with fewer classmates of the same ethnicity may make ethnicity more salient and may increase concerns about being the target of others' prejudice. Researchers need to examine developmentally how ethnic makeup of schools impacts younger children; this research also needs to be extended to countries around the world.

Microsettings Nested Within the Larger School Environment

One aspect of the school context that can affect students' motivation and engagement is curricular tracking (e.g., college track course sequences versus general or vocational education sequences). The strongest justification for tracking practices derives from a person–environment fit perspective. Students will be more motivated to learn if their educational materials and experiences can be adapted to their current competence level. There is some evidence consistent with this perspective for children placed in high-ability classrooms in the United States, high within-class ability groups, and college tracks, although there continues to be debate about these findings (Oakes, 2005). In contrast, the results for students placed in low-ability and noncollege tracks do not confirm this hypothesis. By and large, when long-term effects are found for this group of children, they are usually negative primarily because these children are typically provided with inferior educational experience and support (e.g., Hattie, 2009). Low-track placements have been related to poor attitudes toward school, feelings of incompetence, dropping out of school, and problem behaviors (Oakes, 2005). Thus, the effects of tracking seem to differ by achievement level; however, few strong and definitive answers about the impact of tracking have emerged (Hattie, 2009; Wigfield, Eccles, et al., 2006). Tracking also varies in its timing and scope in different countries; for example, in Germany, children traditionally have been separated into three tracks at Age 10 or 11, and there is little movement across tracks once this occurs. These placements obviously would influence students' ability beliefs and values in different ways.

Social comparison theory leads to a different set of predictions regarding the effect of ability grouping and

curricular tracking on one aspect of development: ability self-concepts. People often compare their own performance with the performances of others to determine how well they are doing (Marsh, Trautwein, Lüdtke, & Brettschneider, 2008). Ability grouping should narrow the range of possible social comparisons in such a way as to lead to declines in the ability self-perceptions of higher-ability individuals and to increases in the ability self-perceptions of lower-ability individuals. Marsh et al. refer to this effect as the Big Fish in a Small Pond Effect. Evidence supports this prediction. For example, as mentioned earlier, there is consistent evidence showing that attending a more academically elite high school leads to reductions in students' academic ability self-concepts that persist over time (Marsh et al., 2007). These results have led Marsh et al. (2008) to conclude that academic tracking comes at a cost of confidence in one's academic abilities for academically able students. Similarly, Frenzel et al. (2007) have found in Germany that individual students experience slightly more negative emotions (anxiety, hopelessness, and shame) and slightly fewer positive emotions (enjoyment and pride) when they are in higher-achieving classrooms.

Another aspect of the school context that can support students' need for belonging is the opportunity to participate in extracurricular activities such as sports, the arts, and school clubs (Eccles, Barber, Stone, & Hunt, 2003; Feldman & Matjasko, 2012). Involvement in extracurricular contexts increases students' connections to teachers, helps them maintain friendships and make new ones at school, and can connect them to a prosocial peer group that is more likely to value academics and plan to attend college (Fredricks & Eccles, 2005; Schaefer, Simpkins, Vest, & Price, 2011). Activity participation may also have benefits because it provides opportunities for interpersonal competence, challenging life goals, and educational success (Mahoney et al., 2009). Indeed, engaging in an activity that is meaningful to one's identity can reverse outcomes for students who otherwise were on the road to academic failure (Crosnoe & Benner, Chapter 7, this *Handbook*, Volume 4; Peck, Roeser, Zarrett, & Eccles, 2008).

By and large, both the correlational-longitudinal and intervention research supports these assumptions about the positive effects of participation in organized and/or social learning activities (Larson & Hansen, 2005). However, the correlational effect sizes are small and the evidence from randomized trial interventions is not consistent across studies. More specifically, participation in school-based extracurricular activities has been linked to increases in such positive developmental outcomes as high school

GPA, strong school engagement, and high educational aspirations (Eccles et al., 2003), as well as to educational resilience among at-risk youth (Peck et al., 2008). Similarly, participation in high school extracurricular activities, particularly service-based volunteer activities, predicts high levels of adult participation in the political process and other types of volunteer activities, continued sports engagement, better physical and mental health, and reduced participation in risky behaviors (Mahoney et al., 2009; NRC/IOM, 2004; see also Killen & Smetana, Chapter 17, this *Handbook*, this volume).

Interventions to Improve Students' Motivation in the School Setting

Here we briefly describe illustrative group and school-based interventions that have been effective in improving motivation and achievement. There is now more research on effective motivation interventions in different areas such as social skills, reading, creating communities of learning, and fostering engagement, with some of the studies using randomized trial designs; Wentzel and Wigfield (2007) and Yaeger and Walton (2011) provide an overview.

Group Interventions Focused on Beliefs About Intelligence

Blackwell, Trzniewski, and Dweck (2007) conducted an eight-session intervention study (using random assignment to group) to teach the experimental group that intelligence is malleable. Compared to the control group, the intervention students had more positive motivation and their grades, although not increasing, did not decline. Aronson, Fried, and Good (2002) showed that African American college students who were taught the malleable view reported greater school enjoyment and value compared to the control group.

Classroom-Based Interventions

Guthrie, Wigfield, and their colleagues (Guthrie, Wigfield, & Klauda, 2012; Guthrie, Wigfield, & Perencevich, 2004) developed and studied Concept Oriented Reading Instruction (CORI), a reading comprehension instruction program that integrated reading strategy instruction with specific motivational practices to foster students' reading engagement, motivation, and achievement. The motivational instruction practices in CORI include developing self-efficacy, fostering interest through hands-on activities and interesting texts, helping children understand the importance and relevance of reading, and providing

many opportunities for collaboration. Guthrie et al. (2004) studied 9-year-olds and Guthrie et al. (2012) studied 12-year-olds; in both studies they found that students experiencing CORI had higher reading comprehension, stronger engagement, and higher motivation in reading. Guthrie, McCrae, and Klauda (2007) provide a meta-analysis of CORI's effects in numerous other studies.

CORI focuses in part on helping students understand the value and relevance of their work. Hulleman and Harackiewicz (2009) and Hulleman, Godes, Hendricks, and Harackiewicz (2010) conducted intervention studies in which high school students in the treatment group were asked every 3 to 4 weeks to write how what they had learned in science that week was relevant to them. The treatment students who initially expected to do poorly in science had higher science grades. Additionally, students' perceived value mediated the effects of the intervention on general interest and performance. These projects show how a focus on students' valuing of a subject can positively affect their performance.

School-Based Interventions

Goal theorists have worked with schools to try to change the overall school goal structure from performance-oriented to mastery-oriented (Maehr & Midgley, 1996; see Wigfield, Eccles, et al., 2006) for review. The researchers worked closely with teachers and school administrators at an elementary/primary school and a middle school. They found it easier to work with the elementary school staff to develop a stronger mastery orientation in the school; the middle school proved more difficult to work with. At both schools there was evidence that students' motivation improved.

We are encouraged that there are an increasing number of interventions that (using rigorous research designs) are showing that students' motivation and performance in different areas can be enhanced. Some of the interventions just presented here, and by Wentzel and Wigfield (2007), are elaborate long-term interventions involving a great deal of time and effort on the researchers', teachers', and students' part. Yaeger and Walton (2011) reviewed a number of brief social psychologically based intervention programs (including Blackwell et al., 2007) that have been effective in improving both children's and college students' motivation and performance. They describe why these programs are effective even though they are brief, but note there is little information about the longevity of their effects. That is an important topic for future research. As we discussed earlier, it is important to connect motivation and

self-regulation; some interesting intervention programs are doing that, including some that are focused on developing mindfulness in children (Roeser, Taylor, & Harrison, 2013).

Summary

Many aspects of schools and classrooms can influence both individual differences in and the ontogeny of motivation and engagement. In this section, we reviewed the findings for a small subset of these aspects. In each case, the extent to which the particular characteristic being discussed provides students with opportunities to feel competent and both academically and emotionally supported predicts higher levels of motivation and engagement. In addition, the extent to which the students are exposed to learning materials and curriculum that they find meaningful and relevant predicts higher motivation and engagement, as shown in a number of intervention studies. We do not have the space to discuss other very important aspects of school and other institutional settings such as peers' influences, types of role models available, violence, cooperative learning opportunities, service learning opportunities, testing and evaluation practices, teacher and instructional quality, quality of counseling, opportunities to be involved in activities that make genuine contributions to the welfare of other members of the school and class community, school transitions, and various district-wide organizational characteristics such as school start and stop time, and links to the labor market and to local colleges. One feature of school organizational structure that we have long been interested in is grade-level configuration (Eccles & Midgley, 1989; Eccles et al., 1998; Wigfield, Byrnes, & Eccles, 2006; Wigfield, Eccles, et al., 2006). Based on our work and that of others, many schools switched from traditional junior high schools to middle schools to better meet students' developmental needs. There is again interest in the impact of how the K-8 configuration influences students' achievement. Kieffer (2013), in a study utilizing the Early Childhood Longitudinal-Kindergarten dataset, found that students in K-8 schools had significantly higher reading achievement scores at the end of Grade 8 than did students in various middle-school arrangements; math scores did not differ. Future studies of school structure also should examine motivational along with achievement outcomes.

With respect to how these school factors influence motivation and engagement, we believe the same basic principles appear to operate across these various influences with respect to how they influence students' motivation and engagement. Interestingly, these are the same basic

principles that explain much of the association of experiences in the family with both individual differences in and the ontogeny of achievement motivation and engagement. Furthermore, these same school, classroom, and family characteristics are also linked to school achievement. Essentially, highly motivated students learn what is being taught. The central issues for educational settings boil down to two points: how best to create a learning context that motivates engagement and then deciding what to teach the students in those contexts.

CONCLUSIONS

Research on the development of children's achievement motivation and engagement remains a vibrant field. Over the past 10 years, developmental researchers have learned a great deal about individual differences in the development of the achievement-related beliefs, values, and goals that impact motivation and achievement. Most importantly, this work has included diverse groups of children in many different countries, particularly in Europe. Although much remains to be done, motivation researchers increasingly include diverse samples in their work, revise their theories to incorporate culture more clearly in their models, and test their theories in diverse groups (see McInerney & Van Etten, 2004). Following Graham's (1994) call, much work has focused on variation *within* different cultural groups, rather than comparisons across groups.

Another important advance is the growing concern for how motivation and engagement constructs in different theories relate to and affect one another. Each of the motivation constructs discussed in this chapter has its own developmental patterns and relations with outcome variables such as performance and choice. There is also substantial overlap among some of the constructs in the various theories and perspectives, both theoretically and methodologically (e.g., Hulleman, Schrager, Bodmann, & Harackiewicz, 2010; Reschly & Christenson, 2012; Schunk & Pajares, 2009; Wigfield & Cambria, 2010; Wigfield & Eccles, 2000). Researchers have begun to investigate these potential overlaps and thus to get a more comprehensive picture of the critical distinction that need to be maintained. Clearly there are potential relations among a variety of these constructs, and these now are being addressed empirically (see Conley, 2012, for a good example of this work).

The need for domain specificity has become even clearer over the past 10 years. Children and adolescents'

achievement-related motivations differ across different activities and school subjects. More attention has been paid in the associations among the developmental trajectories across various domains. With his work on internal versus external frames of reference, Marsh and his colleagues (e.g., Marsh et al., 2008) have documented that doing well in one subject area (such as math) has consequences for one's motivational beliefs and preferences for other subject areas (such as reading). More work is needed on the cross-domain, within-person dynamics over the course of childhood and adolescence, particularly as it relates to identity formation, activity selection, and the role of perceived costs in the relative subjective task value attached to various achievement-related options.

A great deal more also has been learned about social influences on children's achievement motivation and the processes by which they exert influence, particularly with regard to families and schools. Furthermore, although we did not have space to explore the role of peers, siblings, media, and technology on the ontogeny of motivation, the range of socializing influences being studied has also expanded substantially. More work in this area is still needed on diverse groups of parents and children in different countries so that a fuller understanding of the socialization of motivation can be reached. Although some work has been done on the relative influence of different social influences at different ages and in different groups of individuals, much more work is needed that is guided by strong developmental and sociocultural theories about these variations. It is likely, for example, that the relative role of peers versus parents varies at different ages and in different cultural groups. There is some evidence that peers take on more influence on Western individuals' motivation as the individuals move into adolescence (Arnett, 2012) but it is less certain if this is true for adolescents in other parts of the world. There is also speculation that processes linked to brain maturation across the life span, but particularly during the first 30 years of life and particularly related to preferences for risky and sexual behaviors, may lead to different motivational preferences and styles across development.

Lastly, much more has been learned about how children's motivation varies across different contexts, such as in different kinds of families and different school contexts. It has long been known that motivation is not solely a characteristic of the individual, but the new emphasis on "motivation in context" has brought that point out much more clearly. Again, more of this work needs to be done in different countries to learn more about the different

kinds of educational contexts and how they affect different children.

As noted in the Overview, there are two new areas in the field that we know will receive increasing research attention over the next decade. The first is neuroscience and motivation (Reeve & Lee, 2012). Reeve and Lee describe which areas of the brain are associated with basic reward structures having to do with survival and how those become linked to actions, and the importance of the neurotransmitter dopamine in these links. They also discuss frontal lobe structures dealing with decision making, goal setting, and valuing of achievement, to name just a few. The connections between neuroscience and motivation still are emerging in the field and most of the work has been done with adults; we anticipate that developmental work in this area will become much more active over the next decade.

Second is the role of unconscious or implicit motivation and its role in achievement motivation. Early theories of achievement motivation, such as Atkinson's (1957) EVT, emphasized motivation as an unconscious process, as indicated by the use of projective kinds of measures to assess motivation. McClelland, Koesnter, and Weinberger (1989) described two systems of motivation, one implicit and one explicit. One of the reasons for this distinction is the pervasive finding that measures of a construct using unconscious and conscious means do not correlate with one another, which is interpreted to mean that the two systems are independent (Schultheiss, Rosch, Rawolle, Kordik, & Graham, 2010). Schultheiss et al. (2010) discussed how the implicit system is controlled primarily by nonverbal cues and the conscious or explicit one by verbal cues. Despite their independence, Schultheiss et al. discussed the importance of coordination of the two systems with respect to goal pursuit, if the individual is to have a sense of well-being upon completion of the goal. Most of the work addressing these issues has been done by social psychologists studying young adults. To date, very few developmental psychologists have examined these issues. Because of the importance of implicit motives historically in motivation theory and research and also because of the important findings of social psychologists regarding the impact of implicit motives on well-being and other outcomes, we believe it is time to examine them in children. We postulate that very young children are motivated by the implicit system, with the explicit system becoming more important after the child learns to understand and produce language. The relations of the two systems across childhood seem a very important direction for future research. What happens when the two systems are coordinated? Uncoordinated? We believe this

area of research will become more prominent in developmental psychology. Further, it may integrate with the neuroscientific work on motivation. How do changes in the brain throughout childhood and adolescence affect children's motivations, both implicit and explicit?

As noted earlier, there have been important methodological advances that allow study of the development of motivation in increasingly sophisticated ways, with HLM and latent growth-curve modeling being two particular examples. Researchers are also increasingly using person-centered analyses along with more traditional variable-centered measures. Continuing such work will lead to an even better understanding of the *development* of motivation. Coupling such work with investigations into the *processes* involved in motivation's relations to outcomes also will advance the field.

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CHAPTER 17

Origins and Development of Morality

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INTRODUCTION

Morality is a central aspect of social life and has been at the core of psychological theories for more than a century. The scientific study of morality poses enduring questions about how individual psychological needs for autonomy and attachment to groups and society can be met while also ensuring the integrity, dignity, and equal and fair treatment of others. Drawing on philosophy, biology, anthropology, and sociology, developmental scientists have addressed these questions by studying the origins and acquisition of morality as well as the sources and nature of change.

Debates about the nature of morality have a long history dating back to the Greek philosophers. Plato, who wrote about idealized forms of morality in 380 B.C., was challenged by his student, Aristotle, who speculated about what it means to live a good life. Aristotle appealed to virtues as well as to core principles of justice. In the 1700s, debates about morality arose which have continued to this day. Hume (1739/1969) focused on the sentiments (emotions) that motivate morality, and Kant (1785/1959) theorized about rationality and the categorical imperative (e.g., “Act only in accordance with that maxim through which you can at the same time will that it become a universal law” (p. x). Evolutionary (Darwin, 1871/2004) and sociological theory (Durkheim, 1925/1973) also brought new claims to bear on the conceptualization of morality. Current philosophers have continued these debates, albeit in different forms. They have drawn on psychological theories and provided new interpretations of classic theories to develop more integrated treatments of morality, which are influential in how developmental scientists study morality today (Appiah, 2005; Gewirth, 1978; MacIntyre, 1981; Nussbaum, 1999; Rawls, 1971; Sen, 2009).

Despite varying interpretations, most developmental scientists agree that morality refers to individuals’ treatment of others, not (just) the self, and reflects individuals’ intentions and motivations for actions. Beyond this, there are many different emphases, issues, and methodological approaches, which we will review in this chapter. Because conceptual and methodological approaches vary, comparisons across different theoretical perspectives and research programs are often difficult. Nevertheless, as we detail here, developmental approaches derived from very different foundational theories have moved toward more integrative approaches. Progress toward integration does not mean that controversies no longer exist; they do and will be identified here. Yet, some of the heated arguments

of 50 years ago have changed, with disagreements taking on new dimensions.

Organization of the Chapter

Developmental scientists have made tremendous progress in understanding the origins and development of morality (for a review of different approaches, see Killen & Smetana, 2014). This is promising because developmental science and the study of morality continue to serve as reference points for scholarship and research across a wide range of fields, as well as foci for the popular media.

We begin with a description of the major developmental science definitions of morality. We provide a brief review of the theories that provided the foundation for research over the past half-century and then reflect on the controversies and misconceptions that still exist. Next, we review current literature on the developmental roots of morality, mental state knowledge and morality, and moral judgments and reasoning. Subsequent sections examine the various contexts, ranging from the family and peer groups to society, in which moral development occurs. We conclude with implications and directions for research. Throughout the chapter, we demonstrate how the study of morality has shed light on fundamental topics in developmental science, contributed novel methods, and discovered new knowledge about child development.

Overview of Definitions of Morality

In this section we review and highlight the different ways that developmental scientists have defined morality and its acquisition. We identify some of the central positions, recognizing that our brief overview does not fully capture the complexity or nuances of any given approach.

Deontological Moral Judgments

For researchers studying moral judgment, the definition of morality is derived primarily from moral philosophers taking a deontological perspective (Kant, 1785/1959). According to this approach, morality refers to a set of prescriptive norms about how individuals ought to treat one another, including concerns with fairness, others’ welfare, equality, and justice. To act in a way consistent with moral principles, one is required to be impartial and fair and to not be bound by the dictates of group norms or consensus when they are in conflict with fairness and justice. According to Gewirth (1978), morality is a set of categorically obligatory requirements for action for which compliance

is mandatory regardless of institutional norms, laws, or etiquette. Moral judgments, in their full and realized form, promote equality and reflect a focus on intentions, not outcomes. Further, Gewirth (1978) argues that moral judgments respect the integrity of persons and recognize the importance of promoting others' welfare. Notably, this definition identifies what is not included in the moral domain, such as personal desires and laws or customs. Researchers who study moral judgment development examine the emergence of these judgments in ontogeny and focus on the social experiences and relationships that contribute to the child's changing understanding of morality.

Morality as Empathy and Prosocial Obligations

Stemming from the moral philosophy of Hume (1739/1969), a robust line of research emphasizes the emotional basis of morality. Here the focus is on the human capacity for sympathy, compassion, and empathy, which are viewed as the motivations for prosocial and altruistic behavior. Morality is defined by these emotions, and research investigates how empathy and other emotions emerge and change over time. Empathy involves an emotional and cognitive reaction that often leads to acts that benefit others. Prosocial behavior includes sharing and donating resources, cooperating, comforting others, and volunteering to help another without benefit to the self.

Empathy is of concern not only in Hume's (1739/1969) theory but also in Kantian (1785/1959) philosophy, which has identified perfect and imperfect duties. Perfect duties involve acts with a high level of obligation, such as not harming others, acting in a fair and impartial manner, and treating others as an end rather than as a means to an end. Imperfect duties, including beneficence and caring for others, are acts that are good to do but not obligatory in the same way as perfect duties; while it is good to help others, there are contexts in which helping others is not viewed as a moral obligation. The focus of research on empathy and prosocial behavior has been on imperfect duties, such as being prosocial, kind, and compassionate toward others, and, centrally, caring for others. One goal of this research is to examine individuals' motivations to be moral. Moreover, both emotions and judgments (understanding) have been included in these investigations, albeit with different emphases and priorities.

Morality as an Evolutionary Mechanism

The developmental course of morality is an evolutionary one, and thus biological theories of evolution also have provided insights regarding the adaptive mechanisms

involved in moral development in humans. The evidence for this comes from cross-species comparisons as well as from neuroscience studies, with a focus on evolutionary principles of adaptation and change. Evolutionary theorists propose that morality functions to regulate social interactions cooperatively, not selfishly, and to promote the community's common good. The assertion is that the emergence of cooperation requires specific mechanisms that balance the organism's self-interest with concern and respect for others. Darwin (1871/2004) believed that morality was derived from a social instinct and developed toward rationality. Even though his goal was to introduce a biological (not philosophical) basis for morality, Darwin defined morality as the Golden Rule, which resembles the Kantian categorical imperative: "To do good unto others—to do unto others as ye would they should do unto you—is the foundation-stone of morality" (p. 166).

As discussed next, a wide range of researchers share the belief that investigating the building blocks of morality is essential for understanding moral development. Research on the evolutionary bases for morality has most often focused on the behavioral mechanisms that explain the adaptive functions of moral judgments and emotions that contribute to survival. Complementing evolutionary perspectives, technologies such as functional magnetic resonance imaging (fMRI) and electroencephalogram (EEG) have provided new lenses into moral judgments and emotions by documenting the neurological underpinnings of responses to a range of moral problem-solving tasks. Revealing the neuro-circuitry and brain activation associated with moral responses provides insights about what makes moral judgments and emotions unique.

Morality and Identity

Research on moral identity focuses on the extent to which morality is central to one's identity and motivates one to act in a moral manner. Moral identity is seen as the core of morality and is tied to judgments of personal responsibility and integrity, or the realization that consistency (between judgment and action) is at stake in moral action. The focus of this approach is often on individual differences in moral identity, moral motivation, and personality development. Current research on moral identity has focused on its role in promoting civic engagement, exemplary moral actions, and positive political action. Most of the research, however, has been conducted with adolescents and adults, although conceptual connections exist with early research on conscience, the emerging moral self, and shame in young children.

Morality as Conscience

Research on conscience stems from Freud's (1930/1961) theorizing and refers to the internalization of—and compliance with—parental (and societal) norms. Freud defined conscience as the development of the superego (a result of the internalization of parental values) and positive interindividual behavior toward others, which is maintained through a sense of guilt. Early views of conscience involved an internalized mechanism that enables children to do the right thing (as defined by one's society) and to feel bad when they misbehave. Current research on conscience measures internalization as a function of responses to parental disciplinary strategies, which produce individual differences in the strength of conscience. Conscience is most often measured in terms of children's behavioral and emotional responses, including resistance to temptation and self-regulation.

Morality as Cultural Norms

Researchers inspired by anthropological and sociological theories define morality in terms of cultural norms. Morality is seen as including justice and harm, but these approaches extend the moral domain to include interpersonal duties and familial obligations. Cultural perspectives often focus on cross-cultural variations in moral judgments, along with different perspectives on sources of influence and change. Historically, cultural-developmental approaches have defined morality in relativistic terms (e.g., as delineated and varying by cultures), but this area of research has also examined universal applications of morality (for instance, fairness and the avoidance of harm, as manifested by individuals in varying cultural contexts).

Cultural influences on children's acquisition of morality have been examined by studying how cultural agents communicate moral values. The categories of "individualism" and "collectivism" were introduced by cultural theorists to examine how morality is conveyed and developed in ways consistent with these broad ideological templates in Western ("individualistic") and non-Western ("collectivistic") cultures (Shweder et al., 2006). These categories have undergone extensive scrutiny, resulting in research examining their coexistence within as well as between cultures.

Classical Theories of Morality and Their Evolution

Definitions of morality reflect different theoretical approaches and traditions that guide the central constructs,

measures, descriptions of development, and conclusions to be drawn. Definitions, however, do not fully capture the complexity of theories, as we illustrate here. As one example, in recent years emotion researchers have come to appreciate the processes beyond emotions that are necessary for a full explanation of morality (Carlo, 2014). Conversely, researchers studying moral judgment have incorporated attributions of emotions as a fundamental aspect of morality (Arsenio, 2014; Turiel & Killen, 2010). For this reason and to highlight the source of many assumptions in current research, we review traditional developmental theories along with current extensions. Current researchers trace their theoretical roots to different foundational theories, which are reviewed here, along with extensions of these theories: evolutionary theory, prosocial developmental theory, and social domain theory.

Psychoanalytic Theory

Freud's (1930/1961) theory of morality was based on the centrality of parent-child relationships in early life. Freud (1930/1961) wrote about the necessity of understanding the reciprocity inherent in the "categorical imperative," which refers to the Kantian notion of the Golden Rule. Freud's developmental theory did not include an explanation of how individuals come to subscribe to the categorical imperative from the internalization of parental norms. Likewise, although Freud's theory of moral development was based on the social-emotional aspects of parent-child relationships, he did not provide a basis for the acquisition of a general set of moral principles, because the values that are incorporated into the superego were left unspecified (e.g., which parental values are incorporated?). Development was characterized in stages, but only through the first few years of life and culminating in the development of conscience, which was seen as formed by 5 years of age. Early social relationships with parents provide the basis for personality development as well as the formation of morality.

Current research on conscience examines how young children develop mechanisms for inhibiting negative behavior and promoting positive behavior as a result of internalizing parental norms. Conscience is conceptualized as an inner guidance or self-regulatory system involving an integration of moral emotion and conduct (with a limited focus on cognition). This emphasis is partly on the development of a mutually responsive orientation between the parent and child that sensitizes the child to learn proper conduct, codes of caring for others, and

committed compliance. This is exemplified by Kochanska's research on conscience (Kochanska & Aksan, 2006) as well as Thompson's research on early childhood morality (Thompson, 2014).

Behaviorism

Behaviorism, as described by Watson (1930), and later expanded by Skinner (1971), proposed that psychological theories should derive solely from observable behavior. Watson conducted animal experiments focusing on conditioning and also authored a book on the psychological care of infants and children using his behavioral theory of classical conditioning. This theory contributed to a line of research on how learning principles might explain the child's acquisition of morality. Skinner's (1950) theory of operant conditioning elaborated on these notions. Although not specifically applied to child development, Skinnerian behaviorism had a major impact on American psychology, including theories about morality. Skinner (1971) contended that moral values were subject to the same environmental contingencies as any other learned behavior, such as language acquisition and riding a bicycle. Rewards and punishments were deemed sufficient to account for the acquisition of new behavior. This theory created debates within developmental psychology because Skinner rejected the notion of age-related constraints on development, along with propositions about cognitive developmental changes.

Social Learning Theory

Following and extending Skinner's foundational research, Bandura and McDonald (1963) argued for a social learning theory approach to development. The proposition was that children learn through imitation and observation, not just through behavioral contingencies associated with reinforcement. The results from research using Bandura and McDonald's (1963) "forbidden toy" paradigms (in which children were asked to refrain from touching a toy when an adult was absent) suggested that childhood morality was acquired through adult mandates and from learning correct behavior from adult models. Extensive research conducted from this perspective has focused on the role of parental socialization, disciplinary strategies, and the environmental models that induce behavioral compliance to adult standards as measures of successful moral internalization. More recently, researchers from this perspective have argued for a consideration of parents' different goals for children's socialization (see Grusec, Goodnow, &

Kuczynski, 2000). Parents provide structure and strategies to learn domain-appropriate skills, respond to children's distress, and discipline appropriately.

Constructivism

Piaget's theory of constructivism (Piaget, 1932, 1970), with its larger goal of charting the origins of knowledge, provides a foundation for current research on moral judgment development. Piaget's (1932) classic book, *The Moral Judgment of the Child*, was an in-depth account of how moral judgment and behavior emerge in development. Piaget (1970) focused on how moral knowledge arises through the interaction of biological givens (adaptive mechanisms) and environmental influences (peer and adult-child interactions). His theory was based on the premise that knowledge stems from action and that the acquisition of moral knowledge is a continual process of experience, abstraction, reflection, and evaluation.

Reflecting on the unilateral constraint of authority relationships, Piaget proposed that children are initially heteronomous (defining morality as compliance with rules set by an authority) and then become autonomous by 8–10 years of age. This transition was thought to emerge not from parents but through peer interactions, which, due to children's equal status, are characterized by mutual respect. This assertion was a radical thesis at the time (and still is) because Piaget's proposal that parents inhibit morality due to their unilateral authority relationships with children contrasts with the commonly held assumption that parents teach children morality. Rather, Piaget viewed peer interactions as equal, mutual relationships that promote conceptions of equality and fairness. Piaget (1932) was concerned with social interaction (behavior) as well as judgments, as revealed in his analyses of children's actual conflicts and deliberations regarding social rules and norms in peer exchanges, as well as evaluations of hypothetical dilemmas drawn from the child's world. Research has clearly established that peer relations and particularly friendships play important roles in children's moral understanding. Moreover, unlike Piaget's characterizations, adult-child interactions reflect both unilateral and mutual forms of relationships. In addition, Piaget's description of early morality as heteronomous has not survived empirical scrutiny, as recent research has shown that even young children understand the intrinsic basis for rules and do not evaluate transgressions solely on the basis of authority. Piaget's early theories about morality launched research programs in the 1960s and 1970s focusing squarely on

morality (see Turiel, 2006, for a review), as well as current research on intentionality, mental states, cooperation, and theory of mind. These have illuminated the complexity of morality in early development and changes in moral judgments from childhood to adolescence.

Cognitive-Developmental Theory

In the context of American psychology in the 1960s, Kohlberg's (1969) extension of Piaget's (1932) theory of morality contrasted sharply with behaviorism. Kohlberg criticized socialization theory (and behaviorism) for ignoring the child's construction of moral knowledge. He argued that imitation and observation were not sufficient to enable children to understand concepts of justice, fairness, and others' welfare because adults are often erroneous, immoral and subject to flawed logic, leaving unanswered the question of how children who have immoral adult role models formulate mature moral judgments.

Cognitive developmental theory was applied to morality (Colby & Kohlberg, 1987) to identify the underlying logical thinking necessary for moral judgment development. Drawing from Rawls's (1971) theory of justice and his own interview studies, Kohlberg posited that morality develops through six stages organized within three levels (preconventional, conventional, and postconventional) of moral thinking.

Kohlberg's goal of empirically testing philosophical theories with psychological data sparked extensive debates between psychologists and philosophers. His conceptual model created a research agenda for studies of moral development for several decades. Kohlberg proposed that his moral stages were "structured wholes" and that his moral stage system reflected an invariant sequence, similar to Piaget's logical–scientific stages (see Lapsley, 2006, for an elaboration). Individuals were hypothesized to progress through one stage to the next and logically could not skip stages. Despite extensive research, this aspect of his theory was not empirically validated. Many criticisms have been applied to Kohlberg's system by researchers both within and outside his theoretical framework (see Lapsley, 2006; Turiel, 2014; Walker, 2006). Despite these limitations, this program of research was important for providing a developmental theory for the study of how individuals reason about moral issues.

Prosocial Development

Eisenberg and colleagues (Carlo, 2014; Eisenberg, Spinrad, & Knafo-Noam, Chapter 15, this *Handbook*, this volume) extended and revised Kohlberg's global stage theory by

focusing more specifically on prosocial development. They drew from Hume (1739/1969) as well as from Kant (1785/1963) to more closely examine the roles of empathy and sympathy in motivating prosocial behavior. Eisenberg and colleagues showed that children's prosocial moral reasoning, or their thinking about situations in which others have needs that require an opportunity to help, develops through a series of stages. Like Kohlberg, they viewed later stages as reflecting developmentally more advanced modes of thinking, but unlike Kohlberg, they proposed that individuals can use a variety of different levels in their reasoning and that reasoning may vary across different situations and circumstances.

Furthermore, as part of their account of prosocial development, these researchers distinguished between the moral emotion of *empathy*, an affective response that stems from the awareness of another's emotional state (and is similar to what the other person is feeling), and *sympathy*, or an emotional reaction in response to another's state without necessarily experiencing the same emotion as the other (Eisenberg, Spinrad, & Morris, 2014). Age-related changes in prosocial development have revealed that young children are sensitive to the needs of others, help others without external rewards, are not punishment-oriented, and are willing to engage in helping behaviors that do not benefit the self. This line of research has revealed the emotional and cognitive components of prosocial behavior and has offered a more specific and differentiated theory of morality than Kohlberg's global stage model.

Social Domain Theory

Over the past 40 years, social domain theory, formulated by Turiel (1983, 2006), Smetana (2006), and Nucci (2001), has asserted that morality is one of three domains of social knowledge and is constructed out of social interactions. Morality is revealed by the individual's evaluation and interpretation of social events (rather than from direct teaching or transmission). Rather than positing domain-general, global stages of moral development, social domain theory postulates that different domains of reasoning coexist in development. These include the *moral* (issues of fairness, equality, justice, rights, and other's welfare, e.g., physical and psychological harm), *societal* (concerns about conventions, group functioning, social institutions, group norms, traditions, and cultural rituals), and *psychological* (concerns with personal goals, autonomy, identity, and individual prerogatives; Nucci, 2001) domains. These domains of reasoning and social interactions emerge early in ontogeny and follow different

developmental trajectories. In contrast to traditional cognitive-developmental characterizations of early moral development, social domain theory research has shown that young children evaluate moral transgressions as wrong even when there is no punishment or authority mandate. In addition, social domain theory has shown that moral development does not emerge from a self-oriented, pre-moral level (Kohlberg's stages 1 and 2), moving through a group-conventional level (stages 3 and 4), and culminating in a justice level (stages 5 and 6). Instead, empirical research has demonstrated that moral, societal, and psychological orientations coexist within individuals and are brought to bear when evaluating both straightforward and complex events. Children focus on moral concerns in some situations but are also concerned with group functioning or conventions (the societal domain) or with autonomy and personal goals (the psychological domain) in other situations. As well, there are social issues that reflect aspects of all three domains; in these cases individuals may give priority to one consideration while weighing multiple factors.

Social domain research has examined the different criteria as well as the reasons children use to evaluate the legitimacy or wrongness of rule violations. This is important, because judgments of transgression severity, naughtiness, and deserved punishment do not necessarily reflect moral evaluations. For example, there are good (or more effective) ways to brush your teeth, as well as good, expected, or conventional ways of calculating algebra problems, and good (that is, more aesthetically pleasing) poems or artworks. Moral rules are considered to be generalizable across contexts. Theoretically, moral transgressions are wrong even if the agent does not get in trouble or an authority condones the act. Further, the evaluation of moral transgressions is not contingent on the presence of rules; moral violations are wrong even if there are no rules governing them. In contrast, conventional (societal) rules are those rules that individuals view as alterable and a matter of consensus; their wrongness is contingent on rules and authority mandates. Children have been found to apply these criteria to evaluate moral and conventional events at an early age, although perhaps unevenly at first. For example, very young children may recognize that conventional rules are contingent on authority (that authority can deem an act to be legitimate) but not yet understand that conventional rules are alterable and can be changed.

Current research on social domain theory has examined how complex issues such as social exclusion and prejudice (Killen & Rutland, 2011), parent-adolescent conflict

(Smetana, 2011), tolerance of cultural practices (Turiel, 2006; Wainryb & Recchia, 2014), and rights (Helwig, Ruck, & Peterson-Badali, 2014) reflect moral, societal, and psychological considerations. These studies challenge traditional views of global stages of development, which would expect that only one form of reasoning would dominate all of individuals' moral thinking at different development periods.

Evolutionary Theories

In his foundational and ground-breaking book, *The Descent of Man*, Darwin (1871/2004) claimed that human beings have a moral sense, or a prosocial disposition. This was seen as the outcome of a natural evolutionary process rather than divine intervention or religious teaching (Hinde, 1982). This has implications for debates about innate origins of morality as well as the role of adult transmission in moral development. Darwin believed that morality is an adaptation that provides a selective advantage, enabling civilizations to thrive and progress. As with Piaget (1932), morality was seen as stemming from experience and social interactions rather than from direct teaching, because the environment influences the behaviors that are selected.

Darwin identified two main steps by which a moral sense developed in humans. Morality was rooted in prosocial instincts, derived from caring for the young, which offset instincts to be aggressive toward outgroup members. The second step was in the intellectual faculties, revealed through memory, reflection, and the development of conscience (defined as reciprocity or "the Golden Rule"). Darwin theorized that humans were biologically inclined to be altruistic, sympathetic, and moral (de Waal, 2006, 2014) and not solely aggressive and competitive, as has often been mistakenly alleged.

Darwin contrasted nonhuman animals and early hominoids ("tribes") to modern humans. Much of this analysis is theoretical rather than empirical, drawing on his observations of human civilization and theory of natural selection. Evolutionary theorists often debate the evidence for what counts as morality in human and nonhuman primates. Moreover, because most of Darwin's writing focused on the phylogenetic emergence of morality (human evolution across cultures and species), he did not speculate about when during childhood the shift from an early social predisposition to a moral intellectual capacity occurs. Darwin's theory influenced developmental accounts of morality in humans as well as provided the groundwork for more recent research on the biological basis of morality and the existence of morality in nonhuman animals.

Current research on the biological basis of morality includes research on the evolutionary origins of morality as reflected in the behavior of nonhuman primates as well as other animals (de Waal, 2006), investigations of cooperation in young children and primates (Warneken, Chen, & Tomasello, 2006), genetic and biological markers for the recognition of distress in others (Hastings, Miller, Kahle, & Zahn-Waxler, 2014), and neurological evidence for moral thinking and emotion (Decety & Howard, 2014). These viewpoints share a common focus on the biological basis for morality, with some differences regarding the characteristics that are proposed to be uniquely human. The literature overwhelmingly supports a biological basis for morality, which is consistent with a developmental perspective.

Beyond False Dichotomies

A significant change over the past 50 years in the field of morality and moral development has been the move beyond false dichotomies. Below we discuss several such false dichotomies: nature versus nurture, judgment versus action, emotions versus judgment, justice versus care, and cultural relativism versus generalizability.

Nature Versus Nurture

The recent interest in the origins of morality, stemming from constructivist, nativist, biological, and comparative approaches, has led to renewed interest in what has been framed as debates between “nature versus nurture.” Yet, our understanding of the origins of morality (nature and nurture) has become more complex and nuanced. For example, our notions of nature are no longer restricted solely to genetic predispositions or inborn temperamental characteristics. Researchers who emphasize nature focus on the biological or evolutionary basis for morality, the innate capacities of the mind, neurological responses to morally relevant stimuli, and the genetic basis for individual differences in moral responses. Research on gene \times environment interactions has revealed that neither nature nor nurture is static. Genetic information is changed by environmental conditions before and after birth (epigenetic change) and, in addition, individuals respond differentially to environmental stimuli as a function of their genetic make-up (Fox et al., 2005). Thus, nature and nurture are intertwined and mutually influential.

In studying morality, nurture is no longer characterized simply as environmental contingencies or parental socialization. Whereas socialization initially referred to a

top-down process by which parents molded children, who were seen as passive “sponges” absorbing information, extensive research indicates that children are cognitive beings, actively interpreting, transforming, and evaluating social information as early as infancy. Thus, socialization occurs through varied social experiences involving bidirectional and interactive processes (e.g., Kuczynski & Parkin, 2007).

Judgment Versus Behavior

Another false dichotomy is that of judgment versus behavior. Traditionally, sharp distinctions have been drawn between approaches that focus on one or the other. Initial discussions about the relationships between judgment and behavior focused on whether individuals’ judgments about the right course of action are correlated with their actual behavior. A central limitation of framing the issue in this way, however, is that most situations are multifaceted. Actual situations are complex and involve multiple considerations (e.g., the relationship between a transgressor and a victim, their past history, the degree of harm inflicted, the intentions of the actor). To adequately compare hypothetical and actual situations there needs to be a control on the number of variables in each context (Turiel, 1983). It is important to know how individuals weigh these considerations in comparing judgments and actions; otherwise the analysis is incomplete. Reflections about the context bear on (and are related to) individuals’ determinations of the right course of action. Moreover, theorists often point out that behavior alone does not elucidate moral motivations because intentions can be positive or negative. Judgments that concern issues that individuals have confronted, whether abstractly or in actuality, provide the basis by which to draw connections between experiences, inferences, interpretations, and outcomes.

Further, neuroscience research has revealed the close interaction between cognitive functioning and behavior, making it difficult to fully differentiate the two. Cognition occurs while individuals are interacting in the world. Saxe (2009), a neuroscientist who studies morality, argued that observable behavior reveals only a small amount of information about “what matters,” because humans are much more interested in perceiving and inferring mental states. In fact, few researchers examine only judgment or behavior in actual situations; most studies include different measures of attitudes, judgments, and evaluations along with social experience, interactions, relationships, and behavior to study their interrelationships. This issue remains a prominent theme that warrants further investigation.

Emotions Versus Judgment

Emotions and judgments are both central to morality and yet, these constructs are too often portrayed as an overly simplified dichotomy. Hume did not define morality solely as emotions, nor did Kant define morality exclusively as judgment, although interpretations of their work and the psychological science research they have generated continues to discuss these constructs as mutually exclusive. Empathy and sympathy, for example, reflect feeling states but also cognitive components regarding the target of empathy, the attribution of harm or distress, and the motivation of the recipient of empathy (Hoffman, 2000; Nussbaum, 1999). Conversely, judgments about respect for life and the integrity of persons involve elements of caring for another individual (Carlo, 2014; Turiel, 2014). Artificially demarcating some responses as “emotions” or “judgments” runs the risk of ignoring the full meaning of morality. Yet, debates remain about whether morality is fundamentally about judgments regarding fairness and equality, or emotional processes and interpersonal care. Recent research on these different orientations reveals that both constructs are important and coexist within individuals.

A recent instantiation of the emotions versus judgments duality can be seen in writings emphasizing the role of moral intuitions over judgments (e.g., Haidt, 2001, 2007). Haidt’s social intuitionist view draws on both evolutionary theory and moral neuroscience to argue that responses to moral events are primarily affective, intuitive, and automatic, whereas moral judgments, when they occur, reflect post-hoc rationalizations (see Decety & Howard, 2014, for an alternate developmental neuroscience view). The argument is that an automatic, very fast, and emotional system evolved to respond to threat and does most of the moral “heavy lifting” (Haidt, 2001). Haidt argues that although moral deliberations may have a role in morality, the cognitive system is an evolutionarily newer and more limited adaptation that is restricted to overriding intuitive responses. These notions have gained much currency recently, particularly in social psychology, but the direct evidence for these propositions is limited and based on experimental tasks posing highly unusual and extreme situations (e.g., eating your dog; incest). Furthermore, developmental data supporting these notions are rarer still. Yet, as others have claimed (Turiel, 2006), processes that look automatic in adulthood may appear so because they have been deliberated and negotiated during childhood, thus becoming habitual over time. In addition, the intuitive viewpoint of morality does not help

to understand the sometimes difficult deliberations that children, adolescents, and adults engage in when making complex moral decisions.

Justice Versus Interpersonal Care

Interest in gender differences in morality has ebbed and flowed over the years. Gilligan (1982) pointed to statements that Freud, Piaget, and Kohlberg all made regarding gender differences in morality suggesting that morality in females is inferior to that in males. Gilligan (1982) argued instead that females and males have different moral orientations and that characterizations of females’ moral orientations were undervalued. More specifically, she proposed that Kohlberg’s moral reasoning stages, which focus on the developing understanding of justice, were characteristic of males, whereas females develop a morality of care entailing responsibility to others, the need to avoid harm, and the self as embedded in relationships. Gilligan believed that care reasoning was overlooked in theories of moral development because the prominent theorists were males and because Kohlberg’s theory was originally developed with a sample of boys.

Although Gilligan’s hypotheses generated a storm of interest, she conducted little systematic investigation of her hypotheses, relying primarily on exemplars of boys’ and girls’ reasoning. Extensive research in the 1980s and 1990s, as well as a meta-analysis of studies (reviewed by Walker, 2006) investigating her claims led to the conclusion that there are few systematic sex differences in children’s moral reasoning. In fact, much research revealed that both males and females value justice (e.g., equal rights) and care (e.g., family responsibilities). Indeed, the proposition that fairness is a male orientation ignores the significant efforts women have made to fight for their own just, fair, and equitable treatment. However, Gilligan’s work called attention to the need to include care, compassion, and others’ welfare in definitions and assessments of morality. These views have become integrated into current conceptions of morality and moral development.

Cultural Relativism Versus Cultural Generalizability

Finally, the issue of culture and context is fundamental to the study of morality, and there have been dramatic changes over the past several decades in how these issues have been conceptualized and studied. Culture is central on many levels. Cultural norms and ideologies often provide frameworks for considerations of who is worthy of or should receive fair treatment, as reflected in concepts of personhood, the status of nonhuman animals,

the relationship of humans to nature, and many other fundamental components of moral decision-making. Conceptually, the ways in which cultural ideologies frame, influence, and contribute to moral development continue to be extensively debated.

Defining morality in terms of cultural norms, however, runs the risk of relativism. Spiro (1987), an anthropologist, pointed out that some positions on relativism have a prescriptive basis, such as “one should not impose one’s values on other groups and cultures; each society has its own morality.” Spiro (1987) argues that this form of relativism is actually a call for tolerance, rather than an extreme form of “anything goes.” Moreover, acts of genocide, violations of human rights, and war crimes are viewed as wrong by most individuals around the world, because they involve suffering inflicted on others. At the same time, supporting universalism does not mean that cultural norms are unimportant or are not influential in morality. Cultural norms provide challenges and obstacles as well as protective factors in daily life and must be understood in relation to morality.

Use of expansive categories such as individualism versus collectivism (Shweder et al., 2006) to characterize cultures has declined over the past few decades. Instead, researchers have focused more on within-culture studies and have examined how different characteristics coexist within cultures (and within individuals; see Oyserman, Coon, & Klemelmeier, 2002; Wainryb & Recchia, 2014). Nonetheless, cultural psychology has been influential in pushing developmental scientists to broaden the samples used to study morality. For this reason, and because so many studies on morality include diverse cultural samples, we have incorporated issues of culture throughout the chapter rather than isolate culturally relevant studies in a separate section. In the next section we begin our review of the six central areas of morality and development covered in this chapter.

THE ROOTS AND EARLY EMERGENCE OF MORALITY

An understanding of moral development requires an examination of its origins. Documenting the roots of morality is important because it addresses fundamental questions about the role of nature and nurture and the evolutionary basis of behavior. We do not take a position here on what aspects of morality are uniquely human. Yet, the types of evidence supporting both continuity (what we share

with other species) and discontinuity (what makes humans unique) are relevant for morality, given that both developmental and comparative psychologists are interested in charting the origins of sociality.

In fact, current research demonstrates that infants are social beings from the very start, before there is much opportunity for imitation or the ability to learn from modeling. While research on the early roots of morality does not negate claims that these processes are important in moral internalization, it demonstrates that children have moral propensities at very early ages.

Early Origins: Awareness of Moral Categories in Infancy

The distinction between *sociality* and *morality* is crucial for interpreting research relevant to the origins of morality. All social behavior is not necessarily moral behavior; the bar for what counts as moral is more stringent and includes an obligation to treat others in a fair and just manner. Much of the research on the early roots of morality focuses on cooperation and prosocial behavior. Because these behaviors lack a prescriptive, obligatory basis, questions have been raised about whether these constitute moral behaviors—or positive socially oriented behaviors that contribute to the development of morality. Nevertheless, social awareness is a central prerequisite for morality. For this reason we review literature on early sociality that bears on moral development.

Recent research shows that infants spontaneously engage in social interactions without extrinsic rewards and orient toward helping and caring for others. Evidence for sociality in infancy is extensive and includes a wide range of behaviors, such as having intentional goals toward others (Woodward, 2009), engaging in reciprocal and positive interactions in family contexts (Dunn, 2014), helping others in the second year of life (Brownell, 2013), and responding to the distress of others (Hastings et al., 2014). Due to limitations in the types of responses obtainable from preverbal infants and toddlers, recent evidence has been experimental and laboratory-based, employing a constrained set of behavioral responses (for instance, looking time in infants; reaching behavior in toddlers). This is in contrast to early foundational studies of infant behavior, such as Piaget’s (1952) naturalistic observations of his own children’s reaching, grasping, and finding objects, and Bowlby’s (1969) studies of attachment, which documented children’s needs to maintain proximity to their caregivers in threatening situations.

Once children reach preschool age, the responses available to researchers widen to include verbal reasoning and judgments, spontaneous peer interactions, and responses to social dilemmas in the context of experimental situations. Next we focus on the roots of morality in infancy and early childhood, considering three areas: awareness of others' welfare (physical and psychological harm); awareness of equality, equity, and fairness (resource allocation and turn-taking); and children's cooperation, helping, and empathy.

Awareness of Others' Welfare

Research by Zahn-Waxler, Hastings, and their colleagues (Hastings et al., 2014) has demonstrated that toddlers respond to others' distress and make overtures to help, revealing an orientation toward concern for others. These studies have developed a standard experimental paradigm where an adult experimenter feigns accidental self-harm (cutting one's finger on a board or hurting one's knee and crying "ouch!"), and coders measure toddlers' responses to the experimenter's distress. Research employing this paradigm has found that, by 14 months of age but not before, infants show both nonverbal and verbal concern for the adult. This benchmark reflects toddlers' spontaneous response and orientation to help another without adult encouragement, extrinsic reward, or instructions.

Recently, Davidov, Zahn-Waxler, Roth-Hanania, and Knafo (2013) have called into question the assumption that concern for others does not emerge until the second year of life. Contrary to previous theories, they report that self-other differentiation is evident in 1-year-olds. For example, infants show more distress in response to another infant's cries than to their own (Dondi, Simion, & Caltran, 1999). Davidov and colleagues (2013) refer to these forms of self-other distinction as implicit rather than explicit (e.g., as evidenced by touching one's rouged nose in the mirror). Along with others, they view the self-other distinction as a prerequisite for responding to another's distress. Thus, they argue that their findings provide the basis for responding to the distress of another even earlier, in infancy, than presumed before.

While prosocial responses are a central aspect of morality, more research is needed to document when young children view acts as wrong because of the harm caused to another person and the experience of harm felt by a potential victim. A new line of research with infants provides more information on this issue. To measure whether infants under one year of age distinguish between positive and negative acts toward another agent,

Hamlin and her colleagues conducted experiments that measured whether 6- and 10-month-old infants preferred to look at a "helper" or a "hinderer," depicted in a short video where two blocks moved together up a steep incline (Hamlin, 2013; Hamlin, Wynn, & Bloom, 2007). A round-shaped block (animated with eyes) moved, while another square block nudged it from behind. On separate trials, infants watched the same round block move up the incline but with a triangular-shaped block pushing the round block back down the incline, thus hindering its actions.

The research examined whether infants would view the former actions as "good" and the latter actions as "bad" (for a review, see Wynn & Bloom, 2014). Findings showed that infants preferred to look at the helper longer and reached for the "helper" rather than the "hinderer" when given the option to choose. Other experiments have shown that infants will reach for puppets demonstrating prosocial rather than apparently antisocial intentions (Hamlin, 2013). These prosocial orientations, as measured by visual preference and behavioral reaching, are seen as providing evidence for an innate basis for morality. Although these findings have generated some controversy, the surprising aspect of the Hamlin et al. studies is the very early ages (6–10 months) at which human infants reveal an agent-oriented (social object) rather than object-oriented preference. This early agent-oriented set of behaviors may provide the basis for the development of evaluative rules about the prescriptive treatment of others, but further research is needed to demonstrate this by making direct connections between the types of responses observed in infants and in young children's moral judgments.

Research by Warneken and Tomasello (2009) with toddlers has shown that 14-month-olds will help an adult stranger open a box, get a pencil, and solve a problem when the adult looks mildly distressed or confused. Whether toddlers' behaviors reflect responses to the distress of an adult or prosocial actions designed to help another is not fully known, but the data have provided further evidence that responses to another's concern are evident very early in development (Warneken & Tomasello, 2009); importantly, these behaviors are not performed simply to obtain external rewards. Further research is needed to determine whether toddlers view it as necessary or obligatory to help and wrong if one does not. Research with toddlers has shown that they evaluate moral and nonmoral social interactions differently (Smetana, 1984), indicating that their sense of obligation emerges during this age.

Awareness of Fair and Equal Resource Allocation

Children's understanding of fairness is a central moral concept that also emerges in early childhood. Foundational research by Damon (1977) documented moral understanding regarding the fair distribution of resources by middle childhood. More recent research has investigated whether a preference for the fair allocation of resources, or an understanding of the wrongfulness of unfair allocation, emerges in infancy and early childhood. A range of approaches and methods drawing on behavioral economics (Fehr, Bernhard, & Rockenbach, 2008), comparative psychology (Brosnan & de Waal, 2012; Warneken, Lohse, Melis, & Tomasello, 2011), cognitive development (Geraci & Surian, 2011), and moral development (Cooley & Killen, *in press*; Smetana, 1985) have shown that children younger than the age of 6 years have a preliminary understanding of the importance of distributing resources equally or equitably.

Research on fairness in young children from various disciplinary perspectives has addressed somewhat different questions. Research from behavioral economics aims to demonstrate how individuals (mostly adults) maximize the best outcome given a range of possible strategies to achieve this goal. It also examines the strategies individuals use when playing the Dictator game, which involves choosing among multiple options for maximizing an advantageous outcome; the paradigm has been modified and simplified for children in several studies (Gummerum, Hanoch, Keller, Parsons, & Hummel, 2010). In contrast, evolutionary perspectives draw on cross-species and phylogenetic data, using behavioral tasks to address the central question of the origins of human cognition. In this view, resource allocation is viewed as an adaptive mechanism in development (Brosnan & de Waal, 2012). In contrast, the focus of infant cognition research is to determine how early in ontogenesis humans can discriminate between different stimuli that reflect constructs such as morality, albeit in a preliminary form. These studies rely on visual habituation and visual looking time to demonstrate preferential knowledge.

Geraci and Surian (2011) examined infants' (10- to 16-month-olds') preferential looking and behavioral choices to the outcomes of computer-animated events depicting equal and unequal distribution of resources. Older infants looked longer at the fair than at the unfair distributor. In addition, infants in the older group—but not the younger group—were more likely to pick up a toy that was identical to the computer-generated image of the fair rather than the unfair distributor. The researchers concluded

that a preference for fair distribution is evident in infancy. Furthermore, the authors noted that the results were consistent with other recent studies involving nonhuman primates; capuchin monkeys showed negative reactions to unequal reward distributions in exchanges with human experimenters (Brosnan & de Waal, 2003). In addition, monkeys refused to participate if they observed a conspecific obtain a more attractive reward for equal effort. These findings suggest that there is an evolutionary basis for a concern with fairness.

Warneken et al. (2011) showed that when 3-year-old children performed a task together that resulted in a reward, children were more likely to share equally than not, even when the rewards could be monopolized. In the first of several studies, children were more likely to share resources when the rewards were gummy bears rather than stickers, but the researchers did not find a difference between food and nonfood rewards in the follow-up study. These results indicate that there is an emerging sense of equality for distributing rewards, which leads to successful collaborations in early childhood. However, the researchers did not examine why 3-year-olds shared equitably and how this compares with other findings showing benefits to the self or ingroup preference regarding resource allocation; this issue requires further inquiry and explanation.

Moreover, decisions about resource allocation do not occur in a vacuum. A number of contextual features are activated in most allocation contexts, including social relationships, the history of interactions, and group dynamics. When such partner features are included in the research designs, young children weigh these social dimensions in their resource allocation decisions. For example, Olson and Spelke (2008) found that friendship status affected 3.5-year-olds' allocations; young children more often allocated equal resources to puppet friend than nonfriend dyads. Moore (2009) replicated this finding in the same age group when distributing resources to an actual friend. These findings suggest the importance of including relationship contexts and interaction features in this research. Moving forward, measuring social and moral reasoning may illuminate why children prefer one type of choice over another.

Several recent studies have examined young children's reasoning about resource allocation and revealed that young children (prior to the age of 6) understand equality and merit. Baumard, Mascaro, and Chevallier (2012) found that preschoolers focused on effort when they were given the option to distribute a large or small cookie to a hard-working child (who made the cookies) or a lazy

one (who did not). This study revealed a rudimentary understanding of merit in 4-year-olds. Although children were able to match the amount of the resource with greater effort, Baumard et al. (2012) found that children preferred to distribute cookies equally when this option was made available. In fact, only a small minority of children explicitly used merit as the reason for their decision. For example, children who gave the larger cookie to the harder worker often gave nonmoral reasons such as "She has a bigger mouth." These findings suggest that merit-based reasoning emerges slowly in early childhood, with some children acknowledging merit but most preferring equal allocation when given the opportunity to do so.

In another study, young children's preference for equality (equal allocation of resources) was pitted against their loyalty to group norms (Cooley & Killen, *in press*). When asked to divide resources between the ingroup and the outgroup (defined by classroom affiliation), 3.5- to 6-year-old children supported an ingroup member who wanted to divide resources equally, even when the rest of the group wanted to keep more for themselves. Children gave priority to equal allocation over group norms, and used reasons based on equality. With age, children increasingly expected that the group would be less favorable toward the equal allocating deviant than did younger children (even though they were favorable towards this "ingroup deviant"). These results differed from previous research because equal allocation in this study design meant going against their peer group's desire to keep most of the resources for their own group. Young children are willing to challenge an ingroup norm in order to maintain their preference for equality.

Cooperation, Helping, and Caring

Research has also shown that young children cooperate spontaneously. Brownell (2013) pointed to a dramatic shift in cooperation from the first to the second year of life when engaged in nonverbal tasks designed to enable two children to coordinate their actions to obtain a desired toy. Brownell, Ramani, and Zerwas (2006) found that 12- and 18-month-old peers did not take their partners' behavior into account in this task and were not able to cooperate to obtain their goals. However, 24- to 27-month-olds were able to do so successfully and by 30 months, they conveyed information to their peers about what to do. Thus, Brownell and colleagues have documented age-related shifts in the coordination of behavior to cooperate and achieve mutual goals. These findings contrast with those of Warneken and Tomasello (2007), who have shown that 14-month-olds

can cooperate with adults. The differences between these results may reflect differences in the partners (peer or adult) studied, because adults can fine-tune their behavior to accommodate children's intentions. Consistent with Piaget's (1932) claims, Brownell noted that social knowledge created in adult-child and peer exchanges are qualitatively different. Piaget believed that equal relationships between peers provided a basis for the construction of morality, but in the experimental studies demonstrating early cooperation in adult-child encounters, adult experimenters asked children for help in solving a problem and thus functioned more like peers.

Warneken and his colleagues (2006) have conducted other studies comparing children's cooperative behavior (with an adult partner) to that of chimpanzees. These studies examined whether shared intentionality (e.g., when both interacting partners have a joint goal and develop joint attention or plans for achieving their shared goal) is uniquely human. The tasks were nonverbal to facilitate cross-species comparisons. In one study, Warneken et al. (2006) gave 18- to 24-month-old children four tasks involving tools that required cooperation to solve successfully. For example, in one task, a tube with handles had a toy inside, and obtaining the toy required that two people simultaneously pull both ends. The results showed that cooperative behavior has roots very early in childhood. Children were able to cooperate with an adult partner, and the ability to coordinate significantly improved from 18 to 24 months of age. Studying even younger children (14-month-olds), Warneken and Tomasello (2007) demonstrated that infants helped an adult open a box for no external rewards. These studies point to the ontogenetic origins of cooperative behavior.

Vaish, Carpenter, and Tomasello (2010) studied prosocial behavior toward those who helped or harmed others. In many ways, this research is a natural extension of the Hamlin (2013) studies into early childhood. Vaish et al. (2010) recorded children's behavior while observing an adult who helped the recipient (by picking up the fallen objects) or harmed another child (by breaking necklaces, or tearing up pictures made by the other child). Children took into account another's harmful actions when deciding whether or not to help them. Children were less likely than would be expected by chance to help the adult who acted harmfully, but no differences were found for the adult who helped. The authors acknowledged that children may have been afraid of the harmful adult and thus acted out of self-protection rather than in response to moral concerns with fairness and rights.

To partially address this possibility, Vaish, Missana, and Tomasello (2011) investigated 3-year-old children's interventions in third-party moral transgressions using the same experimental paradigm but involving two puppets (not an adult). Children either observed a puppet destroy a picture made by another puppet or watched another puppet act in a similar manner without destroying the puppet's picture. Children protested the destruction of the picture and tattled on the actor; they behaved more prosocially toward the recipient who had an object destroyed than the one who did not. Thus, as young as 3 years of age, children protested another agent's moral transgressions.

Most of the studies reviewed here involve behavioral measures of cooperation, allocation decisions, or refraining from helping a harmful adult but do not reveal why children acted as they did. An interesting and important next step in this research would be to connect these behavioral responses with children's reasoning about their preferences and choices. This would add more information about children's motives and intentions regarding helping and cooperation, as well as their interpretation of these events. In the next section, we discuss research that includes young children's reasoning about issues of fairness, equality, and others' welfare; these issues will be expanded in the following section on moral reasoning and judgments.

Moral Judgments in Early Childhood

Researchers have conducted experimental and observational studies to determine whether children's decisions and methods of conflict resolution, evaluations of rule transgressions, and responses to peer and adult protests reflect an understanding of moral concerns about fairness, equality, and harm (Nucci & Nucci, 1982). In studies of conflict resolution, for example, young children left to play with toys on their own and in the absence of adults have been shown to use moral reasons about fairness when discussing object disputes, despite expectations from adults that they would resort to aggressive strategies (Hay, 2006; Ross & Conant, 1992). In fact, during adult-supervised activities, children are more likely to turn to teachers to resolve conflicts rather than to use collaborative modes of discourse to bargain, compromise, and trade toys, as documented in peer exchanges (Killen & Turiel, 1991).

Further, young children 2.5 to 6 years of age increasingly use verbal information to identify ownership when playing with toys. Blake, Ganea, and Harris (2012) found that by 4 years of age, children interpreted third-person statements, such as "That's Billy's ball," as more reliable

cues to ownership than first-person statements, such as "That's my ball." In a related study, Blake and Rand (2010) found that children's preferences regarding resources affected children's willingness to donate stickers; children donated their least favorite more often than their favorite stickers. These findings reveal that children use information regarding ownership and value preferences to determine how to allocate resources and that they considered these factors more with age.

A number of studies have employed structured interviews with preschool children to obtain their evaluations of straightforward, hypothetical, and prototypical moral violations (for instance, hitting, teasing, or taking another child's toys) as compared to conventional violations (such as standing during naptime, wearing pajamas to daycare, or not saying "please"). These studies provide robust evidence that by about 3 years of age and more consistently by the age of 4, young children distinguish moral from social conventional violations; both forms of transgressions are also understood as distinct from issues of personal jurisdiction and autonomy (see Smetana, 2013; Smetana, Jambon, & Ball, 2014, for reviews). For example, children treat moral transgressions as more generalizable wrong (e.g., wrong across several contexts) and more wrong in the absence of rules and authority sanctions than social-conventional transgressions. These distinctions have been validated in a wide range of cultures, including samples from North America, China, Central and South America, Europe, and the Middle- East (see review by Smetana, 2013). For instance, in interviews with 4- and 6-year-old Chinese children from lower socioeconomic status families in Hong Kong, Yau and Smetana (2003) found that all children viewed prototypical moral transgressions as more serious, more wrong across contexts, and more wrong independent of authority than conventional events, based on justifications regarding the harmful or unfair consequences of the events for others. They also distinguished personal domain events from both moral and conventional ones. Children in Cartagena, Colombia, as well, viewed moral transgressions about harm as distinct from conventions and issues about personal choice (Ardila-Rey & Killen, 2001). Thus, these studies reveal that these distinctions are broadly applicable across diverse cultures.

Young children also treat harm to others (such as a child pushing another child off a swing) as more wrong than harm to the self (such as when a child purposely jumps off a swing), even when violations have similar consequences (Tisak, 1993). Indeed, children treat moral transgressions as more wrong even when prudential violations have

more severe consequences than moral ones or when the consequences of moral violations are depicted as minor (Tisak, 1993). Thus, these judgments are not based on severity but rather on whether acts cause harm to others as opposed to the self.

Most of the research on moral judgments in early childhood has been cross-sectional, but recently, Smetana and her colleagues (Smetana, Rote, et al., 2012) examined longitudinal changes over 1 year in 2.5- to 4-year-olds' judgments regarding prototypical moral transgressions. At the first of the three assessments, children (divided into two age groups for this analysis) distinguished moral and conventional rules and transgressions on nearly all of the criteria studied (although younger children did not make this distinction in terms of deserved punishment). Furthermore, age-related changes in the acquisition of moral concepts based on these criteria as well as individual differences in the rate of growth were found. Thus, these findings suggest that robust domain distinctions are evident early in development and that different experiential factors influence how moral concepts are conceptualized and consolidated in early childhood.

Furthermore, experimental studies have demonstrated that children make moral judgments and distinguish moral from conventional rules on the basis of their features rather than their knowledge of the specific content of acts. When young children (3-year-olds) were asked to evaluate events that were unspecified and labeled using nonsense words, they made moral judgments when acts were depicted as wrong across contexts and having consequences for others' welfare. In contrast, they made conventional judgments when acts were described as contextually relative and prohibited by adults although they did not cause harm or violate rights (Smetana, 1985). These findings are consistent with studies described earlier showing that young children are concerned about harm and unfairness.

Preschool children's moral understanding also differs according to whether they were the victims or perpetrator of transgressions. Wainryb, Brehl, and Matwyn (2005) obtained preschoolers' (as well as 5-, 7-, 11-, and 16-year-olds') narrative descriptions of moral conflict situations where they either hurt or were hurt by a peer. Their extensive analyses demonstrated that children's descriptions became more complex with age, but they also varied as a function of whether children narrated experiences as victims or perpetrators. When reporting being victimized, children primarily focused on the harm inflicted on them and on their own emotions. In contrast, when narrating experiences as perpetrators, and increasingly with

age, children offered more complex narratives that focused on their own and the victim's experiences and included a broader range of concerns and emotions.

In keeping with these findings, preschool victims of actual moral transgressions (as observed in their preschool) rated those transgressions as more serious and more deserving of punishment than did the same children, when they were violators. However, when children were in the role of transgressor, they viewed their behavior to be more justified than they did when they were victims (Smetana, Toth, et al., 1999). The factors that contribute to different attributions of these situations warrant further examination.

In some studies, children apply moral criteria at younger ages when the moral events reference physical harm than when these events pertain to psychological harm or unfairness (see Smetana et al., 2014, for a review), but more research is needed to understand why children apply moral criteria at earlier ages to acts involving physical than psychological harm or unfairness and why some transgressions are more complex for children to understand.

Summary: Roots and Early Emergence of Morality

Over the past decade, there has been a substantial increase in interest in studying the early roots of morality in infancy and early childhood. This research has been motivated by a variety of different theoretical perspectives and concerns and has drawn on new methods developed for research with preverbal infants and young children. Studies of the fair allocation of resources, others' welfare and harm, and cooperation provide compelling evidence that children are attuned to moral concerns at very early ages. Thus far, however, little research has connected these very early predispositions to the development of moral concepts across different ages. This is a crucial next step for research and will be important for understanding trajectories of moral development across the lifespan.

At present, the early developmental story is intriguing but remains incomplete. More expansive criteria are needed for defining what "counts" as a moral behavior or response, especially in infancy, and particularly for the distinction between moral and prosocial responses. In addition, there has been little attention to issues of generalizability across different ethnic groups, cultures, and socioeconomic statuses. This may stem from the theoretical assumptions motivating these different lines of research, particularly the assumption that these reflect universal moral developmental achievements. These issues warrant further empirical attention.

Finally, the studies of early moral judgments reviewed in this section indicate that children make distinctively moral judgments regarding both hypothetical and actual prototypical transgressions when they are straightforward and involve simple connections between intentional acts and the negative outcomes produced. As we discuss in the following section, however, an understanding of others' mental states is needed to appreciate more complex situations, where the links among acts, intentions, and outcomes are less straightforward.

MORALITY AND KNOWLEDGE ABOUT MENTAL STATES

Over the past 10 years, there has been a great deal of new research examining the role of mental state knowledge in young children's moral development. This research has increased our understanding of both the limitations and emerging competencies in young children's morality and the developmental processes that may underlie them. In this section, we describe studies on theory of mind, psychological knowledge, and intentionality awareness as they bear on morality.

The notion that children's understanding of others' mental states may be implicated in children's developing morality is not new. Piaget (1932) was among the first to recognize the importance of children's psychological understanding in the development of moral judgments. As noted earlier, he believed that young children have a limited understanding of intentionality but that with age, they begin to consider actors' intentions in their moral judgments. These claims were extensively tested and expanded in the 1970s and 1980s, but as interest in Piagetian stage theories waned, research on the role of psychological knowledge in moral judgment development languished. Although research on theory of mind has flourished over the past 25 years, research and theorizing about the intersections between theory of mind and moral development has been quite recent (Chandler & Lalonde, 1996; Wainryb & Brehl, 2006; Wellman & Miller, 2008).

Despite ongoing theoretical debates about the nature of and processes involved in theory of mind, there is a fair amount of convergence in descriptions of the developmental trajectory of children's mental state understanding (see Hughes & Devine, Chapter 14, this *Handbook*, this volume). Infants evidence goal-directed behavior during the first year of life, reflecting an early precursor of intentionality and of children's psychological understanding more generally (Wellman, 1990; Woodward, 2009).

Most research on children's developing psychological knowledge has focused on achievements during the pre-school and early school years, especially the development of an understanding of false beliefs, although some researchers have shown that psychological understanding continues to develop well beyond these ages (Chandler & Lalonde, 1996). Mental state knowledge has been shown to develop in a fairly predictable sequence (Wellman & Liu, 2004), although some cultural differences have been found in the ordering of specific abilities (Fang, Wellman, Liu, Liu, & Kang, 2009). More generally, development is seen as reflecting a shift from a view of the mind as a copy of reality to a more active and constructivist view (Chandler & Lalonde, 1996; Wainryb & Brehl, 2006). Thus, children come to understand that their view of the world may differ from others' and that individuals actively interpret their experiences based on their beliefs and expectations.

There is less agreement about which theory of mind abilities are implicated in moral development and the nature of their interrelationships. Associations between mental state knowledge and children's moral understanding (and behavior) typically have been examined by studying children's responses to hypothetical, morally salient stories (sometimes but not always associated with theory of mind tasks). Some studies have also examined children's discourse or narratives for evidence of young children's use of mental state language. Increasingly, researchers have employed behavioral tasks or tasks that require minimal verbal ability (Vaish et al., 2010). Most of the research on intersections between theory of mind abilities and morality has focused on young children. This is changing, though, as we will demonstrate, with new measures allowing for investigations of mental state knowledge in middle childhood and adolescence.

In their research on references to mental states when discussing the roles of victims and perpetrators, Wainryb and her colleagues (2005) concluded that young children are unable to grasp the psychological aspects of their moral conflicts. References to mental states increased from the ages of 5 to 16 years (at which point half of their accounts include such references), and the large majority of older children's narratives focused on both their and others' beliefs, intentions, and emotions as they interpreted situations and tried to figure out what was happening.

False Beliefs, Diverse Beliefs, and Moral Judgments

Because the capacity to understand false beliefs is often seen as a hallmark in the acquisition of theory of mind in

childhood, a number of studies have focused specifically on how acquiring this understanding results in advances in moral judgments. For instance, Takagishi, Kameshima, Schug, Koizumi, and Yamagishi (2010) found that preschoolers who passed a standard false belief task proposed more equitable solutions than those who did not. Because more than a third of the children who failed the false belief task also proposed fair offers, the researchers concluded that mental state understanding may enhance fairness in this context but may not be a necessary condition for it. Yet, an explanation for why false belief knowledge might spur greater fairness remains to be delineated.

In a study of 4-year-olds, Dunn, Cutting, and Demetriou (2000) also found associations between false belief understanding and children's understanding of moral transgressions. These researchers found that more advanced false belief understanding as assessed on standard theory of mind tasks was associated with greater use of moral justifications focusing on the welfare and feelings of others when considering hypothetical victims of moral transgressions. Thus, Dunn et al. (2000) viewed children's understanding of other minds (as well as their emotion understanding) as central to the development of moral understanding.

Flavell and colleagues (Flavell, Mumme, Green, & Flavell, 1992) viewed the standard assessments of false belief understanding as reflecting only one type of false belief and examined commonalities between "factual" false beliefs and differences of opinion regarding conventional or moral values and property ownership beliefs. Children's understanding of these different beliefs was highly correlated, leading these researchers to conclude that the ability to appreciate diverse beliefs is applied in similar ways to different content domains. Furthermore, consistent with other research (Wellman & Liu, 2004), Flavell et al. (1992) found that 4- and 5-year-olds but not 3-year-olds were able to attribute different beliefs (including those about morality) to others.

Yet, Wainryb and Ford (1998) have asserted that moral judgments may change in ways that go beyond what would be expected based simply on cognitive advances in theory of mind. Children's developing psychological understanding may constrain but not necessarily predict children's moral judgments. These researchers examined the role of 3-, 5-, and 7-year-olds' moral beliefs and informational (factual) beliefs in making moral judgments. They found that 3-year-olds were unable to grasp that others held divergent beliefs of either type; in contrast, older children were able to correctly attribute different moral and informational beliefs to others. Further, with age, an understanding that

others may have different factual (but not moral) beliefs led to greater acceptance of unfair or harmful practices. Wainryb, Shaw, and Maianu (1998) found that tolerance increased with age, but acceptance of divergent moral and informational beliefs varied in complex ways depending on whether individuals were depicted as holding different beliefs, publicly expressing them, or acting on them.

Killen and colleagues (Killen, Mulvey, Richardson, Jampol, & Woodward, 2011) proposed that when false beliefs are embedded in morally relevant situations, different (and potentially more complex) considerations are implicated than when considering factual false beliefs. This notion was tested by directly comparing an understanding of false beliefs separate from moral judgments among children at 3.5, 5.5, and 7.5 years of age. A novel aspect of the study was the use of three separate measures: a prototypical moral judgment task, a factual false belief task, and a morally relevant false belief task. The findings revealed that morally relevant false beliefs were more challenging than standard false beliefs. Further, children who failed standard false belief tasks also incorrectly believed that the accidental transgressor's moral behavior was intentional, leading to judgments of greater harm and more deserved punishment.

Although all children evaluated the prototypic moral transgression as wrong, they did not fully understand accidental harm embedded in a false belief context until 7 years of age. Thus, successfully passing the morally salient false belief task accounted for some but not all of the age-related differences observed in children's moral understanding. Children's developing mental state understanding influenced their construal of the situation. In a follow-up study conducted with Chinese children, Fu, Xiao, Killen, and Lee (2014) replicated the U.S. findings and determined that second-order theory of mind was related to older children's moral judgments. These studies implicate the importance of intentionality in moral judgments, an issue we more fully explore in the following section.

Understanding of Intentionality and Moral Judgments

Piaget's initial insights regarding children's understanding of intentions (versus outcomes) in their moral judgments generated a great deal of research. Contrary to Piaget's findings, research has consistently shown that children as young as 3 years of age can take intentions into account and distinguish intentional from accidental transgressions, as long as information about intentions is made explicit

and intentions are not confounded with outcomes (Helwig, Zelazo, & Wilson, 2001; Zelazo, Helwig, & Lau, 1996).

Researchers such as Zelazo et al. (1996) have argued that the ability to coordinate intentions, acts, and outcomes is constrained by more general cognitive changes in children's information-processing abilities or executive function and their ability to coordinate different rules—abilities that are thought to increase between the ages of 3 and 7 years. In a clever study design, Zelazo et al. (1996) examined children's moral evaluations in situations entailing normal causality (e.g., hitting causes pain) or unusual or noncanonical causality (e.g., hitting causes pleasure). They found that 3-year-olds judged the acceptability of acts and the amount of punishment deserved based on the objective aspect of the situations (e.g., on the basis of the outcome or harm caused), even in noncanonical situations. However, children's ability to integrate different kinds of information and use higher order rules in making moral judgments increased with age during the preschool years. Other research has shown that, as children grow older, they increasingly distinguish intentions from other mental states such as desires, although they do not fully understand this distinction until around 7 years of age (Schult, 2002).

Until middle childhood, children lack the ability to fully integrate the information necessary to make accurate judgments in more complex situations, for instance, those that include considerations of negligence. This was demonstrated in a novel study by Nobes and colleagues (Nobes, Panagiotaki, & Pawson, 2009). They investigated 3- to 8-year-olds' coordination of information about intentions, consequences, and acts performed as a result of negligence. Nearly all children considered ill-intentioned acts to be wrong and deserving of punishment even when due to negligence, but with age, they were better able to distinguish between well- and ill-intentioned acts. In addition, 3- to 6-year-olds often misattributed negligence to transgressors, even when they were described as careful and not intending to cause harm.

Studies also have shown that preschool children's judgments of intentionality vary as a function of whether acts lead to negative moral outcomes (that is, whether the foreseen consequences of the act are harmful, or caused an actor to feel happy or sad). In a paradigm developed with adult samples, Leslie, Knobe, and Cohen (2006) demonstrated that 4- and 5-year-olds (but not 3-year-olds) judged that a foreseen side effect was intentional when that side effect was morally negative (for example, making someone sad), even when that actor was described as not intending to cause those consequences or not caring

about them, but not when the side effect was positive (for example, making someone happy). Thus these researchers asserted that this "side-effect effect" is evident by 4 or 5 years of age. Furthermore, the asymmetrical nature of children's intentionality judgments appears robust, regardless of different ways of manipulating the explicitness of the foreknowledge (Pellizoni, Siegal, & Surian, 2009).

As these studies suggest, the vast majority of research examining intersections between morality and theory of mind have focused on children between the ages of 3 and 7 years. Yet, an understanding of mental state knowledge continues to develop beyond age 7 years. Recently, Jambon and Smetana (2014) extended this to examine 5- to 11-year-olds' ability to coordinate the psychological perspective of others in their moral evaluations of situations of "necessary harm," or harm that is well intended and done to prevent additional serious harm. With age, children increasingly understood that causing harm to others may be morally justifiable in certain circumstances, based on justifications regarding the actor's positive motives and intentions. As children grew older, they demonstrated a greater tendency to coordinate competing concerns, particularly when considering psychological as compared to physical harm. Thus, along with others, Jambon and Smetana (2014) asserted that children's developing understanding of others' mental states allows for the emergence of novel, more complex patterns of moral thought but that this understanding does not in itself determine children's evaluations of particular moral situations.

The studies reviewed in this section converge to show that children's understanding of intentionality increases during middle childhood, especially when intentionality is embedded in complex moral situations involving multiple components.

Desires, Emotions, and Moral Judgments

Studies of how children coordinate intentions or desires with their emotions have yielded new findings about their understanding of intentionality. Extending research on children's concepts about others' desires in the moral domain, Yuill, Perner, Pearson, Peerbhoy, and Ende (1996) examined children's attributions of emotions in moral situations that vary the actor's desires and whether or not the actor achieved the desired outcome. These researchers sought to integrate children's understanding of others' "wicked desires" and associated emotions with research on "happy victimizers" (Arsenio, 2014). This research has revealed that young children (but not older ones) believe

that victimizers will feel happy when they obtain material resources through aggressive means.

Yuill et al. (1996) found that 3-year-olds judge that actors with bad motives feel sad, even though they have achieved their desired outcome. However, by 5 years of age, children matched desires and outcome in bad-motive stories and judged that moral transgressors would feel happy when negative outcomes were realized, as research on happy victimizers would suggest. But older children (7-year-olds) shifted back to believing that actors feel sad (remorseful). Thus, as found in studies of false beliefs, young children appear to evaluate the transgressor's emotions on the basis of the objective value of the outcome, but with age, they become able to fully understand the implications of moral transgressions for moral emotions. Likewise, when examining children's emotion and behavior predictions in situations involving psychological harm, Helwig et al. (2001) found that 3-year-olds evaluated psychological harm in terms of the objective aspects of the situations (for example, outcomes). With age, 5- and 7-year-old children focused on intentions or were able to coordinate intentions and outcomes.

Lagattuta (2005) has conducted a number of studies to examine how emotion attributions bear on children's social and moral cognition. For example, Lagattuta noted that the fulfillment of desires in transgression situations may lead to positive emotions, whereas focusing on rules may lead to negative emotions, because one has failed to follow the rules. She demonstrated that in early childhood, children develop the ability to coordinate an understanding of links between emotions and desires (for example, getting what one wants feels good) with an understanding of moral obligations in prohibitive rule situations (Lagattuta, 2005). When there were no rules, 4- to 7-year-olds reported very positive emotions associated with fulfilling their desires, but they reported feeling less positive when fulfilling desires by breaking rules. In situations involving emotions and desires with rules, 4- and 5-year-olds attributed positive emotions to rule-breakers (much as Yuill et al., 1996, found), with increasingly positive or mixed emotion attributions with age to hypothetical actors who were depicted as using willpower to abstain from rule breaking. The most dramatic shift in making connections among desires, rules, and emotions—as well as in employing mental state language—occurred between 5 and 7 years of age, when children, like adults, attributed positive emotions to actors who exhibited willpower and desisted from transgressing, while attributing negative emotions to transgressors. This approach to the development

of moral judgment includes social cognition as well as emotion attributions.

Direction of Effects Between Moral Judgments and Theory of Mind

Although the research reviewed thus far is almost entirely cross-sectional, it has been guided by the assumption that the development of children's mental state understanding leads to changes in children's moral understanding. However, there is also evidence for reverse causation; several researchers (Knobe, 2005; Leslie et al., 2006) have found that the presence or absence of negative moral outcomes influenced whether preschool children viewed acts as intentional. Smetana, Jambon, Conry-Murray, and Sturge-Apple (2012) explicitly examined connections between theory of mind as assessed using standard theory of mind tasks and moral judgments longitudinally over one year in a sample of 2.5- to 4-year-olds. Using cross-lagged path models, the researchers found that the direction of effects depended on the specific moral criterion judgment examined. Some of the moral criterion judgments led to greater theory of mind understanding, but, over time, children also came to view prototypical moral transgressions as less deserving of punishment and as less wrong (although still unacceptable) when they conflicted with school rules. This is consistent with past research suggesting that children come to make more forgiving moral judgments with age (Jambon & Smetana, 2014; Killen et al., 2011). Thus, young children's psychological understanding and moral judgments appear to be transactional, bidirectional processes. Moral experiences may provide children with opportunities that facilitate their understanding of others' minds, which in turn serves to inform and guide the development of moral thinking.

Neuroscience of Intentionality and Morality

With the expansion of neuroscience research more generally, there has been an outpouring of interest in the biological basis for thinking about intentionality and morality. Much of the innovation in this research has come from the development of methods, such as the use of functional magnetic resonance imaging (fMRI), which has only recently been used with children and adolescents rather than solely with adults. The findings of studies on mental state understanding and morality have been examined in recent research combining assessments of children's judgments of intentional versus accidental harm,

depicted as involving damage to people or objects, using neurophysiological measures (Decety & Howard, 2014; Decety, Michalska, & Kinsler, 2012; Young & Saxe, 2011). In an ambitious project that included participants from preschool-aged children to adults, Decety and colleagues (2012) yoked responses to morally laden scenarios with assessments of neurophysiological reactions, obtained using eye tracking and fMRI data. Decety et al.'s (2012) youngest participants were able to correctly identify whether an action was intentional or not and rated harm to persons as more wrong than harm to objects.

Ratings that intentional harm was more wrong than accidental harm to persons increased with age and also were associated in a curvilinear fashion with signal changes in the amygdala. Amygdala responses, which are associated with emotion processing, declined with age in childhood and then increased into adulthood. In contrast, among older participants, signals in the dorsolateral prefrontal cortex and medial prefrontal cortex increased. As these latter brain regions are associated with metacognitive representations, the findings reflect an increased integration between the prefrontal cortex and the amygdala (e.g., between emotion and cognition). Thus, evaluations of whether an act is morally salient or not depends on more than affective sensitivity; an understanding of others' mental states must be integrated with a representation of the consequences of actions.

Deception, Lying, and Theory of Mind

The topic of lying is also an important area of investigation. Research has examined changes with age in viewing lying as a moral transgression and their associations with mental state knowledge. As Lee (2013) explains, to lie successfully, "individuals must represent and differentiate the mental states of themselves and the listener, and make appropriate statements to conceal the truth while instilling false beliefs into the mind of the listener" (pp. 91–92). Age trends found in young children's lying in experimental resistance-to-temptation situations (e.g., being told by an experimenter not to peek or play with a toy when the experimenter leaves the room) are consistent with developmental trends in theory of mind understanding. While the majority of 2- to 3-year-olds who violate an experimenter's instructions confess their transgressions, older children often lie (stating that they did not peek or play with the toy). Their lies have been interpreted as efforts

to deceive the experimenter (Lee, 2013). Furthermore, older preschoolers (4- to 5-year-olds) are more likely than 3-year-olds to confess if there was an eyewitness to their transgression (Fu, Evans, Xu, & Lee, 2012), and young children who lie have been shown to have better false belief understanding than those who confess (Evans, Xu, & Lee, 2011).

In addition, and further revealing the role of intentionality in lying, there are developmental changes between 2 and 7 years of age in how children respond to follow-up questions about their lies. Although 2- to 3-year-olds are not good at covering up their lies and make blatantly inconsistent statements, as they grow older, children grow less clumsy and inconsistent in explaining how they acquired their knowledge of the identity of a hidden toy. As Dunn (2014) has noted, having an understanding of others' mental states can be put to good as well as nefarious ends. For example, lying to avoid being caught touching a forbidden toy has a different moral status from lying to avoid offending someone or to protect another person from danger. Further progress in this line of investigation may be made by studying the intention to deceive in conjunction with the type of act.

Summary: Morality and Mental State Knowledge

Research conducted over the past decade provides robust evidence that children's understandings of others' mental states, as examined in different ways and on various types of tasks, are associated with increasing sophistication in children's moral judgments. In particular, children's ability to consider mitigating circumstances and apply their understanding of others' emotions, intentions, and desires when making moral judgments increases with age, with major leaps in the coordination of different concerns occurring between the ages of 5 and 7 years. Additionally, new methods from social neuroscience have advanced our understanding of the biological bases of these interconnections.

In past research, studies were largely limited to the use of simple responses (e.g., ratings of naughtiness), as associated with early-developing theory of mind competence. Expanding the focus beyond early childhood to include more complex forms of moral and mental state understanding would be fruitful. More research determining whether the ability to coordinate concepts varies as a function of the type of moral acts depicted is also needed.

MORAL JUDGMENTS AND MORAL REASONING

The comprehensive literature on children's moral judgments and reasoning reveals that judgments about the wrongness of physical harm and unfair distribution of resources appear in infancy and toddlerhood. These two moral issues are predominant in early childhood due to their salience and frequency (e.g., hitting and not sharing toys) as sources of disputes, as well as their concrete nature. A large body of evidence now indicates that knowledge of other moral issues typically thought to be too complex for children to understand emerges early as well, although in a rudimentary form. This includes an understanding of psychological harm (such as teasing others), concepts of rights (such as freedom of expression, property ownership, and self-determination), knowledge about unfair treatment of others (such as prejudice, discrimination, and stereotyping), and awareness of social inequalities (such as unfair distribution of resources based on group membership). Thus, children's knowledge reflects various moral categories, which are coordinated (or not) with other concepts such as psychological and societal group issues in the context of moral judgment and decision-making.

Social-Cognitive Developmental Processes

In addition to the role of psychological knowledge (such as intentionality) in moral judgments, children and adolescents become increasingly aware of groups, group membership, and group processes, which bear on the development of morality in multiple ways. Group identity enables children to affiliate with a larger community beyond the family, which is essential for healthy development. At the same time, identification with groups creates ingroup preference that can lead to prejudice and outgroup dislike. In fact, morally relevant issues such as discrimination, exclusion, and prejudice require knowledge about groups, increasing the social-cognitive complexity of these moral judgments. Along with these multifaceted issues are judgments about rights, which require knowledge about the equal treatment of others and basic human needs (e.g., the right to express views freely or the right to self-determination). Further, other social cognitive skills such as processing capacities, attributions of emotions, and understanding of intentional states continue to develop and

bear on moral judgments. We discuss research on these topics in this section.

Straightforward and Complex Social Interactions

Even though judgments about the wrongness of intentionally inflicting physical harm on an undeserving person emerge very early in development, situations entailing harm can be straightforward or complex, regardless of age. Whereas most adults are likely to view prototypic acts of harm, such as the murder of an innocent child, to be wrong, other harmful acts involving provocation, retaliation, and retribution, as well as self-defense, deterrence, and security, may include different (e.g., psychological, societal, and nonsocial) considerations. Thus, the meaning and interpretation of harmful acts must be examined to understand how individuals evaluate and coordinate different types of concerns.

Similarly, for young children, judgments and decisions about how to distribute a few toys between two friends may be relatively straightforward, but concepts of the fair distribution of resources become complex very quickly. Considerations such as the nature of the resource (how necessary it is), the legitimacy of ownership claims, modes of distribution, and relationships among the recipients all bear on resource allocation decisions. In addition, judgments become more complex when different groups or communities have to consider competing claims, goals, and needs for how to distribute fundamental resources. Thus, although there appears to be a developmental trajectory in the types of considerations that individuals weigh when making moral decisions, the developmental picture is also complicated by the fact that there are variations in whether contexts are straightforward or multifaceted and contain different components.

As an empirical example of the distinctions between straightforward and complex events, Turiel (2008) conducted a study in which children's judgments about actual transgressions (on the playground, in the classroom) were compared with their judgments about hypothetical transgressions. The findings revealed that moral judgments were applied to both the actual and hypothetical contexts, but there were also differences between them. Moral transgressions in hypothetical contexts were judged as less permissible and more rule-contingent than in actual situations. Contextual information was brought to bear on judgments in actual situations requiring children to

weigh more diverse sources of information when making their judgments. For instance, knowledge of children's histories of interactions contributed to attributions of blame (e.g., transgressors were judged differently when participants reported that they had been taunted by the presumed victim for several weeks).

In the following sections, we review research on judgments about harm to others, the fair distribution of resources, the unfair and prejudicial treatment of others, and conceptions of rights.

Judgments About Harm to Others

As discussed earlier, research has shown that by early childhood, children judge straightforward acts of harm to be wrong due to the physical or psychological pain such acts inflict on other people. Beyond this, children are able to grasp such factors as the underlying intentions and the deservedness of the recipient. As we have seen earlier, they are also able to apply moral criteria (such as generalizability) to moral acts. In more complex contexts, other considerations are taken into account, such as whether the act was provoked and in retaliation for a previous act. For example, Smetana, Campione-Barr, and Yell (2003) found that U.S. middle-income 6- and 8.5-year-olds judged hypothetical, prototypical (e.g., unprovoked) moral transgressions to be more wrong and more deserving of punishment than provoked transgressions, and more wrong when retaliation involved hitting rather than teasing. However, children's moral condemnation of provocation increased with age. Thus, "in-kind" retaliation was more acceptable than retaliation that was greater in magnitude than the original offense.

Research in Colombia, South America, has examined moral judgments of harm among war-affected children, who had been exposed to high levels of violence, poverty, lawlessness, and displacement. Posada and Wainryb (2008) interviewed 7- to 15-year-old Colombian children living in a poor slum near Bogotá regarding prototypical instances of stealing and physical harm, as well as the same acts in the context of survival and revenge. All children judged it wrong to steal or hurt someone, even when it would help for survival, based on reasons pertaining to justice and others' welfare. However, a sizable proportion endorsed stealing and hurting in the condition of revenge and expected that others would do the same. Whereas younger children expected that the protagonist would feel guilt as well as shame, older children expected a mixture of guilt, shame, and happiness at revenge. Importantly, this study

demonstrates that concerns with others' welfare generalize to more extreme situations, but it also reveals some of the contextual factors that may change the application of moral concepts to different situations involving threats to the self.

To examine the role of socioeconomic status and exposure to violence on concepts of harm, Ardila-Rey, Killen, and Brenick (2009) conducted a study of both low- and middle-income children in Colombia. They found significant differences in 6- to 12-year-olds' moral judgments based on levels of exposure to violence and living conditions. All children viewed acts of harm (hitting) and unfair distribution of toys (not sharing) as wrong using moral reasons (e.g., concerns for others' welfare). However, displaced children from Bogotá shanty towns, who had suffered extreme exposure to violence and who lived in very poor conditions, judged it more legitimate to hit in reaction to provocation or retaliation than did nondisplaced children from Cartagena, who had experienced minimal exposure to violence. Surprisingly and somewhat hopefully, however, all children viewed postconflict reconciliation between the transgressor and recipient as feasible and worthwhile. Astor (1994) found somewhat similar results studying a sample of U.S. children in Chicago who experienced family and peer violence. Children justified their moral judgments using moral reasoning when evaluating straightforward issues, but they used less moral reasoning when considering provocation and retribution.

Posada and Wainryb's (2009) study, described previously, as well as a recent study by Gasser, Malti, and Gutzwiller-Helfenfinger (2012), also demonstrate that emotion attributions are important in the application of moral judgments regarding harm. Further, there are individual differences due to aggressive profiles. Gasser et al. (2012) studied 7- and 9-year-old Swiss children's moral understanding of retaliation as compared to unprovoked aggression and found that aggressive children judged retaliation as less serious and referred less often to the harmful and emotional consequences of retaliation than did nonaggressive children.

Another line of research has focused on "happy victimizers" and age-related changes in the reading of emotional cues in the context of aggression and inflicting harm on another. Nunner-Winkler and Sodian (1988) analyzed 4-, 6-, and 8-year-olds' victimizers and victims' emotional attributions after an incident in which the victimizer gained access to a material resource through aggressive means (e.g., pushing someone off the swing to get a turn). They found that the majority of 4-year-olds expected the victimizer to feel happy, in contrast to 8-year-olds, who

predicted that the victimizer would feel guilty or bad. Arsenio (2014) has argued that the shift from happy attributions to a mixture of emotions (happy and sad) reflects a conflict that is increasingly resolved with age during middle childhood.

As we described earlier in terms of Yuill et al.'s (1996) research on theory of mind, children must coordinate the victim's and victimizer's responses with their judgments about the wrongfulness of inflicting harm on others. In addition, this situation creates a conflict between children's judgments and their affective responses when gaining a desired resource (because it feels good to get what one wants). This is particularly so for children exposed to violence or who have been diagnosed with behavior disorders (Arsenio, 2014). However, there is a need for more research on how specific social experiences (such as experiencing violence) influence developmental changes in happy victimizer responses and moral judgments more generally.

Sampling low-income ethnic minority adolescents, Arsenio and his colleagues (Arsenio, Adams, & Gold, 2009) demonstrated that reactive aggression reflects social-cognitive deficits, such as failing to read social cues and over-attributing hostile intentions. This is in contrast to proactive aggression, which reflects intentions to victimize and harass others. This distinction is important because the researchers showed that lower moral concerns (but higher verbal abilities) were associated with proactive but not reactive aggression. Further, this line of research reveals connections between children's moral emotion attributions and aggressive behaviors and highlights the need for specificity (e.g., distinguishing among types of aggression) in making connections between moral judgments and behavior.

In addition to including emotion attributions, recent research has also examined whether concepts of harm are considered when children evaluate destruction of the environment. Severson and Kahn (2010) studied 7- and 10-year-old children of U.S. farm workers regarding their conceptions of harm to nature in the form of pesticide exposure. They found that children evaluated exposure to pesticides as wrong using moral criteria, providing an example of how concepts of harm can be applied to broader societal (environmental) issues at a young age.

Concepts of the Fair Distribution of Resources

One of the most robust developmental findings regarding conceptions of fair resource allocation has been the age-related shift from a focus on strict equality, which

involves relatively straightforward decision-making, to the consideration of merit, need, others' welfare, and other factors (Damon, 1977). As Rawls (1971) theorized, defining justice in terms of fairness implies that the method of allocation is only the means, not the end, to achieving fairness. Thus, researchers have sought to measure when in development children rely on equality to ensure fairness or take other considerations such as merit and need into account. Earlier we described studies that have shown that young children tend to distribute resources equally and that focusing on merit is only minimally understood. By middle childhood, however, children take merit as well as many more factors into account.

In one of the first comprehensive studies to examine children's judgments regarding various claims, Sigelman and Waitzman (1991) analyzed 5-, 9-, and 13-year-olds' evaluations of rules of equity, equality, and need in three contexts (work situations with rewards, voting situations with equality, and charity situations with principles of need). Younger children preferred equality in all three conditions, but with age, children considered both equity and need. Further, children reasoned about fairness to support their decisions. The authors cautioned that the findings did not imply that younger children could not consider merit but that their preference was to focus on equality. Documenting the generalizability of understanding merit, Liénard, Chevallier, Mascaro, Kiura, and Baumard (2013) found that 5-year-olds from a tribal society (the Turkana) in Kenya demonstrated a clear understanding of merit and took individuals' contributions into account when distributing a collectively produced resource. Another way to measure children's understanding of fairness is to document their protests in response to an inequitable allocation. Recent studies have found that 6- to 8-year-olds will discard additional resources provided in a distribution task (that would require inequitable allocation), even at a cost to their own benefit (Blake & McAuliffe, 2011; Shaw & Olson, 2012). Moreover, a recent study has revealed that 3.5- to 6-year-old children use fairness, equality, and others' welfare when evaluating necessary resources as compared to luxuries, suggesting that children take the type of resource to be distributed into account (Rizzo, Elenbaas, Cooley, & Killen, 2014).

Although there are normative developmental trends towards considering merit over strict equality, contextual factors also influence children's allocations. The recent findings also reveal that children display previously undocumented social cognitive sophistication regarding the fair distribution of resources.

Moreover, with age, children consider other social dimensions pertaining to resource allocation decisions, such as the history of the relationships, status, and reputation (Elenbaas, Rizzo, Cooley, & Killen, 2014; Paulus & Moore, 2014). For example, friendship status is related to equal allocation decisions (Olson & Spelke, 2008), along with self-presentational biases, such as whether one's resource decision is known to other members of a group or not (Shaw et al., 2013). Moore (2009) found that children made more equitable decisions with a friend than with a nonfriend peer (see also Paulus & Moore, 2013). They were even less likely to distribute equitably when the peer was a stranger, but they responded in a more prosocial manner with a stranger when the cost was not high. Studying 10- to 19-year-olds' allocation decisions, behavioral economists Almås, Cappelen, Sørensen, and Tungodden (2010) found that, with age, children became focused on merit rather than strict equality when merit was defined as individual achievement. Older children considered merit in some contexts and strict equality in others, indicating that older children used both forms of allocation depending on the specific situation.

Dividing resources is a frequent source of conflict in childhood and beyond, and understanding children's conceptualizations can be useful for effective conflict mediation. Research has shown that moral judgments about resource allocation involve not just the capacity to understand equal allocation or allocation based on merit but also other factors. Research has been conducted from many different theoretical perspectives, and integrating the age-related findings from these various views will provide a more comprehensive understanding of the foundations of distributive justice.

Judgments About the Unfair and Prejudicial Treatment of Others

Research on children's prejudicial attitudes and stereotyping has a long history in developmental science, and over the past two decades, a robust area of research has emerged on children's and adolescents' understanding of unfair and prejudicial treatment of others (Brown & Bigler, 2004). This research examines when children view it as morally wrong or unfair to treat someone differently because of their group membership (e.g., gender, race, ethnicity, culture, and nationality). These judgments are complex because they require the recognition that individuals belong to different groups and that they may be deliberately treated differently because of their group

membership. Research has drawn on theories regarding developmental intergroup attitudes and social identity theory to incorporate the role of group norms for investigating the emergence of prejudice and its association with moral reasoning. Here, we report on how children apply their moral judgments to contexts in which stereotypes and group identity play a role; later, we will discuss the role of peers and intergroup contact.

Moral Judgments in the Context of Stereotypic Expectations

Even though gender stereotypes regarding boys' and girls' activities are pervasive in early childhood (Ruble, Martin, & Berenbaum, 2006), young children sometimes view social exclusion based on stereotypic expectations (for example, about gender) as wrong and unfair. U.S. 3-, 4-, and 5-year-old children evaluated as unfair a girls' doll-playing group's exclusion of a boy from playing (or a boys' truck-playing group's exclusion of a girl) using moral reasons (Killen, Pisacane, Lee-Kim, & Ardila-Rey, 2001). When asked whom to include (a more complex decision), children were more likely to use conventional reasoning about group identity as well as stereotypic associations with activities. With age, children used both moral and nonmoral social forms of reasoning for a complex decision such as whom to include.

Generally, as children grow older, they take more considerations, such as talent, merit, and previous experience, into account, and these are sometimes given priority when making inclusion decisions involving gender or race (Killen & Stangor, 2001). Furthermore, social-conventional and autonomy reasons for why it is legitimate to exclude others increase from 6 to 12 years of age. In adolescence, moral reasoning both becomes more advanced (e.g., focusing on the wrongfulness of discrimination) and better coordinated with other concerns (Crystal, Killen, & Ruck, 2008). This approach to studying the development of children's evaluations of social exclusion has been applied to gender, race, ethnicity, nationality, and religion, as well as sexual identity (Horn, 2008).

An important new area of research focuses on adolescents' social reasoning about sexual minority youth (Horn, 2008; Poteat, 2007). Research has revealed that sexual prejudice (toward peers who identify as lesbian, gay, bisexual, or transgender [LGBT]) is multifaceted and involves moral, conventional, and personal reasoning, as well as stereotypic expectations. For example, adolescents use more conventional and less moral reasoning to exclude homosexual peers who are depicted as

gender-nonconforming than gender-conforming in appearance (e.g., cross-dressing) and activities (e.g., ballet for boys and football for girls; Horn, 2008). In addition, while half of the youth sampled by Horn (as reported in Horn, 2008) stated that they believed homosexuality was wrong, only 11% condoned exclusion as legitimate, using moral reasons such as unfair treatment. This indicated that their judgments about personal sexual identity differed from judgments of social exclusion based on identity. Further research could determine how adolescents' conceptions of sexual orientations as essential or innate rather than personally chosen bear on the decisions to accept or reject social exclusion and peer harassment of LGBT youth.

Moral Judgments in the Context of Group Identity and Group Norms

With age, group identity factors such as ingroup preference, outgroup bias, and status enter into judgments about exclusion based on group identity and group norms (Abrams, Palmer, Rutland, Cameron, & Van de Vyver, 2013). For example, with age, U.S. ethnic majority children (9 to 15 years old) were more likely than ethnic minority children to view interracial exclusion as legitimate (for conventional reasons) when non-race factors were mentioned (such as parental or peer pressure); in contrast, ethnic minority children were more likely to use moral reasons to reject such exclusion (Crystal et al., 2008; Killen, Henning, Kelly, Crystal, & Ruck, 2007).

Studies conducted in Switzerland, the United Kingdom, and Korea have shown similar findings according to high- and low-status nationality groups. Minority youth are more likely to use moral reasoning to reject intergroup exclusion, whereas majority youth rely on group identity and traditions to condone exclusion (for a review, see Hitti, Mulvey, & Killen, 2011). As an example, Serbian adolescents, who were evaluating a Swiss national peer's decision to exclude a Serbian peer from attending a sporting event (Malti, Killen, & Gasser, 2012), viewed exclusion in this context as more unfair than did Swiss nationals and were more likely to expect that the Swiss national peer would feel proud rather than sad about their decision. With age, children and adolescents take a number of contextual factors into account when evaluating group norms for their ingroup, especially when these norms reflect unequal or exclusionary behavior toward outgroup members (Hitti, Mulvey, Rutland, Abrams, & Killen, 2013; Rutland, Killen, & Abrams, 2010).

By middle childhood and adolescence, children define group identity by group norms rather than just by

group membership (gender, nationality, school affiliation). Thus, with age children recognize that the norms and values of the group are central to their identity (Rutland et al., 2010). Most of the research on group identity examines loyalty to the group without determining whether loyalty is based on norms related to fair treatment of others or to conventions and traditions, concepts that are differentiated at relatively young ages.

When investigating decisions to choose an outgroup member who supports equal allocation of resources over an ingroup member who does not, children 9 to 13 years of age gave priority to fairness over ingroup status (Killen, Rutland, Abrams, Mulvey, & Hitti, 2013). This finding challenges the view that ingroup bias is pervasive across contexts (including moral ones). Yet, prior research has rarely examined ingroup preference in the context of identification with a group that holds negative moral norms. As an example, 9-year-olds supported an ingroup member who voiced explicit concern about their own group's decision to keep more resources than to divide equally (Killen et al., 2013). While 9- to 13-year-olds were more willing to include an outgroup member based on gender who supported fairness norms, they were less willing to do so regarding group membership based on school affiliation, revealing variation by the form of group membership (Mulvey, Hitti, Rutland, Abrams, & Killen, 2014).

In these contexts, children and adolescents recognize that groups are more favorable to ingroup members who are loyal than disloyal, even in the context of fairness considerations. This recognition that groups are likely to exclude members who protest their norms contributes to age-related increases in being reluctant to choose an outgroup member over an ingroup member (Hitti et al., 2013). Thus, concerns about being excluded from a group for appearing disloyal provide a challenge to the application of morality in social contexts. The factors that foster ingroup and outgroup bias and the mechanisms that effectively enable individuals to recognize the unfairness of acting on biased expectations about others are not yet fully understood.

Research on national and cultural identity is a particularly central issue in Europe, with the recent influx of Muslim migrants, the disbanding of Yugoslavia, and long-standing regional conflicts based on religion. Moral judgments regarding exclusion in these cultural contexts have been examined. Verkuyten and his colleagues have conducted an extensive program of research on this topic. For example, Gieling, Thijs, and Verkuyten (2010) found that Dutch adolescents (ages 12 to 17 years old)

were more tolerant of acts committed by Muslim actors when the issue was viewed as personal (e.g., clothes) than when it was seen as moral and involving harm to others. With increasing age, adolescents became less tolerant of Muslim conventional practices, such as separate schools based on religion, which remains a controversial issue. On the one hand, this practice can be interpreted as reflecting an increased focus on the threat to Dutch norms with age; on the other hand, forms of segregation often contribute to inequality of access to resources.

Furthermore, adolescents who were high on multiculturalism, as assessed on a separate scale, were more tolerant of non-harm-related cultural practices than were those who scored low on this scale (Gieling et al., 2010). Issues of prejudice and bias in a moral context raise concerns about rights. In fact, with age, children and adolescents view the denial of individual rights as an issue of unfair treatment. Group migration has existed throughout human history, and yet, developmental scientists have only recently studied the tensions it raises and its moral implications. Further research on the types of cultural conflicts that emerge in societies absorbing large numbers of immigrants from different religious and ethnic traditions would enhance our understanding of conceptions of fairness and rights in contexts that create prejudice and discrimination.

Conceptions of Rights

Until recently, traditional theories of moral development viewed conceptions of rights and civil liberties as emerging primarily during adolescence. Over the past two decades, however, Helwig et al. (2014) have taken a moral developmental viewpoint to study children's and adolescents' conceptions of rights. They have examined how American and Canadian children's and adolescents' conceptions of freedom of speech and religion are viewed as moral or "natural" rights independent of authority and laws and generalized across contexts. While even children as young as 6 years of age support civil liberties by appealing to moral reasons, beginning around 8 years of age children understand the broader societal, cultural, and democratic implications of rights. As an example, children view freedom of speech as important because it can serve as a vehicle for correcting injustices. By adolescence, youth view freedom of religion as a more complex issue, involving multiple considerations such as religion as a matter of personal choice, as a way of being part of a group, and a freedom that should be protected from a moral viewpoint. The novel aspect of

Helwig's findings is that children and adolescents did not evaluate civil liberties as defined by authority or existing laws, but rather by morality, or what is often referred to as "natural law."

In an early study, Helwig (1995) examined Canadian 7th grade (12-year-olds) and 11th grade (16-year-olds) as well as college students' reasoning about the straightforward application of rights (e.g., giving a public speech critical of governmental economic policies), and complex situations involving civil liberties and other social issues (such as a speech that advocates violence). Children and adolescents viewed the straightforward civil liberties as moral (in that a denial would be unfair) and were mixed in their evaluations of the conflicts. For example, younger children were more likely than older adolescents to view it as unacceptable to exercise civil liberties when these were ruled as wrong based on a set of hypothetical laws, indicating that older adolescents used moral criteria to view the denial as wrong more than did younger children. Importantly (and as we discuss later, in the context of civic engagement), Helwig's findings have been replicated in other cultural contexts, particularly in those countries, like China, with economic and political attitudes toward rights and civil liberties that are different from North American countries.

Ruck and his colleagues (Ruck, Abramovitch, & Keating, 1998) have demonstrated that children distinguish two types of rights, nurturance (referring to children's rights to care and protection) and self-determination rights (referring to autonomy and control over their lives), and that these emerge in childhood. Children's justifications for nurturance rights focus on social and familial roles with little reference to rights, while reasoning about self-determination rights focuses on personal freedom and autonomy. By adolescence, 13- and 15-year-olds are more likely than their parents to endorse requests for self-determination rights (e.g., keeping a diary private) and less likely than their parents to favor request for nurturance rights in the home (e.g., talking to a parent when being emotionally upset). Ruck's research has been extended to show that British adolescents endorse same-age asylum-seeking children's nurturance rights over self-determination rights (Ruck, Tenenbaum, & Sines, 2007), demonstrating that the distinctions between these different forms of rights are generalizable to other cultural contexts. The factors that contribute to adolescents' support of nurturance over self-determination rights require further research. This could shed light on the biases that exist when a

majority group (e.g., British adolescents) denies rights to a minority group (e.g., asylum-seeking peers).

Neuroscience of Moral and Conventional Judgments

Only recently, and reflecting advances in methods, has it been feasible to extend neuroscience studies of moral judgments to childhood. As described earlier in the chapter, Decety and his colleagues (Decety & Howard, 2014) have investigated the neuroscience of intentional moral judgments in childhood through adulthood. To test distinctions between moral and conventional judgments in adolescents and young adults, Lahat, Helwig, and Zelazo (2013) recorded event-related potentials while participants read scenarios regarding moral violations, conventional violations, or neutral acts. When the acts were described as regulated by a rule, reaction times were faster across ages for moral than conventional violations, but when there was no rule, reaction time differences were found for moral but not conventional violations. Thus, this study identified some of the underlying neurocognitive mechanisms involved in processing and evaluating moral and conventional violations in adolescence.

In a series of experiments, Blair (described in Blair, 2010) has conducted neuroscience research using fMRI techniques to examine differences in brain activation in moral judgments in nonclinical and clinical samples (e.g., with neuropsychiatric patients). Blair (2010) reviewed extensive research, his own and others, with a nonpatient sample of adults, demonstrating that different neurocognitive systems are involved in moral reasoning. Both the amygdala (which is associated with processing emotional responses) and medial orbital frontal cortex (which is involved in reasoning) are activated when making moral decisions. Thus, consistent with Decety and his colleagues (Decety & Howard, 2014), Blair's research demonstrates that moral judgments entail an integrated neural response involving both emotion and cognition.

Furthermore, Blair and his colleagues (White, Leong, Smetana, Nucci, & Blair, 2013) have recently used fMRI techniques to demonstrate both similarities and differences in the brain regions activated when normal, healthy adults made judgments about moral (welfare and harm-based) and conventional transgressions. Blair et al. (2013) observed increased neural activation in the amygdala and ventro-medial prefrontal cortex when adults rated harm-based transgressions as compared to conventional transgressions,

but there was also activation in several regions in the frontal cortex when adults processed both types of transgressions. These findings provide interesting new evidence regarding distinctions between morality and social convention, specifically that judgments about morality involve both emotion and cognition. Thus far, however, only Lahat et al. (2013) have pursued this line of inquiry with adolescents, and the developmental trajectory of judgments from childhood to adulthood, as assessed using neuroscience methods, remains to be studied. Early moral neuroscience studies relied on overly simplistic definitions of morality, due to the limitations of neuroimaging assessment methods. Given the fast pace of changes in this field, collaborations between neuroscientists and moral developmental researchers using the most accurate assessments of moral development are essential. Further, connecting brain activation studies that have provided novel insights into the underpinnings of cognitive and affective processes with research on children's moral judgments and behavior is fruitful.

Summary: Moral Judgments and Moral Reasoning

During childhood and adolescence, moral judgments reflect a wide range of moral issues, including concern for other's welfare (harm), fair distribution of resources, equal treatment of others (exclusion, wrongness of prejudicial attitudes), social inequality, and concepts of rights. The literature demonstrates that as children develop, they begin to take more contextual factors into account. When making moral judgments and decisions, children consider a broader range of concerns, including judgments about the self (e.g., personal goals), social conventions, group identity, and group functioning. These decisions operate in actual situations, as shown in neuroscience studies as well as studies demonstrating associations between hypothetical and actual moral judgments. Furthermore, even when children understand and apply moral concepts, competing nonmoral considerations may be highly salient and important, making moral decisions potentially difficult. The contexts of development also influence whether moral principles are inhibited or facilitated.

Thus far we have reviewed research focused primarily on the cognitive, social, and emotional processes reflected in an understanding of morality in childhood and adolescence. However, moral development occurs in a context, and in the following section, we consider how morality is

facilitated in the family, and in subsequent sections, in the context of peer groups and societal groups, social institutions, and cultures.

MORAL DEVELOPMENT IN THE CONTEXT OF THE FAMILY

One of the more enduring topics in research on moral development has been the role of the family—and in particular, the influence of parents—on children's developing morality. Parents are seen as central influences because they generally have the primary responsibility for raising children and have the most time and opportunity to influence them. Parents are also fundamental because of the powerful affective bonds they have with their children, which may make children particularly receptive to parental influence. Much of the interest in the role of parents stems from psychoanalytic and behavioral (social learning) theory approaches, which have traditionally emphasized the importance of early experiences in the family on children's moral socialization. According to social learning theory accounts, the internalization of parental values and expectations occurs through interactions with caregivers during early childhood. Thus, research has focused on how parenting practices and particular discipline techniques influence these processes (see Grusec, Chaparro, Johnston, & Sherman, 2014, for a review).

Nativist and comparative approaches are less concerned with these issues, given that morality is seen as innate and emerging out of social cognition and social interaction. Yet, recent research has begun to provide more complex portrayals of the role of family relationships in moral development. Social learning theory approaches have acknowledged the importance of children's acceptance, reflection, and reactions to parents' discipline or attempts to instill morality (Grusec et al., 2000; Kuczynski & Parkin, 2007). Research on moral judgment development has moved to examine how different modes of parent-child interactions (both unilateral and mutual) bear on the construction of notions of justice, fairness, and rights (Dunn, 2014; Smetana, 1997; Walker, Hennig, & Krettenauer, 2000). Family systems theories have focused attention on how different family relationships, such as sibling relationships, interact with parent-child relationships to influence moral development.

Socialization approaches typically have been concerned with the parenting styles and disciplinary practices that most effectively facilitate the internalization of moral

behavior, and particularly, children's compliance with parental directives and responsiveness to parents (but see Grusec & Goodnow, 1994, for a critique). This has been assessed primarily using laboratory tasks that are seen as paradigmatic for measuring successful internalization, including following parental commands not to touch attractive toys (resistance to temptation tasks), heeding parental requests to help with cleanup, or cheating tasks focused on game rules. These tasks emphasize obedience to authority, compliance with parental directives, and the development of self-regulatory (inhibitory) abilities, with little attention to the type of norm to be internalized. As Kochanska and her colleagues (Kochanska, Koenig, Barry, Kim, & Yoon, 2010) recently acknowledged, however, most of the experimental tasks are social-conventional, not moral in nature. This has implications for how conscience is defined and the validity of these assessments as measures of the moral components of conscience. Thus, more research employing tasks that go beyond compliance to assess morally relevant dimensions (harm and welfare) is warranted.

There have been significant advances in considering bidirectional processes in children's development. In some of the current research, this has been considered primarily in terms of how parents adapt their disciplinary practices in response to children's temperamental characteristics. Successful socialization is still conceptualized in terms of children's accommodation to and compliance with parents' expectations and values. While heeding parents' directives is often very important, this focus on accommodating to parents' wishes is limited because parents have other socialization goals beyond compliance, and their diverse goals need to be recognized and studied (Grusec et al., 2000). Furthermore, children do not simply accommodate to parents; children take an active role in making meaning, interpreting and responding to parents and thus may influence parents. Finally, such approaches assume that parents, as agents of society, transmit positive values; they do not explicitly address situations where parents seek to instill immoral, prejudicial, or antisocial goals. Children do not accept parents' values as given; as discussed in this section, they negotiate, contest, and sometimes resist expectations that they deem unfair or illegitimate. In the following sections, we identify and consider different types of family influences (including both parents and siblings) on moral development, as conceptualized and measured from different perspectives. Although the majority of studies focus on mothers, we highlight studies that have also included fathers in their samples.

Attachment Relationships and a Mutually Responsive Orientation

The quality of children's attachment relationships to parents, formed during the first year of life, is widely considered to be important for moral development (Thompson, 2012), and this has been examined most directly by researchers studying the development of conscience in normative samples. In addition, insecure attachments to caregivers have been implicated, at least theoretically, in the development of conduct disorders and antisocial behavior. That is, insecure attachments are seen as resulting in fragile parent-child bonds and a lack of empathy toward others, predisposing children to trajectories of antisocial behavior (van IJzendoorn, 1997).

Attachment security has been empirically linked with young children's moral development. Denham (1994) found that toddlers who had secure attachment relationships with caregivers had prosocial and sympathetic responses to mothers' simulated displays of anger and sadness. In keeping with the attachment theory notion that attachment security leads to emotionally open and coherent discourse, Laible and Thompson (2000) found that mothers employed a greater frequency of moral evaluations (that behaviors were "good" or "naughty") when children were more securely attached. Furthermore, when children had secure attachment relationships or when dyads shared positive affect, mothers referred to feelings in their conversations about the child's past transgressions. The outcome was that children had the greatest moral internalization, measured in terms of behavioral compliance (Laible & Thompson, 2000).

The role of attachment security (measured retrospectively and across multiple interpersonal relationships) also has been studied in adults' construction of moral identity. Walker and Frimer (2007) found that adult moral exemplars (recipients of Canadian awards for exceptional bravery or caring) reported more secure childhood attachments than did a matched group of adults and that exemplars of caring reported more secure relationships than did exemplars of bravery.

Going beyond attachment, there is agreement across many different approaches that parental warmth and responsiveness facilitate moral development. In discussing moral internalization, Hoffman (1979) noted almost 25 years ago that parental "affection is important because it may make the child more receptive to discipline, more likely to emulate the parent, and emotionally secure enough to be open to the needs of others" (p. 958). Parpal and

Maccoby (1985), and more recently, Kochanska and her colleagues have articulated similar notions. For instance, Kochanska, Forman, Aksan, and Dunbar (2005) have highlighted the importance of a mutually responsive orientation for the internalization of morality. Mutually responsive orientations have their foundations in secure attachment relationships and involve parent-child dyadic relationships that are positive, trusting, cooperative, and reciprocal.

Researchers from the Kohlbergian tradition also have found that warm, supportive interactions facilitate moral judgment development. Whereas research has demonstrated that cognitively challenging and critiquing interactions between peers facilitate the development of more mature moral judgments (Berkowitz & Gibbs, 1983; Walker et al., 2000), similar types of interactions, when employed by mothers and fathers, do not. In fact, they have been found to hinder moral reasoning development, perhaps because adolescents perceive them to be hostile, interfering, or overly critical. Instead, Walker and Taylor (1991) found that mild cognitive challenge in the context of a warm affective climate that involved support and encouragement facilitated adolescents' moral maturity, particularly when discussing real-life dilemmas. Thus, research from diverse perspectives has converged in demonstrating the importance of secure attachments and warm, responsive interactions for facilitating moral development.

Parenting Styles and Discipline Strategies

Parenting styles and disciplinary practices have been examined as central precursors of moral internalization in studies of young children, perhaps most extensively in Kochanska and her colleagues' programmatic research (reviewed in Kochanska & Aksan, 2004). These researchers found that individual differences in children's biologically based temperament interacted with mothers' socialization in facilitating the development of conscience. The findings reveal that gentle maternal discipline that deemphasized power assertion and stressed inductive discipline as a way of facilitating anxious arousal facilitated conscience development, but only for relatively fearful children. The claim is that an optimal level of anxiety is necessary to help children process parental messages, thereby promoting successful internalization. For fearful children, this is accomplished by gentle parenting, whereas for fearless children, a mutually responsive orientation with their mothers provides the pathway to moral internalization. Although these findings have been very robust in studies with mothers, Kochanska, Aksan, and Joy (2007) did not

replicate the findings for child fearfulness in two different samples of fathers. Thus, more research on fathers' influence on conscience development is clearly needed, as well as the interactive effect of mothers' versus fathers' styles of parenting on moral development.

Furthermore, the interactions between parenting and temperament have not been consistently replicated in other research employing different methods and measures more directly focused on the harmful consequences of acts for others. Dunn, Brown, and Maguire (1995) examined various longitudinal influences on 5- and 6-year-olds' moral responses to moral stories. When children were 33 months old, the researchers examined mothers' observed use of control, mothers' other-oriented responses to managing sibling conflicts, and mother-reported positive sibling interactions. When children reached 40 months of age, the researchers examined children's emotion understanding. At 72 months of age (6 years), shy children demonstrated less internalized moral orientations (reflecting an empathic orientation reflecting feelings or concern for the victim) and fewer reparative story completion responses than other children; none of the variables influenced 5-year-olds' moral reasoning. Although the measures of moral internalization differed somewhat from Kochanska's program of research, these findings contrast with Kochanska's results on temperamental differences.

The definition of conscience has varied in different studies. In Kochanska's research, conscience in early childhood has been defined empirically in terms of two relatively stable factors consisting of moral emotions (children's distress following transgressions involving damage and harm to another) and conduct, or rule-following behavior in the absence of surveillance. However, reflecting the increasing importance of moral cognition in children's conscience development as children grow older, Laible, Eye, and Carlo (2008) found that conscience in middle adolescence consisted of two factors reflecting moral affect (including guilt, shame, sympathy, and empathic anger) and moral cognition (including moral values and prosocial moral reasoning). Furthermore, consistent with the results of Hoffman and Saltzstein's (1967) classic study of the role of parental discipline in moral development, Laible et al. (2008) found that power-assertive parenting was negatively associated with the affective dimension of conscience. Adolescents higher in this dimension engaged in more prosocial behavior, whereas adolescents higher in the cognitive aspect reported both more negative emotionality and parents' greater persistence in discipline. Both aspects of conscience were associated with more moral behavior,

including less encouragement of bullying and greater likelihood of helping a victim of bullying.

The roles of parenting styles and disciplinary strategies have also been examined in older children and adolescents. Patrick and Gibbs (2012) employed Hoffman and Saltzstein's (1967) classification of discipline techniques in their study of moral identity development. They found that parents' use of inductive discipline (but not love withdrawal and power assertion) was associated with a stronger moral identity, but only for middle adolescents and not for younger children. These findings are consistent with the notion that morally salient self-descriptions increase in frequency in mid- to late adolescence, as conceptions of self and moral identity become increasingly integrated (Hart & Fegley, 1995). However, little support for such age-related shifts have been found in recent research employing large samples of adolescents (Hardy, Walker, Olsen, Woodbury, & Hickman, 2013), highlighting the need for more research on the developmental dimensions of moral identity. In addition, Patrick and Gibbs (2012) found that adolescents who rated parents' use of induction as more fair and appropriate also reported stronger moral identities.

Researchers have emphasized the importance of authoritative parenting, where parents are both highly responsive but also relatively demanding in their expectation for mature behavior, and this efficacy has been confirmed in studies of moral development. In the United Kingdom, Leman (2005) found that early adolescents who rated their parents as authoritative rather than authoritarian were more likely to believe that hypothetical adults described in moral scenarios would justify expectations regarding moral misbehavior with references to reciprocity and equality. Pratt, Hunsberger, Pancer, and Alisat (2003) likewise found that more authoritative parenting was associated over a 2-year period with greater value congruence (for both moral and nonmoral values) between late adolescents and their parents.

Family Discourse, Conflicts, and Responses to Transgressions

Parents influence moral development in numerous ways that go beyond discipline encounters. In everyday conversations and discussions, caregivers articulate expectations for their children's behavior, reminisce about past (or future) moral behavior, or negotiate moral topics in the context of conflicts. Therefore, numerous studies have examined morality as it emerges in family discussions, discourse, and narratives, as well as in everyday conflicts.

Observations and Family Talk

Dunn (2014) conducted studies of naturally occurring conversations in the family to examine how children, siblings, and parents discuss moral and other types of issues in the home. Although these studies have focused only on maternal responses, Dunn viewed the parent-child relationship as a context that encourages reciprocity. She has emphasized how family members negotiate conflicts related to sharing and fairness. In addition, family members discuss the role of emotions and mental states in children's reactions to rule violations in the home. Within the context of family social interactions, children's emotional reactions, discourse, and ability to anticipate the intentions of others are viewed as central to the acquisition of morality.

These studies revealed that, from the second year of life onwards, children talk with their parents and their siblings about what is allowed and what is not and, specifically, about matters pertaining to fairness, property rights, and conventional rules. Mothers increasingly refer to social rules and use more sophisticated justifications as their children move through the second and third years of life. As Dunn (2014) noted, young children attempt to alleviate others' distress, show concern for others, and draw mothers' attention to siblings' misbehavior well before they are able to clearly verbalize these concerns in interviews. Dunn's observations also make clear that a much broader set of emotional reactions than guilt, fear, and anxiety, which are stressed by Hoffman (2000) and others as central to moral internalization, are at play in family moral interactions. Children also express positive emotions—pleasure, excitement, amusement, and glee—in violating rules, conspiring with siblings to subvert parental rules, and teasing and having conflicts with siblings.

According to Dunn (2014), all of these aspects of family interaction provide important motivations for acquiring moral understanding and highlight children's active agency in these processes. Mothers' concerns with harm, welfare, and rights in their interactions also help to emphasize the salience of moral concerns for their children. For instance, observations of mothers' and peers' responses to 2- and 3-year-olds' transgressions in the home (Smetana, 1989) show that moral transgressions occur primarily when target children interact with peers, with mothers mostly providing third-party interventions in peer disputes. Mothers made statements regarding rights, requested that children take the other's perspective, redirected children's attention to the harm or injustice that was done, and commanded children

to stop their misbehavior. Thus, these findings suggest that parents may scaffold the moral understanding children construct from their moral interactions with peers.

Parents' (and victims') emotional reactions to young children's moral transgressions also provide important information about the nature of the event. For instance, Dahl and Campos (2013) found that mothers of 11-, 13-, 15-, and 17-month-olds reported more anger in response to moral than to other transgressions. Reasoning and explanations for moral transgressions have been found among mothers of older children as well. That is, mothers of 6- to 10-year-olds have been shown to employ explanations for moral transgressions, in contrast to verbal force (yelling and threats) for conventional transgressions (Chilamkurti & Milner, 1993).

As Dunn's (2014) research has demonstrated, sibling relationships are an important context for moral development, and increasingly so with age. When mothers intervened in 33- to 37-month-olds' sibling conflicts, they consistently endorsed sharing and prohibiting property damage (Piotrowski, 1997). Ross and her colleagues (Ross, 1996; Ross, Tesla, Canyon, & Lollis, 1990), however, reported that when mothers intervened in peer and sibling property disputes, they were inconsistent in supporting owners over possessors when ownership claims were in conflict; mothers were more concerned with restoring harmony. Thus, Ross (1996) concluded that children do not simply internalize their parents' disciplinary messages, but rather construct notions of rights from sibling and peer interactions, drawing from the parts of parental messages that seem fair.

Children's other-oriented responses, such as statements focusing on others' rights and welfare, emerge between the third and fourth year of life and occur more frequently during arguments with peers than with mothers or siblings (Dunn et al., 1995; Smetana, 1989). Adult intervention in moral conflicts regarding object disputes decreases from the preschool years to middle childhood. Those interventions also differ according to setting, as children become more actively involved in negotiating and resolving moral disputes regarding more complex issues such as social exclusion and rights. Such evidence challenges the view of young children as passive recipients of adult moral values. This is also clearly evident in research on parental differential treatment of siblings.

Parents typically treat their children differently because they have different personal characteristics, needs, or interests. Children often view parental differential treatment as fair and appropriate in meeting a sibling's needs (Kowal

& Kramer, 1997; McHale, Updegraff, Jackson-Newsom, Tucker, & Crouter, 2000), but it becomes problematic for children's adjustment and family relationships when it is seen as unfair or not legitimate. This occurs more among second-born than first-borns, particularly in mother-son and father-daughter relationships. It also increases in adolescence, perhaps because, as adolescents grow older, they became more reactive to the unfairness of parental differential treatment (McHale et al., 2000) or, as we have shown earlier, become better able to weigh and consider different types of concerns. Parental differential treatment is particularly deleterious when it pertains to warmth as compared to perceived parental involvement or expectations regarding household chores (McHale et al., 2000).

With age, children view parental assignment of gender-associated household chores to girls or boys (e.g., asking only the daughter to sew curtains or the son to change the oil in the car) as legitimate (for a review, see Sinno, Schuette, & Killen, 2014). Younger children (5- to 8-year-olds) viewed this form of differential division of chores as unfair, but older children (9- to 10-year-olds) viewed it as conventional and therefore legitimate, and more so for male- than for female-stereotyped activities. Regarding the larger context of parental roles in the family (working outside the home or staying at home to take care of children), early adolescents view second-shift arrangements (when one parent is both working and caretaking) as more unfair for fathers than for mothers. Adolescents use stereotypic reasoning, such as references to prior experience (mothers are more used to doing both) or stereotypic expectations about effort and work (fathers work harder, to explain why fathers as compared to mothers should not be responsible for doing double duty) (Sinno et al., 2014). An interesting next step for this research would be to examine how growing up in different family arrangements influences children's judgments about the fair division of caretaking, work, and chores in the home.

Recent research also has focused on the specific challenges that minority parents face in socializing their children and, more specifically, the complex burden ethnic minority parents in the United States bear regarding moral development. For instance, most African American parents stress the importance of egalitarianism, yet they also must prepare their children for potential discrimination and unfair treatment (Hughes et al., 2006). How minority parents balance these competing, morally salient goals is an important area of inquiry that is not typically conceptualized in terms of children's moral development but could make a significant contribution to the literature if considered in this light (see Killen & Cooley, 2014).

African American parents in the United States often socialize their adolescents to cope with discrimination and unequal treatment (Hughes et al., 2006), teaching them about racial bias in the broader society and providing them with strategies to cope with prejudice. Indeed, research has shown that when ethnic minority parents in the United States talk to their children about potential discrimination and unfair treatment, this form of discourse promotes resilience in the context of exclusion and victimization (Neblett, Terizan, & Harriott, 2010) and leads to more proactive coping and better mental health outcomes (Hughes et al., 2006). Furthermore, a longitudinal study with African American families demonstrated that hearing parents' egalitarian messages led to better psychological adjustment among adolescents (Neblett et al., 2008). These forms of parental socialization reflect issues of unfair treatment that children must face every day.

Narratives and Discourse. Narrative methods also have illuminated the emergence and development of moral understanding in parent-child contexts. These studies have shown that when mothers use a more elaborative style in their reminiscences about their preschool children's previous moral behavior and misdeeds, their children display more behavioral internalization (as measured on a resistance to temptation task) and higher levels of emotional understanding (Laible, 2004). Mother-child conversations also differ when they focus on helping versus harming. Recchia, Wainryb, Bourne, and Pasupathi (2014) found that when European American mothers had conversations with their 7-, 11-, and 16-year-olds about instances where they helped (as compared to hurt) a friend, they focused more on others' needs and encouraging children to see themselves as prosocial moral agents. In comparison, conversations about hurting a friend were more elaborated and complex, involving more challenges and conflicting viewpoints, which may facilitate moral development. Children focused both on others' needs and their own internal states, thus integrating their understanding of others' needs with their motivations and feelings about harming others. Mothers highlighted children's wrongdoing but also helped their children to reconcile their negative behavior with a sense of themselves as moral agents. With age, children became more active in the conversations; children offered more psychological insights and were less reliant on their mothers to scaffold their moral reasoning.

In their recent monograph, Miller, Fung, Lin, Chen, and Boldt (2012) suggested that the types of maternal strategies described by Recchia et al. (2013), particularly those that bolster children's self-esteem, are culturally specific and reflective of Western cultural values. Miller et al. (2012)

employed ethnographic, longitudinal home observations and analyses of everyday conversations to study moral socialization in European American families of 2.5- to 4-year-olds in the United States and in Chinese families in Taiwan. They found that conversations in the two contexts occurred at similar rates and showed similar age-related increases in frequency and child participation, but they also observed culturally specific differences in moral socialization. In Taiwan, conversations were more didactic; caregivers focused on elaborating, narrating, and correcting children's misdeeds and privileged the roles of the bystander and narrator. In the United States, conversations were more affirming of the children, and downplayed children's rule violations to emphasize children's strengths and preferences.

These analyses highlight the dynamic, constructive nature of moral meaning-making. Although contextual differences were observed, this does not mean that children necessarily view all of their parents' discipline methods in a positive light. Children reflect on parents' behavior, and as they grow older, their evaluations of whether parental behavior is fair, right, or legitimate have a substantial effect on their moral development and adjustment. As Reccchia et al.'s (2013) analyses suggest children increasingly exert agency in their moral development. In a recent study, Helwig, To, Wang, Liu, and Yang (2014) compared 7- to 14-year-old rural and urban Chinese and Canadian children's evaluations of different disciplinary practices, particularly those involving psychological control and shaming in response to moral transgressions. They found that shaming and love withdrawal were more common in China than in Canada. But, regardless of setting, children preferred induction and, with age, became increasingly critical of shaming and love withdrawal. They viewed these disciplinary practices as having negative effects on self-worth and psychological well-being.

Research has also shown that cultural variations in whether children view parental discipline as fair and reasonable moderates its effects on children's adjustment. Lansford and her colleagues (Lansford et al., 2005) have studied mothers and children across a broad age range and in different cultures that vary widely in the normative status of physical discipline (spanking or slapping, grabbing or shaking, and beating) and in mothers' use of those practices. Regardless of the cultural context, frequent physical discipline had adverse effects on children's adjustment. Harsh forms of discipline have been shown to be associated with maladjustment in childhood. When children interpret physical punishment as administered out of love and concern, however, its negative effects are mitigated.

Although physical punishment is still deleterious, it is less so. Further research needs to determine how this form of discipline is justified by parents as well as how it is interpreted by children.

Summary

The family provides the first set of sustained social relationships that children encounter and is a rich context for the development of morality, whether conceptualized as identity, moral emotions, behavior, or moral judgments. Studies demonstrate that from early ages onward, secure attachment relationships, authoritative parenting, and inductive discipline facilitate children's moral development, as do parent-child conversations, reminiscences about children's past and expected behavior, and conflict negotiations. These offer children opportunities to reflect on and interpret their experiences, consider and integrate an awareness of others' internal states with their concepts of right and wrong, and challenge others' (including parents') interpretations of moral events. The current research described here details how parenting varies in different contexts and depends on the nature of the transgression. As children grow older, they increasingly reflect on parental treatment (of them and in comparison to their siblings) and evaluate whether it is fair, legitimate, and appropriate. With age, new sources of social influence, such as the peer group, become important, as we consider next.

MORAL DEVELOPMENT IN THE CONTEXT OF PEER AND INTERGROUP RELATIONSHIPS

Researchers have examined different types of peer interactions (from friendships to groups to crowds) and relationships of varying quality to determine how peer interactions bear on moral development (Rubin, Bukowski, & Parker, 2006). Peer interactions have the potential to facilitate moral development through opportunities to cooperate, negotiate, and compromise (Piaget, 1932). Positive peer interactions can lead to the conceptualization of others as equals and help children form concepts about the fair treatment of others.

Peer interactions are seen as differing from adult-child relationships, which Piaget (1932) originally characterized as unilateral, hierarchical, and authority oriented. Peer relationships may also be hierarchical, however, just as parent-child relationships can reflect mutuality and reciprocity. The hierarchical quality of peer groups has been studied in terms of bullying and victimization as well as

in terms of status, prejudice, and group identity, which are related to intergroup attitudes (identification with ingroups and outgroups). Group identity can play a positive role as a form of affiliation or a negative role as a factor in social exclusion and prejudice. We discuss each of these areas of research, highlighting key findings.

Peer Interactions Promoting Morality

From early ages on, peer interactions play a positive role in enabling children to consider other points of view and in understanding why it is wrong to hit someone or deny toys and resources. Children's interpersonal conflicts provide a context in which children learn about the connections between acts and consequences (e.g., that hitting causes pain). Children's recollection of these experiences, as well as their own observations of other children being hit and crying in response—can enable the inference that hitting is wrong, particularly when the child identifies with the victim. In early childhood, object disputes—sharing toys and taking turns—are the most frequent source of interpersonal conflict, but this changes with age, as conflicts and negotiations over social interactions and relationships become more frequent.

Dunn (2014) proposed that friendships provide a context for the development and growth of moral sensibilities. The results of studies further suggest that the interpersonal bonds of friendships may facilitate children's thinking about the mitigating circumstances in which transgressions may occur (an issue we discussed earlier when considering links between morality and theory of mind). For example, one study found that although moral transgressions were viewed as wrong, preschool children were more forgiving of hypothetical moral transgressions and treated them as more permissible when they involved a friend rather than a nonfriend (Slomkowski & Killen, 1992).

Research by Dunn et al. (2000) has shown that young children who were observed to have high quality friendships (marked by low levels of conflict and high levels of shared imaginative play) were more likely to respond to hypothetical moral transgressions with justifications that focused on others' welfare, feelings, and interpersonal relationships. Furthermore, few associations between the quality of play and children's judgments of the permissibility of moral transgressions were found, pointing to the importance of going beyond simple quantitative measures (of permissibility, severity, or goodness) to consider qualitative differences in children's reasoning about events. Age-related changes demonstrate that young children's

ability to negotiate fairness begins in dyadic interactions and moves to triadic and group contexts. Children often have conversations and discuss issues of others' welfare, fairness, and rights. Further, as discussed earlier, young children negotiate resource allocation using moral reasons, often in the absence of adults.

Friendships typically have been defined as mutually reciprocal relationships in which both individuals identify the other as a friend (Bukowski, Motzoi, & Meyer, 2009). Research has revealed that such reciprocal relationships involve responsibility, cooperation, and coordination. Much like high quality parenting, high quality friendships supply social support that provides the basis for the development of concepts such as fairness, empathy, and equality. For instance, McDonald and colleagues (McDonald, Malti, Killen, & Rubin, 2014) found that, when resolving conflicts about hypothetical social dilemmas, adolescent best-friend dyads with high-quality conflict resolution exchanges used more constructive discourse strategies and more moral reasoning than best friends who had poor conflict resolution exchanges. Research also has shown that adolescents' prosocial orientation toward peers is related to moral reasoning (Carlo, 2014). A noteworthy finding is that children who have friends are less at risk for peer victimization than those who do not, leading researchers to assert that friendship provides a buffer against the risk of bullying (Hodges, Boivin, Vitaro, & Bukowski, 1999). More systematic research focusing on the role of friendship and the processes involved in enhancing moral development is warranted.

As has been well documented, peer interactions during adolescence become more complex and more embedded in social groups and cliques, as we describe below. Through childhood and adolescence, peer interaction continues to play a unique role, expanding in multiple ways in terms of dyadic friendships, group affiliation, and group identity.

Hierarchies and Inequalities in Interpersonal Peer Relationships

Peer relationships have the potential to be mutual and foster equalitarian principles, but many peer relationships also reflect unequal, unilateral relationships that undermine or create obstacles for moral development. Exchanges involving bullying and victimization are moral violations in that they cause harm to others and involve treating others unfairly and disrespectfully. Further, children who experience high levels of victimization are at risk for a host of

negative outcomes, including poor school and academic achievement (Graham, Bellmore, Nishina, & Juvonen, 2009; Juvonen & Graham, 2001).

Extensive research has focused on peer rejection and its consequences. Researchers have identified children who are neglected, rejected, popular, or “average” on the basis of peer nominations of friendships (Rubin et al., 2006). Rejected children, who identify other peers as friends but who do not receive reciprocated nominations, are often victimized by peers, and, in turn, react aggressively using bullying tactics. Thus, these relationships reflect negative moral intentions on the part of the victimizers and negative outcomes for the victims. Intention to harm others is a moral issue, and research that has focused on the moral dimensions of bullying includes studies of relational aggression (Crick & Grotpeter, 1995), the intersection of developmental psychopathology and moral judgments (Arsenio et al., 2009; Malti, Gasser, & Buchmann, 2009), and moral disengagement (Hymel, Rocke Henderson, & Bonanno, 2005).

Crick and colleagues (Murray-Close, Crick, & Galotti, 2006) were instrumental in identifying social cognitive factors as well as moral reasoning associated with relational aggression. Relational aggression was defined as the negative intention to harm another through psychological means, such as damaging the victim’s relationships and status through social exclusion. Children engaging in relational aggression often lack self-control and self-regulatory abilities, are less skilled at reading social cues, and interpret others as having hostile intentions in ambiguous encounters (Crick & Dodge, 1994). These deficits include an inability to coordinate victims’ and perpetrators’ intentions, as reflected in their expectations that victimizers will feel happy. Lacking these skills, children are at risk for bullying behavior toward others or being victims themselves. Thus, this research helps identify children at risk for committing moral transgressions such as harming others. Arsenio (2014) and others have also examined how information-processing deficits are related to moral judgments. These deficits, which reflect individual differences, contribute to becoming chronic bullies or victims, and to the negative consequences of interpersonal rejection.

Children also experience exclusion based on their cultural group membership, and this has been shown to be detrimental from a moral developmental viewpoint. Huynh and Fuligni (2010) found that Asian American and Latin American adolescents reported more adult and peer discrimination than did their European American peers, and

Latin American youth reported more adult discrimination than their Asian peers. Discrimination reflects unfair treatment based on group membership, and these types of experiences are related to various negative outcomes. For example, the frequency of discrimination predicts lower academic performance and self-esteem and more depressive symptoms, distress, and even somatic complaints. School composition, teachers, and classroom climates are central to children’s and adolescents’ experiences of safety, freedom from victimization, and social exclusion. Rejection and exclusion due to group membership factors differ qualitatively from rejection due to personality deficits, however.

Studies that have directly compared how early adolescents (11- to 15-year-olds) evaluate peer rejection based on personality traits (aggressive and shy) in contrast to group membership (gender, ethnicity, nationality) reveal that early adolescents use personal choice reasoning to explain why interpersonal peer rejection is justified, and use moral reasoning to explain why intergroup social exclusion is unfair (Malti et al., 2012; Park & Killen, 2010). An important direction for further research would be to examine the intersection of these variables. For example, studies could test whether children use moral reasoning to explain peer rejection of an aggressive ingroup peer or personal choice reasoning to explain rejection of a nonaggressive outgroup peer. Analyses of social and moral reasoning help to elucidate the developmental processes contributing to patterns of inclusion and exclusion as well as prejudice, as we discuss next.

Interpersonal and Intergroup Aspects of Peer Relationships

In contrast to interpersonal rejection experiences, intergroup peer exclusion occurs when a member of a group excludes someone based solely on group membership, such as gender, race, ethnicity, culture, or sexuality (Killen, Mulvey, & Hitti, 2013). Intergroup approaches focus on the normative, societal expectations that foster group identity (and group affiliation) and often, at the same time, create ingroup bias and outgroup dislike. In turn, these attitudes have the potential to lead to prejudice, discrimination, and bias, both explicit and implicit (Abrams & Rutland, 2008; Killen et al., 2013; Nesdale, 2004).

Intergroup relationships are those in which ingroup and outgroup categories interact, and they contribute to both positive and negative aspects of moral development. On the one hand, forming a strong group identity provides

an affiliation that enhances self-esteem and bolsters confidence. On the other hand, ingroup identity often creates ingroup preference, which can result in outgroup dislike. Within the intergroup attitudes literature, there is debate about whether ingroup preference is necessarily linked to outgroup derogation (Nesdale, 2004). When outgroup derogation exists, however, the results are often in the form of negative and unfair treatment of others, including prejudice, discrimination, and exclusion.

Whereas the intervention goals in the case of interpersonal peer rejection are to train children who lack social skills to better read social cues, the aim of intergroup exclusion interventions are to train the majority group to be aware of both explicit and implicit biases in order to reduce prejudice and discrimination, which occur throughout development. Recent research applying this issue to moral reasoning has proposed that a central aim of intervention is to increase the understanding that prejudicial exclusion is a moral transgression because it reflects the unfair treatment of others. Children are both the perpetrators and recipients of negative intergroup attitudes, which create harm, injustice, and unequal treatment. Contrary to popular belief, children's prejudice is not a direct outcome of parental attitudes (Aboud & Amato, 2001). Instead, children form ingroup and outgroup categories early in life, which contribute to their evaluation of peer encounters including those that are morally relevant.

Intergroup Contact Facilitating Moral Judgments

Relying on Allport's (1954) intergroup contact hypothesis, which identifies the conditions under which intergroup contact can reduce prejudice, developmental researchers have examined when contact with members of outgroups increases moral reasoning, empathy, perspective-taking, and prosocial behavior toward others (Tropp & Prenovost, 2008). Studies examining which conditions for contact are most effective have yielded conflicting findings. A meta-analysis of developmental studies on the connections between intergroup contact and reduction in prejudicial attitudes (Tropp & Prenovost, 2008) revealed that the most significant factor for prejudice reduction was cross-group friendships. This is important because friendships and peer relationships play such a central role in moral development. Thus, having a friend from an "outgroup" was related to a reduction in negative attitudes toward the group as a whole. Aboud and Spears Brown (2013) report that discrimination emerges as early as 4 years of age,

and thus interventions focused on cross-group friendships are particularly important early in development.

Recent findings support the expectation that intergroup contact increases more positive moral judgment and moral reasoning regarding intergroup social exclusion (Brenick & Killen, 2014; Crystal et al., 2008; Feddes, Noack, & Rutland, 2009). As an example, a longitudinal study conducted by Feddes et al. (2009) cross-group friendships experienced by German children predicted positive attitudes about Turkish children, as well as positive attitudes about peers and peer relationships. Thus, cross-group friendships provide an important form of social experience that reduces negative moral treatment of others. Turner, Voci, and Hewstone (2007) investigated self-disclosure (sharing intimate details with another person) in children's cross-ethnic friendships and found that it led to more positive attitudes toward outgroups, with increased levels of empathy and intergroup trust, two forms of moral responses by peers. When U.S. ethnic majority children and adolescents attend ethnically heterogeneous schools and report cross-group friendships, they use fewer stereotypes and more moral reasoning when discussing interracial relationships and social exclusion than majority youth attending ethnically homogeneous schools (Killen, Kelly, Richardson, Crystal, & Ruck, 2010).

In another study, Aboud, Mendelson, and Purdy (2003) studied 6- to 12-year-old White Canadian and Black Caribbean children's friendships and found that children with less biased attitudes had more cross-race companions and more positive perceptions of their friends. These studies identify aspects of peer interactions and social experience that enable children to recognize why prejudice is wrong and unfair.

Peer Groups, Prejudice, and Classroom Expectations

The roles of teachers and classroom interactions in prejudice and bias have been investigated from many different viewpoints. Here we consider classroom variables that contribute to hierarchies and discrimination, as well as students' perceptions of unfair classroom or teacher practices that contribute to negative peer relationships. For instance, in investigating patterns of ethnic segregation among 8- to 11-year-old African American and European American children, Wilson and Rodkin (2011) found that when African American students were in the numeric minority, they were more likely to be friends only with same-ethnicity peers and disliked by ethnic majority peers.

However, this was not true when European American students were in the numeric minority in a classroom, revealing a status hierarchy that may contribute to prejudicial behavior.

In a series of studies by Verkuyten and colleagues, social exclusion among 10- to 12-year-old Dutch, Turkish-Dutch, Moroccan-Dutch and Surinamese-Dutch preadolescents was associated with school segregation (or desegregation) and multicultural education (Verkuyten & Thijs, 2002). Children experienced less exclusion if they believed they could tell teachers about unfair behavior toward them and that the teachers would take action. This demonstrates that children who could report on the unfairness of exclusion were less likely to be victimized. Dutch children also reported more awareness of ethnic exclusion when they came from classes that spent more time discussing multicultural issues, such as the need to be fair to others from different countries and recognize different cultures within the class and society.

Verkuyten's findings also indicate that youth are aware of the role of power imbalances between victims and perpetrators and that this awareness influences judgments regarding the wrongfulness of exclusion. When the perpetrator was from the majority-status group, exclusion reflected societal-level patterns and an asymmetrical power balance, in contrast to when the perpetrator was from the minority-status group (Verkuyten, Weesie & Eijberts, 2011). This supports the view that school climate is related to perceptions of safety and experiences of prejudicial attitudes. These studies reveal the challenges and obstacles for applying principles of impartiality and fairness to contexts in which stereotypic expectations are pervasive.

Møller and Tenenbaum (2011) examined 8- to 12-year-old majority (Danish) children's reasoning about peer and teacher exclusion stemming from increasingly overt discrimination against Muslims in Denmark. Danish majority children found it less acceptable for teachers to exclude children than for peers to exclude other peers. Children were sensitive to the roles of authority as well as of group status in such moral transgressions. They judged it less acceptable to exclude a less powerful group member, but they did not extend this judgment to peer encounters. The legitimacy of peer exclusion based on cultural membership raises concerns about the existence of underlying biases. Thus, teachers and school climates have significant impacts on children's moral development regarding issues of fair treatment of others based on group identity. Identifying measures of classroom climate that could

be used across studies would help promote comparison studies and enable a more systematic way of testing the effectiveness of different ways to promote fair treatment of others in classroom contexts.

Summary

Research on the roles of peers and social groups has expanded greatly over the past decade. Research demonstrates that friendships and peer interactions can be important—indeed central—contexts for moral development, as they afford opportunities for cooperation, reflection, and reciprocity among equals. New studies examining the specific characteristics of friends and friendships at different ages and their direct contributions to moral development will provide a more complete picture of the role of peer relationships in moral development.

Peer relationships that are unequal can cause moral harm through bullying, coercion, and harassment. Further, intergroup relationships, which are reflected in peer groups defined by group identity, may have both positive and negative influences on moral development. Cross-group (e.g., cross-race) friendships can reduce prejudice and increase moral reasoning about the wrongfulness of group-based exclusion. Yet, group identity can also contribute to prejudice and discrimination when children and adolescents prefer the ingroup and dislike the outgroup. Developmental science research has not fully analyzed the role of teachers and the larger school environment on the factors and specific mechanisms that provide obstacles or catalysts to promoting fairness and justice. Curricula that foster cross-group friendships may also help to reduce inequalities and facilitate moral development. These issues need to be examined systematically.

MORALITY IN THE CONTEXT OF CIVIC ENGAGEMENT, SOCIETY, AND POLITICAL INSTITUTIONS

Beyond family and peer groups, youth also engage in and are influenced by the larger societal and political context. Interest in how youth become engaged citizens of their societies has long been the province of political scientists, who have focused on associations between demographic variables and political behaviors such as voting (see Helwig et al., 2014). Increasingly, however, developmental scientists have addressed these issues by

studying the moral dimensions of civic life. Thus, we consider recent research on civic engagement, moral attitudes, moral identity, political reasoning, and social inequality.

Civic Engagement

A great deal of research has examined adolescents' civic behavior, including volunteer activities and political activities like voting or protesting for a cause, with an eye towards determining the factors that predict involvement (and with a concern about how to instill these values in childhood and adolescence so as to enhance civic engagement in adulthood). One of the central areas of research in this field concerns the connections between civic engagement, moral attitudes, and moral identity. These studies have focused primarily on community service and have been guided by the assumption that greater involvement facilitates moral identity. As Hart, Atkins, and Donnelly (2006) noted, youth who engage in voluntary community service often are motivated by altruistic intent; indeed, a survey of a large representative sample of U.S. teens demonstrated that stronger endorsement of moral attitudes (e.g., that it is important to help others in the community) is associated with more involvement in community service 2 years later. Similar findings have been obtained in a large survey of youth in seven countries (Flanagan, Bowes, Jonsson, Csapo, & Shlebanova, 1998). Further, in her studies conducted in 28 countries, Torney-Purta (2002) documented the school's role in promoting civic engagement, demonstrating the generality of this issue across the globe. Even when schools mandated teens' involvement in community service, engagement in these activities led to further interest in community service and civic participation (Hart et al., 2006).

Research on civic engagement has employed behavioral measures of these constructs (for instance, community service, voting in an election, protesting for a cause, joining a civic organization), but very little research has examined adolescents' conceptions of these different activities and their moral relevance. Metzger and Smetana (2009) showed that middle-income U.S. ethnic majority 17-year-old students judged community service involvement and volunteering (like helping to feed the homeless) as morally obligatory and praiseworthy activities. Moreover, adolescents who were more involved in these activities were more likely to reason morally and have a moral orientation to these activities. In contrast, political activities like voting in an election were seen as obligatory, but in a conventional sense (because they facilitate the

effective functioning of society). Further, engaging in community activities (like joining a neighborhood social club) was judged to be a personal issue. With age, adolescents viewed community service less as an obligation and more as a worthwhile activity (Metzger & Ferris, 2013). These studies demonstrate that adolescents have complex and differentiated conceptions of different types of civic engagement and suggest that the type of activity researchers operationalize as measuring civic engagement may influence the findings they obtain.

Hart and Fegley (1995) examined concepts of self and identity among poor, urban, primarily African American youth who were heavily involved in community service (and thus were designated as "moral exemplars"). They found greater congruence between morally exemplary youths' actual and ideal selves, their past and future selves, and their images of their parents than among a comparison group of youth, who were matched demographically but were not heavily involved in community service. These researchers suggested that personal ideals, parental models, and youths' sense of personal identity facilitated their commitment to community service, although, as they also noted, the cross-sectional design of the study makes the causal direction of the findings unclear.

Evaluations of Democratic and Other Forms of Governments

Numerous studies have examined children's and adolescents' moral evaluations of different political systems. For instance, Helwig (1998) compared Canadian children and adolescents' conceptions of the fairness of different governmental systems, including different forms of democracy (consensual, direct, and representative), oligarchy (rule based on wealth), and meritocracy (where decisions are made by the most intelligent and knowledgeable individuals). All participants evaluated democratic systems as more fair than nondemocratic systems, but by early adolescence, direct democracy was evaluated as fairer than other democratic systems, based on appeals to majority rule and representation. These responses did not mimic what adolescents learned in school, nor did they reflect their own political system (representative democracy).

To extend the research to children living in non-democratic political systems of government, Helwig and colleagues (Helwig, Arnold, Tan, & Boyd, 2007) replicated this study, comparing Mainland Chinese and Canadian adolescents. The participants included urban, middle class teens in Canada and Nanjing, China. All youth

asserted that democratic systems were better and fairer than the nondemocratic systems; they reasoned that people should have a voice and that they should allow for various segments of society to be represented in governance. Moreover, Chinese youth viewed representative democracy as better than democracy by consensus, based on concerns with practicality and utility. Thus, these findings suggest that adolescents in different cultures consider the features of political organizations independent of official cultural ideologies and connect them to judgments of political fairness.

Social Trust Beliefs

In a series of studies, Flanagan and her colleagues have examined social trust, or the belief that people are trustworthy and treat others fairly rather than maximize their own gain. These positive beliefs about humanity accord well with philosophical perspectives on morality (Nussbaum, 1999). Flanagan (2003) argues that individuals develop these beliefs from interacting with people who are different from them and in families that value equality, empathy, and tolerance. To test these hypotheses, Wray-Lake and Flanagan (2012) examined the development of social trust in a large sample of U.S. 11- to 18-year-olds that were followed longitudinally over 2 years. They found that adolescents' social trust beliefs were higher in early than in middle and late adolescence and that they declined over time. However, mothers' beliefs did not differ according to adolescents' age, nor did they change over time.

Wray-Lake and Flanagan (2012) found that democratic parenting, which involves respect for adolescents' autonomy, led to increased social trust for early and middle adolescents, whereas parental messages regarding compassion increased social trust for middle and late adolescents. Flanagan and Stout (2010) further found that beliefs about social trust became increasingly differentiated from interpersonal trust during adolescence. In addition, classroom climate (being in more open classrooms where student opinions were valued and students were respected) led to greater social trust over time, but these effects were mediated by feelings of school solidarity. Thus, these studies provide important insights into how the fair and respectful treatment of adolescents in different social contexts (families and schools) can facilitate positive moral views of others. Research discussed next examines adolescents' beliefs about other morally relevant aspects of society and political life.

Reasoning About the Sources of Social Inequalities in Society

Researchers also have examined children's and adolescents' conceptions of the sources of various social problems and economic inequalities (Olson, Shutts, Kinzler, & Weisman, 2012). For instance, Flanagan and Tucker (1999) examined adolescents' explanations for unemployment, poverty, and homelessness. Distinctions were drawn between explanations that situated causes in the individual and their dispositions versus those that focused on situational, societal, and structural reasons. Youth from lower as compared to higher socioeconomic status families were more likely to believe that individuals were personally responsible for their misfortunes, to endorse the belief that the United States provided equal opportunities for all, and to report that their family valued self-reliance more than compassion and social responsibility. In contrast, adolescents from higher socioeconomic status families were more likely to focus on structural and situational reasons for these social problems. Flanagan and her colleagues have asserted that differential access to societal opportunities (as reflected in social class) led to differences in their understanding of the social contract and the extent to which it offered opportunities for changing economic circumstances.

In a related study, Flanagan, Cumsille, Gill, and Gallay (2007) examined U.S. majority and minority (European, African, Latino, and Arab American) adolescents' beliefs that the United States is a just society, as measured using beliefs about equal opportunity. They found that regardless of ethnic origin, gender, or age, adolescents had stronger beliefs in the United States as a just society when they had a stronger sense of connectedness to their community, and particularly if they believed that their teachers employed democratic practices in their classrooms. The importance of social connectedness has been implicated in other studies of civic commitment as well. However, adolescents' beliefs in the United States as an equal opportunity society were also negatively associated with their experiences of ethnic and racial discrimination (Flanagan, Syvertsen, Gill, Gallay, & Cumsille, 2009). That is, the more discrimination African, Latino-, and Arab-American teenagers reported, the less they believed that society offers individuals a fair chance and equal opportunity to succeed. African American teenagers were least likely to believe that the U.S. government is responsive to individuals "like them" and that the police mete out justice fairly. These findings call for more research on connections between experiences of unfair treatment by authorities and judgments about trust

and confidence in governmental institutions. Such studies need to be conducted in different groups to determine the factors that contribute to adolescents' negative perceptions.

These findings are important, because they show the intersections between adolescents' interpersonal experiences with peers and their beliefs about the fairness and opportunities available in the broader society. The latter, in turn, has implications for ethnic minority youths' willingness to be involved in civic life and the broader society, which is important not just for citizenship but for developing a fair and just society.

CONCLUSIONS, IMPLICATIONS, AND FUTURE DIRECTIONS

As the research reviewed in this chapter indicates, morality is a central topic of inquiry in the developmental sciences, and in the past decade, research on the emergence and development of morality has flourished. Morality is being investigated across multiple disciplines, including economics, anthropology, social psychology, comparative psychology, biology, and the neurosciences. Questions and perspectives from these disciplines have enriched the developmental study of morality, which reciprocally, has raised challenges and questions for scholars in other disciplines. New areas of inquiry have emerged, theoretical approaches have become more integrated, and innovative methods have been applied to broaden and deepen our understanding of moral development.

Thus, for instance, and as we have shown in this chapter, research has demonstrated that the foundations of moral awareness are present in infancy and toddlerhood, as well as in nonhuman primates. Theory of mind competence has been demonstrated to be related to moral judgment. Neuroscience research has explored the biological bases of morality. Children's concepts of harm, resource allocation, fair and nonprejudicial treatment of others, social inequalities, and rights develop from a very focused and narrow form in early childhood to their application in different situational and cultural contexts. Thus, with age, moral judgments require the ability to weigh contextual variables. As well, moral judgments become more comprehensive and generalizable with age.

As this review of research findings suggests, morality cannot be characterized as developing along a linear path. Morality is embedded in cultural contexts and in social relationships; it is neither biologically predetermined nor entirely socialized. As with biological and

cognitive development, moral development is multiply determined; many processes help to ensure that children become morally competent adults. Moral cognition, emotion and behavior all interact and are woven together as children develop.

We have also seen that healthy family and peer relationships facilitate individuals' abilities to live together within societies and treat one another with justice, fairness, equality, and compassion. Secure attachment relationships with caregivers provide a strong basis for the development of trusting, compassionate, and just relationships with others (Cassidy, 2008), but this is only the beginning. Parenting that is responsive, respects the child as an autonomous individual, helps the child to understand his or her own and others' emotions, and scaffolds an understanding of justice, fairness, and others' welfare through reasoning all contribute to healthy moral development. Children reflect on and evaluate parental messages, which may facilitate moral growth, but also, when messages that are not understood or are seen as unfair or illegitimate, may be resisted or rejected.

Children's conflicts and negotiations with siblings and in the context of high quality friendships are central to moral development as well. Social interactions with equals and near equals provide children with opportunities to learn about cooperation, loyalty, respect, and fair treatment. Mirroring the types of interactions with caregivers that facilitate moral understanding and empathy, having teachers and classrooms that employ democratic practices also facilitate a sense of connectedness to their community. We have also seen that these developmental contexts can pose many challenges. Parenting that is harsh and punitive undermines moral development, as do peer relationships that are coercive or involve rejection, harassment, or are prejudicial. Furthermore, schools and societal practices that perpetuate inequalities and unfair hierarchies lead to challenges in children's moral development.

Where to go from here? Despite the considerable progress of research, much remains to be done; there are many new avenues for moral development research to pursue. The family, peer, and community contexts for development reviewed in this chapter rarely have been central to philosophical treatises of morality or its origins (Nussbaum, 1999; Okin, 1989). For example, Okin (1989), a political scientist and philosopher, observed that, despite the centrality of the family in foundational philosophical theories of morality (e.g., such as the view that morality originates in the family context), family arrangements have historically been one of inequality and inequity with

respect to women's roles, as well as to children's status as rational beings deserving of fair and just treatment. This is still the case today, and future research needs to more directly link the quality of parent-child relationships with moral concepts of equality and equity. This would also illuminate how family relationships and conventional norms about status, power, and hierarchies contribute to moral development.

More research also is needed to better conceptualize the role of children's and adolescents' interactions with family members, peers, and friends and their implications for moral emotions, cognitions and decision making. As we have seen, recent research has gone beyond a focus on parent-child relationships to more broadly consider how different relationships within the family contribute to moral growth. Much research has shown the importance of sibling relationships for morality, but research needs to consider broader definitions of families. For instance, in some groups and cultures, extended families, including grandparents and other relatives, are the norm, and stepparent, reconstituted, and single-parent families are increasingly common. Fathers play a crucial role, and too many developmental science studies continue to ignore the role of the father despite extensive evidence that children thrive when both mothers and fathers are involved in children's development (Lamb, 2010); this role applies to moral development as well. Further, we are in the midst of historic legal changes regarding same-sex marriage, and there will surely be a rise in families with children raised by lesbian, gay, bisexual, and transgendered couples. Studying the role of different family arrangements and roles is essential for our science and for public policy and could help illuminate moral developmental processes.

Although positive peer interactions and relationships contribute to moral development, we have seen that negative peer relationships—being the recipient of negative bias and expectations from one's peers based solely on skin color, ethnicity, gender, and sexual orientation—can have wide ranging detrimental effects for children's moral development. Some children, both from ethnic minority or majority backgrounds, are clearly aware of the unfairness of differential treatment and social inequalities, but others are not, and we need to better understand why this is. Furthermore, research needs to include children who are potential targets of unfair treatment and those who are potential perpetrators (from all backgrounds). Moreover, we have shown the importance of considering children's awareness of unfair treatment of others based on group membership and intergroup attitudes;

this research should be extended to other areas of moral development. Finally, while social inequality at a societal level is pervasive, we know little about whether and how this is perceived and evaluated by children and adolescents.

The current global landscape is filled with moral issues that bear on children's healthy development. Violence continues in many parts of the globe; children continue to experience crippling poverty, life in refugee camps, recruitment as child soldiers, and even slavery. Research on moral development can help us understand these many and overwhelming challenges that too many of today's children experience. Research on resilience has shown that children can survive and even thrive in the face of overwhelming odds, but we know very little about moral development in such catastrophic situations, which offer opportunities to understand healthy moral development, development gone awry, and the factors that tip the balance in either direction. Just as importantly, studying such situations can make an important contribution by helping to cast light on the inequalities and perpetuation of injustice around the world.

Moreover, many social issues worthy of study do not pertain only to children's status and well-being but also to the context of the family, schools, and social institutions. For example, recent protests regarding women's rights in India have implications for children's lives in the family context, and U.S. discussions on racial profiling of minority males as reflecting unfair and prejudicial treatment affect minority children's aspirations and motivations. Negative school climates create unsafe environments for children that bear on children's welfare as well as their rights to an education, and to become productive members of the workforce.

As children around the world are living in new communities and growing up in cultures that are more heterogeneous than in the past, parents, teachers, and educators are struggling to determine how best to teach children about fairness and inclusiveness, especially in contexts in which negative messages about individuals based on group membership are pervasive. The data reviewed in this chapter, however, reveal that children are neither passive recipients of information, nor are they ruled by selfish and aggressive instincts. Concepts of morality emerge very early, and for the most part, young children have an awareness of equality, fairness, and rights, which becomes much more fully formed by adolescence. In this chapter, we have demonstrated that what develops is not the ability to appreciate morality but rather the social

cognitive competence, knowledge, and experience required to apply morality to increasingly complex social situations. We do not yet fully understand why children feel, think, and apply moral understanding in some circumstances but not in others, and this remains an important issue for further research, as identified throughout this chapter. Parents and educators have to help children disentangle the complex considerations present in situations that call for moral judgments; they also have to foster positive social relationships that motivate children to choose the moral course of action.

Children everywhere experience discrimination and unfair treatment as a result of their age, gender, sexual orientation, race, ethnicity, religion, nationality, indigenous background and other categories. At the same time, and as research reviewed here indicates, children are also the perpetrators of exclusion and discrimination. Adults also play both roles, teaching children to respect others but communicating negative messages about outgroups, which contributes to unfair treatment of others. Legal frameworks are essential for providing the foundations for equity and justice in childhood and throughout development. However, this is only the first step toward securing a course of healthy moral development. Social and psychological attitudes and the types of relationships that form in development also need to change. Thus, understanding the psychological developmental underpinnings of the origins and development of morality is essential for creating effective intervention programs.

Moral development research has expanded exponentially across the globe in recent years. While much of the research reported in this chapter has been conducted by North American and Western European researchers, studies have included ethnic, religious, and racial minority subgroups, in addition to majority groups. This has been an important contribution to our knowledge. Nonetheless, more research in different contexts and across wide age ranges are required to more fully understand moral development.

There are ongoing debates more generally about the virtues of studying “within-culture” versus cross-cultural studies. Both types of studies are needed to build a comprehensive picture of moral development. However, studying moral development in another culture should not mandate a “comparison” sample from the United States. Conceptualizing the role of culture requires going beyond broad templates and overgeneralizations and towards acknowledgment of the diversity of perspectives present within all cultures. In an age of ever-increasing global

connectedness, immigration, and international political and economic collaboration, detailed investigations of how individuals in diverse cultures develop, evaluate, and apply morality in their everyday lives and interactions will help researchers to answer fundamental questions about the culturally specific and universal aspects of morality.

As we noted earlier, morality is being widely studied in other disciplines, and statements are being made about the nature of morality without adequate connection to developmental processes. Therefore, we encourage researchers to engage with scholars in other fields so that the types of innovative findings reviewed here can be better integrated across disciplines. The research described in this chapter reflects high-quality scholarship and science, providing examples of innovative theory and methodology that are driving new avenues of research. The developmental science of morality provides theories, evidence, and data for making a difference in children’s lives, and for promoting justice, fairness, and equality.

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CHAPTER 18

Development of the Self

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Perhaps more than any of the domains of human development, self-processes have garnered long-term multidisciplinary interest and attention. Philosophical, theoretical and empirical views concerning self-processes have often served as conceptual tools, either for guiding responsive national policy or as explanatory devices for evaluating outcomes. Approaches to the nature of the self matter, as do interpretations of self-processes: Both are implicit in much education and youth-related policy. With broad, global media accessibility (see Swanson, Edwards, & Spencer, 2010), there are a much wider variety of influences on self-processes in contemporary society than in the past. Researchers are paying more careful attention to historical and contemporary everyday cultural practices that affect how diverse groups of humans live and adapt (e.g., see Lee, Spencer, & Harpalani, 2003; McGee, Hall, & Spencer, *in press*). Moreover, filtered through socially structured opportunities and challenges, media images and cultural practices provide the “interpretational framing” of our own lives, and those of others—all within the various social contexts of human development. Thus, our conscious and unconscious views about the nature of the self as implied for ourselves and inferred for “others” make a difference. They unavoidably contribute to the structuring

of everyday contexts constructed for others and those taken for granted by ourselves (e.g., structured inequality and conditions of privilege). As complex phenomena linked with evolving cultural contexts, life course psychosocial processes matter profoundly.

Consequently, this chapter posits that—given the social, economic, and cultural realities and complexities evident in 21st-century North America—conceptual cautions are needed. An emphasis on self-processes must provide, at minimum, equal attention to the widely disparate social and economic conditions. These social inequalities contribute heavily to differences in self-processes in the first two decades of life in all societies. Traditional psychological perspectives on the self did not emphasize differential access to resources and varying levels of exposure to developmental challenges, particularly for minority youth. Researchers have begun to emphasize these social inequalities when studying minority youth development (see Spencer, Harpalani, et al., 2006, for an overview), but there is much that can still be learned by conceptualizing self-processes specifically in terms of these inequalities. Given America’s growing racial and ethnic diversity—a phenomenon that is also occurring in many European and other nations across the world—there

is a need for developmental psychologists to place racial and economic inequality at the forefront, even when studying individual psychological phenomena such as self-processes.

While they share physical and psychological space and a national identity as Americans (see Spencer, 2011), the nation's diverse youth frequently face unique challenges related to racial and economic inequality. Given increasing racial and ethnic diversity, context-linked adaptive processes matter for youth character development and self-appraisal (see Spencer, 2008a, 2008b; Spencer, Harpalani, et al., 2006; Spencer & Tinsley, 2008). To name but a few environment-mediated factors, psychosocially significant values concerning attractiveness—even for males—(e.g., see Korobov & Bamberg, 2004), age-relevant criteria (e.g., Proulx & Chandler, 2009), gender (e.g., Davis & Stevenson, 2006; Dupree, Gasman, James, & Spencer, 2009), as well as race and ethnicity (e.g., see Harpalani & Spencer, 2009; Swanson, Cunningham, Youngblood, & Spencer, 2009; Swanson, Spencer, Dell'Angelo, Harpalani, & Spencer, 2002) are all salient messages that influence self-processes. The process begins early and continues across the life course as messages requiring adaptations or reframing become part of the culture (e.g., Davis & Stevenson, 2006; Harpalani & Spencer, 2009; Slaughter-Defoe & Wang, 2009; Spencer, 2008a; Swanson et al., 2002). From both long-term and recent theoretical formulations and contemporary reports representing links between self and a broad array of person characteristics, the topic's influence has not abated. It has enjoyed historical speculation, is consequential both for individual level and group members' adaptive processes, and is understood to have salience for the ultimate character of life course experience and outcomes.

William James (1892/1961) is generally credited as the individual who made foundational advances to our understanding self-processes. The "I-self" or sense of one's basic existence as a unique individual suggests consciousness and stability; that is, an awareness that one's unique experiences, thoughts, actions, feelings and perceptions continue across place and time. However, very young children's developmentally appropriate egocentrism prevents a full appreciation of the fact. Associated with a consciousness of self, as viewed by William James, is a gradual awareness of a sense of agency or inference which communicates that who you are is linked to and consequential for the experience of the environment or social context; in many ways, the implicit agency assumption is consistent with mid-20th-century theorists such as Robert White's (1959,

1960) representation of the construct as one of competence and effectance motivation and DeCharms's (1968) notion of personal causation. The second major aspect of William James's conceptualization is the "me-self," the distinctive description that generally refers to our knowledge about ourselves and to the ways of defining the self (e.g., age, gender, ethnicity). Individuals' objective categories about themselves may include roles (e.g., daughter/son), personality characteristics, cognitive distinctiveness, and physical individuality (e.g., height, skin tone) (see Harter, 1999). The latter categories suggesting "me-self" discernments are usually assessed as self-concepts (i.e., conceptions about the self). The noted constructions are associated with context.

As suggested in James's formulation, agency plays a critical role in self-processes. Although under-acknowledged in writing prior to the last quarter of the 20th century, societies contain diverse individuals. From a life span developmental perspective, it is critical to recognize human diversity and acknowledge the contributions of thought processes and environmental influences. This orientation also emphasizes the dynamism and *multidimensionality* (i.e., simultaneous consideration of biology, cognitive and psychosocial domains) for self-processes, especially given the varied experiences of diverse individuals. Acknowledging the breadth of developmental influences on self-processes makes the cross-domain manifestations exceedingly important (e.g., as illustrated by the disparity literatures across the fields of health, education, and juvenile justice). The fact of patterned disparities and assumptions about self-concept is particularly relevant when considering and comparing these processes in the diverse groups who share the same physical space. When considering diverse individuals beyond the "standard" (i.e., White, middle income, and, often, male), particularly in an era of global media intrusiveness, self-processes linked to body attributes and awareness become especially significant and complex. General body awareness themes are important; however, at the same time, issues of color awareness, social status (e.g., immigrant status), nativity, faith group, gender bias, and evaluative judgments about these issues matter in very special ways and have varying degrees of impact on the self as a function of the individual's developmental status and thus awareness.

In light of these themes, this chapter examines historical perspectives regarding self-development and presents contemporary conceptualizations of self-processes with specific attention to race and gender as visible characteristics associated with societal expectations that shape

conditions for privilege or marginalization. It then discusses factors that require negotiation of these processes by diverse youth. Family and school contexts are presented as contextual areas of vulnerability that affect identity development and coping outcomes necessitated by conditions of risk and challenge. The chapter concludes with an examination of methodological considerations in examining self-development and future implications for research on diverse groups of youth—research that will have to consider race, gender, and economic inequalities as they affect self-processes.

DEVELOPMENT: A LIFE-SPAN ORIENTATION

Human life course changes are vast (particularly between birth and late adolescence) and, as suggested, the underlying influences themselves are significantly intertwined. Accordingly, understanding age-related patterns of growth and change that take place both within and between developmental stages (i.e., infancy and late adolescence), and acknowledging the numerous contextual and cultural processes that mediate different life stage outcomes are critical. Considering and integrating the meanings for the self and particularly insights about the inherent processes significantly enhance the probability that effective policies and pedagogy will support all children and youth. Further, when considering developmental issues associated with the transitions that children make from stage to stage, it is critical to acknowledge that the combinations of maturational and environmental influences on development are unique for each child; accordingly, individual variation from the norm is more typical rather than the exception. Thus, the existence of individual difference increases the challenge to committed researchers, adding another test to policy makers (i.e., guaranteeing that supports actually function supportively for those they are intended to benefit).

The Self: Challenges and Opportunities

An inescapable challenge given individual variations of experience in myriad settings is that everyone is vulnerable. All humans represent some level of vulnerability: a high level, a balanced level (i.e., risks and supports are at an even keel), or a low level (more supports than challenges are evident or an inferred low level of risk is suggested). The balanced (or imbalanced) relationship between the level of support (i.e., protective factors) and perceived risk (and anticipated challenge) on a moment-to-moment

basis communicates the degree of protection afforded as a function of privilege and the accessibility to resources and support, as opposed to high-risk exposure with inadequate supports (see McGee et al., in press; Spencer, 1995, 2008a, 2008b; Spencer, Harpalani, et al., 2006). However, irrespective of vulnerability level, human resiliency is possible (see Dupree, Spencer, & Spencer, in press; Luthar & Cicchetti, 2000; Masten, 2001; Tinsley & Spencer, 2010; Werner, 1993). That is, for individuals high in vulnerability level, successful outcomes (i.e., resiliency) are nonetheless possible. At the same time, individuals low in human vulnerability can still show maladaptive outcomes and significant failure because the untoward aspect or downside of a privileged life status suggests less experience with adaptive coping (e.g., Luthar, Cicchetti & Becker, 2000; Luthar & Lattendresse, 2002). Privilege and excessive opportunity, which function as significant levels of protective factors, obfuscate the experience of challenge; more specifically, maladaptive coping in the event of significant challenge is due to an individual's lack of adaptive coping practice. Unacknowledged privileging conditions undermine opportunities for adaptive coping; accordingly, the situation leads to potentially less productive adaptive responses to everyday or normative stressors (see Spencer, 2008b; Spencer, Swanson, & Edwards, 2010). Accordingly, self-processes, combined with cross-domain relationships (i.e., physical, psychosocial, and cognitive) and linked to environmental interactions, become complex representations of human vulnerability. Such vulnerability is inextricably associated with nuanced self-processes that can serve as protective factors and positive options, or can become sources of challenge and risk. This chapter examines and delineates the complex interactions between self and social context, and it provides a conceptual framework and theoretical underpinning to analyze their impact on diverse groups of youth.

Domains of Self: Contributions of Risk and Opportunity

Developmental variation for individuals includes interactive changes within the biological, cognitive, and social/emotional domains as associated with environmental quality. Each period of human development, given the character of the context, presents opportunities for variations in the construction of the self and the associated adaptive processes engaged in by the individual (i.e., multiple levels of experienced individual–environment interactions). Acknowledging the latter is critical since growth and development do not occur in a vacuum but happen in contexts ranging from the parent, family, and peer

group to the complex and multitiered societal level (i.e., the frequently overlooked interactions with multiple layered environments). Developmental transitions may represent heightened periods of human vulnerability in formulating and expressing self-processes, to name just a couple, given (1) the upcoming period's specific expectations and requirements (e.g., the attachment-based developmental tasks of infancy, and later periods' sophisticated [cognitive, social, cognitive and physical] tasks for mastery); and (2) the significant variety of person–process–context interactions that mediate the net balance between the components of vulnerability: risk level versus protective factor presence salience across the several human domains (i.e., cognitive/intellectual, affective/emotional, social, and physical/biological).

To illustrate this set of interacting forces, Jean Piaget's theory of cognitive development is helpful; it describes how children construct an understanding of self and the world by interacting with their physical and social environments. Children adapt to their environments by developing mental organization or schemes to interpret and frame their understanding about the nature of the self and of the world. The biological need for balance between mental schemes and actual experiences drives adaptation, spurring the development of more differentiated and complex mental structures including social constructions of "me" and "not me" formulations. However, when young children are deprived of opportunities to interact optimally within their environmental and social worlds, their transition into the next stage of development and nature of the constructed self may be compromised. Hence, they are unable to take full advantage of the opportunities presented to them during the next stage of development because the foundational support necessary for optimal growth is lacking. Particularly with more multifaceted self-construction changes heralding the start of adolescence, self-relevant processes become more nuanced.

Erikson (1959) describes complex self-construction themes as eight stages of ego identity crises associated with developmental challenges and corresponding consequences as experienced across the life course. During infancy, the challenge is for infants to develop a sense of trust in the world based on responsive care-giving (i.e., to develop a secure attachment relationship). When infants' attachment and trust needs go unaddressed, they develop a sense that the world is not a safe place and, in worst-case scenarios, experience severe developmental delays. This sense of mistrust affects children as they get older and face the developmental challenge of becoming more independent (i.e., development of autonomy). Other

developmental challenges identified by Erikson include autonomy versus shame and doubt (toddlerhood), initiative versus guilt (early childhood), industry versus inferiority (middle childhood), group identity versus alienation (early adolescence), and identity versus role confusion (late adolescence). The ways in which children and youth cope with the developmental challenges of each stage help shape their developing sense of self and identity and their ability to cope adaptively with future challenges.

Although human developmental stages are characterized by *normative developmental tasks and disputes*, the transitions between stages are periods of enhanced vulnerability and accordingly pose their own unique challenges. For example, the transition into adolescence precipitates an increased focus on the self—both the inner self and the outer self. It is difficult for young people to escape a preoccupation with their physical appearance given the dramatic bodily changes ushered in by puberty. Further, with the onset of formal operational thought, adolescents become more introspective and more likely to engage in thinking about what others are thinking about them. For the first time, they begin to really see and appraise themselves through the perceived eyes of others, increasing feelings of self-consciousness and self-judgments. During early adolescence, self-evaluations are based predominantly on normative standards, social comparisons, and behaviors, evolving into personal beliefs and standards during late adolescence. Given that early adolescence is a period when the social environments of youth are rapidly expanding and their bodies are quickly changing, the task of meeting new people and trying to make a good first impression becomes a more frequent occurrence, and for some, a common source of anxiety. Support structures need to be in place to help adolescents through this transitional time of development, and to help children and youth during other transitional periods, as well.

Despite the opportunities and challenges associated with normative transitions of development and growth, the ability of children, youth, and adults to successfully give meaning to and cope with ongoing challenges presented by and experienced within their unique environmental contexts persists throughout life. The development of positive coping strategies (i.e., that lead to more positive self-constructions) is critical, especially when children are growing up in contexts where environmental challenges serve as distractions from normative developmental growth and learning experiences. More than ever before, given the central role of media (as well as its potentially intrusive character), children and youth experience an increased

prevalence of adverse influences including models of violence (i.e., domestic, community), exaggerated portrayals of beauty standards, and separation from family members (through death, incarceration, economic stress, etc.). Typically, children are not provided with opportunities and supports that enable them to effectively talk about and cope with their experiences unless they are diagnosed or labeled as having a particular disorder or disability, thus aggravating feelings of marginalization. In some cases, their seemingly maladaptive responses to these experiences are appropriate considering both the nature of the constructed experience and their developmental status. Nevertheless, it is rare that a child can receive the necessary intervention and support without having endured the process of being labeled or diagnosed, because funding for such interventions is often earmarked for certain populations or services. How policy makers deal with these issues remains to be seen. However, the prevalence of policies that discount normative developmental challenges and reward the practice of labeling children's reactive coping strategies as pathological may well seriously undermine the design of authentic supports; the latter suggests behavioral interventions designed, in fact, with the expressed intent to promote healthy development for all children and youth. However, the latter goal may not represent the actual intent.

As described by Spencer, Harpalani, et al. (2006), a normative human development perspective is essential for a maximal understanding of *resilience* and *vulnerability* given the pursuit of stage-specific life course competencies. The risks that youth face, along with the successful and unsuccessful strategies they employ in coping with these risks, must be understood in relation to *both* their maturational status and identity formation processes as linked to the larger social, cultural, and historical contexts of development. Research in developmental psychopathology and applied human development has increasingly focused on risk and resilience. Scholars have begun exploring important conceptual issues that require greater clarity, such as the various definitions of resilience as a construct, and the utility of these in various contexts (see, for example, Dupree et al., in press; Luthar, 2003; Luthar & Cicchetti, 2000; Luthar, Cicchetti, & Becker, 2000; Spencer, 2001; Tinsley & Spencer, 2010). Importantly, a key point to add to this discussion is that risk and resilience cannot be separated from normative developmental processes that occur in multiple contexts. Healthy and normal human development involves negotiating some level of risk and demonstrating a degree of resilience in the face of challenge. From our perspective, *risk* is properly

conceptualized as the exacerbation of normative challenges encountered in the pursuit of myriad stage-specific competencies and is linked to broad sociopolitical processes (i.e., racism, sexism) and/or lack of resources (e.g., Gallay & Flanagan, 2000; McGee et al., in press). These exacerbated normative challenges can be negotiated in conjunction with protective factors, including social (e.g., cultural capital) and material (e.g., the intergenerational transmission of wealth) resources that help individuals to cope with challenges and maximize available supports. We define *vulnerability* as the net experience of both risk and protective factors that an individual encounters (see Anthony, 1974). Productive coping outcomes as well as *unproductive* coping products are possible. Accordingly, as an outcome, *resilience* involves successful negotiation of *exacerbated challenges*; however, resilience is not possible without significant challenges and as linked to heightened risk conditions. The risk and protective factors of youth are key processes given the unavoidable self-awareness, which then leads to self-appraisals.

Self-Appraisal Processes

Self-appraisal processes provide the key link between personal identity development and the individual's relationship to the social world. These processes integrate various aspects of an individual's life and thus promote cognitive, affective, and social development. Self-appraisal is also central to self-esteem and feelings of competence in childhood and adolescence (Swanson, 2010). The long-term persistency of the literature's linking of self-appraisal with color, race, power, and gender deserves to be framed historically, as in the following section.

The Color Bias System and Its Salience to Self-Appraisal: A Historical Review. The color bias system has a complex and global history. Montalvo and Codina (2001) identified the historical roots of the caste classification in Latin America, specifically focusing on Mexico, and noted how differences based on skin color became associated with relative social positioning. They described the colonial involvement in Latin America and indicated how the Spanish and Portuguese colonial powers promoted an absorption ideology. African slaves and indigenous populations were encouraged to blend with White lineage, known as "Whitening," yet despite this color-blind policy, a subtle racial hierarchy developed. Montalvo and Codina described the caste system in Mexico, noting that it was established by the Spaniards in power based on phenotype so that the minority of European heritage was socially

and economically more powerful. The system established White and Black as the extremes, yet a fluid intermixture occupied the middle ranks and, as Whiteness was encouraged, families could improve their social and economic standing by marrying Whiter individuals. Considerations of power mattered.

Conflict between the lesser ranks of castes allowed the Spaniards to maintain power as a system of racial hierarchy and racial stereotypes endured. This caste system was not based on religion or a legal structure. “The incentives for whitening were powerful and not the least of these was the colonial belief that ‘the least drop of Spanish blood was sufficient to raise Mexicans from the rank of slaves’” (Montalvo & Codina, 2001, p. 324). Although the Mexican caste system was abandoned after the war of independence from 1810–1821, the caste system was eliminated and “replaced with informal arrangements that still managed to carry over social privilege based on phenotype” (p. 325).

Globally, other groups have histories similar to that of Mexico in which biases were perpetuated based on skin color. These include Brazil (Lovell & Wood, 1998), the Caribbean (Simonsen, 2003), and Australia (Trigger, 1989), each of which note patterns of behaviors explicitly linked to skin color and social practices created to enhance social control. With a somewhat different historical approach to biased practices, Dikötter (1994) reported that China incorporated a notion of race into its self-definition even as other scholars have claimed racism does not exist in China, stating that “In an era of economic globalization and political depolarization, racial identities and racial discrimination have in fact increased in East Asia” (p. 404). Dikötter discussed several examples of racist ideology dating to the 19th century in which the superiority of the yellow race in its alignment with the White race was claimed in contrast with the inferiority of the Black race and its cultural impurity. Color and status remained salient.

Montalvo and Codina (2001) suggested that, for particular areas of the lower U.S. South during the same period of the Spanish colonial period, a three-tiered system of race privilege developed in which mixed race individuals received more privileges in society and were used to manage Black populations of slaves. However, with the American Civil War, a two-tiered system developed due to the need to defend slavery. Following the war, the American South—where the majority of Black Americans resided—implemented a legal system of racial segregation (commonly known as “Jim Crow”), designed to keep the social lives of White Americans separate from those of Black Americans, and to keep the latter group in a

politically subordinated position. Interracial unions were legally forbidden and racial classifications were reduced to a dichotomy in which a White person was defined as having not a single drop of Black blood. However, within the Black community, lighter skin was more privileged and these perceived advantages remain today. Many Latinos/Latinas have managed to minimize race as a strategy to protect themselves from the American racial binary. However, those with darker skin born in America have suffered more discrimination. Montalvo and Codina noted that, as minorities will continue to grow in number in the United States, “Nevertheless without a basic cultural change in American institutions and attitudes, the reality will not improve the asymmetry in race relations as some believe, but will likely transform it into a hierarchical caste-like system as history proposed” (p. 337). Their perspective suggests that skin color preferences shape the experience of Latinos in America and that the silence that excludes this discussion makes this experience invisible.

The one-drop rule in the American context during slavery and afterwards was driven by a fear of contamination of the “White” gene pool. Any individual with any Black blood was considered Black. However, in the Deep South a three-tiered system developed in which mulattos had more privileges than Blacks. The Deep South had more isolated communities and fewer women and the mulattos acted as middle-men in dealings between Whites and slaves. Furthermore, mulatto slaves occupied indoor positions while physically grueling work was done by Black slaves. As pressure increased from the North to abandon slavery and Whites sought to preserve social hierarchies, the three-tier system eroded to a two-class society racially divided by the “one-drop” rule. The mixing of White, Black, and Native American individuals left a variety of skin colors in the Black population (see Sharfstein, 2007). This mixing across race and class became the basis of color classism among American Blacks. Accordingly, skin color, preferential treatment, and status suggested a foundation with interpersonal implications for both within- and between-group-relations.

The creation of “color classism” in the United States is similar to racialization in many other nations: For example, Bonilla-Silva (2001) notes the development of similar racial hierarchies in Latin America and South America. This suggests that group identity formation is central to understanding social and economic inequality—although not always based on race. Alam (2003) defines auto-centrism as “the tendency of social groups to claim superior attributes—racial or cultural—and, conversely,

to denigrate other groups" (p. 205). The author explored autocentrism throughout history and space. Alam's analysis suggested that while autocentrism existed among the ancient Greeks, Islamic and Chinese civilizations, distinctions were asserted based on cultural superiority, not specific to race. The one exception argued by the author is that, in the 19th century, the Chinese employed their superiority based on race (the author argued that this is an adaptation of a western characterization). Nevertheless, in modern societies—and especially in American society—race has become the central domain of autocentrism.

West's (2002) approach analyzed what gave rise to White supremacy in modern discourse in the west. The author suggested that White supremacy cannot be explained only in terms of economics, the political interests of slave holders, and the psychological needs of the dominant White group; rather, it was sustained by a particular scientific way of understanding the world and humans through description and rank ordering. The scientific revolution highlighted observation and evidence. Furthermore, West argued that the reemergence of classic aesthetic values was important in establishing a "normative gaze" for ordering and comparing.

During the enlightenment, White privilege was so entrenched that the connection between Black skin color and inferior human characteristics and a less civilized manner was assumed to be natural so no justification for racist ideology was needed. Hume, Jefferson, and Kant all expressed racist views without offering justification for them. West (2002) contended that science played important roles in "highlighting the physical appearances of people in relation to what it is to be human, beautiful, cultured, and intelligent" (p. 108). Furthermore, "race did matter in classical antiquity.... The crucial difference seems to be that racial differences were justified on cultural grounds in classical antiquity, whereas at the inception of modern discourse, racial differences are often grounded in nature, that is, ontology and later biology" (p. 108).

Considering these scholars collectively, it is fair to conclude that the idea of White supremacy as a cultural and aesthetic ideal operates along with the capitalist system of production. Thus, it is not surprising that the issue of self-appraisal, given its links with agency, continues to be a powerful contributor to assumptions about life course self-processes both for those without resources as well as for those enjoying significant privilege.

However, as described by Spencer (1985) and colleagues (see Harpalani & Spencer, 2009; Spencer, Harpalani, et al., 2006), the cognitive egocentrism of young children prevents them from internalizing the affect;

thus, they are able to maintain a positive sense of self even though they show awareness of color bias by age three. While young children are certainly affected by racial and economic inequalities, they have not yet developed sufficient self-consciousness for these inequalities to negatively influence their self-esteem. This changes with the onset of late middle childhood and adolescence, when self-consciousness is at its highest. For this reason, adolescence is a particularly important development stage in elucidating how self-processes are affected by racial, social, and economic inequalities.

Societal Expectations, Assumptions, and Influence on Self-Appraisal

Developing a sense of efficacy is crucial during adolescence due to the heightened self-consciousness and greater cognitive awareness of youth, and it is one of the key developmental tasks articulated by Erikson (1968). Successful performance on a particular task increases a sense of personal empowerment (i.e., competence) and the likelihood of future successes in subsequent tasks: Erikson's (1968) "Industry versus Inferiority" stage precedes the future developmental tasks of identity development and intimacy.

Individual development, however, is also determined by the opportunities and expectations of the larger society, and from the local environments where the individual resides and engages developmental tasks. Moreover, given the general developmental tasks associated with early adolescence, issues of competence are compounded by one's culture as well as one's status in the larger society. Therefore, competence is not only rooted in culture and prior successes, but is crucial for successful adaptation to subsequent adult roles. As described by Spencer and Dupree (1996) and suggested by Bandura's (1978) theorizing, self/other appraisal processes are key to social learning and identity development. During middle childhood in particular, these recursive self/other evaluative processes are unavoidably linked to experiences of stress. The stress response requires coping that leads to stable psychosocial responses that may be maladaptive or adaptive. Stable psychosocial coping strategies are linked to a coping outcome or product that may be either productive in quality (e.g., competency, self-efficacy, resiliency) or unproductive (e.g., school avoidance, "acting out" behavior, school-leaving/dropout). These coping outcomes set the stage for the recursive and subsequent experience of context, given individual self/other appraisal processes, as the individual progresses developmentally across the life

course. Recent conceptual framing provides a template for understanding the processes noted.

Phenomenological variant of ecological systems theory (PVEST; Spencer, 1995) elucidates all of the different facets that go into self-appraisal by integrating a phenomenological perspective with Bronfenbrenner's ecological systems theory (1989). A systems theory, PVEST consists of five components linked by bidirectional processes (Figure 18.1); it is a cyclic, recursive model that evolved during the subsequent decade and that describes identity development throughout the life course (Spencer, 2008b; Spencer, Harpalani, et al., 2006).

The first component, *net vulnerability*, consists of factors, such as psychosocial stressors, that can predispose individuals to adverse outcomes. The risks, of course, may be offset by protective factors (e.g., cultural capital). For urban minority youth, risks include socioeconomic conditions such as poverty, sociocultural expectations such as race and sex stereotypes—all of which can pose threats to healthy development. These conditions are also related to self-appraisal: how minority youth view themselves depends on their perceptions of these conditions and societal expectations.

Net stress engagement, the second component of PVEST, refers to the net experience of situations that challenge one's psychosocial identity and psychological well-being. These are essentially risk contributors that are actually encountered and manifested in everyday life and may be offset or balanced by available supports (e.g., interactions with supportive adults). Experiences of discrimination and negative feedback are salient stressors for minority youth, and these influence self-appraisal. In conjunction with normative developmental processes, such as the expression of adolescent male bravado, these stressors can have adverse consequences if appropriate supports and interventions are not in place.

In response to stress, *reactive coping methods* are employed to resolve dissonance-producing situations. Normative cognitive maturation makes awareness of these situations acute and unavoidable. Reactive coping responses include strategies to mitigate or solve problems that can lead to either adaptive or maladaptive solutions. As coping strategies are employed, self-appraisal continues, and strategies yielding desirable results for the ego in the short-term are preserved—even if they may have long-term maladaptive consequences. The reason for this is that

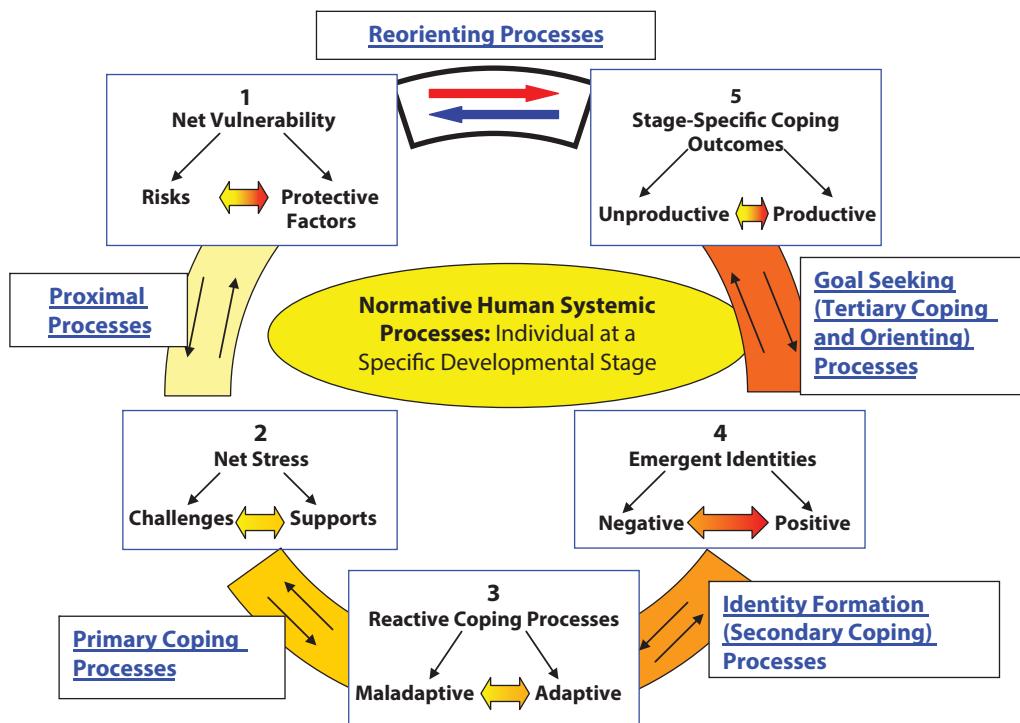


Figure 18.1 Phenomenological variant of ecological systems theory (PVEST: Cyclic version).

Source: Adapted from "Lessons Learned and Opportunities Ignored Since *Brown v. Board of Education*: Youth Development and the Myth of a Color-Blind Society," by M. B. Spencer, 2008, *Educational Researcher*, 37(5), pp. 253–266; and "Phenomenology and Ecological Systems Theory: Development of Diverse Groups" (pp. 696–735) by M. B. Spencer, in *Child and Adolescent Development: An Advanced Course*, W. Damon and R. M. Lerner, Eds., 2008, Hoboken, NJ: Wiley.

children and adolescents live “in the moment”; given their heightened and growing self-consciousness, immediate self-appraisal, rather than long-term projection, is key.

Over time, these strategies become stable coping responses which, coupled together, yield *emergent identities*, the fourth component of PVEST. Emergent identities define how individuals view themselves within and between their various experiences in different contexts (e.g., home, school, neighborhood). The combination of cultural/ethnic identity, sex role understanding, and self and peer appraisal all define one’s identity. Identity lays the foundation for future perceptions and behavior contributing to adverse or productive *life stage-specific coping outcomes*, the final component of PVEST. Productive outcomes include good health, positive relationships, and high self-esteem, while adverse outcomes include poor health, incarceration, and self-destructive behaviors. Accordingly, given context-linked life experiences, multiple possibilities can be explained.

The PVEST processes cycle and recycle through the lifespan as individuals balance new risks against protective factors, engage new stress levels determined by the ratio of challenges to potential supports, try different coping strategies and engage in self-appraisal, and redefine how they and others view themselves.

Within the PVEST framework, self-appraisal is key to coping and resultant identity formation. Relevant aspects of cognitive and social development include self-perceptions, self-efficacy, self-esteem, intelligence, temperament, and problem-solving and interpersonal skills (see Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). Individual attributes develop as a function of behaviors or beliefs that reflect an active, selective, structuring orientation toward the environment. The ability to modify, select, and reconstruct the environment, however, depends on being enabled or empowered to engage in behavior that influences the environment, and appraisal of one’s own ability to influence that environment. The social structures and conditions, from the micro- to macro-level systems provide relevant experiences that interact with psychological processes to produce unique behaviors. In sum, the individual is engaged in a life course process of coping with environmental challenges (e.g., risk and stress), sociocultural contexts (e.g., expectations, attitudes, cultural beliefs and assumptions), and normative developmental tasks (see Havighurst, 1953), and self-appraisal provides the link between coping, identity, and outcomes.

As noted by Erik Erikson (1959), Anna Freud (1958), and more recently by James Marcia (1991), it is the pure

rapidity of physical and psychological changes, social fluidity, and the spatial mobility of youth that contribute to the enhanced high risk character of childhood and adolescence. Unfortunately, regardless of the life stage being considered, few have attempted to integrate the attendant *processes* of identity pursuits with coping responses and character development (Damon, 1997), as linked to the multiple levels of the ecosystem described by Bronfenbrenner (1979, 1989). These attendant processes include the perceptions and resultant meaning making accrued and experienced by the individual, and serve as a *feedback loop* of influence for subsequent decision making and coping outcomes. Self-appraisal is central to understanding all of these processes.

In addition, there are other important oversights—racial/ethnic identity and *identifiability*, contextual experiences, and available supports—to address when analyzing adolescents’ evolving self-appraisal. Characteristics such as race/ethnicity and skin color, gender and body type, and sexual orientation serve as *opportunities for identifiability* and are thus linked to the experience of stigma and related stress. As such, in conjunction with coping and identity, it is necessary to consider self-appraisal processes in relation to these individual characteristics. Although generally an uncomfortable factor to consider and integrate into conceptual analyses, race, ethnicity and human identifiability make a difference for life course experiences.

Race and Ethnicity

Several flaws have characterized scholarship on minority youth (Spencer & Harpalani, 2001). Generally absent from consideration is a systems analysis that considers risk level and the presence of protective factors. From our own work (Spencer & Dornbusch, 1990; Spencer & Markstrom-Adams, 1990; Swanson, Spencer, & Petersen, 1999) as well as that of others (e.g., Youniss et al., 2002), it is clear that identity formation during adolescence requires that youth understand themselves as members of a society within particular ethnic, cultural, religious, or political traditions—each of which is associated with potential and unique protective factors. Further, Youniss et al. (2002) have posited that an “orientation to habitual right action” is fundamental to identity insofar as the process of defining oneself entails becoming part of a normative cultural unit.

Youniss and colleagues’ notion is important when considering the experiences of culturally diverse young people who are often subjected to being “missed, dissesed, and pissed” as described by H. S. Stevenson (1997). The salient point made by Stevenson is that the person’s

phenomenology *matters*. Inferences made about an individual's experiences may be linked to: (1) the perceptions of challenges and available resources, (2) exposure to modeled strategies for reactive coping, and (3) the character of self-processes inferred and enacted, thus becoming a stable identity. Following this line of thought, individuals' life stage-specific coping products (i.e., as a consequence of a stable identity, these processes provide consistency in coping responses over time and space) have societal implications as outcomes for either noble versus ignoble deeds (Damon, 2002). How these outcomes are framed too frequently include inferences concerning group membership.

Race and Self-Appraisal

With regard to race, there is a need to focus on how race is lived on a daily basis and how individuals, including developing youth, make meaning of these experiences. Experiences of race are filtered through larger societal influences such as manifestations of structural racism (see Bonilla-Silva, 1997), as illustrated by residential and economic segregation, and by encounters of negative stereotypes in the media and in everyday life. Race and ethnicity are also separate but intertwined constructs: While "race" generally refers to perceptions of observable phenotypes, the latter refers to cultural background. At times, it is useful as researchers to focus on ethnicity; for example, the culturally specific family experiences of African Americans and African immigrants may differ, and these two groups may have different referents for self-appraisal. However, youth from the two groups may experience similar racial stereotyping and treatment based on the common denominator of race. Depending on the particular circumstances, it may be more useful to focus on one or the other. It is also important to note that many youth and adults perceive their racial and ethnic backgrounds as interchangeable if not identical. It may be useful to consider race and ethnicity together, and to emphasize how the two interact in shaping everyday experiences of self-appraisal processes (for an overview, see Fisher, Jackson, & Villarruel, 1998, pp. 1157–1166).

Additionally, consideration of race and ethnicity must include White youth; otherwise, this would only contribute to the normalization of Whiteness. White youth, like all others, must be studied as one of many diverse groups. While youth of color are disproportionately represented among the low economic resource population, many White youth are also in this group. White youth and youth of color face the same basic developmental challenges; the primary difference between the two is that White youth are

considered to be the "norm" and reap all of the privileges of this status, ranging from greater cultural consonance across school, family, and neighborhood settings to "racial invisibility" in everyday encounters.

Self-appraisal links coping with identity and theories of racial and ethnic identity apply Eriksonian and Marcian concepts of identity formation to racial/ethnic awareness. Racial identity development refers to the "process of defining for oneself the personal significance and social meaning of belonging to a particular racial group" (Tatum, 1997, p. 16). William E. Cross's original Nigrescence model (Cross, 1971; Cross, Parham, & Helms, 1991) delineated four stages of racial identity formation for African Americans. During the *pre-encounter* status, Black individuals view the world from a White, Eurocentric frame of reference, consciously or unconsciously holding pro-White and anti-Black attitudes. The second status, the *encounter* phase, involves an event or series of events that cause individuals to recognize that they cannot fully assimilate into White society. These may be tangible experiences of racism—crises in an Eriksonian sense—which facilitate exploration of racial identity. The third phase, *immersion-emersion* is a reaction to the encounter phase. Here, through coping and self-appraisal processes, individuals become more interested in their Black identity and show increased awareness of racism and sensitivity to it. This phase may be characterized by anti-White attitudes. Individuals will also show a superficial immersion in realms associated with Black cultural attributes (e.g., music, speech styles, etc.). *Internalization* occurs as individuals become secure with their Black racial identities and move toward a more pluralistic perspective. African Americans then represent the primary reference group, but individuals' attitudes are not anti-White. In contrast to the superficial displays of the immersion-emersion stage, individuals in the internalization stage have more stable, deeply rooted connections to attributes of their Black heritage, and they may also have the ability to connect comfortably with aspects of White society; for example, they may have diverse groups of close friends.

W. E. Cross Jr. (1991) modified the Nigrescence framework into a more dynamic and flexible model of racial identity development. He argued that individuals may recycle through the different stages at various developmental periods, and, depending on parental racial socialization, they may not start in the pre-encounter stage. Thus, the stages should not always be viewed as a literal progression. Cross (1991) also added a fifth stage to the original four; this stage, known as "internalization-commitment,"

represents a more consistent internalization phase. This last phase can vary among individuals and include bicultural identities.

White racial identity is also important to consider; most notable in this area is the work of Janet Helms (1990). Helms's model of White racial identity development consists of six statuses, organized in two developmental phases. The first phase, *Abandonment of Racism*, consists of three stages. *Contact*, the first stage, involves acceptance of the dominant status of White people, although not explicit awareness of this dominance or the subordinate status of people of color. *Disintegration* occurs through self-appraisal, as White individuals become aware of their dominant status in society and go through a period of dissonance. In *Reintegration*, the person acknowledges his or her Whiteness and holds the view that he or she deserves the privileges accorded by this status. The second phase of Helms's (1990) model was called *Defining a Nonracist White Identity*. This begins with the *Pseudo-Independent* stage; individuals begin to question the dominant status of White Americans and may become overly involved with trying to help or change people of color. In the *Immersion/Emersion* stage, individuals begin to focus on changing White people rather than African Americans. With the final stage, *Autonomy*, individuals achieve a positive racial identity and also appreciate and seek opportunities to learn from other groups.

Other theorists have built upon this work and have also examined ethnic identity. For example, Phinney (1992) drew upon W. E. Cross Jr.'s (1971, 1991) racial identity theory and J. E. Marcia's (1966) work on identity statuses to devise the Multigroup Ethnic Identity Measure (MEIM), a psychological assessment instrument that can be used across diverse groups. Nevertheless, in conjunction with the earlier points about race/ethnicity intertwinement, it is important to be clear about the particular conception of race/ethnicity (or combination of the two) at issue, and this depends on the context and issues under examination. For example, Chinese Americans, Vietnamese Americans, and South Asian Americans may all be classified as "Asian American" even though there is significant within- and between-group variation for these groups. At the same time, it is important to note that different groups such as Chinese, Vietnamese, and South Asian Americans may have similar racialized experiences; they may be identified by others as one racial group and thus stereotyped and stigmatized in a similar manner (i.e., the "model minority" myth; see Takaki, 1998). Thus, there may also be a dimension of similarity in their experiences, and depending on

the issue and context of investigation, it may be more useful to emphasize the similarities or differences among various experiences.

In that vein, racial stereotyping, in all of its manifestations, is a significant contributor to high vulnerability and risk for children of color. Awareness of racial stereotypes and group membership status plays a key role in self-appraisal and identity formation. In addition to the negative stereotyping noted earlier with regard to aggression and violence, racial stereotypes present a barrier to academic achievement and resilience for African American youth. Steele's (1997; Steele & Aronson, 1995) work on "stereotype threat" highlighted these issues. *Stereotype threat* is essentially the fear of confirming a negative stereotype under circumstances where that stereotype is primed and salient; Steele's program of research (1997; Steele & Aronson, 1995) has experimentally demonstrated how stereotype threat can negatively affect the academic performance of Black college students. Moreover, the phenomenon of stereotype threat is most salient for high-achieving Black youth who have a great desire and expectation to succeed. However, it is not the value of effectance motivation and desire to succeed which is emphasized in the literature but rather the problem of stereotyping.

Academic stereotypes can also be a source of significant increase in risk and high vulnerability for Asian American youth, who are often monolithically viewed as high-achieving "model minorities." This can create tremendous pressure to succeed and meet expectations. Even seemingly positive racial stereotypes have a negative side; Asian American youth are often taunted as "geeks" and "nerds," and they are viewed as passive and socially inept. Additionally, positive and negative stereotypes can be coupled together, as is the case with African American athletes (Harpalani, 2005; Stone, Perry, & Darley, 1997). Here, the idea of African Americans as outstanding athletes, a seemingly positive attribute, is linked to the notion that African Americans are less intelligent and inherently lower achievers, due to genetic (J. P. Rushton, 1995) or cultural (Hoberman, 1997) factors. With regard to academic racial stereotyping, another subtle facet of opinion offered that contributes to the level of vulnerability is lenient feedback and low expectations from teachers; again, this becomes a risk factor as normative human development progresses. Cognitive maturation renders adolescents more sensitive and aware of feedback from elders and peers, and they themselves are more perceptive of false or deceptive tactics than younger children—and these also feed into self-appraisal.

Additionally, White privilege is a critical, although often ignored, element of any discussion of race and racism. Whiteness, specifically the history of White Americans as a racial group in America, has been the normed reference group. The group must be understood and considered to explain the current privileges and challenges of White youth. In her widely cited article, "White Privilege: Unpacking the Invisible Knapsack," McIntosh (1988) defined White privilege as a "package of unearned assets which [Whites] can count on cashing in every day... an invisible weightless knapsack of special provisions" (p. 10). In this vein, White privilege basically encompasses the advantages that White people secure on the basis of skin color. In many instances, White Americans themselves may not be aware of guaranteed advantages; more specifically, many are incidents that *do not* take place, such as *not* being stopped unjustly by the police, *not* being followed in a store or suspected of being a thief, and/or *not* being questioned about one's national loyalty. Because these are incidents that they *do not* experience, many White Americans do not understand the everyday burdens that people of color encounter, or they tend to minimize the salience of these burdens. White Americans often take their own advantages for granted and attribute them solely to hard work and "merit." Moreover, the social and cultural practices of schools and workplaces are defined by White American norms, and cultural expressions by people of color, ranging from hair and clothing styles to language, are either discouraged or embraced superficially under the rubric of "diversity," without any deeper exploration of their meaning and significance. All of these factors contribute to the continuation of White privilege as a salient issue. Nevertheless, there is also a "downside of privilege." In the context of Whiteness, "privilege" is typically viewed as a racially dependent advantage, usually unfair in some broad sense. On the surface, privilege appears to serve as a protective factor, offsetting potential risks that more marginalized individuals may face. However, one who is privileged is not subject to particular experiences of stress engagement—for example, negotiating cultural dissonance or racial stereotyping. Youth who must negotiate these challenges acquire valuable coping skills, whereas privileged youth do not. This lack of requisite coping skills, due to non- or minimal engagement with stress, may lead to adverse outcomes. Privilege precludes the opportunity to hone coping repertoires, through self-appraisal and demonstration of resilience, which are necessary to cope adaptively with later life challenges. The consequent lack of coping skills is the *downside of privilege* (see Spencer, 2008a). Not just the fact

of monoracial identification and coping opportunities (e.g., Whiteness and privilege status) but, additionally, a multiracial identity may introduce psychosocial complexity.

The increasing number of Americans identifying as biracial or multiracial also complicates the notion of racial identity and self-identification. Beginning in 2000, the U.S. Census allowed individuals to identify more than one race, and America's growing attention to diversity has promoted such multifaceted identification. Historically, like most minority groups, researchers tended to pathologize biracial and multiracial individuals, assuming that they suffered from inferiority complexes, hypersensitivity, and other psychological problems (Stonequist, 1937). By the 1970s, however, biracial/multiracial identity research had turned toward a *comparative or equivalent approach*: Researchers presumed that monoracial, biracial, and multiracial individuals developed racial identity in a similar manner (Thornton & Wason, 1995). Drawing from her clinical work, Root (1990, 1992, 1996) was among the first to argue that biracial individuals can make different healthy identity choices. Root's work identified four distinct positive identities for biracial and multiracial individuals: (1) acceptance of the identity ascribed by the larger society; (2) identification with a single racial group (typically the minority group); (3) identification with more than one racial groups; and (4) identification as a new and different racial group.

Additionally, Brunsma and Rockquemore (2001) have examined the manner by which multiracial individuals conceive of their racial identities. Rockquemore (1999) proposed a four-category identity typology that is different from Root's earlier conceptualization. Individuals with a *singular identity* choose to identify with a single racial group—most commonly (though not always) the minority group. Brunsma and Rockquemore (2001) attributed this to social treatment of hypodescent (e.g., the "one-drop" rule for Blackness in America). Individuals with a *border identity* tend to identify with two distinct racial groups: They choose labels such as "mixed," "biracial," and "half-and-half." Brunsma and Rockquemore viewed this group as merging and respecting multiple perspectives simultaneously. Nevertheless, in 2001, Brunsma and Rockquemore revised Rockquemore's (1999) original typology, adding the notion of *validated* versus *unvalidated* border identities. An individual of mixed heritage who chooses to self-identify as biracial implicitly requests that others accept that identity as well.

In contrast to *border identity*, individuals who possess a *protean identity* may identify themselves differently

depending on the social context. Finally, individuals with a *transcendental identity* attempt to defy racial labels or identification by race: For example, they may abstain from responding to self-report race questions or choose “Other.”

Given the increasingly diverse and complex nature of America’s racial landscape, and the continuing salience of racial identity, models of racial identity need to be further tested for their validity on future populations. Factors in need of integration and consideration include colorism relevant themes.

Skin Color. Perceptions and stereotypes related to skin color can influence self-appraisal in conjunction with racial identity. Skin color biases pose another risk for youth of color (and particularly African American youth). Skin color is probably the most visible and salient phenotypic feature associated with racial categorization and related biases. Colorism can be defined as systematic bias and inequality on the basis of skin color (usually privileging lighter skin tones over darker ones). Color consciousness and attitudes begin at an early age. Much of the early literature regarding skin color preference involved preschool populations (e.g., Clark & Clark, 1940). Clark and Clark found that Black children as young as 3 years old had knowledge of skin color differences and that they could identify their own skin color. In later work, young Black children were given a Black and a White doll and were asked questions such as which one they would “like to play with” or “which one is the nice doll?” (Clark & Clark, 1947). The majority of the participants in that study demonstrated White preferences. The Clarks concluded that this is an indication of Black self-hatred, a finding that was cited in the U.S. Supreme Court’s 1954 landmark decision in *Brown v. Board of Education*.

However, later work illustrated that these studies involved inaccurate interpretations or methodological flaws (Baldwin, 1979; Brand, Ruiz, & Padilla, 1974; Cross, 1991; Spencer & Horowitz, 1973; Spencer & Markstrom-Adams, 1990; Swanson et al., 2009), and that color preferences during early childhood are not related to self-esteem: Despite having a White preference (for dolls, pictures, or other objects), Black children display positive self-esteem and self-concept (Banks, 1984; McAdoo, 1985; Spencer, 1984). Young Black children do not internalize pro-White/anti-Black messages, due to their cognitive egocentrism (Piaget, 1932). Spencer (1984) noted that such young children do not project their preferences inward; they have a protective level of egocentrism that generally precludes low self-esteem. Cross (1991) noted that, even in the Clarks’ data, it was not clear that Black children

systematically preferred White dolls, and in any case, their preference shifted with age (see Harpalani, Qadafi, & Spencer, 2013).

Self-appraisal processes are key to understanding the development of self-esteem in relation to color. As children mature, they shed this protective egocentrism and become more aware of how society views Blackness. Data indicate that Black preschool children demonstrate Eurocentric attitudes, preferences and color-connotations, with increased Eurocentricity through age nine (Spencer, 1999). These attitudes and preferences reflect the fact that children learn at an early age that all things “White” are more valued in society. However, *children do not internalize these attitudes because of their egocentrism*. The onset of concrete operational thought marks a shift in attitudes and preference toward a more Afrocentric orientation. Another risk factor then emerges: the end of egocentric thinking and the emergence of self-appraisal in relation to others. Once Black children have the “veil of protective egocentrism” lifted, they begin not only to understand societal attitudes and stereotypes of color, but to view themselves in light of them. Many Black children react to this dissonance by shifting preference behavior rather than acquiring low self-esteem; nonetheless, this shift itself diverts energy from other developmental tasks such as academic engagement.

Of course, such risks may be offset by protective factors: Black parents can, and often do, socialize their children to understand the importance and implication of their skin color. Racial socialization can be a protective factor by decreasing the psychological impact of hostilities based on color and race. Proactive racial socialization strategies encourage racial and cultural pride, while protective strategies emphasize awareness of racism and related biases such as colorism (H. C. Stevenson, 1994).

As children transition into early adolescence, there are well-defined stereotypes about skin color related to social valuation of lighter skin over darker skin. These stereotypes exacerbate the already significant stress during adolescence that is related to body image and physical appearance. Color biases can also exacerbate stress in the realm of interpersonal relationships, where skin color can be a source of acceptance or rejection. According to Porter (1991), children prefer honey brown tones to darker ones, independent of gender or age. Porter found different gender- and age-related rationales for preferences, rooted in cognitive development, and linked with intergroup social experiences. Children between the ages of 9 and 11 offered reasons related to desire for sameness and desire to be liked

by others (e.g., “her friends are that color” and “wants to be like everyone else”). Older children (12- to 13-year-olds) explained their preference based on physical attractiveness (e.g., “probably thinks she’s ugly with that color”) and the possibility that people are discriminated against on the basis of skin tone (e.g., “could get more jobs and people would talk to her more”). These findings underscore the significance of normative developmental tasks, such as forming peer relationships, in mediating the impact of skin color. Affective processes become increasingly salient.

On the psychosocial level, researchers have found that skin color is related to feelings of attractiveness, self-esteem, and satisfaction. Stress related to body image and physical appearance is the most prominent developmental manifestation of skin color bias. Early researchers assumed that, because light skin was valued more than dark skin, there would be a negative effect on self-esteem related to this bias, especially in children (Clark & Clark, 1940). However, as with the doll studies, such assumptions can be erroneous: Coping responses to stress vary significantly within groups. Fegley, Spencer, Goss, Harpalani, and Charles (2008) found that skin color consonance (satisfaction with one’s own skin tone) and dissonance (dissatisfaction with one’s own skin tone) were related more significantly to a variety of measures of psychosocial well-being, including body image, than was skin tone itself. In their multiethnic sample of adolescents, darker skinned individuals were more likely to be dissonant than lighter skinned individuals, although individuals rating their skin tone in the middle showed the greatest amount of satisfaction. Fegley et al. (2008) also found Asian and Asian American youth to be the most dissonant with respect to skin tone, and that lighter skinned individuals (of all racial/ethnic groups combined) had lower overall body image and less positive general attitudes. These findings indicate that the relationship between colorism, coping, and psychological well-being is more complex than one might predict based strictly on societal biases. Other factors, such as cultural upbringing, may also play a role: For example, Montalvo and Codina (2001) found that relatively dark-skinned Mexican Americans (born in the United States) had lower self-esteem scores than dark-skinned Mexicans born in Mexico. Quiros and Dawson (2013) found similar evidence of stigma and privilege associated with colorism among native Caribbean Latinas. These findings reflect the needs of individuals negotiating societal expectations based on physical characteristics. Gender continues to be high on the list of characteristics exacerbating the processes noted.

Gender. In addition to race and the effect of colorism, gender socialization plays a large role in self appraisal, particularly as children grow into gender roles and receive gender-specific feedback on their behaviors. Parents provide different socialization experiences for males and females, and there has been much emphasis on analyzing the impact of father-absence and female-headed households. Males are encouraged to be physical and allowed significant independence while females are frequently assisted rather than encouraged toward independence and mastery. For example, boys who are reared in female-headed homes without a positive male figure may lack adequate identification with a male role model; these youth may compensate for their sense of masculinity by demonstrating excessively aggressive, assertive and often antisocial behavior patterns (see Cunningham, 1993; Ketterlinus & Lamb, 1994).

Of course, such behavior has consequences for coping and identity processes and for educational and life outcomes (Spencer, 1995). According to the gender intensification hypothesis (J. P. Hill & Lynch, 1983), observed sex differences between adolescent males and females are largely due to accelerated gender-based expectations resulting in youth behaving in stereotypically masculine and feminine ways. This “intensification” occurs as youth seek acceptance in social groups. For minorities and low-resource youth, efforts toward acceptability, and the development of greater independence expected of developing adolescents are often confounded by their experiences within the broader society, with its stereotypes and expectations.

The demand and demonstration of independence and responsibility occur early and are recognized in particular microsystems such as family, school, and church. Many low-resource minority youth find themselves moving into positions that demand responsible and independent behavior, but lacking the necessary provisional tools and support.

These challenges are manifested differently for males and females. As reported by Swanson and Spencer (1997), traditional masculinity as experienced in Western societies includes engaging in certain behaviors that are not socially sanctioned, but nevertheless validate masculinity. Male adolescents, in seeking to demonstrate their masculinity, may believe that others will perceive them as masculine if they engage in risk-taking behaviors, which may include involvement in premarital sex, alcohol and drugs, and participating in delinquent activities (Swanson, Cunningham, & Spencer, 2005).

For Black male youth, who feel frequently challenged due to myriad expressions of structural racism, risk-taking behavioral patterns may be viewed as more salient for guaranteeing their view of self as a man. Black males are probably the most highly stigmatized and stereotyped group in America—as illustrated by the recent, vast media coverage of Trayvon Martin’s killing and subsequent accusations of racial profiling. The even more recent Summer 2014 Ferguson, Missouri, residents’ reactions to a police officer’s killing of another unarmed Black male youth dramatically illustrate the dilemma. Whether it is with images of the super-athlete, criminal, gangster, or hypersexed male, it seems that most of society’s views of African Americans are defined by these stereotypes. The Black male has, in one way or another, captured the imagination of the media to such a wide extent that media representations create his image far more than reality does. Most of the images of the Black male denote physical prowess or aggression and downplay other characteristics. For example, stereotypes of Black athletic prowess can be used to promote the notion that Blacks are unintelligent (Harpalani, 2005). These societal stereotypes, in conjunction with numerous social, political, and economic forces, interact to place African American males at extreme risk for adverse outcomes and behaviors.

H. S. Stevenson (1997) has described how African American youth are “missed” and “dissed” by mainstream American society, and how this treatment in conjunction with neighborhood factors relates to African American youth becoming “pissed” and managing their anger. Black youth are “missed” as stereotypical media-based images distort, usually in negative terms, the meanings of their social and affective displays. Hence, these unique cultural displays are devalued and viewed with insolence—“dissed.” In conjunction with these misrepresentations, many Black youth reside in high-risk contexts where anger displays may be appropriate coping mechanisms. Anger may indeed become a form of competence for social and emotional viability in certain high-risk contexts. Thus, misrepresentation, disrespect, and hazardous contextual factors interact in creating the anger of Black youth (i.e., “pissed”).

Additionally, African American parents often describe anecdotally the additional developmental task of having to instruct their male children on how to respond to police officers while insuring that their behavior is not misconstrued as threatening or aggressive. This childrearing strategy reduces the probability that their Black sons become victim to police brutality at worse or simple harassment at best (see Cunningham, Hurley, Foney, &

Hayes, 2002). It is not surprising, then, that girls and boys perceive neighborhood police presence as having very different meanings, serving quite different potential sources of stress and self-definition (see Spencer, 1999, 2001). For minority parents, childrearing efforts require the provision of explicit explanations of minority status and its meaning and significance relative to race, gender, body type, physical size, and responses to authority. American culture and the minority experience are themes explained by some parents to their sons as cultural socialization. However, such explicit socialization is not typically the norm, although its protective function in support of positive youth development has been established (see Spencer, 1983; Spencer, Harpalani, et al., 2006). Yet the differential experiences of Black males and the related stress remain present even when not made explicit. In the context of such a culture, youth having similar experiences can exhibit either resiliency and school adjustment or problem behavior and academic disengagement. Unfortunately, the complexities of these processes are not well understood for youth who chronically struggle with difficult conditions. Too frequently, these youth are stereotyped as lacking appropriate moral fabric (see Spencer, 1999).

For example, many Black males believe that their behaviors are misinterpreted and their academic efforts are not respected by the school system. Whether it is hostile encounters with law enforcement, lukewarm everyday interactions with strangers, or negative teacher perceptions (Spencer, 1999), Black male youth experience and develop within stress-filled contexts. Not only through numerous structural and economic inequities, but even for middle class Black males, there exists a societal ethos that defines them as dangerous, threatening, and unintelligent. All of these factors, in addition to normative developmental processes encountered by adolescents, affect identity formation among African American adolescent males (Cunningham, 1993).

Stereotypes and social expectations can affect self-appraisal for various groups: For example, Asian American males are stereotyped as weak and unmasculine, and females are portrayed as submissive. These stereotypes, in conjunction with other factors, can render these youth vulnerable to mental health and social adjustment problems. Nevertheless, stereotypes can affect identity formation in complex ways. Von Hippel, Hawkins, and Schooler (2001) proposed a different and interesting take on the impact of racial stereotypes. Their study found that, among both Black and White Americans, counter-stereotypic performance was more salient to self-concept. Of the participants in their study who performed well

academically, Black Americans were more likely than White Americans to define their sense of self around intelligence, whereas among high-performing athletes, White Americans were more likely to define their sense of self around athletics. Harpalani (2005) examined athletic identity and academic resilience among low-income urban youth from various racial groups. He found that, while there were no differences in sports participation by race or achievement level, high-achieving Black adolescent males placed less importance on sports as part of their identity than either marginally achieving Black males or high-achieving non-Black males. These effects were not present among females, for whom sports participation does not have the same salience overall at school during adolescence. Harpalani (2005) also found that high-achieving Black students viewed intelligence as a more flexible entity and also emphasized the importance of being smart or intelligent as a means to success more than either marginally achieving Black students or high-achieving non-Black students. All of these findings are consistent with Von Hippel et al.'s (2001) argument, and, building on their work, Harpalani proposed the counter-stereotypic identity hypothesis: When an individual excels in a domain that runs counter to stereotypes of his/her racial group, that domain takes on particular salience for identity.

Adolescent females face a different array of issues related to social expectations of femininity, power dynamics related to gender, and the relationship between these and other factors and racism, family structures, and other forms of inequality. Physical maturation is an even more significant stressor, given the particular societal emphasis on female appearance. Moreover, maturation may be related to family structure and socialization. Ellis, McFadyen-Ketchem, Dodge, Petit, and Bates (1999) found that early sexual maturation is related to father absence. Analyzing data from a longitudinal study of 173 girls, the authors concluded that quality of father's relationships with daughters delayed the onset of puberty. Also, Spencer and Dornbusch (1990) noted that single parenthood may create additional stress by giving children autonomy earlier. While this may facilitate the development of coping skills, it can also be associated with negative outcomes. Adolescents dealing with normative developmental issues may not have the supports available to deal with the challenges of additional autonomy; this depends on the quality of resources and relationships available in school, community, and other contextual settings. Developmental stressors also compound identity development for adolescent females. This effect may be pronounced when fathers are absent. Fathers often serve as an initial "safe male"

figure (Hetherington, Cox, & Cox, 1985), whose male feedback plays a role for girls in gender socialization. It may be from this feedback that girls understand and refine a sense of their own femininity.

When the father is not present, girls may seek this feedback from their peers, which is not as "safe" an interaction. Moreover, this risk is increasing as girls are physically maturing at much younger ages. The average age of menarche has fallen from 17 to 13 between the mid-1800s and the mid-1900s. One out of seven White girls starts to develop breasts or pubic hair by the age of 8; for Black girls, nearly half start showing such signs of sexual maturity at this early age (Lemonick, 2000). By drawing more attention from older males, early maturation can increase the risk for earlier sexual activity and teen pregnancy, and this effect is more pronounced for Black girls.

Harris, Gold, and Henderson (1991) studied the influence of father-absence on gender-role orientation and achievement in a sample of Black and White older female adolescents. Harris et al. expected females without fathers to exhibit greater masculine-linked attributes and have higher achievement motives: Their findings indicated that Black girls (although not girls in general) with fathers exhibited significantly higher achievement needs and higher masculinity and androgynous attributes. One critical question here is the extent to which this finding reflected a characteristic of female-headed (father "absence") outcomes versus cultural socialization experience associated with the multiple roles of Black females. Ladner's classic (1972) research on sex-role development indicated that positive characteristics of adulthood, including strength and independence, were less sex-role differentiated among poor African American adolescents than among their European American, middle-class counterparts. Ladner suggested that multiple gender roles have been a reality for African American women for generations.

Adolescent females experience greater emotional barriers, greater anxiety, and have a greater inclination to regressive reactions when confronting problem-solving situations (Jung, 1993). Adolescents who generally demonstrate higher self-confidence show higher heuristic competence and lower accompanying emotions, greater social cognition, and a more active or proactive adaptation to stress.

Gender-typed characteristics, specifically female's level of masculinity, reflect a sense of efficacy and control that has been linked to depressive symptomatology. Females with low levels of masculinity score higher on measures of depression than their female counterparts with high levels of masculinity. There is a need to more actively assist

adolescent females in translating their positive academic experiences into positive youth outcomes and life-course attributes. This is particularly relevant when considering that multiple gender roles have been a reality for ethnic minority women for generations with less sex-role differentiation among them than among their Anglo counterparts. This is a trend that is not expected to drastically change in the near future and for which adolescent females need preparation and support to embrace.

It is assumed that, because females do not exhibit behavioral problems to the same extent or magnitude as males, they are experiencing successful transitions into adulthood, barring such social problems as pregnancy or drug abuse; however, complexities exist (see Spencer, Fegley, & Dupree, 2006). Although adolescent females fare better than males more generally, there remains the need for more active assistance in translating positive attributes during the transition to adulthood into broader life course opportunities. As long as females feel positive about their school experiences and behave responsibly at home, they appear to possess the attributes necessary for pursuing life goals (Swanson & Spencer, 1997). The potential concerns, however, are whether there are certain attitudes and behaviors that "mask" stressful experiences and whether structural barriers and societal expectations related to gender that emerge in later stages of development (i.e., getting married, having children, etc.) may pose additional coping challenges for females. A key task is determining how to prepare young females for these challenges.

There is also a need to examine gender identity in interaction with race. Research findings have suggested differences in body image perceptions between Black and White adolescent girls. Studies of gender identity often yield significant racial and ethnic differences; for example, Parker et al. (1995) showed how Black and White adolescent girls perceive body image ideals in very different ways. Parker et al. (1995) found that, unlike White adolescent females, Black adolescent females typically do not aspire to an "ideal" body image. Rather, they tend to emphasize the individually desirable features that they already have. In contrast to the so-called Barbie doll ideal that many White girls aspire to, the Black girls in Parker et al.'s study emphasized making one's own physical features "work for you." These different concepts of body image have implications for gender identity, and they illustrate how proactive cultural socialization can serve as a buffer against the stresses that adolescent girls face regarding beauty ideals.

Nevertheless, color bias is also related to body image and has different implications for males and females.

For Black females, concerns about skin tone exacerbate the normative challenges of body image and appearance (Fegley et al., 2008); these occur because of the greater importance placed on physical attractiveness for females generally. Moreover, developmental period also plays a significant role, as concerns about appearance grow for all youth during adolescence. Thus, risks associated with colorism vary with gender, context, and development, and resultant stress, coping, and self-appraisal also vary based on this plethora of factors.

In addition to race and gender, issues of sexual orientation and transgender status and identity development have become more visible and prominent in the last decade. Much of the attention has focused on gaining legal rights and reducing prejudice based on sexual orientation. These are important efforts that can help reduce the risk and stress faced by gay, lesbian, and transgender youth, but there is still the need to study coping, identity, and outcomes, given that these statuses are still marginalized. Although there has been some important work on self-appraisal and identity development in gay and lesbian youth (e.g., Savin-Williams, 1990, 2005), this is a prominent area for future research. The same is true for transgender youth (Grossman & D'Augelli, 2006; <http://srlp.org/resources/fact-sheet-transgender-gender-nonconforming-youth-school/>).

Body Awareness: The Special Experiences of Girls. An important issue that is helpful to consider involves the evolution of the relationship young girls develop with their physical bodies. Especially salient questions include why they begin dressing provocatively and when they begin to place such a significant emphasis on how their bodies appear to other people.

Useful evidence can be derived from studies that examine individuals suffering from clinically identified body-related disorders. These types of studies help identify maladaptive perspectives that individuals develop regarding their bodies and the reasons youth develop them. A central theme from many published studies suggests that individuals come to associate positive and valued *internal* characteristics with specific physical characteristics. One clinically identified body-related disorder is called body dysmorphic disorder (BDD). Individuals challenged with this disorder have recurrent, negative thoughts about a specific body part, and do so often to the point that they stay at home or avoid contact with other people. One theory for the cause of BDD involves the development of maladaptive thought patterns (Buhlmann et al., 2009). Individuals who suffer from BDD have maladaptive beliefs

about the *importance of attractiveness*. They come to believe that beauty is highly important and, critically, start to associate beauty with other positive attributes, such as social and intellectual competence (Buhlmann et al., 2009). Many of these studies utilize measures that assess implicit associations. In other words, they try to target the underlying, perhaps unconscious, associations that individuals make between physical qualities and internal qualities. These automatic associations are important, because they often go unchallenged and may be more influential than explicit and logical thoughts that are available to conscious awareness.

The Implicit Associations Test (IAT) and the Beliefs About Appearances Scales (BAAS) are two empirically validated tests that are commonly used to determine whether individuals have maladaptive beliefs about physical beauty (Buhlmann et al., 2009). When taking the IAT, participants classify words into categories using a computer program. One example of an IAT task is asking participants to classify words that relate to beauty into the category "good." Two words representing the categories will remain on the screen (such as "good" and "bad"). Then the participant will be shown different adjectives and must classify words that relate to beauty in the "good" category as quickly as possible. The program records reaction time. The shorter the reaction time required to classify a word into a particular category, the more likely the classification represents the participants' automatic associations.

The BAAS is a self-report survey that asks participants to answer questions about attractiveness. It is intended to identify dysfunctional beliefs about external appearances (Spangler & Stice, 2001). Participants are asked to report the extent to which they agree with statements that link appearances with other valued qualities. For example, one question asks participants to rate the extent to which they agree with the statement, "The opinion others have of me is based on my appearance" (Spangler & Stice, 2001). This scale investigates a range of domains that are potentially affected by implicit beliefs about appearances.

It is likely that the same types of implicit thought patterns underlie problematic behaviors of young girls, such as dressing provocatively to get attention. Young girls begin to believe that their value is based on their appearance. They begin to develop these implicit associations between characteristics that they value (i.e., intelligence, agency, social competence, etc.) and the positive reactions they receive for their bodies. As a result, they shape their behaviors to continue to receive positive feedback for their bodies. These behaviors may eventually become

stable aspects of identity, which continue to feed into the negative beliefs and automatic thoughts about the importance of appearance. In other words, when considered from a particular theoretical perspective which focuses on recursive processes (see phenomenological variant of ecological systems theory, Spencer, 1995, 2008b), the redundant thoughts may be internalized into "stable ways" of conceptualizing the self in relation to body awareness beliefs. It is critical to identify the sources of these associations between the physical body and internal characteristics as well as to examine ethnically diverse groups of girls given their unequal representation in media portrayals.

Of course, another significant influence is the family unit. From a very young age, girls learn that they are evaluated based on their looks, rather than based on their character, feelings, or potential (McKinley, 1999). They receive direct feedback from their family members. They are also very observant of the types of feedback their mothers receive about their bodies from their fathers and other members of society (McKinley, 1999). Young women are also highly susceptible to feedback from their peers (Kichler & Crowther, 2009). Negative communication from family and friends, defined as repeated negative comments about physical appearance, significantly and adversely affect levels of experienced body satisfaction (Kichler & Crowther, 2009).

These types of implicit associations are primarily formed in the cognitive domain. However, the socioemotional and physiological domains of development play significant roles in the formation of these associations. There is significant overlap and critical influence between these three domains. For example, emotional reactions can come from unconsciously (but cognitively) equating physical characteristics with internal qualities that matter to the individual. However, the resulting emotional and behavioral *reactions* to the same types of influences can differ based on temperament and social support. For example, a physically large woman equating small physical size with being less "needy" is more likely to be negatively affected by this implicit association if she has a more sensitive, shy, or internalizing temperament, particularly if this temperament is combined with few social supports. On the other hand, a resilient temperament or strong emotional supports could mediate the effects of these negative associations. Thus, context is critical, and it is imperative to examine the influence of all three of these domains of development. All would have potential for ultimate self-appraisal processes independent of gender.

NEGOTIATING SELF IN CONTEXT

A range of literature addresses relationships with family, peers, and adult mentors which affect self and identity development during adolescence (see Swanson et al., 2010). These relationships provide stability and offer support for enhancing resilience and protective factors (Benard, 2004; Garmezy, 1994; Masten et al., 1999; Waller, 2001). According to literature on positive youth development and asset building, relationships are central to identity processes (Damon, 2004; Lerner, Almerigi, Theokas, & Lerner, 2005; Small & Memmo, 2004), and critical to the meaning making youth engage in when interpreting the world around them and their place in it (Spencer, 2008b). However, the nature of relationships with safe, trusting adults is particularly instrumental in the self-appraisal processes of youth as the adults are positioned to engage youth with interpersonal feedback and experiential opportunities relevant to preparing for, and successfully negotiating, early adulthood expectations.

All families experience some level of vulnerability but those requiring out-of-home placement for children suggest a high level of vulnerability too frequently ignored in the literature on normal youth development. Accordingly, the following section explores the implications for youth in families with significant levels of vulnerability as a result of unstable or disruptive family conditions. The section also notes the impact of key cultural socialization practices for youth in these highly vulnerable conditions.

Family Socializing Efforts and Positions of Vulnerability

Stability

Multiple changes during the course of childhood and adolescence contribute to inconsistencies in lived experiences that can compromise self-development processes. Frequent residential moves are stressful but have the potential benefit of predictable family relations and expectations. While the impact on self-processes can vary depending on the reasons for multiple moves, consistent relationships within the family are particularly relevant for identity exploration within a supportive context. Youth experiencing multiple moves as a result of being placed with families outside their kinship network experience heightened vulnerability for identity development (Swanson, 2010).

In interviewing 12- to 19-year-olds about their perceived status as foster children, Kools (1997) found high levels of

insecurity, with approximately half of all youth in foster care moving to three or more different placements. Other sources of instability include memories of birth families as well as both positive and negative experiences in foster care (Upshur & Demick, 2006). Mediators of insecurity include adoption and kinship care, since “children placed with relatives average fewer placements than those in non-kinship care, are more likely to remain in their first foster care placement, and exhibit lower reentry rates” (Schwartz, 2007, p. 1203).

Some research suggests that youth experiencing long-term instability seek stability or continuity in other contexts or relationships. Given the process of identity development occurring during adolescence, seeking stability in relationships during this period provides a short-term solution with long-term implications. Some youth, for example, can demonstrate the academic potential expected in an educational system and are able to find stability within the school setting, thus allowing the exploration of an identity associated with post high school educational opportunities. In contrast, others find stability in peer relationships, sometimes outside of socially sanctioned contexts, but often within relationships that offer “support necessary to withstand emotionally challenging circumstances (i.e., school-related problems) and to cope in appropriate and effective ways” (Stanton-Salazar & Spina, 2005, p. 380). Instability leads to challenges in efforts by youth to create a coherent sense of self by contributing to the complexity of youth’s experiences while negotiating self (Surrey, Smith, & Watkins, 2006).

Complexity

The extended contexts, physiological transitions, and greater cognitive differentiation that occur during adolescence contribute to the complexity of developmental factors to negotiate. Living in an out-of-home placement exacerbates the difficulties youth can experience in developing a coherent sense of self (Surrey et al., 2006). Some children may experience discontinuity in their experience of selfhood. Some also experience more discontinuity in identity when placed in kinship placements (with relatives) than participants placed with nonrelatives (Schwartz, 2007). Additionally, youth in adoptive families that understand their uniqueness have more opportunities to discuss where the youth came from than those that insist they are no different from biological families (Upshur & Demick, 2006). Therefore, the degree of openness within families about a youth’s past appears to be a resource for youth. This is comparable to the research, discussed in the next section,

on racial and cultural socialization, which provides youth with a source of pride based on the history of one's group. Without openness, youth may feel as though they have a hidden self (i.e., connection to birth family) and a false self (i.e., connection to adoptive family). As summarized and reported by Surrey et al. (2006), Watkins and Fisher suggested that "the fact that children must knit together the various pieces of a complex identity neither means that they will fail this task nor that this task handicaps them in any way" (quoted in Surrey et al., 2006, p. 155). Whether or not a child is given the opportunity to process questions of origin and self is a seemingly important resource for creating a unified understanding of self.

Despite having such complex histories by the time they reach adolescence, as with all youth, foster youth continue to participate in and be shaped by their social environments (Cole, 1996; Lave & Wenger, 1991; Wortham, 2006); therefore, foster caregivers play a key role in the child's ongoing self-development. Generally, as caregivers form relationships with youth, norms and patterns of interaction emerge that reinforce and/or undermine various selves (Wortham, 2006). Some aspects of self will be more formative, evolving, and perhaps even undiscovered (e.g., perception of self or perception of others), while others will be somewhat stable by adolescence (e.g., ways of relating to others). For example, when a youth moves into a new foster home, the youth's perception of self will be influenced by her or his perception of the foster parents (cf. Cooley, 1902; James, 1892/1961). The ways in which youth have learned to relate to others, particularly adults, are likely to be more stable, though not unchangeable. Research has shown that children develop models for relating to adults based on their normative interactions with significant caregivers (Bretherton & Munholland, 1999), such as expectations around rules, discipline, communication, affection, and so on. Even with the complexity of a youth's history, both the unification of past selves and the development of future selves remain open to possibilities since youth can learn new models for relating to adults over time, models based on consistent interactions with significant caregivers (Swanson et al., 2002).

Ethnic Identity and Socialization

Beyond attending to basic needs, parents provide the socialization they perceive necessary for their children's success from their early developing years into adulthood. The processes and unique requirements of cultural socialization are significant aspects of self-appraisal processes for youth. Parental cultural socialization varies significantly and often may be emotionally unavailable as a source of protection

to buffer the impact of discrimination and stigma. Minority parents, however, seldom raise issues regarding race concerns with their adolescent children unless it is in response to an injustice or request by the youth. N. E. Hill's (2006) research supports these long-standing findings, noting that the majority of parents consider racial and ethnic socialization as important, although most nevertheless adopt reactive positions in discussing race with their children. Youth in families explicitly promoting cultural socialization (i.e., knowledge and celebration of one's ethnic pride, history, and heritage) and preparation for discriminatory bias, report more attention to these during adolescence than during childhood (Hughes, 2003). To support positive self-appraisals, parents provide both cultural socialization and preparation for bias to assist youth in coping with discriminating messages and behaviors (see Hughes et al., 2006, for a comprehensive review). Much of the research on the impact of racial and cultural socialization has focused on understanding these processes within intact families with generational experiences addressing discrimination. Youth in families that struggle to meet the basic physical and emotional needs are subjected to negotiating self-development in unstable and complex systems.

Initially intended as a temporary respite for families in a time of need, foster care has become a long-term living situation for many youth, who average 5 years in foster care (Kools, 1997). Theorists and researchers have paid considerable attention to the development of self among children, but in most cases, studies have focused primarily on biological families and mostly middle class, Caucasian participants (Schwartz, 2007). As indicated, it is our view that all humans are vulnerable (i.e., have varying levels of both protective factors and challenges). The same applies to families. Accordingly, like contextual factors that facilitate resilience in heavily researched impoverished youth, the following discussion highlights self-development under varying levels of vulnerable family circumstances.

Out-of-home placements induce a high level of vulnerability. However, despite limited research, there are different views on the impact foster care and adoption has on self. The most prominent view is that it has a negative impact (Kools, 1997; Wegar, 2006; Yancey, 1992); thus, it suggests a high level of vulnerability (i.e., many more challenges than objective supports experienced). A wealth of evidence suggests that children in foster care suffer severe impairment, including unhealthy identity outcomes, poor academic achievement, early educational discontinuation, substance abuse, and even homelessness (Pinderhughes, Harden, & Guyer, 2007; Wegar, 2006; Yancey, 1992).

Unique aspects of foster care with implications for positive selfhood comparable to other vulnerable conditions for youth include provisions for stability, facilitating an integration of increasing complexity due to interactions in a wider range of contexts, enhancing ethnic identity, and strategies for negating or offsetting stigmatizing assumptions regarding one's personal status or social position. Strategies promoting positive youth development particularly for those in special circumstances are available.

Child welfare agencies have increasingly focused on enhancing ethnic identity among children in foster care (Schwartz, 2007). It is commonly accepted that "adolescents seek a sense of belonging in the larger sociocultural world and a sense of connection to traditions that precede them and will outlive them" (Levy-Warren, 1996, p. 131). According to Levy-Warren, developing a mature ethnocultural identity satisfies this need; however, several factors are known to affect a child's ethnic identity while in foster care. These factors include racial distinctiveness or dissimilarity with foster or adoptive families, inability of foster families to assist youth in participation of ethnic traditions and rituals, and inability of foster or adoptive parents to prepare a youth for the negative views of minorities by the dominant culture. The majority of factors are related to minority youth, as "research suggests that the development of ethnic identity is more of an issue for minority than majority children" (Schwartz, 2007, p. 1202). Youth placed with relatives engage in more rituals and practices related to their ethnicity, while those placed with nonrelatives displayed more art and information about the foster child's ethnicity. Yancey (1992), in a meta-analysis, contended that social maladaptation of minority youth in foster care signifies identity disturbances caused by negative perceptions of African Americans and Latinos perpetuated by dominant society that are unmediated by foster parents. It is, in essence, insufficient to primarily educate youth about their ethnic background; it is also important to assist them in maintaining a connection to their ethnic background through rituals and practices (Schwartz, 2007). Accordingly, those youth "living" ethnicity and experiencing its legitimacy as positive cultural representations enjoy psychological protection which then lowers their level of vulnerability. As a source of support, it serves to undermine the potential effects of stereotyping and stigmatizing experiences.

Stigmatization

Youth who are prepared to recognize and negotiate biases associated with an aspect of self-identification exhibit

fewer problem behaviors and mental health instabilities than those unprepared. This is consistent for youth facing stigmatizing attitudes as a result of their racial, ethnic, gender, religious, or sexual orientation identification. It is not only a matter of being "socialized" for bias but also for having the necessary supports to assist youth in coping with them. Youth in foster care experience stigma in a form of isolation from peers in addition to the separation from close family. This ongoing experience of stigma, reminders of their "differentness," also reinforces the experiences of instability that limits their opportunities for identity exploration. Upshur and Demick (2006) noted that foster children face the challenge of balancing a "true self" and a "public self," which is characterized by the views of others outside the family. Unfortunately, these views are often permeated by myths about foster children and families. Such myths are that: (a) foster and/or adoptive mothers are defective or depressed and contribute to the psychiatric symptoms in their children; (b) adoption and foster care comprise a lifelong grieving process for all members; (c) the only way to have true attachment is to bond with a child in its first hours of life; and (d) the psychological health of a child is entirely dependent upon relationships within the nuclear family (Surrey et al., 2006). Foster children have also reported feeling stigmatized by either direct or indirect negative stereotypes about being in foster care.

Kools (1997) identified the outcomes of the stigmatized self-identity as being low self-confidence, lack of future orientation, and a focus on "what I cannot do," rather than "what I can do" (p. 268). The findings, generated from the perspectives of participants, highlight the association between stigma and an imposed self with negative expectations consistent with other youth who identify as members of a stigmatized group. These negative expectations are a major factor for the possible future selves toward which youth are directed. This form of identity foreclosure, as suggested by J. Marcia (1991), represents the classification of an individual who is socialized into a particular identity with "goals and expectations determined by others or defined by group membership" (Kools, 1997, p. 269).

Due to the influence of families and the family context in self-development processes for youth, young people developing in highly vulnerable family contexts encounter greater instability and complexity in negotiating these processes. Having safe places and relationships from which to explore and develop remain critical throughout this developmental period. In the following section, these attributes are explored within relationships between adults and adolescents in relation to educational experiences

with the school as a context for self-development. Factors related to stability, contextual and developmental complexity, ethnic identity, and stigma also shape the educational and nonfamilial relationships, particularly in schools, thus affecting the academic outcomes of all youth. In addition, challenges of relationships within schools and the impact of unacknowledged privileges in shaping supportive contexts are discussed.

Schooling and Competence

Various factors contribute to students' academic achievement and success. These include teacher expectations, parental involvement, and changing demographics (e.g., family composition, neighborhood conditions, and national economics which influence social economic status). These factors, however, vary in the extent to which they influence achievement. As such, identity formation is determined or influenced by the level of cognitive maturation, the quality of ego defenses, existing situational factors, and prior socialization (Spencer, Dupree, & Hartmann, 1997).

Students with low evaluations of their academic competence and general self-worth generally perform poorly in school, loose interest in academic activities and are also likely to be truant. For African American adolescents, academic self-esteem is a better predictor of achievement than general self-esteem (Hare, 1977; T. J. Jordan, 1981; Mboya, 1986; Swanson & Spencer, 2011). Studies have shown that self-esteem emerges from feelings of competence in domains of greatest significance to the individual, namely, academic, social, or athletic domains (see Harter, 2003). Older children can find sources of support and gratification in the peer group, school, neighborhood, and work place that can help to counter the negative effects of adverse situations.

Assessing links between social and cognitive functioning is especially relevant during the middle and high school years (i.e., adolescence). Relationships between identity processes and academic performance influence the development of individual coping strategies and a personal sense of competence. For example, although boys are considered at higher risk of displaying specific types of reading delays, a large percentage of boys referred for learning difficulties reflect biases in teacher identification procedures (Hinshaw, 1992; Swanson et al., 2009).

The presence of coping skills, social supports, and positive self-esteem mitigates the risk of emotional and social problems posed by high stress and/or physical vulnerability in children and adolescents. The absence

of these coping mechanisms increases the likelihood that emotional or behavioral disorders will occur even under conditions of moderate stress and no physical vulnerability (Spencer, 1995).

Identity Processes and Academic Experiences

Resilient youth demonstrate positive outcomes in their academic trajectories and psychosocial processes (Luthar, 2006). Resilience is defined as "a dynamic process encompassing positive adaptation within the context of significant adversity" (Luthar, Cicchetti, & Becker, 2000, p. 543). Outcomes associated with resilience are broadly identified as factors contributing to success under adverse conditions and are subsequently explored to understand the processes. The concept has drawn attention as being domain-specific, such that youth can demonstrate resilience in one domain while remaining vulnerable in another (see Luthar, 2003; Wang & Gordon, 1994). In recognizing multiple components of resilience, educational resilience represents a specific domain where youth have positive educational adaptations and outcomes within the context of significant adversity (Wang & Gordon, 1994). As demonstrated by seminal research by Werner (1995, 2005), familial relationships are important in facilitating resilient outcomes. Werner also emphasized the importance of the roles of "substitute parents," such as grandparents or older siblings. These significant adults enhanced students' potential for adaptive outcomes by buffering students from negative circumstances. Cunningham and Swanson (2010) extended the concept of "substitute parents" to examine the roles of significant adults within the school context.

Slaughter-Defoe and Rubin (2001) pointed out that school officials have tremendous influence during the adolescent years. The researchers followed 56 African American children and their families from Head Start to 12th grade and the results of their longitudinal study demonstrated that the magnitude of influence changes from elementary to middle school. While parental influences were evident in the early grades, the authors found that, as children grow older, teachers have more influence on achievement patterns and educational outcomes than parents. However, the most significant findings of this study were associated with the students' early indicators of academic success (i.e., grades obtained before 7 years of age). Slaughter-Defoe and Rubin found that these early grades predicted the educational goals of students in their 13th year of formal schooling when they were around 17–18 years old. The ideal aspirations of these students appeared to have been largely influenced by early indicators of

school success (accounting for 31.4% of the variance in level of goal setting).

For many African American students, educational resilience is associated with achievement within school systems that have numerous social and economic challenges. Many urban African American adolescents, while negotiating the normative challenges associated with development during this period, are also faced with exposure to community violence, poverty, and racism. An important point to emphasize is that students can be educationally resilient and still face challenges in other areas. As Luthar and colleagues (2000) suggested, unevenness in functioning is expected in all humans.

There are two factors particularly relevant to educational resilience: students' exposure to significant adversity (e.g., negative life events, low teacher expectations, or race-related stressors) and the influences of their home environment, teacher expectations, and classroom climate (see Cunningham & Swanson, 2010; Wang, Haertel, & Walberg, 1997). These students are more likely to report high teacher or school support, high expectations from parents and significant adults (i.e., teachers), high academic self-esteem, and high parent involvement or parental monitoring.

Youth vulnerability is heightened when overall disadvantage or challenge increases their levels of stress. Some students experience greater vulnerability to adversity associated with the increased stress than their counterparts. For example, Cunningham, Corpew, and Becker (2009) reported that vulnerability increased among students with friends who engaged in antisocial behaviors. Their assessment of vulnerability acknowledged that all youth experience challenges and stressors, but the outcomes for some youth are associated with maladaptive outcomes consistent with being "vulnerable and reactive" (Luthar et al., 2000, pp. 547–548).

Education is viewed as a primary impetus toward social and economic mobility as well as a mechanism for redressing inequalities (J. Jordan, 1999). Nevertheless, the difficulties some youth face in educational systems contribute to disengagement from the educational process. According to Swanson et al. (1999), disengagement is displayed in the form of poor academic performance with little or no educational goals. Academically disengaged youth withdraw both socially and emotionally from the school climate, interact minimally with others, fail to find a place of belonging in the academic system, and do not develop adequate levels of commitment to the institution of learning (Kelly, 2003). This is consistent with others who have

compared Black males to other groups and found higher suspension rates, lower attendance, and lower standardized test scores, all of which are predictive of high dropout rates (Ford, Grantham, & Whiting, 2008; Gibbs, 1998; Noguera, 2003, 2008).

Some researchers contend that part of the solution lies within the connection between youth and influential adults. Swanson and associates (2002) claimed that the extent to which adolescents are able to demonstrate competence is dependent on their access to a range of legitimate opportunities and long-term support from caring adults. Furthermore, they suggest that relationships provide a context in which adolescents can grow by being exposed to the values of others, which frequently includes adults in their community and their school.

Teachers and Classroom Climate

As previously noted, teacher relationship and the school environment are critical protective factors for fostering educational resilience. These factors include (a) developing caring relationships that teach social skills while providing positive regard and a culture of care, respect and support; (b) setting high, achievable, and explicit expectations for academic performance and classroom behavior; and (c) providing opportunities to actively engage in meaningful learning experiences (see Benard, 2004; Henderson & Milstein, 1996).

Patrick, Turner, Meyer and Midgley (2003) identified supportive classroom environments as encompassing these school-based factors that foster resilience. They studied teachers and their students to distinguish between supportive, ambiguous, and nonsupportive environments. In contrast to supportive classes, teachers who created nonsupportive environments were authoritarian in that they stressed teacher power and control, conveyed low expectations, and used extrinsic motivation to engage students. Ambiguous environments reflected teachers who were generally supportive but did not connect with students in a personal way. They may have set high expectations but were inconsistent in demanding effort and respect and thereby undercut their own efforts.

In differentiating between resilient and nonresilient students, Waxman, Huang, and Padron (1997) examined the classroom context and individual attributes of Latino middle school students in math classes. Resilient students had significantly higher perceptions of academic involvement, satisfaction, self-concept, and aspirations than nonresilient students. Although nonresilient students were comparable to national levels of academic aspirations, the resilient

youth were significantly higher. No difference was found between the two groups' perspectives on parental involvement (i.e., interest and expectations). In fact, both groups reported average amounts of parental involvement.

Historically, schools have focused on their role as a conduit for transferring knowledge without consideration of cultural factors in learning (Spencer et al., 2006). This prevailing position, while explicitly challenged in contemporary reviews, still poses an obstacle to thinking contrarily (and therefore responding differently) about what a safe, inclusive and positive school environment should be for students. It impedes discussions that consider how to mitigate exclusionary practices in serving all youth and how to provide access to various levels of intervention. Mainstream teaching practices remain intact as well as the argument that disruptive students need to be removed from the class to preserve teaching and the experience of the better resourced and self-regulated students (Advancement Project, 2010; Skiba, Shure, Middelberg, & Baker, 2012). Morris (2012) described further the breadth of school's influence on the trajectory of minority youth:

According to the theory of social reproduction, educational institutions in their pedagogy, design, structure and practice, serve to reproduce social hierarchies. Using this lens, institutions that are not intentionally "learning organizations" or evolving in the context of their intentional quest for knowledge and social change are those that continue their reproductive role in churning out children trained to maintain racial and social stratification. (Morris 2012, p. 8)

Based on these ideas, schools not only exclude but replicate through their specific contexts and practices negative school experiences, which potentially initiate or exacerbate negative trajectories for youth of color. What is also coupled as an effect from the lack of school flexibility and advancement is the transmission of negative understandings of the self to minority youth. Skiba et al. (2012) and others who are against the use of zero tolerance practices in schools underscore the marginalization process disadvantaged youth of color experience. Regarding the conditioning minority youth receive as a result of zero tolerance practices, Noguera (2003) observes that, "by sorting children on the basis of their presumed academic ability or behavior, children learn whether they are in on the educational pipeline and develop expectations regarding where they will end up on the social hierarchy" (p. 118). How youth are treated and related to informs their self-understanding and feelings about their own potential. It is evident that the process of physically and publicly

removing students of color from classrooms, and in some cases school grounds, is traumatizing. This type of discipline reinforces negative stereotypes and low academic engagement.

Students classified for special education services are most at risk for negative outcomes associated with zero tolerance as they have typically been identified as those most often suspended or expelled from school (Chin, Dowdy, Jimerson, & Rime, 2012). Those suspended from school are more likely to continue to repeat negative behaviors, fall behind in school, or drop out (Rausch & Skiba, 2006; Sharkey & Fenning, 2012). Specific references in the literature identify higher rates of engagement by youth with poor role models, risky behavior, and difficulty with re-entry into the school system (Casella 2003; Michail, 2013; Noguera, 2003; Skiba et al., 2012).

There is a cumulative effect of negative stigmas resulting from being suspended or expelled and identified as a special education student. Black males represent a large majority of the students who are identified as needing special education and were often susceptible to punitive measures under zero-tolerance policies (Advancement Project, 2010; Fenning & Rose, 2007; Noguera, 2003; Raffaele Mendez & Knoff, 2003). Student removal, suspension or expulsion resulting from punitively based policies trigger a series of negative emotions in children and youth, which is compounded in marginalized groups. Feelings ranging from anger and sadness to frustration and shame occur (Schulz & Rubel, 2011). Some youth, due to the lack of alternative supports, engage in maladaptive behaviors as a coping outcome (Michail, 2013; Schulz & Rubel, 2011; Spencer & Tinsley, 2008). Recognized and accessible supports as well as meaning making of particular feedback and events can offset the adverse impact.

Significant Others and Educational Aspirations

Social status research consistently identifies interpersonal relationships as significant correlates of educational aspirations and educational achievement (Buchman & Dalton, 2002). In the earliest discussions of interpersonal influences, Cooley (1902) and Mead (1934) referred to social interactions with significant others as major sources of information, guidance, and support for youth. Additionally, research on productive or unproductive responses of youth to normative challenges encountered emphasize the importance of significant others as a "mediating variable for educational aspirations" (Scratchfield & Picou, 1982, p. 22).

Davies and Kandel (1981) suggest that causal models of educational and occupational attainment identify

interpersonal influences as a vital link to educational and occupational aspirations. Research supports interpersonal influences as critical in shaping educational aspirations of children more profoundly than their scholastic aptitude or previous academic achievement (Cunningham & Swanson, 2010).

Social psychologists have defined significant others as “persons who exercise major influences over the attitudes of individuals” (Woelfel & Haller, 1971, p. 75). They explain that significant others exercise a major influence on the attitudes of individuals by: (a) communicating the norms, values, and expectations of the culture or society in which they live; (b) defining the behavior that is considered to be appropriate to the culture or society in which the individual resides; (c) modeling appropriate attitudes and behaviors; and (d) providing necessary information about the environment to the individuals under their influence. The formation of attitudes, according to Woelfel and Haller (1971) and consistent with a phenomenological orientation, requires the processing of information through self-reflection and daily interaction with others. For example, youth may conceptualize an event or experience through perceptions and the internalization of information provided by his or her significant other through daily communication. Thus, in an educational context, significant others are instrumental in shaping students’ expectations through the youth’s perceptions of how those significant others distinguish educational goals and communicate academic expectations (Cunningham & Swanson, 2010; Entwistle, Alexander, Pallas, & Cadigan, 1988; Picou & Carter, 1976; Woelfel & Haller, 1971).

Early perspectives exploring the process by which significant others are influential suggests that change in youth’s behavior and attitudes occur through two modes of interpersonal influence. One describes significant others as models who serve as a basis for emulation and the other suggest they are definers whose expectations set the standard for appropriate behavior (Kelley, 1979). Theoretically, these constructs, referred to as models and definers, are dominating frameworks in methodological and theoretical approaches of early studies on the influence of interpersonal relationships and significant others.

Recognizing that these two modes of influence (definers and models) are not mutually exclusive, Cohen (1987) posited that “significant others can be both definers and models of educational aspirations” (p. 339). In his study to determine how parents influence their children’s educational aspirations, Cohen (1987) found that parents influence their adolescent children through both modeling

and defining. Modeling was defined as the emulation of parents’ education, exemplifying either college-educated or non-college-educated people and life styles. Definers, on the other hand, communicate expectations for appropriate behavior, stressing one level of education over another (p. 339). The researchers drew on the earlier assumptions of Woelfel and Haller (1971) indicating that: (a) Attitudes are relationships between a person and an object or set of objects; (b) humans’ perceptions of an object are mediated by symbolic structure; and (c) relationships are conceptual in that they are based on one’s conception of the self and the conception of the object at hand. These earlier assumptions, now empirically validated, support the significant impact of relationships on youth development within varied contexts (Cunningham & Swanson, 2010; Spencer, Harpalani, et al., 2006).

Several key points are drawn from methodological and theoretical approaches to research on significant other influence: (a) Significant others influence adolescents’ attitudes and behavior by acting as models or definers or both; (b) significant others influence acts as mediating variables for educational aspirations; (c) significant others are often identified as parents, peers, teachers, extended family and adult friends; (d) parents have a more powerful influence on the formation of educational goals than peers; and (e) influence of significant others mediates the effect of socioeconomic status and ability on educational aspirations. This foundational work remains instrumental in research examining students’ academic trajectories and relationships supportive of the academic experiences of youth. Nonetheless, how children and youth cope when significant supports are unavailable or inadequate is relevant to understanding the impact of interpersonal relations on developmental outcomes and the impact on policy decisions.

Bullying and “Drama”

In recent years, the issue of school bullying has become a focus of law and public policy—following highly publicized instances of suicide related to bullying (Hanks, 2012). In August 2010, several federal executive departments, including the U.S. Department of Education, and the U.S. Department of Health and Human Services, held the first ever National Summit on Bullying, and the following March, president Barack Obama, along with first lady Michelle Obama, held the White House Conference on Bullying Prevention (Hanks, 2012). In *Kowalski v. Berkeley County School District* (2011), the U.S. Court of Appeals for the Fourth Circuit held that a school’s decision

to protect students from bullying and harassment trumps any free speech concerns. Other Circuit Courts have ruled similarly: the Sixth Circuit in *Lowery v. Euverard* (2007), and the Ninth Circuit in *LaVine v. Blaine School District* (2001).

However, the Third Circuit ruled, in *Morrow v. Balaski* (2013), that a school district has no affirmative constitutional duty, absent very particular circumstances, to protect students from bullying. This is consistent with the U.S. Supreme Court's ruling in *DeShaney v. Winnebago County Department of Social Services* (1989) that, unless there is a specific custodial relationship (such as with prisoners), state government agencies do not have an affirmative constitutional duty to protect individuals from private harm.

Nevertheless, most of the legal and political response to bullying has come at the level of state and local government—implemented through school and school district policy rather than through the federal courts. While the vast majority of states have passed some form of anti-bullying legislation, different states have taken different approaches; for example, eight states (Arkansas, Connecticut, Louisiana, Massachusetts, New Hampshire, New Jersey, New York, and South Dakota) include off-campus behavior in their anti-bullying legislation (Hanks, 2012). While federal case law suggests that schools have to meet a high standard to punish off-campus behavior (demonstration that off-campus conduct adversely affected school operations), the U.S. Supreme Court has not yet ruled on whether the scope of anti-bullying legislation intrudes on the First Amendment's protection of free speech.

Anti-bullying laws typically have several elements: a statement of the conduct prohibited; whether the conduct constitutes a single act or repeated actions; classes of students who are protected; coverage of cyber-bullying or electronic communication; and the scope of prohibition (on- versus off-campus). States have taken various approaches to these issues, which may implicate several federal Constitutional issues besides free speech, such as the Fourth Amendment (school administrative searches) and procedural due process (Hanks, 2012).

Future cases will likely address these issues. Additionally, school bullying is an international issue: According to the World Health Organization (WHO), it is a worse problem in some countries than in the United States (Currie et al., 2008). According to WHO, Turkey, Lithuania, and Greenland have higher levels of bullying among preadolescent and early adolescent youth than the United States, while Spain and Sweden have less (Currie et al., 2008).

Thus, bullying is garnering global attention, with many initiatives designed to address the problem.

Nevertheless, Weddle (2004) contends that, at least in the United States, most of these initiatives address individual conduct of bullies rather than root cause of bullying, which is school climate and culture. He identifies "social control" and "social cohesion" as characteristics of schools that most effectively address bullying (Weddle, 2004, p. 653). Others have also supported this notion; for example, the American Educational Research Association (AERA) report on prevention of bullying also notes that schools with "fair discipline" and a "supportive atmosphere" have less bullying (AERA Report, 2013, p. 38). However, Weddle (2004) notes that the focus on individual perpetrators, as opposed to school climate, is problematic. For example, it is very difficult to find school administrators and teachers legally liable for individual incidents of bullying, because such events are usually not individually foreseeable. Also, as noted earlier, schools do not have an affirmative duty, under most circumstances, to prevent such harms against students. Even if school administrators are generally aware of bullying in the schools, they are rarely aware in advance of specific incidents that will occur or are likely to occur. Weddle (2004) recommends greater focus on changing school climate to foster bullying prevention, and on creating legal accountability for schools that fail to do so.

The emphasis on school climate is particularly salient for racial minority and LGBT youth, both of whom already face hostile school environments. As noted earlier, H. S. Stevenson (1997) discussed how Black males face hostile school and neighborhood environments; in these environments, superficial displays of prowess and aggression may be necessary to mitigate bullying and victimization. Additionally, behaviors such as the "acting White" epithets discussed by Fordham and Ogbu (1986) and their critics (e.g., see Spencer & Harpalani, 2008) also represent conduct that could fall under the rubric of "bullying." Tyson, Darity, and Castellino (2005) have discussed how school climate is related to "acting White" epithets, noting that these are more likely when Black students perceive the school to be a hostile environment, and when there is gross underrepresentation of Black students in higher level classes. Also, as Spencer and Harpalani (2008) note, identity formation and racial identity development, along with related coping strategies, are all intricately related to perceptions of the school environment. Thus, while a focus on school climate is necessary for bullying prevention, such an approach must also be contextually

and developmentally sensitive—taking into account the particular challenges that diverse groups of youth face in negotiating school, home, and neighborhood climates (Phelan, Davidson, & Cao, 1991).

Further complicating the conceptual framing of bullying interventions is the fact that researchers' definitions have not expanded with the social changes of a technological era; during middle and late adolescence, youth define and identify bullying behaviors differently from the definitions used to study the behavior and develop interventions. To explain the disconnect, researchers have suggested that *how students understand bullying* is a function of development and their perceptions of bullying change during adolescence (see Allen, 2013, for a review). Similarly, research exploring adolescents' understanding of privacy in socially mediated communication finds youth often dismiss current conceptualizations of bullying referring to it, in contrast, as "drama" (Allen, 2010). Marwick and Boyd (2011) found that adolescents often view bullying as childish and immature and doing so may be a "protective mechanism" (p. 1) that allows adolescents to avoid seeing themselves as powerless (e.g., a "victim") or having to acknowledge that they are guilty of bullying. While still preliminary, this work supports the notion that adolescents may understand bullying quite differently than researchers or even school officials and those conceptualizations may be affected by the context, development, and interpretive or meaning-making processes of youth.

Allen (2013), in examining social interactions and developmental shifts, identified four themes linking bullying behavior and drama: (1) elitism, (2) drama and the social milieu, (3) developmental change, and (4) norms, status, and hierarchy. These are each uniquely connected to the nature of social interactions and developmental change during adolescence. For example, elitism is connected to drama and the social milieu because elitism affects the social interactions among students. Likewise, drama and the social milieu are affected by how students develop and change socially over the course of middle and high school (i.e., from ages 10 to 18). "Developmental change affects [how] students create norms and negotiate status and hierarchy" (p. 428). In synthesizing the themes, norms, status, and hierarchy are connected to the elitist attitudes that permeate the social culture of the school environment; while each emergent theme is an entity within itself, they are also interconnected. Allen's findings are based on work with suburban youth from economically affluent families. Elitism as a theme, however, represents only one type of

status that privileges some youth over others, creating and heightening experiences of vulnerability and risk.

While social hierarchies and contexts are central to addressing bullying, one should also not exclude individual psychological approaches. Memory and cognitive-based therapy (CBT) models may be useful for individuals who have been victims of bullying and related forms of stress. Bullying experiences can have a long-term impact, and without positive supports and necessary interventions, negative thoughts and maladaptive coping mechanisms may become implicit, automatic, stable thought patterns (Brewin, 2006). The impact of bullying on self-processes and identities derives from social climate and hierarchies, and these are the root causes of the problem; nevertheless, it is important to explore interventions such as CBT, which may help individuals who have already been victims.

Social Privilege and Stigma

Apparent from the history of colorism, as reported in global accounts and its continuation in 21st-century life, power disparities are a part of the human experience given the under-acknowledged problem of color bias. These disparities are also prevalent as a part of the experiences of youth, given the challenges of family vulnerabilities, academic opportunities, and relationships in school contexts. Various forms of privilege, including colorism, have consequences for the broadly reported life course outcomes and differences in social status.

Black and Stone (2005) suggested that the concept of privilege communicates the various ways that opportunity is made possible for some in a society while, at the same time, denied to others. They caution that most academic discussions of privilege have centered upon race and gender, thus they wish to expand this conceptual framing to include other frequently marginalized groups. In doing so, they hope to pull readers away from a dichotomous view of privilege and unpack the various factors that shape and complicate one's identity and thus one's ability to access different forms of privilege. The authors affirmed that a more sophisticated perspective indicates that the concept of privilege communicates the various ways opportunity is made possible for some in a society while denying it to others. The authors suggested that an understanding of human identity and its many aspects of privilege and oppression may help us to identify each individual's unique needs. The forms of privilege addressed note their budding presence in scholarly literature and the authors' argument that they are

granted social privilege rather than just “preference” (which they see as less well-defined and pervasive).

People with social privilege often deny the fact that they enjoy unearned advantages at the expense of others and maintain that they are truly more intelligent, hardworking, determined, and so on, than the groups they dominate. To avoid the dissonance and confusion that results from being confronted with one’s social privilege, they must uphold distorted or inflated views of their own innate value and justify their oppression (either overt and hostile or subtle and indirect) of others. To become aware of one’s social privilege is to accept one’s responsibility to surrender unfair advantages and entitlements, recognize one’s role in the oppression of others, and fight against the system that reinforces injustice—a feat that proves challenging for some.

Meanwhile, people who identify partly or entirely with an underprivileged group experience many mental and physical consequences. Membership in multiple oppressed groups means that one experiences various kinds of oppression, and persons with conflicting identities (i.e., partly privileged and partly underprivileged, as in the case of a Black male, a rich woman, a gay White person, etc.) can feel confused, angry, and cynical about their standing in society. The experiences that come as a result of an underprivileged identity often have a highly negative effect on the overall well-being of the individual (Swanson, 2010). Members of disadvantaged groups may internalize their oppression and view themselves as inferior to others. They also may develop antisocial or maladaptive behaviors to cope with their oppression and gain some of the advantages that they lose by virtue of their identity.

With regard to counselors, counselor educators, and their patients, privilege studies can greatly enhance the effectiveness of the counseling relationship. Counselors are in a unique position that enables them to help clients understand their experiences of privilege and the way they are negatively affected by it. Black and Stone (2005) affirmed that it is the counselor’s responsibility to engage in meaningful self-exploration, internal reflection, and processing of their various identities—counselors cannot afford to retain the privilege-blindness of some members of dominant groups. They must also examine the ways in which their individual identities influence their relationships with their supervisors (or supervisees) and clients. For example, a counselor who occupies a socially powerful position may be more likely to place exclusive blame on the client, or the family (in the case of school counselors), for circumstances that result from the client’s underprivileged status. Black and Stone believe that counselors

must be trained with an eye to their social identities and that a failure to do so will only strengthen unfair social hierarchies and reduce the effectiveness of counseling.

Along the same lines, the perspective on privilege provided by Case (2007) examines college students’ attitudes toward various feminist issues before and after taking courses with and without gender content. The study measured students’ awareness of male privilege, prejudice against women, support for affirmative action, and identification with feminism. Findings provided insights regarding the complexities of the relationships and processes. In general, the women’s studies and diversity courses examined seemed to be effective in raising students’ awareness of men’s systemic advantages in society, lowering their endorsement of various forms of sexism, and increasing their support for affirmative action measures. These findings are important because previous studies have indicated that greater awareness of White privilege can lead to direct action (speaking out to friends and family about racial stereotypes, challenging racism, etc.), thus diversity courses that address issues of gender may also help motivate students to oppose various forms of sexism and identify with feminist values. However, these results may have been influenced by the students’ own self-selection into courses—it may be that students who chose to take a course with gender content were already predisposed to show a change in their attitudes toward women over a period of time, regardless of whether they had taken that specific course.

Despite reinforcing other studies’ findings that courses entirely devoted to gender content can encourage students to develop a feminist identity, Case’s (2007) study found that self-identification with feminism remained stable in the courses that addressed both race and gender. This indicated that the amount of gender content that a course contains really did influence its effectiveness in advancing feminist identification. However, general diversity courses provide students with more opportunities to consider intersections of oppression and make connections across different types of human identity and privilege. It may be that the benefits accrued by learning about various forms of privilege (rather than focusing on just one) are greater than the potential loss of feminist self-identification.

Future research on diversity courses’ influence on the attitudes discussed in this article would help to reinforce or repudiate these conclusions. Some new directions for this research that the author suggested would be to examine the effectiveness of courses that address other kinds of social inequality (race, sexuality, disability, socioeconomic

status, etc.). It would also be valuable to observe how or if diversity courses actually affect the behavior and practices of students in addition to their self-reported mental positions. Finally, because random assignment to college courses is rarely possible, this research requires further inquiry into student interest in diversity courses as predictors of the change in their levels of sexism and male privilege awareness.

Coston and Kimmel (2012) used Erving Goffman's study of stigma to examine three potential sites of marginalization (disability, homosexuality, and working-class status) within a group that is generally recognized as privileged: men. According to Goffman, there exist at least three strategies by which a marginalized group can react to the stigma against them and reduce the amount of distress they experience. These strategies were identified as (1) minstrelization—exaggerating the differences between yourself and members of the dominant group, overconforming to the stereotypes they have that portray you as inferior in strength, intellect, and so on; (2) normification—minimizing the differences between both groups to undermine or eliminate the basis of any possible discrimination; (3) militant chauvinism—highlighting the differences between the groups for the purpose of claiming that your marginalized group is truly superior to the dominant group, and thus attempting to assert power over the dominant group.

For Coston and Kimmel, the marginalization of men who are disabled, gay, or working class is rooted in their perceived failures to embody some aspect of hegemonic masculinity and thus complicates their ability to access the male privilege we expect them to have. Although they are men, the site of their privilege also provides the basis for the discrimination they face, thus they often do not feel (very) privileged at all. Coston and Kimmel discussed how each group may react to society's problematization of their masculinity with either or both overconformity to hegemonic masculinity and/or resistance to it. In doing so, the authors provided a complex view of male privilege and the inflexible standards required to access it. Males can also be denied access due to their deviation from other standards. The approach extends research on intersectionality and how various forms of privilege and marginalization can exist within a single person.

Pratto and Stewart (2012) observed that social privilege exists in a "half-blind" state within the members of socially dominant groups. This means that, although the dominant group is capable of recognizing the inequality and problematized identity of the disadvantaged group,

they are not always capable of recognizing their own social dominance as a privilege (as opposed to the normal or unmarked position). They referenced other studies' findings that people can be aware of the disadvantages that come with certain other social identities but fail to see or to acknowledge that privileges accompanies their own identity. Pratto and Stewart also pointed out that members of a subordinate group are more likely to perceive themselves as members of that group and to recognize that their identity has been stigmatized, whereas members of a dominant group do not necessarily see themselves as members of a social group or as having a distinct social identity. The study drew upon two theories to account for these discrepancies. The first is norm theory, which posits that people implicitly view certain (dominant) groups as the default setting such that other groups are viewed as a deviation from the norm. The second is social dominance theory, which explains how the psychology of one's unique group position accounts for one's (in)ability to recognize social privilege. Their theorizing and findings suggest four hypotheses: (1) group membership is more prominently perceived by members of a subordinated groups than by members of dominant groups, (2) dominant groups generally have higher levels of social dominance orientation (SDO) than subordinated groups, (3) SDO will be more positively associated with differential group identification in privileged groups than it is in underprivileged groups, and (4) overt measures promoting the power of one's own group will be more associated with SDO in dominant groups than in subordinated groups.

As suggested, their survey results confirmed the authors' four hypotheses for each sample group and across each type of group distinction (sexual orientation, social class, gender, and race). Interpreting the results, the authors noted how low identity salience helps dominant groups to remain blind to their role in an unfair social hierarchy and their responsibility to fight against it. Similarly, other privilege studies show advantages associated with any socially dominant group similar to the association between being American and being White (Devos & Banaji, 2005). In essence, privileged status allows the privileged person to experience (usually blindly) their daily life and identity as routine, all encompassing, normal, neutral, and universal. Pratto and Stewart (2012) affirmed that it would be interesting to extend their analysis to see how the processes discussed in their article translate into real-life behaviors and practices. They noted that policies designed to treat all groups equally and neutrally (e.g. "color-blind" policies) are likely to maintain group dominance because they are

(perhaps implicitly) designed to suit the dominant group best. These biased policies result in material advantage for dominant groups, and other studies have found that those with privilege react with anger and opposition toward policies that acknowledge and attempt to counteract their unfair advantages. On the other hand, opinion polls often find that women and racial minorities support measures to eliminate institutional discrimination and privileges. Thus this study ultimately suggests that dominants will oppose group-sensitive policies unless they come to endorse greater group equality, relate to the subordinated groups, and recognize the innumerable obstacles faced by people who do not have the social privileges the dominants take for granted. Most studies of privilege focus on the disadvantaged group. An impressive aspect of this perspective is the acknowledgment that dominant groups are in fact cognizant of social inequality. While gay and lesbian support groups are common in high schools in providing supportive relationships, they do not mitigate the marginalization prevalent in a heterosexual dominant context. This latter point also reflects the experiences of youth who are members of a religious minority.

Schlosser (2003) concurred with others in noting that the majority of conversations about diversity or multiculturalism are concerned with race-based issues and affirms the importance of ensuring that discussions include other minorities whose experiences have been neglected by dominant society and researchers alike. Schlosser explicitly discussed religion and the privileges afforded to Christians in agreement with McIntosh's (1988) claim that the subtle unearned advantages that White people possess (referred to as White privilege) are mimicked in the dynamics between all dominant groups and those who they oppress. His list of 28 privileges afforded to Christians in the United States, however, varied from others in its attention to those that have no perfect equivalent in other forms of oppression, such as seeing knowledgeable celebrations of your holidays across the media, receiving time off from school or work on your holy days, being greeted in public places according to your holiday season, having ready access to places where you can worship, feeling comfortable displaying items of religious significance, and so on. He suggested that, in order to understand how power operates, all types of dominant groups must be identified as privileged, and these silent advantages must be articulated and discussed.

In his discussion of religious groups in the United States, Schlosser emphasized that the majority of Americans practice Christianity and are thus positioned as members

of the dominant religion. Christians are identified as those who believe in Jesus Christ as their Lord and savior and the teachings of the Old and New Testaments. Other criteria are that Christians take communion and celebrate holidays congruent with their religious beliefs (e.g., Easter and Christmas). In addition to the advantages of being members of the dominant religion, their greater numbers and historical control in political realms provide Christians with significant power in creating policies and laws. One way in which this power makes itself known is in the common concept of "separation of church and state," which presumes both that the word "church" means something to all people and that the meaning of "church" is singular and stable. In a society where Christianity was not the dominant religion, we might think of this as the separation of "temple and state," "mosque and state," or more inclusively as "religion and state." Another example of religious bias emerged in the 2000 presidential election, during which the press frequently ignored Joseph Lieberman's political qualifications and instead focused on the fact that he (the Democratic Party's vice presidential candidate) was an Orthodox Jew. One more example can be found in George W. Bush's declaration of June 10, 2000, as "Jesus Day" in the state of Texas, where he served as the governor. Each of these phenomena displayed a lack of consideration of minority religious groups.

Continuing his comparison of Christian privilege to White and male privilege, Schlosser suggested that the feminist concept of "nonconscious ideology" might also help to explain the existence of Christian privilege. To Schlosser, it seems that Christians are not likely to interpret their environment as religiously hostile or discriminatory because there are no significant pressures on them to imagine how it feels to be a person who does not share their own (dominant) religious beliefs. They cannot share the perspective of the oppressed groups and thus they do not perceive their surroundings as oppressive, at least in that particular way. Nevertheless, Schlosser states that it is the responsibility of any dominant group to become familiar with their unearned advantages and welcome a discussion of the power they possess. Schlosser also briefly made a case in favor of religion being viewed as an ethnic group and thus a legitimate variable of research in power and privilege studies. Schlosser's approach was novel for its strong introduction to the concept of Christian privilege. Schlosser noted that his list of Christian privileges was not at all complete but was intended to spark further dialogue about Christian privilege and help bring society closer to including all religions in dominant discourse. Moreover,

Schlosser insisted that all people should strive to cherish rather than merely tolerate the existence of religions that differ from our own. Particularly for youth who are members of a religious minority, acknowledgement of their beliefs and related practices reduces the stressors associated with maladaptive coping outcomes (see Swanson et al., 2010).

Although attention to the issue of privilege is relatively recent, what the various approaches have in common relative to their implications is that someone benefits by denying access and opportunity to others. The outcomes are significant not only for individuals victimized by the socially constructed conditions but, in fact, there are implicit psychological costs for those objectively benefiting from the untoward practices.

IDENTITY AND COPING

Within a developmental framework, juxtaposed against the concept of privilege, stereotypic messages related to domains of the self and experiences of discrimination have implications for educational experiences and mental health outcomes, particularly during adolescence (García Coll et al., 1996; Spencer, 1995; Swanson, 2010). In synthesizing several theoretical perspectives on depressive symptomology for youth, including cognitive and socio-ecologic factors, Hammack (2003) identified oppression as the primary catalyst contributing to adolescent depression. The following section elaborates on (a) significant social and developmental factors associated with the etiology of depression during adolescence and (b) the significance of a positive reference group in identity development and in mitigating depressive symptoms.

In response to the uncertainties of their environment, many marginalized or stigmatized youth develop coping skills and adaptive behaviors to compensate for their status as minority group members. Anxiety for these youth may be triggered by academic problems, family conflict, community violence, interpersonal relationships, or employment and career issues. Behaviors such as hyperactivity, acting out, and aggression in younger adolescents suggest the presence of unaddressed anxiety, while delinquent activity, substance abuse, and sexual promiscuity may be responses to underlying anxiety or depression in older adolescents (Gibbs, 1982; Kauh, 2010; Swanson, 2010). These behaviors reflect coping responses that enable youth to adapt to impoverished or oppressive lifestyles, but

are yet maladaptive for success in mainstream society (see Gibbs, 1989; Spencer et al., 2006).

These strategies can result in positive resolutions that contribute to the development of an effective repertoire of responses. Adaptive strategies, however, are important independent of the developmental period (Taylor, 2010). The possible negative or problematic consequences are particularly relevant during adolescence as these early-developed coping responses are utilized in facing future stressors, with implications that extend into adulthood (Luthar, 2006; Swanson, Cunningham, & Spencer, 2003). The extent to which youth experience competence in their efforts to change their circumstances is critical for establishing a foundational framework for future challenges. Some stressors that challenge competence are adolescent-dependent, in that they are events unique to adolescence (i.e., pubertal changes, school transitions). Most normative stress that adolescents encounter is inevitable and uncontrollable: They are encountered by most youth and include day-to-day hassles found in different social environments. Life-event stressors in impoverished urban communities are often associated with exposure to violence as well as typical adolescent stressors (e.g., puberty and increased conflicts with parents).

While students may perceive typical stressors as a hassle, research over the past decade has demonstrated that the perceived hassles are good indicators of parental monitoring (see Cunningham et al., 2002; Spencer, Dupree, Swanson, & Cunningham, 1996, 1998). Parental monitoring is generally referenced as parents' awareness of their children's activities. Specifically, parental monitoring is defined as parents' knowledge, supervision, and control of their children's daily activities and peer relationships in an attempt to minimize the potential risks to which their children are exposed (Barber, Olsen, & Shagle, 1994; Cottrell et al., 2003; Gray & Steinberg, 1999; Parker & Benson, 2004; Spencer et al., 1996, 1998). For example, families that show moderate to high parental monitoring may include parents who are familiar with their children's friends, extracurricular activities, and express concern about where their children spend time away from home and school (Spencer et al., 1996). Even some single-parent families manage to exhibit high parental monitoring, although they may experience more difficulties than parents in two-parent households (Gutman & Eccles, 1999; Spencer et al., 1996). Single parents may have more challenges to exhibit high parental monitoring because they are often the sole providers for their families. Single parents have various constraints that compromise the

availability of resources needed to manage their children's activities and relationship. Factors such as financial strains, restrictive social supports, psychological distress, and time constraints interfere with consistent levels of parental monitoring (McLoyd, 1998).

Explicit strategies for addressing adversities at home or school that are communicated and modeled shape the perspectives of youth on the challenges they encounter and actions required to mitigate them. O'Connor (1997) explored the characteristics of six African American students who were a subsample of a study examining 46 students' perceptions of American opportunity structures and the impact of their optimism on future aspirations. Resilient students had (a) strong evidence of their personal competence, (b) concrete experiences which conveyed that individuals could defy racial barriers, and (c) social interactions that communicated strategies that would allow them to negotiate the financial limitations of their households in their pursuit of upward mobility (p. 622).

These attributes, however, were considered insufficient to account for the optimism expressed by the educationally resilient youth. O'Connor found that most of these students recognized systemic challenges, relative to their status as minority members, associated with race, class, and, at times, gender that could potentially frame their perspectives that life opportunities were limited. Some students defied odds and demonstrate defiance against the perceived limitations. Gordon (2004) defined defiance as "acts of active resistance to a challenge and pushing against obstacles standing in the way of personal achievement" (p. 124). As such, in contrast to students who recognized systemic challenges, those students identified as academically resilient also recognized and explicitly responded to social injustices; they were not resolved to accept systemic challenges without struggle or action. The social experiences of the resilient students, while having heightening awareness of structural constraints, did not represent indomitable structures that could not be defied, negotiated, or altered. This acknowledged potential for change may have additionally created the space for these youths to be optimistic about their futures and exhibit continued effort in school (O'Connor, 1997, p. 623).

As stated earlier, systemic challenges (i.e., stressful contextual and life experiences) may compromise the academic success and transition into adulthood of youth (Cunningham et al., 2009). Impoverished youth are more likely not to graduate from high school than their peers from more economically stable homes and communities. Youth caring for siblings or helping parents with

addictions, mental health problems, or physical disabilities are also at increased risk of poor academic outcomes. These outcomes are often attributed to absences or lack of focus when able to attend school (Slaughter-Defoe & Rubin, 2001). To mitigate these vulnerabilities, sufficient supports are required to enhance academic competence leading to academic resilience (Trask-Tate & Cunningham, 2010). The supports reduce risks in areas that are most likely to directly affect academic performance and intellectual curiosity. For example, in a sample of urban African American adolescents, Trask-Tate and Cunningham (2010) examined students' reports of parental "school-based" involvement, perceptions of social support from school officials, and students' expectations for how long they intended to go to school (e.g., drop-out, graduate high school, finish college, or attain a graduate or professional degree after college). The results indicated that perceptions of support from school officials accounted for the most variance associated with academic future expectations. Although the home environment is a critical context for developmental outcomes, the supports provided by other socializing agents can significantly mitigate the limitations of a vulnerable family.

Vulnerability and Depression

Racial and gender differences in rates of depression have been attributed to several factors, including socioeconomic status, experiences of racism and discrimination, gender socialization, and societal attitudes about physical beauty (Boyd-Franklin, 1995; García Coll et al., 1996; Kohn-Wood, Hudson, & Graham, 2008; Nolen-Hoeksema, 1990; Smolak, Levine, & Gralen, 1993). Although reporting similar rates in perceived discriminatory experiences, males and females may differentially internalize these encounters (L. D. Scott, 2004; Sellers, Caldwell, Schmeelk, Karen, & Zimmerman, 2003).

Gender differences

J. L. Rushton, Forcier, and Schectman (2002) found that, among a national sample of adolescents, females and ethnic minority youth were most likely to report baseline depressive symptoms with females reporting persistent symptoms at follow-up. Theorists suggest that such gender differences in the prevalence of depression in the United States are associated with both psychological and societal factors. Nolen-Hoeksema (1990) suggested that boys and girls differ in their ruminative styles. As youth progress from childhood through adolescence, they gain the ability

to think more abstractly and to think in more sophisticated ways (Piaget, 1972). As a result, they apply the ability to reflect on different thoughts and actions. Females, in particular, tend to mull over their negative self-appraisals, which leads to bouts of depression and anxiety. In contrast, boys' gender socialization toward a performance orientation encourages them to utilize distraction strategies (i.e., acting out) when experiencing perceived threats to their sense of self (Carlson & Grant, 2008; Cunningham, 1999).

Pubertal development for both boys and girls contribute to immense physical changes to their bodies that include an increase in body weight associated with growing muscle and fat (Susman & Dorn, 2013). Girls are particularly sensitive to these physical changes, as they decline significantly in self-esteem and increase in depressive state around the onset of puberty (Rosenblum & Lewis, 1999). Researchers suggest that the negative impact of pubertal development on girls' mental health can be attributed to societal appreciation for and definitions of physical beauty that favors tall, thin women. The onset of pubertal development, consequently, leads to a sudden increase in body fat, which as previously noted can exacerbate an adolescent female's tendency to be overly concerned about her body weight and physical appearance (Smolak et al., 1993). As such, their psychological well-being—in the form of higher body dissatisfaction, lower self-esteem, and higher depression—declines (Rosenblum & Lewis, 1999).

Research notes, however, that these same trends in depression as they relate to pubertal development do not emerge among African American females. In contrast, although African Americans are at greater risk for obesity than Whites (Ogden, Flegal, Carroll, & Johnson, 2002), their sense of well-being seems less vulnerable to the physical changes that accompany pubertal development, which many theorists believe can be attributed to cultural differences in the ideal body. Numerous studies have found, for instance, that the ideal female body type among both African American males and females is heavier than that of Whites (Freedman, Carter, Sbrocco, & Gray, 2004; Gluck & Geliebter, 2002). As such, sudden increases in body fat and body weight associated with pubertal development may not have as negative consequences on the mental health and well-being of African American females as is evident among their White female peers. This relationship may depend, however, on the extent to which African American girls identify with their racial group. Girls, for example, who weakly identify with African American culture may not share the same attitudes about body image. As such, they are more susceptible to societal attitudes

regarding weight and this contributes to relatively higher depression during adolescence. In examining psychosocial correlates of obesity, Asthana (2012) found that obesity among adolescent girls in Delhi significantly predicted self-esteem, depression and social anxiety. The relationship between weight and mental health are attributed to weight stigma—the negative cultural attitudes and discrimination associated with weight.

Racial Differences

Overwhelming evidence suggests that lower socioeconomic status (SES) is strongly linked to poorer physical and mental health (Adler et al., 1994; Schreier & Chen, 2013). In fact, individuals from the lowest SES backgrounds experience higher psychological distress (Eaton & Muntaner, 1999) and are 2 to 3 times as likely to have mental disorders (Muntaner, Eaton, Diala, Kessler, & Sorlie, 1998) as those from the highest SES. Disadvantaged communities often lack resources that promote well-being (e.g., high levels of supervision for teenagers) and, instead, possess high rates of unemployment, homelessness, substance abuse, crime, and violence (Bowen & Chapman, 1996; Brody et al., 2001). Exposure to neighborhood crime and violence puts individuals at greater risk for experiencing immediate, as well as, long-term psychological distress (Cunningham et al., 2009; Gorman-Smith & Tolan, 1998; Miller, Wasserman, Neugebauer, Gorman-Smith, & Kamboukos, 1999). Further, African Americans and other ethnic minority groups are overrepresented among the lowest income brackets; 24% of Africans Americans live in poverty compared to 8% of Whites. As a result, African Americans are at particularly high risk of experiencing mental health problems.

In addition, ethnic and racial minority individuals' experiences with racism and discrimination can negatively affect their mental health by increasing depression and anxiety (Kessler, Mickelson, & Williams, 1999; L. D. Scott, 2004). Simons et al. (2002) investigated the correlates of childhood depressive symptoms in preadolescent African American children and found that racial discrimination was positively related to their depressive symptoms. The impact of such experiences can become increasingly negative during the transition into adolescence when a shift from concrete to more formal cognitive abilities occurs. Specifically, the decline in egocentric thinking allows for the emergence of perspective-taking abilities (Grusec & Lytton, 1988). In the context of ethnic minority youth, increased abilities to consider the perspectives of others may leave them more susceptible to the negative effects

of societal stereotypes and discrimination. Some youth, for instance, internalize negative stereotypes about their racial group, leading to poorer self-esteem and psychological functioning (Cross, Strauss, & Phagen-Smith, 1999). Moreover, the negotiation of these experiences becomes a part of the process of racial identity development, which involves the restructuring of individuals' cognitive schemas in response to changes in their maturational level *and* interactions within their environment (Spencer, Swanson, & Cunningham, 1991). Further, depression may represent individuals' responses to perceived lack of power or efficacy to effectively influence their environment. Racism and discrimination further contribute to poorer mental health through its relationship to discriminatory hiring and housing practices that force racial minority individuals to live in lower SES neighborhoods and work lower paying jobs.

Implications of Ethnic Identity

Racial identity encompasses many psychological and behavioral components ranging from feelings of belonging, commitment and attitudes toward one's group to shared language, behaviors, and values (Cross et al., 1999). It represents an important psychological characteristic that may protect racial minority youth from developing depressive symptoms caused by various risk factors. Mumford (1994) stated that identification with the dominant White culture (Eurocentricity) has a positive correlation with depression, while having a positive Black identity is negatively correlated with depression.

Theorists suggest that individuals' racial identity represents a source of strength. Cross et al. (1999) suggested that a strong racial identity instills positive images and attributes of in-group members and the ethnic culture, thereby instilling pride in the ethnic group and in an individual's affiliation with that group. Similarly, Kulis, Napoli, and Marsiglia (2002) argued that being embedded in an ethnic or racial culture "[enhances] pride, self-esteem, and interpersonal skills" (p. 103). According to Scheier, Botvin, Diaz, and Ifill-Williams (1997), the lack of a strong racial identity leads to "feelings of inadequacy, marginality, and role confusion, all of which [may lead to negative behaviors] as a means of coping with internal psychological pressures" (pp. 23–24). As such, much research focusing on the implications of racial identity for the mental health of African American youth emphasizes the importance of their ability to identify specifically with Black culture. Results of numerous other studies support these theories and findings; racial identity has been

positively related to self-esteem and negatively related to depression (McMahon & Watts, 2002; Roberts et al., 1999; Sellers et al., 2003; Sellers, Copeland-Linder, Martin, & Lewis, 2006).

Although research has primarily focused on how the need for African American youths to identify with Black culture contributes to their overall sense of self-worth and identity development, some suggest that ethnic and racial minority youth must successfully negotiate identification with *both* their ethnic culture as well as the dominant White culture (LaFromboise, Coleman, & Gerton, 1995). Du Bois (1989), however, described the African American experience as a duality, in which, an individual is American but not completely accepted in American society. Along similar lines, Cross' stages of psychological Nigrescence for Black Americans consist of two dimensions, which Cross argued were in direct conflict with each other: (1) individuals' orientation toward Black culture and (2) individuals' orientation toward mainstream White society. As such, positive Black identity has been assumed to have a direct negative relationship with perceived White precedence (i.e., having Eurocentric values). In as much as past research has suggested that both of these dimensions are important for the sense of self and mental health of youth (Pyant & Yanico, 1991; Ward & Braun, 1972), few studies have simultaneously examined the relative contribution of each of the dimensions for adolescent well-being. Rather, the majority of studies examine either identification with Black culture alone or in combination with identification with the dominant White culture. Swanson et al. (2009), however, argued that these dimensions of identity are unique and should be independently assessed. Work by Sellers and colleagues (2006) expanded the conceptualization of racial identity to include public and private regard but also national identity in examining the impact on mental health outcomes.

Significant conceptual and empirical work has focused on the impact of negotiating challenges to salient areas or domains of self during adolescence. The positive relationships between racial identity and positive outcomes suggest the need for youth to have a positive reference group as an orienting aspect of identity development (e.g., high centrality buffers the effect of school discrimination; Sellers et al., 2006). Research, for example, with Mexican youth confirm the salience of cultural values in mitigating anxiety, depression and behavioral problems by providing opportunities for defining and interpreting societal expectations (Berkel et al., 2010). The concept of a reference group orientation is attributed to work by Cross (1971, 1985) in his early

conceptualization of identity development processes for African Americans. This conceptualization of a reference group orientation, however, has not been explicitly framed or extended in understanding identity development based on other referent groups within developmental science. Significant research contributions in recent decades have provided and contributed to understanding the impact of group affiliations on self-appraisal processes. Attention has appropriately focused on the sense of belonging or affiliations to a referent group of youth, but there has been less attention to the factors within referent groups which create the foundation needed to support development, particularly under adverse conditions.

Given the wealth of research showing how positive affiliations and referent group orientations support self-appraisals, studies on cultural identity among Native Americans have not consistently shown the same pattern of outcomes. Hamill, Scott, Dearing, and Pepper (2009) examined depressive symptoms and the moderating effect of cultural identity among 12–18-year-old Native American youth. They found cultural identity significantly reduced depressive symptoms, which was moderated by age (assessed as students' grade in school). W. D. Scott and Dearing (2012), however, later found lower depressive symptoms among the younger participants (ages 12–15) within the same sample reporting high self-efficacy; this relationship was not moderated by cultural identity. Whitesell, Mitchell, and Spicer (2009) examined developmental trajectories of self-esteem and culture in relation to personal resources, problem behaviors and academic performance as part of a 3-year longitudinal study on Native American youth. The positive relationship between self-esteem and academic achievement was consistent with previous literature but cultural identity had no direct effect. The discrepancies may reflect early exploration of identity processes that contribute to inconsistencies in findings over time, different criteria used for assessing problem outcomes, and different assessments of cultural identity.

In addition to culture providing a reference group for identity exploration and development, faith communities may also contribute to the self-appraisal processes of youth. The sense of connection associated with belonging to a religious group can have a positive impact on mental health. This relationship is contributed to factors that include social cohesion, family support, and consistent values (Dabbagh, Johnson, King, & Blizzard, 2012). There have also been inconsistent findings related to the influence of faith communities on identity development.

Some studies differentiate spirituality from religiosity, with spirituality reflecting a commitment to faith principles in contrast to practicing the traditions and expectations of a religious community. Butler-Barnes, Williams, and Chavous (2012) explored racial pride, educational utility beliefs, and religiosity. They found an interaction between high educational attributions and low religious beliefs. Reported beliefs in religious practices, often the focus of religiosity assessments, did not represent the attributes associated with positive outcomes (i.e., cohesion). Nevertheless, it was also noted that a faith community can contribute to, or exacerbate, experiences of stigma and adaptive challenges (see Bridges & Snarey, 2010).

Methodological Considerations

Early research on Black children did not differentiate between personal and group identity, and nondevelopmental interpretations of negative self-concept were attributed to racial self-hatred for decades thereafter (see Swanson et al., 2009, for a review). While focusing on one or both constructs, the research frequently ignored developmental transitions, parental racial socialization, and societal and historical traditions that stress racial membership as a determinant of group and individual experiences. Phenomenological approaches (i.e., PVEST) are consistent with understanding the meaning-making processes of individuals from diverse backgrounds and experiences. Emergent contextualized perspectives offer greater conceptual and analytic sophistication for examining developmental processes. These, however, still require a phenomenological orientation to mitigate the implicit biases of oversubscribed, presumably objective assessments. While efforts to create valid and reliable measures are necessary for large-scale studies, it is misleading to suggest that the selection of measures and the associated constructs are diversely representative without exploring the meaning-making processes of those being studied.

In addition to considering assessment approaches, recent advances in theoretical applications have contributed to complexities in analytic strategies. Studies examining the influence of various contexts (e.g., multilevel models) and that promise broad ranging impact, have gained in popularity over recent decades (Raudenbush, 2005). When designing and conducting studies that examine contextual factors, it is critical to address any differences in units of analysis.

Similarly, it can be misleading to assume that constructs such as "self" and "identity" share the same

meanings across cultures. It is important to understand and examine culturally salient factors contributing to self-appraisals in non-Western societies. Much of this current review has focused on research with global implications but drawing largely from research conducted in the U.S. Examining philosophically different perspectives on how self-processes are defined and on factors influencing the meaning-making processes associated with self-appraisals facilitate an enhanced understanding of self development processes. Additionally, examining cultural influences on these processes can contribute to understanding how they may differ over time, thus identifying developmental trajectories from childhood through adolescence.

Mixed methods, path modeling, and hierarchical linear modeling relevant to multilevel modeling provide greater support for using this perspective. In studies that use an ecological perspective, the context should be adequately described to provide information about the contextual level being examined (i.e., meso versus exo, degree of embeddedness), and, in the case of a developmental focus, individual factors should be provided to situate the person (i.e., child, parent) within a specific context at a given period in time.

A final note regarding methodological trends is the rising prominence of mixed-methods research designs. Cross (2005) provided a historical review of the use of mixed methods when studying identity among African Americans. He noted that, although valuable new constructs were added over time in the research on Black identity, self-report questionnaires were the primary method of assessment. Multiple ethnic identities and situational and developmental changes in identity are clearly important, and therefore the use of mixed methods extends knowledge of identity processes across contexts. There remains value in utilizing a clearly focused research method that continues, for example, to explain processes, predict trajectories, and identify critical developmental periods and influences. The strength of mixed methods is its potential for addressing complex phenomenon but a major challenge is that the strengths and limitations of each method must be addressed. Sensitivity to issues of reliability and credibility are necessary in the initial design and in the analytic decisions. While using the strengths of quantitative and qualitative methods, it is important to address potential pitfalls by adopting greater vigilance in design and implementation of the research that is appropriate for the research question and implications for the population being studied.

FUTURE IMPLICATIONS FOR CONCEPTUALIZING SELF

Several relevant issues for future conceptual considerations and research studies are presented throughout this chapter. The following are some highlights and additional directions for research on self-development and self-processes:

- Explore in greater depth the impact of self-efficacy or an agentic perspective on self-processes: importance of feeling like you matter; importance of effectance motivation (classic perspectives by theorists such as Albert Bandura, Robert White) on self-development and experiences that further shape it. There is very little research on these processes during middle childhood, which has implications for adolescence and later development.
- Broaden and examine reference groups that are salient for the identity formation of youth. Particularly salient for understanding societal references they draw on (i.e., cultural factors or faith-based values) during self-appraisal processes.
- Explore memory and cognitive-based therapy (CBT) model. Individuals form an initial memory that then competes to be remembered. According to this model, if the individual does not have positive supports and does not learn to identify the negative thoughts before they become implicit and automatic, they can become stable thought patterns (Brewin, 2006).
- It is also critical to take into account how young individuals make sense of the world. Currently, when scaled measures are applied to young children, they are not adapted to the minds of younger individuals (for example, see Kichler & Crowther, 2009).
- Examine the noted considerations through the lens of different human development models. For example in using a PVEST perspective, meanings eventually become stable coping patterns: “I get meaning from my body.”

CONCLUSION

Early and ongoing self-processes facilitate later identity formation and contribute to the development of positive efficacy under supportive conditions. Positive academic experiences and social competence are associated with adolescents’ ability to adapt. These, however, are frequently compromised for youth of color and other marginalized youth by a variety of challenges related to

the contexts of their development. During a time when peer relations become significantly more relevant to an adolescent's self-esteem, the role of adults in ensuring continued positive efficacy is expected to provide a sustaining impact.

Adolescence, as a time of normal exploration and unavoidable cognitive transformations, provides opportunities for further growth and positive development that can be facilitated through integrated services and programs directed toward youth. Among diverse youth, positive identity formation, safe interpersonal relationships, and development of skills and interpersonal competencies in conjunction with available supports are vital for experiencing and transitioning the adolescent years.

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CHAPTER 19

Aggressive and Violent Behavior

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Generations of students have been taught to think about the nature of human aggression as a choice between two alternatives. Was Thomas Hobbes (1968/1660) right in assuming a natural “omnipresent danger of violent death” in the absence of the monopolizing power of the state? Or was Jean-Jacques Rousseau’s (2002/1762) vision of a natural peace among humans in the absence of evil brought about by manmade injustice more adequate? According to primatologist Frans de Waal, thinking about human aggression in relation to these alternatives is a waste of time (de Waal, 2005, p. 215). Humans are a bipolar species: We have an unparalleled capacity for cruelty, hatred, and brute use of force, but we also have a matchless sense of compassion, care, and moral obligation. The real question, therefore, is under which conditions either of these capacities prevails. Variation occurs at different levels: Whole societies can quickly move from a state of peace to outright civil war, where young men rape and kill, and societies ridden by extreme violence can experience massive declines in a matter of just a few decades. At the same time, variation occurs within individuals: Despite considerable stability of aggression over the life-course, humans move in and out of periods of temper tantrums, fights with classmates, and involvement in youth gangs during the growth from infancy to adulthood. In this chapter, we review current knowledge of the mechanisms that bring forth stability and change, and examine research on how developmental change is connected to societal conditions and biological mechanisms.

ORGANIZATION OF THE CHAPTER

We begin the chapter with three sections that outline the framework of our review. We first briefly define the terms *aggression* and *violence* (first section), then discuss the phylogenetic and ontogenetic origins of aggression (second section), and continue to identify six general crosscutting themes in developmental analyses of aggression (third section). The subsequent two sections discuss

epidemiological aspects of aggression. Specifically, the fourth section examines subtypes of aggression, the role of aggression in clinical diagnoses, and comorbidities with other mental health problems and behaviors; the fifth section provides an overview of different perspectives on the epidemiological description of aggression over the life-course. The remaining five sections review current research in a selection of domains implicated in the causation of aggressive behavior over the life course, namely genetic and biological factors (sixth section), cognitive and emotional development (seventh section), moral development (eighth section), family and peer dynamics (ninth section) and the link between macro-level processes and individual differences in aggression (tenth section). Across these sections we link current research to the six cross-cutting issues identified. We conclude with an integrative discussion of future strategies in developmental aggression and violence research.

WHAT IS AGGRESSION?

Aggressive behavior has been defined as behavior through which individuals intentionally cause physical or psychological harm to others (Krahé, 2013). This definition comprises many different behaviors. The English language, for example, probably contains several hundred verbs that describe acts that fall under this definition. Table 19.1 lists a selection of these verbs grouped into eight heuristic categories, namely inflicting physical injuries (bite, hit, rape, wound), engaging in confrontational conflicts (argue, fight, quarrel), using coercive power (abuse, coerce, intimidate, terrorize), using group-level coercive power (conquer, raid, battle), withdrawing support from dependents (abandon, neglect, starve), inflicting reputational losses (disregard, insult, tease, provoke), retaliating (avenge, retaliate), and inflicting personal harm by taking or destroying somebody’s property (burn, destroy, rob, vandalize).

TABLE 19.1 English verbs that express aggression

Heuristic Category	Examples
Inflict physical injury	Abort, assault, attack, batter, beat, bite, cut, drown, hit, hurt, injure, fight, punch, push, kick, kill, lash out, mutilate, rape, shoot, slaughter, slap, stab, strangle, strike, torture, wound
Confrontational conflicts	Argue, battle, clash, compete, fight, quarrel
Use coercive power	Abduct, abuse, arrest, bully, coerce, compel, force, frighten, intimidate, pressurize, punish, scare, terrify, terrorize, threaten
Use group-level coercive power	Attack, conquer, invade, raid, battle
Withdraw support for dependents	Abandon, maltreat, neglect, starve
Inflict reputational losses	Annoy, disregard, exclude, frustrate, harass, insult, offend, reject, slight, tease, enrage, infuriate, provoke, upset
Retaliate	Avenge, retaliate, revenge
Inflict losses on a person’s property	Burn, damage, destroy, mug, ravage, rob, steal, vandalize

We note three issues with this definition: First, some items used in common psychometric instruments of aggression do not fulfill the criteria of this definition. The aggression subscale of the Achenbach Child Behavior Checklist (CBCL/6-18), for example, comprises items such as “talks too much,” “showing off or clowning,” and “easily jealous” (Achenbach & Rescorla, 2001). These behaviors would not constitute aggression according to the proposed definition. Second, aggressive acts vary widely in the level of “intentionality.” Items like “reacting aggressively when teased” involve little intent. However, they probably belong to the construct of aggression as they imply a goal-directed antagonistic response aimed at countering a primary hostile act. Third, the definition does not limit aggression to norm-breaking or morally wrongful behaviors. For example, acts of self-defense in reaction to a threat, punitive action, and coercive acts by legitimate agents of state control are aggressions by the terms of this definition.

In developmental research, aggression is usually interpreted as a subdomain of the broader category of *externalizing behaviors*, an umbrella term for all antagonistic behaviors directed at the external environment. It comprises aggressive, defiant and disruptive, as well as hyperactive and impulsive, behaviors (Liu, 2004). The notion of *antisocial behavior* refers to aggressive and nonaggressive behaviors that break social and legal norms but not to the spectrum of ADHD-related behaviors. For adolescents, the term *antisocial behavior* is often used interchangeably with *delinquency* or *crime*, although it covers behaviors such as bullying that are not subject to criminal law sanctions. When used for children, the notion of antisocial behavior usually refers to a group of behaviors that includes aggression, oppositional behavior, and status violations.

Violence comprises acts of physical force intended to cause physical pain. Specifically, the 2002 *World Report on Violence and Health* by the World Health Organization defined violence as “the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation” (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002, p. 5). This definition combines three domains, namely *self-directed violence* such as suicide, *interpersonal violence* defined by criminal law, and *collective violence* including war, genocide, torture, or terrorism. The present review is limited to interpersonal violence, that is, behaviors that involve the use or threat of use of physical force to hurt or damage other persons.

WHERE DOES AGGRESSION COME FROM?

Where do aggression and violence come from? Much developmental research interprets this question as a question about the ontogenetic origins of differences between individuals. Empirically, this perspective leads to an emphasis on factors such as brain dysfunction, the learning of aggressive scripts, inadequate socialization, moral deficits, or exposure to aversive life-events. Theoretically, it results in a “violence-as-pathology” model, whereby non-normative characteristics of the individual or the environment explain the aggressive behavior. However, it does not answer the phylogenetic question about the species-wide roots of aggressive behaviors and the astonishing similarities in the mechanisms that trigger aggressive behavior patterns across cultures and over time.

Aggression as Adaptive Behavior

Questions about the phylogenetic roots of aggression and violence require a framework that examines the universal mechanisms associated with violence among all humans, in all cultures, at all times (Eisner, 2009). Its general questions are: What is the function of aggression among human beings? What problems is aggression designed to solve? And where do the neurological and psychological mechanisms involved in aggressive responding come from?

One approach to these questions is evolutionary theory and evolutionary developmental psychology (Archer, 2009b; Buss & Duntley, 2006; Ellis & Bjorklund, 2005). Within an evolutionary framework, aggression is seen as a facultative adaptation, that is, the result of interlocked domain-specific mechanisms (e.g., neurocognitive problem-solving mechanisms such as anger, arousal, or fear) whose activation depends on the environment. These mechanisms are assumed to have evolved during the environment of evolutionary adaptation (Bowlby, 1958). For example, the psychological mechanisms associated with, for example, being a good fighter or effectively deterring a potential attacker through convincing anger displays probabilistically conferred bearers of these abilities greater chances for reproduction over the millions of years during which the neurocognitive and physical characteristics of humans were being shaped. The notion that the neurocognitive mechanisms involved in the aggressive behavior of children, adolescents, and adults have an evolutionary basis does not presume a primordial war of all against all. Rather, it assumes a complex interrelation between evolved

mechanisms that support executive control, cooperation, compassion, and friendship, and mechanisms that bring forth jealousy, revenge, hatred, anger, and rage.

Arguments in support of an adaptationist perspective on aggression come from several sides: Evidence from anthropological, historical, and archaeological research indicates that intraspecific violence was an important selective force throughout the history of the human species until very recently (Eisner, 2003; Pinker, 2011). The incidence of intentional killings varied wildly over time and between places, but reviews suggest that a rate of some 10%–20% of male deaths due to intraspecific violence may have been fairly typical (Pinker, 2011, p. 49). Anthropological research also shows that, in many prestate societies, high social status and access to women is associated with a reputation for being good fighters and warriors (Patton, 2000), and that women find men more attractive who appear to be good warriors and hunters (Escasa, Gray, & Patton, 2010). Furthermore, some fundamental developmental patterns associated with aggression among humans look surprisingly similar to those among nonhuman primates, especially our closest relatives, the chimpanzees: This includes rough and tumble play during childhood (Flanders et al., 2010), the peak of serious physical aggression after the start of sexual maturation (Walsh, 2009), the early emergence of sex differences in physical aggression (Archer, 2004), and individual-level risk factors such as impulsivity, risk-seeking, preferences for alcohol, or exposure to poor child rearing (Higley, Suomi, & Chaffin, 2011).

Buss and Duntley (2006) distinguished among several adaptive problems for which aggression may have evolved as a solution. One is *co-opting the resources* of others. Humans stockpile considerable amounts of attractive goods including toys, food, weapons, and land. Gaining access to these scarce goods is an important goal, and humans use several strategies such as trickery or cooperative exchange to achieve it. But one of the options is aggression, especially if the owners appear weaker than the protagonists. Proactive aggression to co-opt attractive goods can be observed during the second year of life, and raids on owners of toys, food, jackets, or mobile telephones remain a core element of bullying from early to late childhood (Tremblay, 2010). A second function of aggression is *defense against attack*. The assumption here is that, in the presence of conspecifics interested in co-opting one's goods or taking one's life, the chance for survival depends on defensive abilities. Such abilities may be supported by emotional mechanisms such as intense anger and irascibility in the face of threats to the owners'

goods and reputation, as they help to fend off potential attackers (Sell, Tooby, & Cosmides, 2009). A third hypothesis proposed by Buss (Buss & Duntley, 2009) is that aggression serves to increase status and power within social hierarchies. Aggression is not always a successful strategy. But especially in contexts characterized by the absence of central authority or contested hierarchy the use of force is a promising avenue for dominance, which is associated, in turn, with access to valuable resources (Pellegrini, 2008). In this vein, Guerra (2012, p. 105) observed that, for inner-city youths in Jamaica, violence "is one of the few available currencies they have to get ahead. It is relatively easy to learn and can be 'traded' for power, control, resources, respect, status, and other desired outcomes." Fourth, aggression can serve to *inflict costs on same-sex rivals*. Access to valuable members of the other sex is a valuable resource, and aggression against competitors can yield benefits. Aggression against same-sex competitors can include attempts to lower the others' reputation, for example, by spreading damaging rumors about their characters or making detrimental remarks about their ability to control their partners' sexual behavior (McMaster, Connolly, Pepler, & Craig, 2002). It may also involve the public staging of fights which make differences in "formidability" (Sell et al., 2009) visible to members of the other sex.

Aggression as Psychopathology

The dominant perspective in the developmental science literature is that aggression is primarily maladaptive. Especially more extreme and persistent manifestations of aggressive behavior are interpreted as part of a broader set of mental disorders such as oppositional-defiant disorder or conduct disorder (see below, section 4). Extensive evidence shows that persistent aggression is dysfunctional under peaceful social conditions: For example, aggressive children are more likely to be rejected by other children, they do less well at school, and they are more likely to suffer from symptoms of mental disorder including depression, ADHD, and schizophrenia (Connor, 2002). Furthermore, aggressive and antisocial youth are less likely to find stable jobs, are more likely to suffer from a range of health problems, are more likely to have concurrent substance-abuse problems, and have shorter life expectancies (Piquero, Farrington, Nagin, & Moffitt, 2010).

Within this framework, the origins of aggression are generally traced back to various risk and resilience influences that increase or decrease the likelihood of aggression.

Risk factor research has identified hundreds of factors that are probabilistically associated with differences in aggressive behavior over the life-course (Farrington, 1998; Farrington & Loeber, 2000; Ribeaud & Eisner, 2010). Using the ecological framework proposed by Bronfenbrenner (1979), these risk factors are often grouped into individual, family, school, peer, neighborhood, and wider societal categories (Farrington, 1998; Krug et al., 2002; Loeber & Hay, 1997; Lipsey & Derzon, 1998; Loeber & Hay, 1997). Widely accepted individual risk factors include genetic risks, impulsivity, low intelligence, low arousal, antisocial beliefs, and low empathy. Biological risk factors associated with external influences include exposure to pathogens such as lead, birth complications, or child malnutrition. Family-related risk factors replicated across studies comprise, for example, parental criminality, child abuse and neglect, poor emotional bonds with parents or caregivers, low parental involvement, and poor family functioning. School-related individual risk factors comprise truancy, low academic motivation, and poor relationships with teachers, while school-level risk factors include high levels of classroom disruption and poor school functioning. At the level of peers, violent behavior is associated with antisocial peers, gang membership, and rejection by more prosocial children. Neighborhood level characteristics implied in an increased likelihood of aggressive behavior include high concentrated social disadvantage, low social cohesion, and high levels of crime. Finally, at the level of whole societies, associations have been found between violence and characteristics such as high social inequality, social cleavages associated with a lack of interdependence, and poor state functioning, including a lack of state legitimacy (Eisner, 2013).

Recently researchers have increasingly become interested in protective factors (Hall, Catalano, Loeber, & Farrington, 2012). There is not yet a consistent terminology for use when discussing protective factors but most authors conceptualize direct protective factors as antecedent characteristics that predict a low probability of violence or aggression (Herrenkohl, Lee, & Hawkins, 2012). If their effect is linear, they can be seen as the inverse of risk factors. In contrast, the notion of buffering protective factors refers to characteristics that mainly operate in the presence of risk factors (Lösel & Farrington, 2012). For example, Lösel and Farrington (2012) found that individual characteristics such as above-average intelligence and an easy temperament (i.e., emotional stability, positive emotionality, low impulsivity) had buffering effects on aggressive behavior even in the presence of

various environmental risk factors. Moreover, Loeber and Farrington (2012) have drawn attention to the possibility of nonlinear effects, whereby only the “protective” or the “risk” tail of predictor variables may be associated with variations in aggressive behavior.

A recent special issue in the *Journal of Preventive Medicine* reviewed the current state of knowledge (Hall, Catalano, et al., 2012). Among others, it presented findings from four separate longitudinal studies on the effects of presumed protective factors measured at Ages 10–14 on violence during adolescence (Ages 13–18). Of the 92 tests for associations with violence perpetration conducted across the four studies, authors identified fewer direct (i.e., having effects only at the “positive” tail) protective factors (12%) than risk (i.e., having effects only at the “negative” tail) factors (23%). Mixed factors (i.e., those that have both protective and risk effects) were identified in 18% of the tests. However, findings were only partly consistent across studies (Hall, Simon, Mercy, Lee, & Mercy, 2012): For example, in the Pittsburgh Youth Study, high academic achievement was found to be a protective factor. In contrast, in the Seattle Social Development Project study, youth-reported low grades were a risk factor; and in the National Longitudinal Study of Adolescent Health, the grade point average was found to be both a protective and a risk factor.

Generally, approaches that interpret aggression as maladaptive behavior rest on three normative pillars. The first is the broad consensus that children should develop to be socially competent, empathetic, and morally responsible individuals who have good chances to lead fulfilled and contented lives. The second is that, according to the Universal Declaration of Human Rights (1948), humans have a universal right to be protected from harm and victimization by others, meaning that aggression is considered wrong. Third, many risk factors associated with aggression are in themselves widely held to be undesirable conditions that reduce the welfare and well-being of individuals at all stages of the life course, meaning that efforts to eliminate or reduce them are desirable.

Conclusions

At first sight, the adaptationist perspective offered by work premised on evolutionary psychology and the more widely held view of aggression as a maladaptive phenomenon seem to be at odds with each other. However, an increasing number of researchers recognize the possibility of integrating views of aggression as adaptive and as

maladaptive behavior. We outline two areas where such integration may be fruitful: First, the majority of processes and risk factors associated with individual differences in aggressiveness and the prompting of aggressive action in specific situations appear to be cross-culturally universal. We thus need to explain why children and adolescents are more likely to behave aggressively in circumstances such as being teased or treated unfairly, why high fearlessness and risk-seeking are associated with higher risk of aggressiveness, or why homicide peaks among men at around Ages 18–25 across the world. Evolutionary theory, as Bjorklund and Pellegrini (2000, p. 1703) have argued, provides a possible theoretical framework for answering such questions, while it may also help to better understand the extent to which mechanisms leading to aggression are culture-bound.

Second, neurobiological work increasingly identifies specific areas in the brain implicated in aggression-related emotions such as anger and rage as well as in the cognitive mechanisms that control impulses, allow long-term rational planning, and bring forth complex abilities such as compassion and conscience (Raine, 2013). The unfolding of these mechanisms in each individual is critically shaped by the exposure to risk and protective factors as the child grows up. But a theory of how the phylogenetic architecture of the underlying neurocognitive processes (e.g., anger processing in the amygdala) has evolved, and how the cognitive, emotional, and moral development from infancy to adolescence follow patterns that were shaped by the adaptive pressures over the human past may help to organize otherwise disparate findings. Moreover, understanding the universal mechanisms—individual, social, and political—that promote justice, fairness, and compassion rather than anger and aggression in human beings can help to inform strategies aimed at effectively reducing aggression and violence (Guerra, 2012).

THE DEVELOPMENT OF AGGRESSION AND VIOLENCE: CROSS-CUTTING THEMES

The volume of research on human aggression makes it increasingly difficult to organize empirical evidence and theoretical perspectives. In the following section, we propose six cross-cutting questions that can help to structure current developmental aggression research: Is the rank-order stability of aggressive tendencies over time due to latent underlying traits or to external influences? Are there developmental turning points where aggressive behavior

can change its direction? Are there different groups of individuals to whom different explanations of aggression apply? What is the relationship between the long-term development of aggressive potential and the situational dynamics that give rise to aggressive action? How can we simultaneously model causal mechanisms that influence children's behavior as well as the influence that children's behavior has on their environment? And how can questions about right and wrong inform and guide current theorizing and empirical research on aggression?

Population Heterogeneity and State Dependence

Probably the most salient question in developmental research relates to the causes of stability and change in aggression over the life course. In the early 1990s, Nagin and Paternoster (1991) introduced a distinction that helped to organize the main theoretical perspectives. Following work by the economist James Heckmann (1981), they argued that two major groups of developmental theories of crime can be distinguished: *population heterogeneity* and *state dependence* approaches (Nagin & Paternoster, 2000): Population heterogeneity theories explain the continuity of aggression over time—and the stability of differences between individuals at any moment in time—as the result of durable underlying characteristics that differ between individuals and that influence a broad range of different behavior manifestations. This includes theories that emphasize lasting effects of time-invariant genetic differences, neurocognitive impairments incurred in the first years of life, or highly stable personality characteristics such as psychopathy or callous-unemotional traits (Frick, Ray, Thornton, & Kahn, 2013; Van Goozen, Fairchild, Snoek, & Harold, 2007).

State-dependence theories, in contrast, assume behavioral plasticity in that individuals' behaviors change in response to external forces: Hence the continuity of aggression is seen as the result of the stability of the social context, which keeps generating the causal mechanisms that lead to aggressive behavior. State-dependence theories do not deny the lasting influence of early risk factors. But these "pre-specified constraints" (Granic & Patterson, 2006) are seen as relatively subordinate to contingencies in the developmental process. Four major causal mechanisms dominate in state-dependence models: ongoing social learning processes across the life course (Huesmann & Taylor, 2006), stability and change in social bonds with prosocial as opposed to antisocial others (Catalano & Hawkins, 1996; Sampson & Laub, 2005), strains and negative life events

(Agnew, 2001), and “snares” or cascading constraints that result from prior problem behavior (Thornberry, 1987). State-dependence theories also tend to emphasize agency and decision-making—they examine acts of violence or aggression as a result of situational triggers, opportunities, and/or recent life-events (Fontaine & Dodge, 2006).

Turning Points

Population heterogeneity and state dependence are not necessarily mutually exclusive assumptions. Opportunities for turning points may arise in specific developmental transitions (e.g., from childhood to adolescence) or due to major life-events (e.g., failing/passing an important exam), while development is guided by stable latent traits through other periods. The *dynamic systems model of antisocial behavior* by Granic and Patterson (2006) assumes such a mix of processes: It identifies phase transitions where children’s developmental trajectories are especially open to external influences. In particular, entry into day care or school between Ages 3 and 6, the transition to more autonomy from parents during adolescence, and the transition to adulthood constitute such phase transitions in which seemingly minor incidents can act as bifurcations and shift aggressive trajectories in new directions (Granic & Patterson, 2006). This view echoes arguments by Dodge and Pettit (2003) in their *bio-psychosocial model of antisocial behavior*, where the beginning of primary school is also seen as a major “switch-point” that offers an opportunity to change chronic behavior problems caused by dispositional factors and prior adverse experiences in the family. Sampson and Laub’s (2005) *age-graded theory of informal social control*, in contrast, emphasizes individual biographical events rather than developmental periods. It holds that critical events such as moving home, marriage, or employment increase the contingency of the developmental process, offering opportunities for changes in routine activities, friendship networks, and self-identities associated with antisocial behavior.

Developmental Taxonomies

A third question is whether there exist subgroups to which different causal mechanisms apply. In her *dual developmental taxonomy of crime*, Terrie Moffitt (1993) suggested that adolescent offending is caused by two groups of individuals with different developmental trajectories and different etiologies: The life-course persistent trajectory starts early in life and is caused by the combination of

biological (genetic and neurocognitive) and environmental risk factors at an early age. These children show early signs of serious aggressive and nonaggressive conduct problems, and they have a high probability of long criminal careers well into adulthood. Adolescence-limited offenders, in contrast, have few, if any, early developmental risk factors. Their offending during adolescence is “state-dependent,” that is, driven by age-specific tensions (the “maturity gap”), opportunities that emerge through life-style, and routine activities (e.g., Vazsonyi, Pickering, Belliston, Hessing, & Junger, 2002), and the side-effects of reactions to their problem behavior (e.g., school exclusions) on their future life-chances (Berridge, Brodie, Pitts, & Tarling, 2001). Similarly, Frick and White (2008) have presented evidence that there exists a subgroup of children with callous-unemotional traits (lacking empathy, absence of guilt, callous use of others) that can be identified early in life (Dinolfo & Malti, 2013) and who are at risk for later antisocial and delinquent behavior. They are believed to have common genetic and neural characteristics (e.g., deficits in amygdala functioning), which lower the reactivity to environmental influences (Frick et al., 2013). Among others, they are less responsive to distress cues, less able to recognize sad and fearful emotional expressions, less reactive to negative emotional words, and more fearless (Frick & White, 2008, p. 363). In a study of 3,687 7-year-old twins, Viding, Blair, Moffitt, and Plomin (2005) examined the heritability of conduct problems in this group. They found that, for those who also had high levels of callous-unemotional traits, the heritable component was very high (.81), and that it was much lower among those without callous-unemotional traits (.30). The same pattern was confirmed at Age 9. Frick and White (2008) have, therefore, argued that the distinction between aggressive youths with and without callous-unemotional traits could make a substantial contribution to the development of a *taxonomy* of groups of antisocial youths.

Researchers have proposed varying numbers of distinct groups with different trajectories and etiologies (Jennings & Reingle, 2012), but disagreement persists over the number of groups that need to be distinguished, whether such groups are real or pragmatic groupings of essentially continuous characteristics, and whether preventive interventions need to be tailored to distinct groups.

Situational and Developmental Time

From the 1970s onwards, psychological research shifted from analyzing the aggressive act to examining the

aggressive individual (Hartup, 2005). Much current research is therefore more concerned with explaining stable between-individual differences than in examining the dynamics of conflictive episodes. But there is increasing recognition that the *real-time* affective, cognitive, and deliberative processes represented in the operations of the brain need to be part of developmental aggression research. For example, Granic and Patterson (2006) have proposed a distinction between the microsocial (moment-to-moment or "real") time and the macrosocial (developmental) time. They note that, not only must long-term developmental predictors be mediated through the thread-needle of real-time neurocognitive processing of information in order to result in actions that lead to violence, but also that "micro-social interactions [are] the proximal causal generators of development" (Granic & Patterson, 2006, p. 120).

One theory that models the relationship between long-term risk factors and the proximal mechanisms is the *general aggression model* by Anderson and Bushman (2002). It primarily builds on earlier learning and social information processing theories (Bandura, 1973; Crick & Dodge, 1996) and views conflictive episodes as the result of the interaction between individual and situational influences. Person-related factors mainly include the knowledge structures manifested in beliefs, attitudes, and scripts, whereas situational factors comprise aggressive cues, provocations, or frustrations. In a judgment and decision-making process that is influenced by situational cues and the internal state of the individuals (e.g., arousal), choices are then made between thoughtful nonviolent actions and impulsive aggressive options.

There is disagreement about whether the general aggression model, with its emphasis on social learning, adequately captures the mechanisms that link developmental time and moment-to-moment time (Ferguson & Dyck, 2012), and we currently have limited knowledge about how processes at different time scales (from split seconds to days, weeks, and years) interact to create sequences of aggressive behavior throughout development.

Causality and Reciprocal Processes

A fifth problem in developmental aggression research is the disentangling of correlates, causes, and consequences of aggressive behavior. In particular, the past 10 years have seen a growth of interest in models that examine what are variously called reciprocal, bidirectional, or transactional dynamics between children's behavior and their environment. Such issues have arisen, for example, regarding

child-parent relationships (Lansford et al., 2011), child peer-group relationships (Rubin, Bukowski, & Laursen, 2009), teacher-child relationships (Doumen et al., 2008), or the dynamics between violent perpetration and victimization (Hanish & Guerra, 2002). Theoretically, research on reciprocal dynamics is rooted in the transactional models developed by Sameroff (2009). Accordingly, children's present developmental state is the result of a series of reciprocal processes whereby various ecological layers of environment influences, while children also influence their social environments. In aggression research, the *coercion theory* developed by Patterson (1982) is a transactional model. It assumes that children learn aggressive behavior through iterated cycles of reinforcement whereby children adopt aggressive scripts as the mothers' reactions unintentionally signal to children that aggression is successful, while mothers learn that giving in to demands ends conflict.

In the past decade, new conceptual approaches to the reciprocal dynamics involved in the development of aggression and violence have evolved (i.e., developmental cascades) which take into account the timing of events in the emergence, or development of, aggression and violence from childhood to adolescence. Developmental cascades have been described as chain reactions, snowballs, spillovers, or progressive effects in the literature (Masten & Cicchetti, 2010). They describe processes by which antecedent conditions, such as harsh parenting, may be related with varying probabilities to specified outcomes, such as increases in aggression. Thus, cascades are processes by which functions at one level or in one domain of behavior affect the organization of competency in later developing domains of general adaptation (Cox, Mills-Koonce, Propper, & Gariépy, 2010). Theoretically, these effects reflect the transactions by which interactions predict development in complex living systems (Masten & Cicchetti, 2010, p. 491). Whether they are direct and unidirectional, direct and bidirectional, or indirect through various pathways, developmental cascades are believed to alter the course of development in positive or negative ways (Masten & Cicchetti, 2010).

Right and Wrong

The last cross-cutting theme relates to the question of the role of morality in the conceptualization of aggression and its development (e.g., Wikström, Oberwittler, Treber, & Hardie, 2012). As mentioned in the second section, work in evolutionary psychology conceptualizes aggression as adaptive. In contrast, much developmental work

conceptualizes aggressive and antisocial behaviors as disorders or as mental health problems similar to ADHD, depression, or autism spectrum disorders (e.g., Loeber, Burke, Lahey, Winters, & Zera, 2000). But intentional aggression differs from mental health disorders in that it is situated in a broader framework of (violations of) universally valid norms, rules, and obligations that underlie the functioning of societies and regulate social interactions and relationships (e.g., Sen, 2009). Understanding the what and why in how humans apply norms of justice, fairness, and care to the conflicts that inevitably occur in everyday life and how this adaptational process develops throughout the life-span may help to understand why some children behave more aggressively than others, why aggression increases or decreases over time and/or in specific situations, and why and when aggression is considered (mal)adaptive and/or “immoral” (i.e., violating moral norms of justice, fairness, or care).

Reflecting this perspective, theoretical models of the development of morality and aggression in childhood and adolescence have developed relatively independently. Yet, both domains focus on moral decision-making, intentional harm, injustice, and victimization (Arsenio, 2014). Developmental scientists have, therefore, increasingly felt a need to integrate these two domains conceptually. Arsenio and Lemerise’s (2004) seminal *Child Development* paper provided a first attempt to systematically integrate models of moral development and developmental theories of aggression. We believe that these recent integrative developmental frameworks may greatly help us understand and investigate developmental antecedents, causal risk and resilience factors, and consequences of aggression and violence for individuals, groups, and society because they transform questions about the adaptive and maladaptive nature and consequences of aggression to broader questions concerning universal norms of fairness, justice, and care.

Conclusions

Researchers differ with respect to what they consider the most important general questions that any developmental aggression research must address. In the present section, we have presented six cross-cutting questions or issues that we consider relevant for most ongoing research. For example, the extensive body of work on the association between parenting and aggression can be examined by asking whether scholars assume that the association reflects shared genetic factors (i.e., population heterogeneity) or genuine causal mechanisms (i.e., state dependence) (Pettit & Arsiwalla, 2008); whether the parenting behavior

of caregivers is believed to have particularly important causal effects in some developmental periods such as early childhood; whether researchers assume the existence of discrete groups of children that differ in the extent to which abusive parenting has a detrimental effect on their subsequent behavior (e.g., Caspi et al., 2002); how researchers link the real-time sequence of parent-child interactions to the developmental time of slow changes in aggressive behavior tendencies (Granic & Patterson, 2006); whether there are reciprocal causal associations between parenting and child problem behavior (e.g., Stattin & Kerr, 2000); and whether parenting is assumed to affect child aggression by changing moral beliefs about whether inflicting harm is justifiable.

SUBTYPES OF AGGRESSION, CLINICAL CLASSIFICATION, AND MEASUREMENT

Aggression is not a homogenous phenomenon. It comprises a variety of acts with different motivations (e.g., greed, revenge, self-defense, jealousy) and behavior patterns (e.g., hit, insult, ostracize). Recent research has, therefore, turned to distinguishing several subtypes that might have different etiologies and developmental trajectories over the life-course. At the same time, aggressive behavior is associated with a wide range of other behavior problems and mental health issues, suggesting that it belongs to a broadband syndrome of behaviors. In the following section, we selectively review recent proposals to systematize subtypes of aggressive behavior, the role of aggression in clinical diagnoses of mental disorders, and the evidence for co-morbidity with related behaviors and mental health problems.

Subtypes of Aggression

The past 20 years have seen increasing efforts to distinguish several subtypes of aggression (Vitaro, Bredgen, & Barker, 2006). Little, Henrich, Jones, and Hawley (2003) have proposed organizing the literature with focus on two main dimensions: The first relates to the forms (the “whats”) and the second to the functions (the “whys”) of aggression: The first dimension distinguishes *overt aggression* from *relational aggression*. Overt or direct aggression refers to behaviors that are openly directed at others with the intention of causing physical or psychological harm, or coercing them to do things they would not otherwise do (e.g., pushing, kicking, threatening). Relational aggression,

in contrast, refers to acts that intend to damage the social status, friendships, or interpersonal relations of other people (Crick & Grotpeter, 1995). It comprises behaviors such as spreading rumors, malicious gossiping, and social exclusion. Similar terms with a considerable overlap are *indirect* or *social* aggression (Underwood, 2003). The two forms of aggressive behavior are highly correlated with a mean attenuation-corrected correlation of $r = .76$ across 98 studies (Card, Stucky, Sawalani, & Little, 2008). However, they are differentially related to a series of covariates: For example, relational aggression is more strongly associated with internalizing problems than overt aggression, but less strongly associated with ADHD symptoms, delinquency, and the lack of prosocial behaviors (Card et al., 2008).

The second dimension relates to the difference between reactive and proactive aggression (Dodge, 1991; Hubbard, McAuliffe, Morrow, & Romano, 2010). Reactive aggression involves responses to provocations or threats and is usually accompanied by emotions of fear and anger. It is defensive and retaliatory. Proactive or instrumental aggression is the purposeful and goal-directed attack or threat of attack against people. Goals of proactive aggression include co-opting the goods of other individuals (robbery), controlling other peoples' behavior (coercion), or inflicting punishment for perceived prior wrongdoing (revenge). Instrumental aggression is only occasionally accompanied by autonomic arousal and is planned with goals in mind. Proactive and reactive forms of aggression are strongly correlated, although the association may be inflated due to poor differential sensitivity of conventional survey instruments. A meta-analysis of 36 studies suggested a correlation of $r = .68$ (Card et al., 2008). Still, proactive and reactive aggression differ with respect to a range of characteristics (Cima, Raine, Meesters, & Popma, 2013): Reactive aggression is linked to displays of anger under stress, high physiological arousal, and deficits in social problem solving. Proactive aggression, in contrast, is associated with a low level of physiological arousal, callous-unemotional traits, and little sign of rejection by peers (e.g., Arsenio, Adams, & Gold, 2009).

Aggressive and Nonaggressive Antisocial Behavior

Despite the trend to distinguish subtypes of aggression, there is disagreement about whether the high-order distinction between aggressive and nonaggressive antisocial behaviors is analytically fruitful. In particular, violent behavior among youth is consistently associated with a range of nonaggressive behaviors including truancy, lying, sexual promiscuity, binge drinking, gambling, substance

use, and property offenses (Farrington, 1998). Arguments in favor of more encompassing constructs come from criminological work that has found adolescent criminals to be generalists rather than specialists: Capaldi and Patterson (1996), for example, found little evidence of violent specialization in that violent adolescent offenders could barely be distinguished from general frequent offenders with respect to their demographic or risk-factor characteristics. Similar results were found in epidemiological research on mental health disorders. For example, Kessler et al. (2011) examined the comorbidity among 18 *DSM-IV* anxiety, mood, behavior, and substance disorders in 14 developed and developing countries, using the World Mental Health Survey data. In all studied countries, "overt conduct disorder"—which mainly comprised bullying, fighting, and being cruel—was part of a syndrome of externalizing disorders that includes oppositional defiant disorder, substance abuse, covert conduct disorder, hyperactivity disorder, and intermittent explosive disorder (Kessler et al., 2011, p. 94).

Others find analytically meaningful differences: For example, the two behavior domains follow different normative trajectories over the life-course (Loeber et al., 1993; Tremblay, 2010). Overt physical aggression peaks at Ages 2–4 and then declines, while covert behaviors become more frequent as children grow older. This could signal that overt and covert pathways of antisocial behavior are shaped by partly separate mechanisms (e.g., Burt, 2009) but it could also reflect the heterotypic continuity of a broader syndrome of antisociality, the behavior manifestations of which shift from more overt to more covert behaviors with age (as suggested by Patterson, 1993).

Burt (2009) argued that overt/aggressive and nonaggressive or covert forms of antisocial behavior represent correlated, but meaningfully distinct clinical phenomena, although she also noted considerable gaps in consolidated knowledge. Differences included a higher rank-order stability across development for aggression, a higher overrepresentation of boys in physically aggressive behaviors than in nonaggressive rule breaking, a more important role of genetic influences for aggressive as compared to nonaggressive antisocial behaviors, and differential association with personality characteristics such as negative emotionality, which seem more characteristic of aggressive than of nonaggressive behaviors. This suggests that overt physical aggression may be more strongly influenced by developmentally invariant factors than other types of rule-breaking behavior, which are more strongly influenced by contextual mechanisms.

Clinical Classification and Comorbidity

In the fifth edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*; American Psychiatric Association [APA], 2013), a new chapter titled "Disruptive, Impulse-Control, and Conduct Disorders" has been added. All disorders in this chapter are characterized by problems in emotional and/or behavioral self-control. Interestingly, because it is developmentally related to conduct disorder, antisocial personality disorder is listed twice in the *DSM-5*: once in this chapter, and once in the chapter on personality disorders. Also of particular interest, the commonly comorbid ADHD is not listed in this chapter, but instead with neurodevelopmental disorders. Two diagnoses are most relevant for the classification of aggressive symptoms in childhood and adolescence: *Oppositional defiant disorder* (ODD), which consists of symptoms that are grouped into three types: angry/irritable mood, argumentative/defiant behavior, and vindictiveness; and *conduct disorder* (CD), which consists of symptoms that are largely unchanged from the *DSM-4-TR* and are described by reference to prolonged patterns of antisocial behavior, such as serious violations of social and moral norms and rules. However, a specifier has been added for children who show callous and unemotional interpersonal (CU) styles across multiple settings and relationships. This is particularly interesting because of the independently developed body of empirical work on the role of various moral emotions, such as empathy and guilt, in the development of aggression (Arsenio, 2014; J. Blair, Mitchell, & Blair, 2005; Malti & Krettenauer, 2013). Children with the CU specifier are thought to have a more severe form of conduct disorder, making them less responsive to treatment. In a recent study by Kahn, Frick, Youngstrom, Findling, and Youngstrom (2012), a large community sample of children was compared to a clinical sample of 5- to 18-year-olds. In the community sample, 10%–32% of those with CD and 2%–7% of those without CD met criteria for CU specifier. In contrast, in the clinical sample, 21%–50% of those with CD and 14%–32% of those without CD met criteria for CU specifier. Overall, between 10% and 50% of those with CD also had the CU specifier. Importantly, children with CU were rated higher on CD symptoms, especially aggression/cruelty.

Comorbidity

There is strong evidence that aggressive behavior is associated with a range of mental health problems including

ADHD symptoms, autism spectrum disorders, and internalizing symptoms including depression and anxiety (Loeber et al., 2000). Across Western and non-Western societies, studies find a substantial correlation between aggression and ADHD symptoms (Beauchaine, Hinshaw, & Pang, 2010). Also, children with mental health problems in the autism syndrome spectrum have been found to have a higher rate of aggressive behavior, although a substantial part of this association may be mediated by other disorders, especially concurrent ADHD/ADD disorders (Bronsard, Botbol, & Tordjman, 2010). For example, according to analyses of the 2003 National Survey of Children's Health (NSCH)—a study of over 100,000 parents and their children in the United States—44% of children with autism were involved in active bullying as compared to 24% in the general population of children Ages 6–17 (Montes & Halterman, 2007, p. 255). However, the same study also found that bullying was only elevated among children with autism who also had concurrent ADHD/ADD disorders. Furthermore, research suggests a small to moderate correlation between depressive symptoms and aggression from childhood onwards. For example, in the Dutch TRAILS (TRacking Adolescents' Individual Lives Survey) study, a large prospective population study of adolescents, the concurrent association between aggressive and depressive problems ranged between $r = .34$ and $.56$ across four waves from Age 11 to Age 20 (Sijtsema, Oldehinkel, Veenstra, Verhulst, & Ormel, 2014).

Three processes have been implied in the correlation between aggression and other forms of poor mental functioning: First, evidence shows that genetic factors account for a part of the overlap: For example, a substantial proportion of the association between ADHD symptoms and ODD/CD are attributable to genetic factors (Nadler, Silberg, Eaves, Maes, & Meyer, 1998). Second, there is evidence suggesting that the association between different manifestations of poor psychosocial functioning is partly due to shared environmental risk factors, suggesting broadband causal mechanisms that affect a wide range of behavioral outcomes. For example, early childhood adversity has been implicated in the development of neurobiological deficits and cognitive-emotional problems, which affect a range of behavior and emotional problems (Van Goozen et al., 2007). Finally, there is evidence suggesting unidirectional and bidirectional causal links between different behavior domains. For example, researchers have asked whether there is a causal relationship between depressive symptoms and aggressive behavior. Aggression may lead to chain reactions

of failures such as peer exclusion, coercive reactions by parents, and academic failures, all of which may result in an increased vulnerability to depressive symptoms (Capaldi & Stoolmiller, 1999). Alternatively, depression may developmentally precede and cause aggression. In particular, problems with regulating negative affect and irritability may contribute to more conflicts with others and aggressive acting out (Wolff & Ollendick, 2006, p. 208). Recent research has found more support for a causal pathway from externalizing behaviors to poor emotional health, mediated through the effects of disruptive behavior on poor academic functioning (Masten et al., 2005), inconsistent parental discipline (Lengua & Kovacs, 2005), and peer victimization (Leadbeater & Hoglund, 2009).

Measurement

The valid and reliable measurement of aggression has remained a major challenge. The most important instruments for measuring aggression are informant ratings by means of item batteries, self-reports, observer ratings, and experimental estimates of aggressiveness. In high-quality developmental research, it is standard that researchers collect data on aggressive behavior from multiple sources. This may include peers, teachers, mothers, fathers, target individuals, and observations. The idea is that combining information from different informants results in more valid and more reliable estimates of the underlying behavior. Despite the usefulness of multi-informant measurement approaches, worrying discrepancies exist between different informants (Rescorla et al., 2013). The causes for these discrepancies are still unclear although recent work has returned to this important issue (de los Reyes, 2011). Different informants may observe different parts of children's lives (e.g., at school, at home), they may differ in the extent to which they have access to pertinent information, or their response behavior may be biased in systematic ways. Direct observational measures of aggressive behavior can overcome some limitations of survey instruments (Pellegrini, 2008). Although this approach has long been known, it is used surprisingly rarely, probably due to the high costs of collecting this kind of data. Observational measures are based on real-life observations of ongoing interactions, either by trained observers or via technical means such as videotaping, and the subsequent systematic coding of the observations. Another important methodological innovation involves use of the space-time budgets developed by Wikström et al. (2012) to accurately measure the social and spatial environments in which young people

spend their time, to track the kinds of activities they choose in these contexts, to observe how their interactions with others develops over space and time, and to relate incidents of rule-breaking (including violence) to the movement of adolescents through space and time.

Irrespective of how aggression is measured, observational (i.e., nonexperimental) longitudinal studies have limited ability to determine whether risk or protective factors are effectively causal. Jaffee, Strait, and Odgers (2012) identified four main challenges: First, the association between risk factors and outcomes may be confounded by third variables or sets of variables. This *omitted variable* problem can lead to inflated estimates of causal effects. For example, it is difficult to determine whether the association between poor parenting and antisocial child outcomes is causal if important variables such as shared genetic factors are not taken into consideration. The second problem is *reverse causation*. Thus, many studies find that maternal depression is associated with the development of child problem behaviors. But, while low maternal psychological well-being may predict child aggression, disruptive child behavior may also reduce maternal well-being. Unless all potential causal relationships can be explicitly excluded, it is impossible to conclude with confidence that causal effects in either direction have been demonstrated. A third challenge is *social selection*: We may find statistical associations between presumed risk factors and aggression because individuals have chosen exposure to given environments that fit their preferences, interests, and abilities. For example, individuals with aggressive tendencies who lack social skills may prefer aggressive media contents. This would result in positive associations even if the media contents themselves did not influence behavior. The fourth challenge is *misidentification*. This means that presumed risk factors may be associated with other risks, making it difficult to identify true causal agents responsible for associations. For example, parental separation is associated with children's problem behavior; but separation is often accompanied by high partner conflict and lacking attention to children's needs—each of which implies a different causal mechanism. Identifying the active causal ingredient requires the identification of confounders, but it also requires the identification of causal mechanisms that can be operationalized as mediators. However, it is rarely possible to establish the temporal and causal relationships between such intercorrelated factors. One tool to assess the quality of causal inferences based on observational data is the Cambridge Quality Checklist (Murray, Farrington, & Eisner, 2009).

Conclusions

Over the past 10 years, increasing attention has been paid to different subtypes of aggression. In particular, the distinction between two main functional types, namely goal-directed and instrumental proactive aggression as opposed to defensive and impulsive reactive aggression, appears to be analytically useful. Emerging findings (some of which we discuss further on) suggest that they are associated with different neurocognitive mechanisms and varying developmental risk factors. However, there is currently limited knowledge about the age at which a distinction between different motivational complexes becomes meaningful. Also, scholars have noted that the measurement of intentionality in conventional psychometric scales may be problematic, meaning that new empirical strategies to assessing proactive and reactive aggression may be required (Little et al., 2003).

On the other hand, aggression is part of a broader spectrum of externalizing behaviors whose manifestations change over the life-course, but whose components may be differentially susceptible to environmental influences (Burt, 2009). Although much evidence suggests that shared underlying personality characteristics and environmental influences are largely responsible for behavioral syndromes, there is also evidence for causal and reciprocal processes between subdimensions of externalizing behavior. For example, excessive alcohol consumption is known to be a short-term causal mechanism associated with increases in the probability of aggressive behavior. However, separating symptomatic comorbidity from possible causal mechanisms between subdomains of antisocial behavior has proven difficult in part because the typical time-intervals between assessments in longitudinal studies (between one and several years) make it difficult to examine more short-term mechanisms. Emerging research that integrates measurement of short-term variations in problem behavior (for example diaries or space-time budgets) into longitudinal studies may help to shed more light on these issues (e.g., Wikström et al., 2012).

THE EPIDEMIOLOGY OF AGGRESSION FROM INFANCY TO LATE ADOLESCENCE

Extensive work has reviewed the epidemiology of aggression over the life-course (Connor, 2002; Farrington & Loeber, 2000; Krahé, 2013). In our view, four different approaches are particularly useful in shedding light on distinct aspects of the developmental epidemiology of aggression: work that describes normative age curves for

subtypes of aggression, analyses of the relative (between-individual) stability of aggressive tendencies over time, trajectory analyses that group individuals by similar pathways over time, and qualitative descriptions of age-specific manifestations of aggression.

Normative Age Curves

A first perspective describes the prevalence of aggression over the life-course. Current research suggests that distinct age curves exist for physical aggression (Tremblay, 2000), relational aggression (Côté, Vaillancourt, Barker, Nagin, & Tremblay, 2007), bullying perpetration (Scheithauer, Hayer, Petermann, & Jugert, 2006), and violent offending (Loeber & Farrington, 2012). The two empirically most robust and theoretically most relevant normative patterns probably are the *age curve for physical aggression* and the *age-crime curve* for violent crimes.

Knowledge of the developmental epidemiology of physical aggression has mostly been drawn from Richard Tremblay's pioneering scholarship (Tremblay, 2000). Combining the findings from various longitudinal studies, Tremblay found that the prevalence of physical aggression increases steeply from birth until about Ages 24–36 months and gradually declines thereafter along a continuous path (see Figure 19.1). This normative pattern can be found in different societies and seems to be a cross-culturally universal pattern (e.g., Alink et al., 2006). In a recent extension, Tremblay (2010) suggested that the pattern applied not only to physical aggression, but also to oppositional behavior, defiance, and disregard for rules. For more covert behaviors such as vandalism, indirect aggression, and theft, in contrast, findings suggest low levels in early childhood and an increasing trend from childhood to early adolescence.

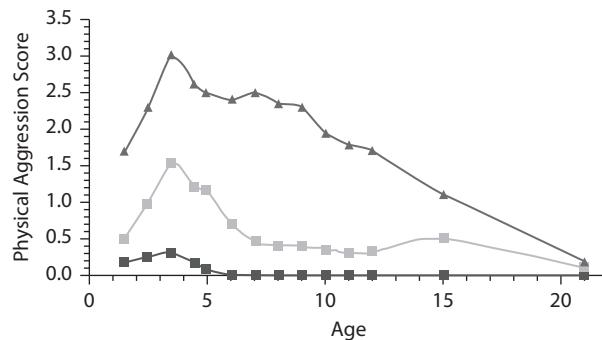


Figure 19.1 Three developmental trajectories of physical aggression from 17 months to 21 years.

Source: From "Development of Sex Differences in Physical Aggression: The Maternal Link to Epigenetic Mechanisms [Comment]," by R. E. Tremblay and S. M. Côté, 2009, *Behavioral and Brain Sciences*, 32, 290–291.

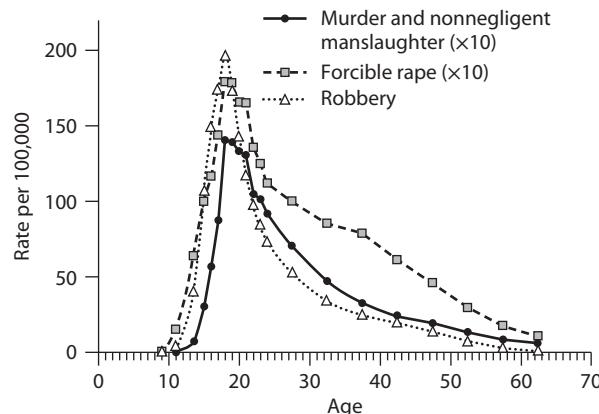


Figure 19.2 Age curve of violent crime in the United States, 2009–2011.

The second normative age pattern is the age-crime curve. It was first discovered in the 1830s by the Belgian statistician, Adolphe Quetelet, who found that the age distribution of criminal offenders followed a curve with a steep increase between Ages 10 and 18, a peak around Age 20, and a subsequent decline as age progressed (Quetelet, 1835). Figure 19.2 shows the age distribution of perpetrators of rape, robbery, and murder/manslaughter in the United States in the years 2009–2011. Both the overall age pattern as well as the differences between types of violence—robbery peaks earliest, assault tends to have a slower decline with growing age—are very similar across many societies (Farrington, 1986).

Interestingly, the steep increasing flank of recorded violent crime between Ages 12 and 17 is not found in the broader survey measures of physical aggression used by Tremblay (2000). The apparent contradiction might reflect the increased official recording following the transition to the age of criminal responsibility. But this is not the case. Data on the age distribution of perpetrators of, for example, homicide or armed robbery demonstrate that the ability to inflict serious physical harm on others indeed increases between Ages 12 and 17. Furthermore, the age curve for serious violent offending resembles the age distribution of other behaviors that index physical strength, recklessness, and high risk-seeking. This includes, for example, involvement in organized intragroup fighting (war) or high-risk sports activities (Rosen, 2005).

Developmental Stability of Aggression

A second approach answers questions about the extent to which between-individual differences in aggression are

stable over different time spans. Generally, findings are in line with what Caspi and Roberts (2001) have called the “twin laws” of longitudinal correlations in personality research. First, the correlations are high over short periods of 1–2 years and decrease as the time intervals between measurements increase. In a now classical review of longitudinal studies on boys, Olweus (1979) found that, over periods of 1–2 years, the (attenuation-corrected) correlations for the same aggression measures were typically in the range of $r = .65–.80$. For longer time intervals, the correlations declined linearly: Over 10 years the average correlations were $r = .60$, and over 20 years they were $r = .40$.

Second, the correlations between subsequent measures of aggression become larger as the age of the participants increase. A recent study suggested that this increase in the stability of aggressive behavior began in the first four years of life. Alink et al. (2006) found that 1-year stability of parent-reported aggression increased between the first year (age 12–24 months) and the third year (age 36–48 months) from $r = .49$ to $r = .72$. In an oft-cited interpretation of this pattern, Olweus (1979) concluded that the developmental stability of aggression is almost as high as that of intelligence. Unfortunately, no new review of the evidence has been conducted, but recent work suggests three qualifications: First, newer studies tend to report smaller stability estimates than those found by Olweus (1979). For example, in a study of children between Ages 10 and 15, Cillessen and Mayeux (2004) found 5-year stabilities for physical aggression of $r = .34$ and $r = .48$ for girls and boys respectively, while stability coefficients for relational aggression were .37 and .39. Also, a study of 205 boys between Grades 1 and 7 found that the stability of aggression fell from $r = .49$ to $.63$ over a 1-year period to $r = .21$ over 6 years (Schaeffer, Petras, Ialongo, Poduska, & Kellam, 2003). Second, stability estimates tend to be highest if they rely on the same informants over time. However, they are considerably lower when different informants assess children in the same environment and even lower if different informants assess children in different environments over time (Frick, Kimonis, Dandreaux, & Farell, 2003). Finally, stability estimates are considerably affected by changes in the social context. For example, a longitudinal study of 664 16- and 17-year-old students in Long Island, New York, examined the stability of physical and psychological dating aggression over 4 months and 12 months (Timmons Fritz & Smith Slep, 2009). Adolescents who stayed with the same partners over the study period were compared to adolescents who changed partners. The 4-month and

12-month stability coefficients for both physical and psychological dating aggression were significantly affected by changes in the dyadic situation: For example, the 4-month stability when staying with the same partners was $r = .40$ (physical aggression) and $r = .71$ (relational aggression), but only $r = .23$ and $.38$ respectively among those who had changed partners.

Trajectories

A third approach uses *trajectory analysis* to answer questions about whether there exist different groups of people with different behavioral trends over age. *Trajectory analysis* (Nagin, 1999) or *group-based modeling of development* (Nagin, 2005) has become increasingly influential over the past 20 years. It uses longitudinal data to identify groups of individuals whose behavior follows a shared trajectory over time. It has an affinity with taxonomic models, such as the dual taxonomy proposed by Moffitt (1993), but it can also be seen as an heuristic device to describe a much more complex reality (Nagin & Tremblay, 2005). Over 100 studies have used group-based modeling techniques to study aggression, violence, or broader constructs of anti-social behavior from childhood to adulthood (Jennings & Reingle, 2012). Findings are not always consistent: Across studies, the number of identified trajectories varies between 2 and 7, and the number and shape of trajectories partly seems to depend on the measurement strategy, the behavior domain, the developmental phase captured, and the length of observation (Martino, Ellickson, Klein, McCaffrey, & Edelen, 2008).

Beyond these inconsistencies, which require further investigation, four important patterns are evident in multiple studies (Odgers et al., 2008). First, most studies find a subgroup of “life-course persistent” children whose physically aggressive behavior remains high over long developmental time-spans. In this comparatively small group, aggression is usually combined with various other age-specific types of antisocial behavior. In the *Montreal Longitudinal Study*, 4% of boys Ages 6 to 15 had such “chronic” trajectories (Nagin & Tremblay, 2005), and more recent studies similarly find that 4%–10% of male children follow this trajectory (Piquero, Carriaga, Diamond, Kazemian, & Farrington, 2012). In mixed-gender studies, boys typically account for over 70% of the children in this category. Second, most studies identify a “persistent low” group. Children in this group start with low levels of aggressive behavior during early childhood and

consistently remain unaggressive throughout their lives (Broidy et al., 2003). The estimates for the size of this group vary widely between 20% and 70%, depending on the examined age span and the measurements used (Broidy et al., 2003), with girls overrepresented. Third, varying proportions of children tend to be classified into one or two “declining” or “childhood-limited” trajectory groups. Both start with high or medium levels of aggressive behavior at the beginning of childhood, but the behavior follows a declining trend across early and middle childhood. These children are the ones who drive the overall decline in physical aggression described in the previous section. Finally, some evidence suggests a distinct additional group of “adolescence onset” aggressive children with an escalating trajectory between Ages 11 and 17 (Jennings & Reingle, 2012; Odgers et al., 2008). For example, Martino et al. (2008) found that 23% of their sample showed increasing physical aggression between Ages 12 and 14. Similarly, in the *Montreal Longitudinal Study*, 17% of the boys were found to be in one of the rising trajectory groups between Ages 12 and 17 (Brame, Nagin, & Tremblay, 2001) and data from the longitudinal *Project Northland Chicago* found that 19% and 22% of the adolescents of African American and Hispanic origin, respectively, were on escalating trajectories between Ages 11 and 13 (Reingle, Maldonado-Molina, Jennings, & Komro, 2012).

From early childhood to early adulthood, the distinction among four major trajectory groups (“life-course persistent,” “childhood limited,” “persistent low,” and “adolescence onset”) emerges as an analytically useful and empirically supported classification. It has helped researchers in their search for early risk factors that predict membership in any given trajectory. For example, socioeconomic adversity, hostile and abusive parenting, poor prosocial skills, and low trust and trustworthiness predict membership in the ‘life course persistent’ trajectory (e.g., Malti, Averdijk, Ribeaud, Rotenberg, & Eisner, 2013). The distinction has also proven useful when analyzing the effects of life-events such as joining or leaving youth gangs, which change the probability of following particular probabilistic pathways (Haviland, Nagin, & Rosenbaum, 2007). Thus, as two of the developers of trajectory analysis emphasize, “It is important for users and consumers of the analyses to remember that individuals do not actually belong to a trajectory group, that the number of trajectory groups in a sample is not immutable, and that individuals do not follow the group-level trajectory in lock step” (Nagin & Tremblay, 2005, p. 898).

Age-Specific Behavioral Manifestations of Aggression

A fourth perspective answers questions relating to the age-specific manifestations of aggression and the situational contexts in which they occur. It entails descriptions of what children and adolescents actually do when behaving aggressively.

Infancy

The selective use of physical force often emerges toward the end of the first year of life (Tremblay et al., 1999). At the age of 12 months, infants show focused protest and self-defense, for example if toys are taken away from them (Hay, 2005). At 14 or 15 months of age, physical aggression against peers or siblings such as pushing, hitting, pulling hair, or biting is evident, and by the age of 17 months, almost 80% of children show some physical aggression, with “taking things from others,” “pushing to get what he/she wants,” “biting,” “kicking,” and “fighting” being the most frequently observed behaviors (Tremblay et al., 1999). Sex differences in physical aggression also emerge during the second year of life. The Québec Longitudinal Study of Child Development, with about 2,000 first-born children, showed substantial sex differences in physical aggression at Age 17 months, where about 5% of boys and 1% of girls were found to belong to the “high aggressive” latent class (Baillargeon et al., 2007). Results from the Dutch Screening and Intervention of Problem Behavior in Toddlerhood study suggested marginally significant sex-differences in physical aggression at Age 12 months according to mothers, but not fathers. By Ages 24 and 36 months, however, reported sex differences were in the range of $d = 0.30\text{--}0.36$ (Alink et al., 2006).

Early Childhood

Some noncompliance, physical aggression toward peers, and poor regulation of impulses are widespread during toddlerhood. For example, temper tantrums tend to occur among children between Ages 18 months and 4 years. In a normative sample of 1219 families with children aged between 18 and 60 months, 81% were reported to have at least one temper tantrum per month; these ranged from short responses to extensive episodes involving screaming, kicking, and dropping to the floor (Potegal & Davidson, 2003). The prevalence was found to increase from 87% at 18–24 months to 91% at 30–36 months before falling to 59% at 42–48 months.

The broader normative decline between Ages 2 and 5 in physical aggression as a strategy to solve conflicts over toys

or territories during dyadic play has been amply described (Hay, 2005; Rubin, Burgess, Dwyer, & Hastings, 2003). It is generally associated with the growth in social, cognitive, and verbal skills. At the same time, verbally mediated forms of aggression become more important (Ostrov, Ries, Stauffacher, Godleski, & Mullins, 2008). As children become older, its manifestations shift from more direct forms during early childhood (e.g., telling a peer that one doesn’t want to play with the peer unless the peer gives him or her a toy) to more indirect forms in middle childhood (e.g., spreading rumors and lies about a peer). Rough and tumble play emerges as a distinct form of playful aggression, which develops into highly sophisticated role-play during the primary school years (Flanders, Leo, Paquette, Pihl, & Séguin, 2009). It seems to contribute to the acquisition of social and emotional skills, the practicing of social rules, and the negotiation of dominance hierarchies, but can slide into antagonistic aggression among rejected or less skilled children (Smith & Boulton, 1990).

Middle to Late Childhood

During middle childhood (6–10 years), the establishment of stable and trusted friendships and wider acceptance by peers become a core concern, while peer rejection becomes a major source of frustration. Physical aggression generally continues to decline, but a small group of children with multiple behavioral difficulties continue to be involved in fights with others, destruction of possessions, or the robbing of valuable objects. Indirect aggression increases, reflecting the growing importance of friendships as well as children’s increasing cognitive skills (Côté et al., 2007). Parent and teacher assessments tend to show low correlations, possibly suggesting that, in middle childhood, aggression is still largely context-specific (Achenbach, McConaughy, & Howell, 1987).

By the beginning of primary school, aggressive children have a clear tendency to select friendships with peers who also show antisocial behaviors. They become increasingly rejected by more social competent children, although children who combine aggression with social skills can be admired and acquire dominant roles. Situations where new groups are formed (such as the beginning of kindergarten or school) or where new children enter groups seem to be particularly prone to trigger aggression. For example, Roseth, Pellegrini, Bohn, Van Ryzin, and Vance (2007) observed 61 children in a preschool child-care setting using seven waves of measurement over a year. They found that levels of aggression increased at the beginning of the

year and then declined as the year progressed. The authors argued that these patterns may reflect initial conflict over dominance hierarchies, which eventually stabilize and allow for more cooperative strategies.

A specific type of aggression that develops in the context of school settings is school bullying. Bullying has been defined as the use or threat of force to intimidate, coerce, and exclude others. Forms of bullying include physical and verbal bullying, being threatened or forced to act, being excluded or gossiped about, having property taken or damaged, and racial, sexual, and cyber bullying (Olweus, 1993). There is disagreement about the development of bullying during primary school. Some authors find that bullying increases between Ages 7 and 12 (Hanish & Guerra, 2004), while others find a general decline through primary school years (Boulton, Trueman, & Flemington, 2002). Solberg and Olweus (2003) reported decreased victimization rates between Ages 11 and 15, but increases in self-reported perpetration rates, probably suggesting that older children tend to bully their younger peers.

Early to Late Adolescence

During adolescence, behaviors associated with intense authority conflict such as truancy or running away from home become more frequent. Alcohol and substance use also begin during these years, and the early onset of substance use is associated with a greater risk of serious and violent offending (Schulenberg & Maggs, 2002). Puberty is also associated with a rapid increase in physical strength, which in turn leads to more serious types of physical aggression including robbery, serious assault, and homicide. According to self-report studies, the 1-year prevalence of serious violent offending (carrying weapons, threatening for money, fighting, beating up family/nonfamily members, hurting with weapons) is around 15%–30% in Western societies, although a small minority of about 3%–5% of adolescents commit most of the violent acts reported (Elliott, Hatot, Sirovatka, & Potter, 2001).

The situational context of aggression and violence during this stage shifts away from conflicts with schoolmates, siblings, or parents and into public space and unsupervised leisure time activities. Across the globe, adolescence is also the age at which delinquent peer associations can turn into criminal gangs (O'Brien, Daffern, Chu, & Thomas, 2013). Such groups are predominantly male, share particular codes of dress and behavior, control territories, and engage in confrontational dominance plays that can lead to serious violence with neighboring groups. Adolescent

girls are considerably less likely to be involved in physical violence than boys.

This period is also characterized by an increase in sexual aggression. In a Canadian longitudinal study, McMaster et al. (2002) found that sexual harassment (homophobic name-calling, making sexual jokes, and making comments or rating sexual body parts) increased substantially between Ages 12 and 14. By Age 15, a considerable amount of sexual and nonsexual violence is committed within adolescent romantic couples (e.g., Averdijk, Mueller-Johnson, & Eisner, 2011). For example, a study of 15-year-olds found that 34% of Italian and 32% of Canadian adolescents reported having used physical aggression against boyfriends/girlfriends (Connolly et al., 2010). Girls reported slightly less physical aggression, but the differences were small and most aggression was bidirectional.

Sex Differences in Aggression

Sex differences in aggressive behavior are among the most robust and stable findings in aggression research (Archer, 2004; Nivette, Eisner, Malti, & Ribeaud, in press). These differences universally follow a similar pattern: Indirect aggression is similarly frequent among both sexes, and possibly somewhat more frequent among girls. Direct verbal and confrontational aggression is more frequent among boys, and sex differences increase further the more they involve escalated physical violence. Among perpetrators of homicide, robbery or assault, men outnumber women by a factor of at least 1:5 in virtually all known human societies, although there is some variation over historical time and between societies (Campbell, 2007). Until recently, the dominant theory for explaining these sex differences was social role theory. This theory focused on the process of socialization and gender roles in forming sex differences in aggressive behavior and posited that the societal division of labor created stereotypical gender roles that socialize women into domestic roles that emphasize nurturing and compassion, whereas men are socialized into “breadwinner” roles that encourage dominance and competition (Eagly, Wood, & Diekman, 2000). This theoretical framework predicted that the sex difference in aggression would be greater in societies where girls are socialized into compliant, subordinate and gentle roles while boys are socialized to be dominant, competitive and aggressive. Also, sex differences should gradually emerge during childhood as the effects of gender-specific socialization accumulate.

Archer (2009a) has argued that the relative cross-cultural stability of sex differences in physical aggression, the similarity with sex differences in physical aggression in the animal kingdom, and the early emergence of sex differences are difficult to reconcile with a social learning perspective. Rather, he argued that sex differences in aggression are due to the greater evolutionary pressure on males to engage in overt competition for reproductive success (Archer, 2009a). For females, long internal gestation periods and higher parental investment lead to higher costs for risky and direct aggressive behaviors. For males, in contrast, greater variance in reproductive success leads to greater incentives for aggressive same-sex competition. These evolutionary processes are assumed to have shaped a number of proximal neurocognitive mechanisms: They include sex differences in the fear system as well as the greater ability of females to engage in reactive inhibition (controlling aggressive responses to fear), effortful control (the general ability to manage attention and actively regulate behavior), and general self-control (Archer, 2009a).

Empirical research on the developmental origins of sex differences bears on this debate between social learning and evolutionary theories (Hay, 2007). Earlier accounts reported that sex differences in physical aggression gradually emerge in the first 4–6 years, leaving ample room for social learning explanations (Loeber & Hay, 1997). Increasingly, however, studies of early child development suggest that sex differences in physical aggression can already be found much earlier. Baillargeon et al. (2007) examined physical aggression among almost 3,000 infants at Ages 17 and 29 months as part of the Québec Longitudinal Study of Child Development. They found that, even at 17 months, male infants were 5 times more likely to display frequent physical aggression than female infants. Also, the sex-ratio of aggressive behavior did not change between Ages 17 and 29 months. The authors argued that these findings are not compatible with the expectations of gender role theory (Baillargeon et al., 2007).

Conclusions

The five descriptive perspectives highlighted in this chapter illuminate a number of conceptually important issues and suggest a number of possible avenues for further research.

First, they suggest that the dominant feature of normative child development is an increasing ability to control aggression with age, experience, and brain maturation, whereby the use of force is supplanted by more effective, more cooperative and more complex strategies for

achieving goals. As Tremblay put it, “Rather than learn how to physically aggress [children] learn not to physically aggress” (Tremblay, 2009, p. 373). Accordingly, learning theories that assume the active acquisition of physically aggressive behavior during the life course seem implausible as a general explanatory framework, although learning processes are likely involved in reinforcing and activating existing trait aggressiveness (Huesmann & Eron, 1989). This suggests that preventive efforts are most likely to be effective if they intervene at the developmental roots of aggression during pregnancy and the first years of life and if they reinforce the normative unfolding of cognitive, social and moral skills as children grow older (Tremblay, 2010).

Findings regarding the rank-order stability of aggression over time suggest a stochastic process that is characterized by decreasing rank-order stability as time intervals become larger and increasing stability as children grow older. Despite the importance of relatively stable between-individual differences, it is worth pointing out that a maximum of about 20% of the variation in aggression at adolescence can be reliably predicted by measures of aggression at, say, the beginning of primary school. Furthermore, little is currently known about whether there exist, as suggested by Granic and Patterson (2006), distinct developmental phases where pathways are more open. Supportive evidence would probably require a decline in the rank-order stability of aggression in specific developmental phases (e.g., at entry into school). Also, systematic reviews of evidence comparing groups with and without change in external circumstances (e.g., moving home, changing partner) could shed light on the extent to which stability in aggression is state-dependent. Furthermore, the emerging evidence for similar trajectories in different societies has enriched the field. At the same time, we note that the evidence for early characteristics that reliably predict membership in the various groups is still limited, although there is clear evidence that the life-course persistent trajectory includes a large proportion of individuals with multiple early risk factors. Probably a fruitful area for further research would combine trajectory analysis techniques with the examination of life events that are hypothesized to change the developmental trajectories of aggressive behavior.

THE BIOLOGY OF AGGRESSIVE BEHAVIOR

Work on the biological underpinnings of aggressive behavior has been among the most dynamic areas of research

over the past 20 years. Four main interlocking strands of research must be distinguished (Portnoy et al., 2013): Behavioral geneticists have used designs such as longitudinal twin and adoption studies to understand the overall contribution of genetic factors to the development of aggression; molecular geneticists have examined the impact of polymorphisms in individual genes, and their interaction with environmental conditions, on aggressive behavior; laboratory neuroscientists have elucidated the real-time neurological processes involved in generating aggressive actions, and the more lasting characteristics of brain functioning that contribute to trait aggression; and neuropsychologists have developed methods that are increasingly embedded in longitudinal studies and that assess the extent to which components of brain functioning are associated with externalizing behaviors.

Behavior Genetics

Behavior genetic studies examine the relative influence of genes and the social environment by comparing the similarity of phenotypic characteristics, such as aggression, in monozygotic and dizygotic twins or in twins growing up with their biological parents as opposed to foster parents (Rhee & Waldman, 2002). They typically distinguish between three main sources of variation (Plomin, 2011): The genetic effect, which is usually measured as the extent to which monozygotic twins are more similar than dizygotic twins; the effect of the shared environment, which is estimated as the extent to which monozygotic twins are more similar than would be expected on the basis of the genetic effect only; and the effect of the nonshared environment, which comprises all remaining variance components. Recent meta-analyses of behavior-genetic studies show high contributions of heritable characteristics to variations in aggression. A review by Moffitt (2005) of over 100 studies concluded that, regardless of the design (twins reared together, adoption, twins reared apart), the heritability estimates for aggressive behavior converged to about 50%. Burt (2009) compared the influence of genetic factors on physical aggression as opposed to nonaggressive rule breaking and, like Moffitt (2005), concluded that the propensity for aggression is highly heritable, with genetic factors accounting for about 65% of the variance. Moreover, the heritability component was substantially lower for nonaggressive rule-breaking, which follows a trajectory over time that only peaks during the adolescent years.

A new line of research has begun examining whether genetic influences may not only account for developmentally

stable between-individual differences in aggression, but may also be responsible for changes over the life-course. For example, a recent study examined parent data from the University of Southern California (USC) Risk Factors for Antisocial Behavior (RFAB) twin study at Ages 9–10 and 14–15. Findings suggested that change in aggressive behavior during the transition to adolescence may be due to genetic factors that are activated during puberty (Niv, Tuvblad, Raine, & Baker, 2013).

Some evidence suggests that the effect of genetic factors varies between contexts (Burt, 2009, p. 612). For example, Tuvblad, Grann, and Lichtenstein (2006) found that, in disadvantaged high-risk neighborhoods, adolescent aggression was mostly due to shared environmental influences, with relatively little variance due to genetic factors. If confirmed by further research, these findings may suggest that genetic factors which index biological malfunctioning could be more important in protected and stable environments, while social factors may be more influential in settings where high levels of disadvantage and threat make aggression more adaptive.

Also, ongoing research is examining the extent to which established associations between social risk factors and antisocial behavior are effectively due to shared genetic influences. This work is important because, until very recently, genetic influences were entirely unaccounted for when exploring the relationship between social factors and aggressive behaviors. For example, Trzesniewski, Moffitt, Caspi, Taylor, and Maughan (2006) tested three hypotheses about the mechanism responsible for the association between reading achievement and aggressive behavior. The first hypothesis was that the association between reading achievement and aggressive behavior was attributable to genetic influences that influence both aggressive behavior and poor reading abilities. The second hypothesis was that the empirical association could be explained by shared environmental antecedents such as child neglect. The third hypothesis was that reading skills and aggressive behavior were causally interrelated, meaning that poor reading skills led to more aggressive behavior and/or that antisocial behavior led to more reading difficulties. Comparing the strength of the correlations for both monozygotic and dizygotic twins, the researchers concluded that a small proportion (21%) of the association was due to additive genetic factors, while most (71%) of the phenotypic association reflected shared environmental effects such as shared family experiences. Finally, the authors found support for a reciprocal dynamic relationship whereby reading skills influenced aggressive behavior and vice versa.

Genetic Polymorphisms

Findings from behavioral genetics likely reflect the combined influence of a large number of genetically influenced characteristics ranging from body weight and size to intelligence or more specific disorders such as ADHD (Portnoy et al., 2013). They are, therefore, commonly interpreted as initial evidence that a search for polymorphisms in specific genes would be worthwhile.

There now exists several lists of possible genes that may be implicated in between-individual differences in aggression (e.g., Ferguson & Beaver, 2009). Recent research has focused on three groups of genes that influence the functioning of two main neurotransmitter systems in the brain, the *dopaminergic system* and the *serotonin system*. The first group is involved in the production of dopamines, neurotransmitters that send signals between cells. They are distributed in the brain through dopaminergic pathways, neural pathways that send dopamine to the different brain regions. Dopamine has been described as a reward system. It plays an important role in motivation, attention, arousal and pleasurable reward. Several genes are involved in dopamine functioning and geneticists have examined the extent to which different polymorphisms (i.e., versions) of these genes are correlated with aggression. For example, in some studies, allele variants of the two dopamine receptor genes DAT2 and DAT4 were correlated with child aggression (Zai et al., 2012).

A second important group of suspects are genes that code for the neurotransmitter *serotonin*. Serotonin is a mood stabilizer, and low levels of serotonin are associated with higher irritability, depression, and impulsiveness. The most widely studied gene is the serotonin transporter 5HTT, a gene that regulates the availability of synaptic serotonin (5-HT). In particular, it is suspected that the polymorphism 5HTTLPR may be implied in a series of affective disorders and behavior problems. For example, in some studies, carriers of the low expressing alleles were at-risk for childhood conduct disorder (Cadoret et al., 2003), and aggression (Haberstick, Andrew, & Hewitt, 2006). A third group of genes that have received much attention are genes that are involved in regulating the metabolism of neurotransmitters, especially the gene MAOA (monoamine oxidase A), which is responsible for metabolizing serotonin and dopamine. Besides possible main effects of MAOA, the gene has also been found to interact with environmental conditions. Caspi et al. (2002) found that exposure to maltreatment predicted subsequent antisocial behavior among men with the short allele of the

MAOA gene, while it had little impact on men with the long allele. The most recent meta-analysis on this G×E interaction (Byrd & Manuck, in press) included 27 studies and showed that the MAOA × maltreatment interaction was robustly replicated in 20 male cohorts, but was not evident in 11 female cohorts (although maltreatment had a main effect on antisocial and aggressive behaviors).

G×E interaction effects suggest developmental models that distinguish different groups of children with varying vulnerability to environmental conditions. In particular, Belsky and Pluess (2009) have argued that various polymorphisms index broader variations in the susceptibility to environmental influences. The implication is that children with higher susceptibility do worse under detrimental conditions, but better under supportive conditions. This also implies that intervention effects are moderated by genetic differences.

Despite the impressive growth in pertinent research, the field remains characterized by inconsistencies. A meta-analysis by Vassos, Collier, and Fazel (2013) reviewed 185 studies involving over 60,000 participants on relationships between genetic polymorphisms and aggression, examining 277 independent associations related to 31 genes. The authors found no replicable significant main effects (G×E interactions were not examined in that study), arguing "that it is unlikely that few candidate genes explain a complex behavior like aggression and many hundreds or thousands of genes probably interact in a complex manner" (Vassos et al., 2013, p. 4). Another recent meta-analysis (Duke, Bègue, Bell, & Eisenlohr-Moul, 2013) arrived at a similarly sobering conclusion regarding the link between serotonin and aggression: It examined 175 independent samples in 144 studies. There was a small relationship between serotonin and aggression, anger and hostility of $r = -.12$, suggesting that about 1% of the variation in human aggression might be related to levels of serotonin. Moreover, the authors noted that the reported effect sizes significantly declined with the publication year, possibly suggesting a systematic bias in earlier publications. They concluded that "contradictory findings, unreliable measurement, and a high degree of complexity leave our overall finding of a small inverse correlation between serotonin and human aggression open to multiple, equally plausible interpretations" (Duke et al., 2013, p. 1165).

Brain Regions

In a recent overview, Raine (2013, p. 267) has summarized research on the various brain regions believed to be

involved in the biology of violence. He broadly distinguished three broad domains, namely *cognitive processes* (thinking), *affective processes* (emotions), and *motoric processes* (behavior).

With respect to cognitive processes, the main relevant brain regions are the *ventromedial prefrontal cortex* (involved in the processing of risk and fear, inhibition, and decision making), the *medial polar regions*, the *angular gyrus* (involved in attention and theory of mind), and the *anterior and posterior cingulate* (emotion formation and processing, learning, and memory). Raine (2013) argued that impairments of these regions result in poor planning, reduced ability for sustained attention, a poor ability to evaluate emotions, poor decision making, impaired self-reflection and a reduced ability to process rewards and punishments. These deficits are, in turn, associated with poor control over aggressive thoughts and feeling, overreaction to minor irritations, lack of insight and a poor response to punishments and rewards.

Among the brain areas associated with deficits in affective processing, Raine (2013) highlighted the *amygdala/hippocampal* complex (processing of emotional reactions), the *insula* (subjective emotional experiences, i.e., feelings and desires/cravings), the *anterior cingulate* (emotional stability, motivation, anxiety), and the *superior temporal gyrus* (perception of emotional stimuli, social cognition). Impairments in these regions are associated with the inability to understand the mental states of others, learning impairments, lack of guilt and empathy, poor fear conditioning, poor emotion regulation, and a reduction in negative emotions associated with moral transgression (Raine, 2013, p. 269). More specifically, the amygdala appears to be critically involved in forming links between conditioned stimuli and unconditional responses; it enables individuals to sense the badness and goodness of actions. According to R. J. Blair (2007), the underactive amygdala fails to signal the full value of aversive stimuli. Psychopathic children therefore fail to fully perceive facial expressions of distress, which normally act as a control mechanism.

For example, a recent meta-analysis by Gavita, Capris, Bolno, and David (2012) has examined the link between anomalies in the anterior cingulate cortex—an area associated with emotional stability and anxiety—and the aggressive behavior of male children aged 11–15. The review of eight brain imaging studies showed a strong overall effect of $d = -.98$. The authors concluded that functional abnormalities of the anterior cingulate cortex are strongly associated with aggressive behavior disorders.

At the level of the regulation of motoric processes, the main potentially involved areas of the brain are the *dorsolateral prefrontal cortex* (motor planning, organization, and regulation), the *orbitofrontal cortex* (correction of inappropriate behavioral reactions), and the *inferior frontal cortex* (response inhibition). Impairments in these areas are associated with response perseveration, impulsivity, failure to avoid punishments, and motoric excess (Raine, 2013, p. 269).

Psychophysiological Correlates of Aggression

Various psychophysiological characteristics are believed to be associated with aggression (Lorber, 2004). Probably the best-replicated correlate is a low heart rate. In a meta-analysis of 45 studies, Ortiz and Raine (2004) found an average effect size for the correlate with aggression of $d = -.44$ for resting heart rate and $d = -.76$ for the heart rate under stress. Moreover, a low heart rate during childhood predicts adolescent violence and life-course persistent offending. Two hypotheses have been developed to explain the link between heart rate and aggressive behavior. The hypoarousal hypothesis argues that children with low resting heart rates have atypically low arousal levels. Aggressive behavior could, therefore, constitute a strategy to stimulate their arousal levels to optimal levels. The fearlessness hypothesis assumes that low resting heart rates are markers for the lack of fear or anxiety, which in turn increases the willingness to engage in attacks, despite the risk of retaliation, and reduces the fear of punishment.

A second well-researched correlate of antisocial behavior is poor skin conductance fear conditioning. Fear conditioning relates to the process by which organisms learn to predict aversive events. It is typically assessed by means of experiments that combine aversive stimuli (e.g., noxious loud noises) with neutral stimuli. Individuals who are high on fear conditioning quickly learn to react with fear (measured by means of skin conductance) to the neutral stimulus even if the noxious stimulus does not occur. Gao, Raine, Venables, Dawson, and Mednick (2010) showed that poor fear conditioning at Ages 3 to 8 predicted aggressive behavior at Age 8 in a sample of male and female children in Mauritius. This finding held after controlling for measures of anxiety and fearfulness.

Conclusions

Research about the links between genes, brain functioning, and violence has recently been described as having “a very long way to go” by a leading specialist in the field

(Raine, 2013, p. 260). At the same time, we increasingly understand how different regions of the brain are involved in the complex cognitive, emotional, and moral processes whereby aggressive behavior is either adopted or rejected in favor of action alternatives. Specifically, genetic and environmental influences interact in the maturation of the neural systems that regulate complex moral emotions (e.g., empathy and guilt), executive functioning, and the display of social skills associated with the gradual replacement of aggressive behavior by more sophisticated strategies of conflict resolution and goal attainment.

Until very recently, almost all research in developmental psychology on aggression was genetically and neurologically “blind,” meaning that a potentially important source of variation was ignored. Moreover, much of the biological research that has been conducted in the past decades tended to treat aggression as a stable trait characteristic rather than as a dynamic phenomenon (Loeber & Pardini, 2008). Genetically informed longitudinal studies that comprise repeated neurological assessments and repeat measures of aggression can overcome such limitations.

COGNITIVE AND EMOTIONAL FUNCTIONING AND AGGRESSION

The role of social-cognitive and emotional functioning in the development of aggressive behavior has been extensively studied (Bandura, 1973; Crick & Dodge, 1996). Below we provide a selective review of central issues that have emerged in this literature. These issues are closely linked to the relationship between moment-to-moment processes and developmental time: Cognitive, evaluative and emotional processes are the core proximal elements of real-time judgment and decision-making (Fontaine & Dodge, 2006). But the way in which they function is influenced by the normative maturation process of the human body, the latent personality structures of individuals, as well as their accumulated experiences and knowledge structures.

Cognitive Functioning

It is well established in the developmental literature that low cognitive ability is related to higher levels of aggressive behavior across development (Lösel & Farrington, 2012). Recent studies have shown that the association between low cognitive ability, especially verbal aspects of intelligence, and aggressive behavior can be found at an early age. For example, Dionne, Tremblay, Boivin,

Laplante, and Pérusse (2003) tested the relations between expressive vocabulary and physical aggression in late infancy with a study that involved 562 19-month-old twins in Canada. They found a small correlation ($r = -.20$) in the expected direction. This association was not due to genetic influences, although a substantial proportion of the total variation in aggression (58%) was accounted for by heritable factors. The authors suggest that delays in language development may increase the likelihood of persistent physical aggression. Research in a different Canadian longitudinal sample similarly showed that physical aggression in early childhood (3.5 years) is associated with receptive vocabulary deficits (Séguin, Parent, Tremblay, & Zelazo, 2009). Also, verbal reasoning predicted physical and verbal aggression negatively in a sample of 11- to 16-year-old Estonian children (Kikas, Peets, Tropp, & Hinn, 2009). Barker and colleagues (2011) found that verbal IQ was negatively related to physical aggression in adolescence. In addition, a study by Giancola and Mezzich (2000) revealed that conduct-disordered female adolescents had poorer language skills than peers without conduct disorders. Lastly, Kennedy, Burnett, and Edmonds (2011) documented lower reading and vocabulary skills in violent offenders than in nonviolent offenders. In a study using a longitudinal birth cohort design, Liu, Raine, Wuerker, Venables, and Mednick (2009) showed that low IQ (as assessed by a composite of verbal and performance IQ scores) was associated with birth complications, and it was found to mediate the link between early predictors and later externalizing behavior.

One of the most commonly studied aspects of neurocognitive development is children’s executive functioning. Executive functioning is the ability of humans to regulate and adapt behavior in the most varied environments, to plan and anticipate consequences of alternative actions, to override spontaneous impulses, and to oversee their working memory. It has long been assumed that there exists a link between aggressive behavior and executive functioning. For example, low inhibitory control is assumed to be associated with a tendency for reactive aggression while a low ability for gratification delay is likely associated with fast discounting of future costs and a tendency for confrontational actions that seem to provide immediate solutions (Raijmakers et al., 2008). The neural system coordinated by the frontal lobe that maintains executive functioning develops gradually and only matures fully in early adulthood (Zelazo, Carlson, & Kesek, 2008). But links between poor executive functioning and aggression can already be found at an early age. Raijmakers et al. (2008) matched

4-year-old high-aggressive and low-aggressive children on intelligence and administered a series of neuropsychological tasks. A factor analysis suggested one main dimension of executive functioning that represents inhibitory control. The study found substantial associations between lacking inhibition and aggression, after controlling for sex and differences in ADHD symptoms.

Separating different subdomains of executive functioning has remained difficult. A rare exception is a longitudinal study of children at Ages 17 to 41 months by Séguin et al. (2009). They examined whether different dimensions of neurocognitive functioning regulate aggression and hyperactivity. The authors found evidence that aggression was specifically associated with measures of poor language functioning while hyperactivity shared unique variance with poor performance on visuo-spatial abilities. The specific role of deficits in language skills at this age suggests that advances in linguistically mediated executive functions play an important role in the increasing regulation of physical aggression and the growth of social problem-solving skills at this age.

Increasingly, it has also become possible to distinguish the trajectories of different subdomains of executive functioning over the life-course. For example, it appears that executive functioning in more abstract “cool” situations develops earlier in life than executive functioning in “hot” situations; this suggests that significant motivational and emotional components develop more gradually and significantly later than those that are less affectively engaging. Such differences in the maturation of “cool” and “hot” executive functioning may be partly responsible for the rise in risky behaviors during adolescence (Prencipe et al., 2011).

Executive functioning has also been shown to vary as a function of external influences. For example, alcohol consumption has been found to negatively affect inhibition, emotional control, flexible thinking, and self-monitoring, all of which increase the likelihood of aggressive behavior (see Eisenberg, Spinrad, & Eggum, 2010).

Social-Cognitive and Emotional Functioning

A significant amount of work has investigated the social-cognitive skills of children with and without aggressive behavior. This research has been conducted in the tradition of the social information processing (SIP) model (Crick & Dodge, 1996). In a nutshell, the SIP model states that individuals first have to encode information about social situations accurately. Second, the encoded information has

to be represented appropriately. Third, this representation has to enact specific goals, which lead in a fourth step to the generation of action strategies. Fifth, individuals have to evaluate the different action responses and lastly, at the sixth step, enact the selected responses. Each of these six steps requires individuals to process information about social situations accurately. The model assumes that children’s information processing about social events changes based both on moment-to-moment experiences in everyday life as well as due to normative developmental changes. In this theoretical framework, numerous studies have documented links between children’s SIP skills and aggressive behavior (for a review, see Dodge, Coie, & Lynam, 2006). According to the SIP model, children with aggressive problem behavior show biases and/or deficits at all steps in the social information processing cycle and this is indeed the case (Crick & Dodge, 1996). A meta-analytic review with 41 studies and over 6,000 participants revealed a robust association between the attribution of hostile intent and aggression, although the effect sizes varied considerably across studies (de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002).

Research on the SIP model has contributed valuable information about the social-cognitive deficits associated with aggression. However, many studies have focused on hypothetical stimuli (such as video, picture or audio stimuli presented in the research laboratory) rather than real-life situations. It is less clear whether the SIP patterns of aggressive children generalize to real-life interactions, such as multifaceted situations of social exclusion and inclusion in school settings. One extension of the SIP approach involves the application of elaborate models of on-line social decision-making and antisocial behavior in youth (Fontaine & Dodge, 2006). For example, Fontaine, Yang, Dodge, Pettit, and Bates (2009) investigated the development of social response evaluation and decision-making across childhood and adolescence. They found no relations between aggressive response evaluations and aggression between 5 and 7 years of age. But between Ages 13 and 17, aggressive response evaluations, nonaggressive response evaluations, and aggressive behavior were strongly interrelated. The authors concluded that social response evaluation mechanisms become increasingly linked to aggressive behavior during adolescence.

Since 2005, developmental theorists have increasingly emphasized the *role of emotions* in the SIP approach to aggression (Lemerise & Arsenio, 2000). This emphasis reflects the renewed recognition of the role of (moral) emotions in motivating aggression (Malti & Latzko, 2012).

Lemerise and Arsenio (2000) introduced a model that added emotions to each of the steps of the SIP model. This was followed by the suggestions of a dual-processing model of information processing. Accordingly, interactions between cognitive functioning, emotional development, and social experiences may cause differences in SIP and related aggression (de Castro, 2010). The introduction of these models was accompanied by empirical research on emotional information processing in children with aggressive problem behavior. In a comprehensive review of the literature on emotions, SIP, and aggressive behavior, Lemerise and Maulden (2010) stressed that one key feature underlying SIP biases in children with aggressive behavior includes poor emotion regulation skills and/or negative emotionality (e.g., Olson, Lopez-Duran, Lunkenhimer, Chang, & Sameroff, 2011). For example, research has provided ample evidence that children with aggressive behavior report more anger than nonaggressive children and are less able to control their anger (Arsenio, 2014; see Hubbard, McAuliffe, Rubin, & Morrow, 2007). Some studies have also revealed that rejected-aggressive children generate less constructive problem-solving responses when presented with stimuli in which provocateurs were angry (Lemerise, Fredstrom, Kelley, Bowersox, & Waford, 2006). In a meta-analytic review, a negative relation between emotion knowledge and externalizing symptoms was documented, although the effect size was small (Trentacosta & Fine, 2010).

Conclusions

In summary, the literature review has revealed evidence for a negative causal link between cognitive functioning, specifically verbal skills, and both aggressive behavior and its development across childhood and adolescence. Thus, one of the most robust correlates of severe conduct problems is impaired verbal ability. Verbal deficits have been found in aggressive toddlers, conduct-disordered children, serious adolescent delinquents, and adult criminals. The evidence on the effectiveness of cognitive-behavioral and social-skills approaches for reducing antisocial and aggressive behavior supports the notion that cognitive biases are causally implied in aggressive behavior (Lösel & Beelmann, 2003). Also, studies on the links between social information processing, emotional processes, and aggression have shown that children with aggressive problem behavior do not only show biases at each of the six steps of the SIP model, but they also display difficulties in a broad range of emotion processes, such as emotion recognition

skills, or perceptions and expression of anger. This is important for the conceptualization of preventive strategies because an array of social-cognitive and emotional skills may be needed to effectively prevent and/or treat aggressive behavior problems. This idea was supported in a recent meta-analytic review of 213 school-based, universal social and emotional learning (SEL) programs involving 270,034 school-age students of all ages. The study documented the positive effects of participation in SEL programs that teach children various social and emotional skills to promote their social-emotional and behavioral development (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). What remains less clear is the relative contribution of specific skills, such as empathy or self-regulation, and if they are being promoted in developmentally appropriate ways, for reducing aggressive behavior. Future research in this area may provide valuable information for the design and/or refinement of aggression intervention strategies and may inform current interventions about where to continue targeting their efforts (Malti & Chaparro, 2014).

Much of the large body of research in this area has remained cross-sectional. Future research on the developmental processes involved in the associations between social information processing, emotional skills, aggression and violence is therefore warranted. In addition, integrative empirical work utilizing various innovative methodologies, such as observations of emotion regulation skills and aggressive behavior in real time, and physiological responding to emotion-evoking stimuli, may further contribute to our understanding of the multifaceted social-cognitive and emotional processes involved in the developmental course of aggression from childhood to adolescence.

MORAL DEVELOPMENT AND AGGRESSION

Developmental theories on children's and adolescents' morality date back almost 100 years, with Piaget's classic book on children's moral judgment published in 1932. Piaget described cognitive moral development as a process involving the active construction of moral knowledge and increasingly autonomous reasoning about norms of fairness and justice. Although links between cognitive moral development and morally relevant behavior, such as aggression and the (dis)approval of violence, were conceptualized early in the cognitive-developmental theoretical tradition, relatively little empirical evidence was available until about 2000. Since then, there has been significant

growth in research on links between different dimensions of children's moral development (such as moral cognition, moral emotion, and moral motivation) and aggressive behavior and violence (Wikström et al., 2012; Arsenio & Lemerise, 2004). Conceptually, this is hardly surprising given that moral development concerns the same domain as aggression, inflicting or preventing harm, maintaining or breaking norms of fairness, and (not) showing care. This new research was also prompted by increasing recognition in the bullying literature that we need to understand why children and adolescents engage in bullying in everyday moral conflicts. For example, one perplexing finding was that bullies do not necessarily lack perspective-taking skills, but rather use their social knowledge strategically to reach their goals (Gasser & Keller, 2009). This has led bullying and aggression researchers to pay closer attention to aggressive children's cognitions, emotions, and motivations about moral issues, such as in situations involving justice, fairness, and care (Arsenio, 2014; Malti & Krettenauer, 2013; Malti & Ongley, 2014). By corollary, there may be important turning points in moral development, such that children acquire the capacity to anticipate guilt feelings, which may change their respective aggression pathway by highlighting the negative consequences of their behavior both for victims and themselves (i.e., feeling guilty and sad about not living up to one's own moral standards).

Next we provide a selective review of this literature, highlight central issues, and identify areas in need of future research.

Moral Reasoning

Research on moral reasoning and aggression was rooted in the notion that moral cognition can motivate morally relevant behavior, such as prosocial behavior or aggression. However, empirical research on the relations between moral reasoning and aggressive behavior has been scarce in the past decade. The existing research points to moral reasoning deficits associated with aggressive behavior. For example, Manning and Bear (2011) documented concurrent and longitudinal relations between moral reasoning and aggression in elementary school children. More recently, the literature has shifted to examining the potential role of social and individual moderators. For example, a study by Gasser and Malti (2012) pointed to the effects that best friends' moral reasoning has on the relation between the friends' aggression and children's aggressive behavior. Other studies have investigated individual

variables that may explain links between moral reasoning and antisocial behavior, such as cognitive distortions (Arsenio & Lemerise, 2004) and egocentric biases (Gibbs, 2014). These cognitive processes have been described in more detail in the related literature on social information processing (see previous section) and the literature on moral disengagement (see next section). In a nutshell, these studies emphasized that cognitive distortions lead to differences in the moral judgments of children with aggressive behavior. Lastly, later work also suggested that aggression and violence is in part due to impairments in specific brain regions (particularly the dorsal and ventral PFC) that subserve moral cognition (Raine & Yang, 2006).

A different, recent line of research has focused on the moral reasoning of children who were exposed to violence. Studying the effects of violence on children's aggression and related moral reasoning development is important as it can reveal if and how being immersed in violent social contexts may affect children's normative development. This research revealed that these children's moral reasoning development remained similar to that of children who were not exposed to violence, although there were context-specific differences. For example, Posada and Wainryb (2008) investigated 8- and 15-year-old Colombian children's judgments about stealing and physical harm in the abstract and in the context of survival and revenge. While considerations of justice led all participants to judge it wrong to steal or hurt others, their judgments in the context of revenge were more mixed, with a sizable proportion endorsing stealing and hurting in that condition. Furthermore, the majority expected that people would steal and hurt others in most situations. In a study by Ardila-Rey, Killen, and Brenick (2009), Colombian children who were exposed to violence, in contrast to those with minimum exposure, judged it more legitimate to inflict harm or deny resources when provoked, and judged it more reasonable to retaliate for reasons of retribution. These findings point to the role of political violence in moral development and the related endorsement of aggression as a justified means of retaliation. There is also evidence that adolescents who are exposed to contexts that allow for interpersonal aggression show different attitudes toward the legitimacy of aggression and violence. For example, one study has shown that adolescents who neutralized the harmful effects of aggressive behavior and who endorsed patriarchal and traditional world-views were more likely to support honor killings in Jordan (Eisner & Ghuneim, 2013). In a study comparing children with violent and nonviolent behavior, Astor (1994) showed that all children condemned unprovoked

violence for moral reasons. Yet, under provocation, children with violent behavior perceived aggression as a form of reciprocal justice. Barber (2008) also provided evidence that a minority of Palestinian and Bosnian adolescents exposed to political violence had different perspectives on their own aggressive behavior, for example, by agreeing to statement such as, "I am more violent." Specifically, data from the Adolescents and Political Violence Project (APVP) revealed that 49% and 38% of Bosnian males and females, respectively, agreed with the statement "I am more violent," as did 17% and 12% of Palestinian males and females, respectively. These findings suggest that experiences of violence, social injustice, and inequality undermine concern for others and facilitate beliefs that promote unfairness, harm and victimization (Arsenio, 2014). But this is only one part of the story. The findings also show that children and adolescents who are affected by war, violence, and aggression also display moral knowledge in spite of having been exposed to these traumatic experiences. This points to the importance of studying how children think and reason about morality in general and in specific, morally relevant situations that are related to their trauma.

Moral Disengagement

The notion of moral disengagement (MD) was developed by Albert Bandura to describe mechanisms that neutralize moral self-sanctions and allow individuals to commit harmful acts by justifying actions in ways that prevent them from feeling guilty or ashamed (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996; for a review on mechanisms of MD, see Hymel, Schonert-Reichl, Bonanno, Vaillancourt, & Rocke Henderson, 2010). It was initially conceptualized to explain how otherwise normal adult people can commit atrocities, but has become increasingly relevant in research about everyday aggression and its development over the life-course. Contemporary research has found robust links between aggressive behavior and MD. For example, one of the first empirical studies was conducted among 799 adolescents aged 10–15 in Rome, Italy. The study found that higher levels of moral disengagement were associated with parent, peer, and self-assessed physical and verbal aggression. Moreover, there was suggestive evidence that the effects of moral disengagement on aggression were partly mediated through hostile ruminations irascibility (e.g., Bandura et al., 1996). One longitudinal study showed that adolescents who maintained higher levels of MD were more likely to engage in

frequent aggressive and violent acts in late adolescence (Paciello, Fida, Tramontano, Lupinetti, & Caprara, 2008). Researchers have extensively investigated the role that MD plays in both traditional and cyber-bullying. Many have shown that traditional bullies have higher levels of MD (e.g., Perren & Gutzwiller-Helfenfinger, 2012), and that a reduction in MD is associated with a reduction in antisocial behavior (Shulman, Cauffman, Piquero, & Fagan, 2011). The findings on MD and cyber-bullying are somewhat inconsistent although a positive link between MD and cyber-bullying has been documented (Thornberg & Jungert, 2013). Children and adolescents who engage in delinquent behavior exhibit high levels of MD as well (Bandura et al., 1996). The directionality of the relation between MD and aggression remains to be determined, but the most convincing model assumes a bi-directional process whereby children retrospectively justify their acts of aggression using techniques of moral neutralization, but moral disengagement also prospectively serves to facilitate future harm-doing against others (Ribeaud & Eisner, 2010). Thus far, however, researchers have not systematically studied if and when mechanisms of MD occur in childhood, although some evidence suggests that early patterns of dysfunctional family- and community contexts, and low empathy contribute to later MD and aggression (Hyde, Shaw, & Moilanen, 2010).

Moral Emotions

In the past decade, moral developmental researchers have increasingly begun to study the role of emotions in children's emerging morality and aggressive behavior. This focus was partially established in order to overcome the strong focus on moral cognition and to identify the factors that prevent children from acting in accord with moral principles of fairness, justice, and care. Emotions were a prominent candidate for further investigation as they matter to us and may therefore serve as important motives for moral action tendencies and impede amoral, aggressive acts (Malti, Gummerum, Keller, & Buchmann, 2009). In developmental research, moral emotions have been defined as self-conscious or self-evaluative emotions because they require an evaluation of one's own action in relation to others in morally relevant conflict situations (Eisenberg, 2000; Malti & Ongley, 2014). Prototypical moral emotions are guilt and shame, as well as the morally relevant process of empathy. Traditionally, research on moral emotions and aggression has had a strong focus on empathy/sympathy and aggression. Overall, there is

evidence that aggression is negatively associated with empathy, particularly the affective component of empathy or sympathy (Jolliffe & Farrington, 2006). In fact, some researchers have argued that empathic dysfunction is one of the major features of clinical symptoms of aggression, such as psychopathic tendencies (J. Blair, 2008). There is also evidence of impaired affective empathy in bullying (Caravita, Di Blasio, & Salmivalli, 2009). This deficit is related to impairments associated with amygdala dysfunction. However, the overall relation between empathy and aggression appears to be only modest in strength, and depends on the type of aggression, age period (i.e., overall, the findings appear more consistent in adolescence than in childhood), and the empathy component (with stronger effects for affective empathy than for cognitive empathy, see P. A. Miller & Eisenberg, 1988). Because of these inconsistencies, future work is needed to disentangle how the different components of empathy, such as affective arousal, emotion understanding, and emotion regulation, are associated with aggression (Decety, 2010).

Another line of work has focused on the role of feelings of guilt in aggression. Guilt feelings indicate that moral norms have been internalized and that individuals accept responsibility for their wrongdoing. For this reason, it is thought that guilt may inhibit aggression (Malti et al., 2009). Developmental research suggests that early precursors and forms of guilt feelings are negatively associated with the development of aggression (e.g., Kochanksa, Barry, Jimenez, Hollatz, & Woodard, 2009). A prominent line of work on the role of guilt in aggression has been conducted in the happy-victimizer paradigm, which has studied the emotions that children expect moral wrongdoers or the self in the role of the moral wrongdoer to feel. These emotion attributions have been interpreted as guilt feelings (Malti & Ongley, 2014). Taken together, this line of research shows that aggressive behavior is negatively related to guilt feelings, both in childhood and adolescence (for a review, see Arsenio, 2014). In a recent meta-analytic review with more than 8,000 participants, Malti and Krettenauer (2013) found that guilt feelings, as operationalized by self-attributed negative emotions following wrongdoing, were negatively associated with aggression, with a medium-size effect (Cohen's $d = .47$). Recent research has begun to assess spontaneous emotions (also known as microexpressions) in response to transgressions using emotion recognition technology (Dys & Malti, 2014). As these emotions are rapid and often unconscious emotional expressions, they can provide insights into children's automatic emotional processes and the ways in which they

influence children's aggression. As such, these kinds of analyses can provide answers to state and trait components of aggression antecedents. There is also evidence that these self-attributed happy emotions are more consistently related to proactively aggressive tendencies than to reactive forms of aggression (Arsenio et al., 2009). Related research on bullying and guilt feelings has revealed a similar lack of guilt in bullies (Thornberg & Jungert, 2013).

In conclusion, this research has shown important links between the moral emotions of guilt and empathy-related responding to aggression. Future work is needed to disentangle how different components of these complex emotions, such as arousal versus emotion understanding, are associated with overt aggression and different subtypes of aggression across development. It would also be beneficial to extend the research on children's narrative construals to assess their emotional experiences of their own interpersonal conflicts, as these may reveal the emotional subtleties involved in experiences of harm and moral transgression (Gutzwiller-Helfenfinger, Gasser, & Malti 2010).

“Moralistic” Aggression

An argument that follows from evolutionary theory is that aggression plays a critical role in maintaining cooperation among humans (Eisner, 2009). Thus, evolutionary theory and game theory alike maintain that cooperation (i.e., the expenditure of resources for someone else's benefit) among genetically unrelated individuals should be selected against, because self-interested actors benefit from not adhering to rules (“cheating”) and reaping the benefits of group efforts without contributing themselves. In game-theoretic terms, in the absence of sanctions, cheating is a dominant strategy. Trivers (1971) therefore argued that, in a cooperative species like homo sapiens, psychological mechanisms must have evolved that overcame this “free-rider” problem. The most important such mechanism is “moralistic aggression”; the process whereby members of a group inflict costs on individuals who choose non-cooperative or “cheating” strategies (Kurzban, DeScioli, & O'Brien, 2007). Such exacted costs can take different forms such as social exclusion, the infliction of physical pain, or murder. If imposed by specialized agencies they are referred to as “punishments,” if carried out by individuals they are described as revenge or reactive aggression. Experimental evidence suggests that moralistic aggression can be reliably elicited in situations predicted by evolutionary theory: Thus, large proportions of individuals are prepared to incur costs for themselves when faced

with violations of social norms, and, when presented with scenarios that indicate different levels of free-riding by other players, respondents express more anger the less the other players adhere to fairness norms (Fehr & Gächter, 2002). Brain-scans suggest that humans derive emotional satisfaction from punishing defectors, and that individuals are more likely to inflict higher punishments on defective (self-interested) players if they are observed by others (Kurzban et al., 2007, p.13). In other words, perceived disrespect, injustice and unfair treatment are important drivers of the anger that leads to aggression motivated by the moralistic aim of restoring balance (D. T. Miller, 2001). This process of intervening, with either physical or verbal aggression, in the case of deviations or violations of fairness norms begins as early as Age 3, and has been interpreted as reflecting an emerging sense of reciprocity and fairness during toddlerhood (Tomasello & Vaish, 2013).

Conclusions

Taken together, integrative research on moral development and aggression has contributed to an increasing understanding of the moral antecedents of aggressive behavior in children and adolescents. We believe that future research systematically integrating these two domains further will be informative, both for the development of theory as well as for applications. While the former has made good progress in recent years, there is still much need to translate moral developmental research into effective strategies that prevent aggression and violence in childhood and adolescence. Collectively, these studies reveal several implications for future research and developmental theory. Clearly, one area for future work is the systematic study of developmental processes involved in the associations between moral cognition, moral emotions, and beliefs about morality, on the one hand, and aggression and violence on the other. A developmental approach to the study of moral emotions, cognitions, and attitudes toward aggression will further elucidate the independent and combined effects of various dimensions of moral development on aggression and violence. This requires longitudinal designs and comprehensive assessments of morality as well as aggression.

Furthermore, future work should combine different levels of analysis, such as trait-based measures and experience sampled measures of empathy and related moral emotions, to yield better understanding of the role of moral emotions in the development of children's and adolescents' aggressive tendencies. This would involve

an analysis of verbal and expressive components of emotion, physiological arousal, brain activity, and observed components of emotions. Lastly, developmental research on real-life experiences of social inequality and injustice, such as social exclusion or exposure to war, is warranted to further elucidate the role of moral reasoning and moral emotions in the development of aggression. Multifaceted social contexts often involve conflicting moral and amoral concerns, such as group functioning or traditions, which may interfere with morality and prompt aggression to be used as a means to reach specific goals or to maintain group functioning (Malti, Killen, & Gasser, 2012). Research on morality in real-life social conflict situations will help to explain how these experiences affect children's and adolescents' morality, aggression, and violence.

FAMILY FUNCTIONING AND AGGRESSION

The links between socialization in the family and the development of aggression and violence have been extensively studied. In the next sections, we provide a selective summary of this literature, identify strengths and challenges, and provide suggestions for future research. Regarding the role of family processes in the genesis and development of aggression, various components, such as marital conflict, domestic violence, family SES, parent characteristics, and sibling relations, have been studied. Given the limited space, we focus on two of the most well-researched dimensions of family functioning: Attachment and parenting (see Bowlby, 1958; Grusec & Davidov, 2010).

Attachment to Parents and Significant Others

The bond between children and parents has long been recognized as important for children's social-emotional and behavioral development. John Bowlby's theory of parent-child attachment integrated evolutionary, biological, developmental, and cognitive concepts into a coherent model of human behavior (Bowlby, 1958). It postulated that the quality of the attachment between mothers and children during infancy has a lasting influence on socioemotional development, including both internalizing and externalizing problems. A recent meta-analysis examined the evidence for the developmental link between insecure attachment and subsequent externalizing behaviors (Fearon, Bakermans-Kranenburg, Van IJzendoorn, Lapsley, & Roisman, 2010). It found substantial support for the hypothesized link, but the average effect size was small

($d = 0.31$) over an average period of 25 months between the measurement of attachment and the assessment of children's externalizing behaviors. The authors also noted a clear lack of studies on father-child attachment. The few existing findings suggest that positive bonds between children and their fathers play important roles in the socialization of children. For example, in an analysis of the National Longitudinal Study on Youth, 1997 wave, Bronte-Tinkew, Moore, and Carrano (2006) found that positive father-child relationships were associated with less property crime, violence and substance abuse at Age 15. These effects were found after controlling for various aspects of the mother-child relationships and other well-known developmental risk factors. Evidence showing the importance of supportive bonds with adults other than the parents also comes from experimental research on the effectiveness of mentoring programs (Dubois & Karcher, 2013).

Parenting Styles and Practices

Current parenting research has been inspired by Diana Baumrind's seminal parenting typology (Baumrind, 1966) with considerable research examining different components of parenting styles (Morris, Cui, & Steinberg, 2013). In the current literature, three dimensions have been consistently identified: parental warmth versus rejection and hostility, structure or behavioral control versus chaotic and inconsistent parenting, and autonomy support versus strict coercion and emphasis on obedience (Skinner, Johnson, & Snyder, 2005). One of the most consistent findings in developmental research on externalizing behavior problems is the correlation between ineffective parenting practices and the onset and continuation of aggressive and antisocial behaviors (e.g., Beyers, Bates, Pettit, & Dodge, 2003). A growing number of studies have revealed links between parenting and aggression in children and adolescents. Several groups of parenting risk factors have been identified: They include inconsistent and harsh parental discipline, low parental involvement in children's activities, poor supervision, and lack of parental warmth or emotional support (e.g., Loeber and Hay, 1997; Olson et al., 2011). Parental warmth may be a protective factor because it promotes the development of empathy, which is known to be associated with a lower likelihood of aggression (Malti, Eisenberg, et al., 2013). A recent meta-analysis examined the strength of the association between parenting and delinquency (Hoeve et al., 2009). Examining 161 studies, the meta-analysis found the strongest associations between delinquency and poor parental monitoring,

parental rejection, hostility and neglect, as well as psychological control (i.e., intrusions in the development of the child). By and large, these findings confirmed the results of over 50 years of research on the topic; namely that poor supervision and harsh and hostile parenting are among the best-replicated and strongest correlates of aggression and violence in children and adolescents. Longitudinal studies provided even stronger evidence of parenting effects on aggression. For example, mothers' spanking at Age 3 has been found to be associated with Age 5 aggressive behavior even after controlling for initial levels of aggressive behavior and other confounding variables such as parents' characteristics, family demographics, and functioning in a population-based U.S. sample (Taylor, Manganello, Lee, & Rice, 2010). Harsh parenting can be transmitted from one generation (i.e., grandparents) to the next (i.e., parents), with the latter predicting child externalizing behavior (Bailey, Hill, Oesterle, & Hawkins, 2009), though it remains unclear if this is, in part, an effect of unmeasured genetic commonalities.

Mechanisms of Parental Influence on Aggression

Several studies have investigated the mechanisms whereby harsh parenting affects externalizing problems. Specifically, poor emotion regulation skills may explain how parenting contributes to adjustment (Morris, Silk, Steinberg, Myers, & Robinson, 2007). Indeed, harsh and intrusive parenting is associated with poor emotion regulation of the child, which is, in turn, associated with aggressive behavior from an early age onwards. For example, Age 3 self-regulation mediated the link between Age 2 low maternal warmth/sensitivity and child externalizing behavior problems at 4 to 5 years in alcoholic families (Eiden, Edwards, & Leonard, 2007). Similarly, self-control mediated the relation between harsh parenting in the preschool years and Age 11 externalizing behavior (Bradley & Corwyn, 2007). Burnette, Oshri, Lax, Richards, and Ragbeer (2012) examined mediators of the effects of harsh discipline on externalizing behavior during early to late adolescence. They found that the effects on externalizing behavior were partly mediated by their effect on emotional reactivity (i.e., being easily aroused) and disinhibition (i.e., self-control and sensation seeking), although in this study harsh parenting only had a significant effect on externalizing behavior for girls, but not for boys. Another link between harsh parenting and aggressive behavior outcomes is through social and cognitive skills. For example, in a study by Dodge, Greenberg, Mallone, and the Conduct

Problems Prevention Research Group (2009), an early social context of disadvantage in kindergarten predicted harsh-inconsistent parenting. This in turn predicted social and cognitive deficits, which predicted conduct problem behavior. High levels of conduct problem behavior in children predicted elementary school social and academic failure, which in turn predicted parental withdrawal from supervision and monitoring. Finally, low parental supervision was associated with deviant peer associations, which ultimately predicted adolescent violence.

Current Themes and Future Directions

The size and importance of causal effects of parenting on children's aggressive behavior is still a source of controversy, for at least three reasons (see Morris et al., 2013, for a review): First, the connection between parenting and child behavior is increasingly viewed as a bidirectional process where parenting is as much influenced by child behavior as the other way round (Rothbaum & Weisz, 1994). For example, Stattin and Kerr (2000) criticized popular assumptions about the association between parental monitoring and aggression. They showed that this well-known association reflected the effect of children's evasiveness rather than a genuine product of parental surveillance (Stattin & Kerr, 2000). Kerr, Stattin, and Özdemir (2012) later re-examined the relationship between parental monitoring and adolescents' maladjustment, reporting that the effects of adolescent adjustment on the changes in parenting styles were more robust than the effects of parenting styles on changes in adolescent adjustment. Similarly, a longitudinal study by Huh, Trastan, Wade, and Stice (2006) of 496 adolescent girls found more support for the hypothesis that externalizing problem behavior had a detrimental impact on subsequent parental support and control than for the reverse. Finally, Burke, Pardini, and Loeber (2008) examined the bidirectional relationship between parenting and disruptive psychopathology in a clinic-referred sample of 177 boys assessed at 10 time-points between Ages 7 and 17. They found limited evidence of parenting effects on child behavior, but substantial support for the notion that child problem behavior affects parenting. In particular, children's oppositional defiant disorder symptoms predicted timid parental discipline, lower parental involvement, and poor communication.

Increasingly, the social mold or socialization model is being criticized, with relatively consistent evidence of reciprocal processes emerging (Pettit & Arsikawa, 2008). In line with the notion of turning points and their role

on trajectories of aggression, it is also possible that the direction of effects changes with age, in that parents may have a greater influence on child behavior at earlier stages, while child behavior has more effects on parenting in later years. In addition, there might be many other confounding variables. For example, poor parenting often comes with a number of other environmental risk factors such as poor parental health, parental conflict, and economic stress. Isolating the effects of parenting from these processes has been difficult. Each parenting dimension also does not stand-alone, so future research on their joint effects is warranted. Third, there is increasing evidence that the effects of parenting on externalizing problems may be moderated by various other individual-level variables such as temperament and emotion regulation (Rubin et al., 2003) or biological reactivity to context (Erath, El-Sheikh, Hinnant, & Cummings, 2011). For example, children with dopamine D4 receptor (DRD4) 7-repeat polymorphism showed increased externalizing behaviors when they were exposed to insensitive parenting (Bakermans-Kranenburg & van IJzendoorn, 2006). Biological indicators of self-regulation, such as respiratory sinus arrhythmia (RSA), and biological sensitivity to context, such as skin conductance reactivity (SCLR), also moderate the association between harsh parenting and the development of externalizing behavior. For example, Erath et al. (2011) found that boys with lower SCLR and harsh parenting maintained high and stable externalizing behavior from Age 8 to Age 10 while externalizing behavior increased from Age 8 to Age 10 in boys with higher SCLR and harsh parenting. Finally, a considerable part of the shared variance in poor parenting and poor child outcomes is likely due to shared genetic factors (Moffitt, 2005). Notably, aggressive children may be at risk of having abusive or neglectful parents, not because poor parenting is the cause of aggression, but because harsh and unresponsive parenting and aggressive child behavior have the same genetic roots.

Conclusions

In summary, the relationship between family functioning and children's and adolescents' aggression is one of the best-researched areas of developmental psychology. Yet, research since 2000 suggests that some accepted answers are now being challenged. In future, bidirectional and nonlinear models need to be investigated to understand both parent and child effects better. Potential confounding variables also need to be controlled for, and biological and genetic characteristics of both children and parents need

to be considered in research on the roles of parent-child relationships and parenting styles on the development of aggression and violence.

PEER RELATIONS

Peer relationships become increasingly important during middle childhood, and developmental research has long suggested a link between peer relations and the development of aggressive behavior in childhood and adolescence. For example, aggressive behavior leads to peer rejection, which in turn predicts subsequent aggression (Lansford, Malone, Dodge, Pettit, & Bates, 2010). Below we provide a selective review of central findings in this area of research, outline strengths and gaps in the current research on peer relations and aggressive behavior, and highlight areas for future research. We differentiate between broader social network variables, on the one hand, and friendship relationships, on the other hand, to characterize children's relationships with peers.

Social Networks and Aggression

There are various relations between social networks and the development of aggression. In this literature, children's and adolescents' social networks are often assessed using measures of social preference (i.e., being accepted/rejected by peers), popularity (i.e., perceived centrality in the peer group), social impact (visibility in the peer group), and social centrality (social status within the network). Social network variables have frequently been measured using peer nomination techniques. For example, social preference is often calculated by counting the number of peer-like nominations, and subtracting the number of peer-dislike nominations. While some studies have also utilized peer nominations of aggression and bullying, many studies also include self- and other reports of aggressive problem behavior (see Rubin et al., 2009).

One main area of research has focused on relations between social preference and aggressive behavior in children and adolescents. Overall, social preference is related rather consistently and negatively to various forms of aggression across childhood and adolescence, both cross-sectionally and longitudinally (Lansford et al., 2010; van Lier & Koot, 2010). The moderators and mediators of this relation are less well-understood. However, peer rejection may relate differentially to aggression depending on the form of aggression. In a meta-analytic review,

Hubbard et al. (2010) showed that reactive aggression, but not proactive aggression, was positively associated with peer rejection.

Another line of work has investigated links between aggressive behavior and different components of peer networks such as popularity, likeability, and peer reputation. The literature shows, in part, differential relations to aggression. For example, a study by Prinstein and Cillessen (2003) has shown that high peer-perceived popularity and low social preference was associated with increases in overt and relationally aggressive behavior in adolescence over a 17-month interval. Because there is consensus in the literature that various social network variables are associated with the emergence, maintenance, and decrease in levels of aggression from early childhood to adolescence, the field has moved toward examining the causal mechanisms and investigating moderators and mediators of this relation, as well as effects on subsequent mental health outcomes.

Friendship and Aggression

Aggression and children's friendship relations have frequently been related conceptually. One of the reasons is that friendships are considered to be among the most central contexts for children's behavioral adjustment and assumed to yield emotional and social benefits for children (Berndt, 2002; Rubin, Malti, & McDonald, 2012). As such, they may help children and adolescents with aggression to overcome these behavior problems. In support of this notion, some researchers have shown that children with aggressive behavioral problems who experience warm and supportive friendships may become less aggressive over time as a result of their positive experiences with friends (Poulin, Dishion, & Haas, 1999). However, friendships that are characterized by negative interactions may not yield socioemotional benefits for children, but may instead promote maladjustment. Furthermore, some researchers have found that children with aggressive behavior problems may have trouble forming and maintaining constructive friendships (Cillessen, Jiang, West, & Laszkowski, 2005). For example, Bagwell and Coie (2004) examined 48 dyads of 11-year-old boys. While they found no differences in self-reported friendship quality between aggressive and nonaggressive youth, they observed more positive engagement and reciprocity in nonaggressive boys and their friends compared with aggressive boys and their friends. Still others have documented that associations between aggression and friendship quality are moderated

by other behavioral and emotional characteristics, such as prosocial behavior (McDonald, Wang, Menzer, Rubin, & Booth-LaForce, 2011). Children with aggressive behavior also have biased cognitions about friendship relations and display low levels of guilt (Malti & Keller, 2009).

Another line of work has investigated selection and influence effects of affiliating with deviant peers on aggressive behavior (for a review, see Dishion & Pihler, 2009). Selection effects are effects whereby previously aggressive children prefer peer relationships with those who are similar in their behavior tendencies. Influence effects relate to the notion that aggressive peers influence the behavior of children who were previously less aggressive. There is substantial support for selection effects (i.e., "birds of a feather flock together"). For example, children choose friends similar to themselves in aggression, controlling for between-friends influence (Berger & Rodkin, 2012). There is also much evidence for influence effects in the literature. Accordingly, although many children may be aggressive before affiliating with deviant peers, peer groups can influence and exacerbate these tendencies (for a review, see Salmivalli, 2010). For example, a study by Weerman (2011) found support for the notion that joining or leaving a street-oriented youth group has substantial effects on delinquency. Haynie (2001) examined the effects of peer networks on delinquency and documented that not all adolescents are influenced to the same degree by their peer networks. Rather, when more of the youths are delinquent or the network is very cohesive, peer delinquency plays a more significant role in the target individual's delinquency.

The development of statistical models to estimate stochastic actor-based models of network dynamics has had a major impact on research exploring the link between peer networks and the development of aggressive behavior (e.g., Veenstra, Dijkstra, Steglich, & van Zalk, 2013). Specifically, longitudinal network analysis involves repeatedly measuring a person's network (e.g., Snijders & Baerveldt, 2003), allowing researchers to disentangle selection and influence effects. A study by Sijtsema et al. (2010) suggested that instrumental, reactive and relational aggression were more likely to be adopted from friends in a sample of 12- to 14-year-olds, but also that adolescents tended to select their friends on the basis of similarity, and that friends reinforced each other's aggressive behavior. A study by Dijkstra et al. (2010) also used network analysis to examine the dynamics of weapon carrying among adolescents in three American high schools that primarily served low-income minority students. Dijkstra found strong influence effects, suggesting that adolescents who

befriended peers who carry weapons subsequently carried weapons, too. Additionally, carrying weapons was associated with aggressiveness rather than vulnerability. The authors argued that this reflected status dynamics whereby low-status peers tried to imitate the behavior of high-status peers (Dijkstra et al., 2010, p. 207). In a similar vein, it has been suggested that friends who are similarly aggressive may reinforce each other's aggressive behaviors (Dishion & Pihler, 2009). Furthermore, if children have friendships with peers who are aggressive, their own aggressive behaviors may remain stable or increase over time (e.g., Adams, Bukowski, & Bagwell, 2005). However, peer influences may also be positive. For example, aggressive children who are friends with nonaggressive peers become less aggressive over time (Warman & Cohen, 2000).

Bullying and Social Dominance

Bullying among adolescents is found in all human societies. Its conceptual association with social dominance within the peer group has led several scholars to examine hypotheses derived from evolutionary theory (Hawley, 2003; Prinstein & Cillessen, 2003). For example, among primary-school children, aggression was associated with high dominance status in peer groups, especially for a "Machiavellian" subgroup of children who strategically mixed coercive/aggressive with more prosocial strategies (Roseth et al., 2007). Pellegrini and Long (2002) examined the functions of boys' social dominance during the transition from primary school to middle school. They argued that boys use a mix of strategies to achieve social dominance, including agonistic (e.g., bullying) and more affiliative (e.g., having a network of peers) strategies. They interpreted the transition from primary to middle school as a change in children's ecology that disrupted established dominance structures, and therefore increased the probability that agonistic strategies would be adopted until new hierarchies were established. In line with their expectations, they found that dominance in the new school environment was initially associated with aggressive behaviors. Five months later, in contrast, teacher-assessed dominance in the class was associated with more affiliative skills.

Along similar lines, Vaillancourt (2005) has proposed an evolutionary theoretical framework to understand indirect aggression among females, which has been observed in many cultures. She suggested that indirect female aggression is an evolved pattern that represents a strategy for securing access to mates and reducing the value of

competitors. According to this perspective, indirect aggression should peak at the age of maximum reproductive value (i.e., Ages 11 to 15), early-maturing girls should be more likely to engage in indirect aggression, and a large proportion of female indirect aggression should entail accusing other females of being unattractive sexual partners.

Bystanders and Aggression

A recent research perspective that emphasizes the episodic character of aggressive acts has focused on the role of bystanders in bullying incidents (Salmivalli, 2010). Starting from the observation that peer witnesses are present in most bullying incidents, Salmivalli's research team examined their reactions and the ways in which these reactions contribute to or resolve the problem. Using peer-nomination data, the researchers identified four roles: assistants of bullies, reinforcers of bullies, outsiders, and defenders of the victim. They hypothesized that the behavior of these bystander groups significantly affects the behavior of the bullies: If others join in the bullying or give even subtle positive feedback they should reinforce the aggression, whereas challenging bullies by taking sides with the victim was expected to help end bullying episodes. A series of empirical studies supported the expectation that the behavior of bystanders acted as a moderator: Depending on their action the likelihood of bullying was either reinforced or reduced (Salmivalli, 2010). Additionally, interventions in support of victims positively influenced the victims' well being.

Salmivalli and colleagues' findings (e.g., Kärnä et al., 2011) regarding the situational dynamics of bullying and the role that bystanders play have led to the development of a Finnish bullying prevention program, KiVa. In addition to the indicated interventions for bullies and victims, the program specifically focuses on changing school-wide norms and changing the behavior of pupil bystanders within a framework of support by schools. The effectiveness of the program has been evaluated in a randomized controlled field trial in which pupils in years 4–6 (10–12 years) in 78 schools were randomly assigned to intervention and control conditions. Findings suggested that the intervention had consistent beneficial effects on seven out of 11 outcomes 9 months after the intervention. This included self-reported and peer-reported victimization and self-reported bullying.

Mechanisms of Peers' Influence on Aggression

To go beyond mere correlational findings, research has investigated potential mechanisms that underlie the

associations between peer relations (i.e., social networks and friendship relations) and aggression. Mechanisms at the social level (e.g., norms of aggression in the peer group) and at the individual level (e.g., holding specific values or affiliating with friends with specific characteristics) are distinguished. At the social level, one mechanism is the acceptability of aggression as a group norm that can make aggression more legitimate and thus make those using it socially accepted and popular (see the previous section on moral disengagement and aggression). In accord with this notion, individuals behaved more aggressively when the group norms favored aggression, especially at 6 rather than 9 years of age (Nesdale, Durkin, Maass, Kiesner, & Griffiths, 2008). At the individual level, research has shown that a wide range of psychological factors moderate and mediate associations between peer networks and aggression. For example, it has been suggested that aggression can promote popularity, particularly when it is accompanied by peer respect (Kuryluk, Cohen, & Audley-Piotrowski, 2011). It has also been shown that high-status peers are particularly likely to influence social aggression in the peer group (Shi & Xie, 2012).

Conclusions

In summary, important research on the role of peer relations in aggression has been undertaken. Affiliation with deviant peers and friends clearly exacerbates aggressive behavior although research on the moderators and mediators of these associations is still relatively sparse. Future research thus needs to determine if and how variation in the features of children's peer and friendship relationships relate to their aggressive behavior trajectories. In other words, who are the friends and peers of children and adolescents with aggressive behavior, what are their developmental and social backgrounds, and how do these features help shape the development of aggression in children and youths. Furthermore, although there is now considerable research on the mechanisms that underlie the various associations between peer relations and aggression, models that test dynamic relations between these variables over time are still sparse. Therefore, longitudinal network analysis is needed to shed further light on the causal mechanisms that underlie stability and change in children's peer relations and aggression. Lastly, researchers have stressed the role of culture in children's peer and friendship relationships (Chen, Chung, & Hsiao, 2009), and there is some limited research on peer relations and aggression outside of North America and Europe (e.g., for a study on popularity and

aggression in India, see Bowker, Ostrov, & Raja, 2012). For example, one study found that Chinese peer groups were homogeneous on aggression (Chen, Chang, & He, 2003). Chen et al. (2009) concluded that children appear to form peer groups on the basis of similar behavioral characteristics that are culturally embedded. However, few cross-cultural research studies on peer relations and aggressive behavior have been published, and more research on the way in which cultural norms, values, and expectations influence children's peer relations and aggression is needed.

MACRO-LEVEL DYNAMICS AND INDIVIDUAL DEVELOPMENT

Most developmental aggression research emphasizes proximal data tracking the unfolding of individual characteristics and life-circumstances. It emphasizes the influence of factors like deficits in executive functioning, parental maltreatment, or associations with delinquent peers. Macro-level comparative research on violence, in contrast, usually relies on aggregated data to examine cross-national, regional, or neighborhood level differences in violence. In its explanatory framework, macro-level research tends to examine factors such as social inequality, the quality of governance, social disorganization, or alcohol and firearm availability (e.g., Nivette, 2011). Bringing these two perspectives together has been a continuing challenge. Although most developmental models of aggressive behavior incorporate cascade models of how contextual (neighborhood, city, country) influences shape individual development, the nature of the causal chains linking macro and micro-level variation has remained elusive.

Cross-National Differences

Social contexts differ widely with respect to levels of violence (United Nations Office on Drugs and Crime [UNODC], 2011). Homicide rates, for example, vary between countries by a ratio of about 1:100, and worldwide differences between cities vary by factors of a thousand (e.g., in the early 1990s between about 350 per 100,000 in Medellin, Colombia, and about 0.4 per 100,000 in Tokyo, Japan). The 2011 UNODC *Global Study on Homicide* showed that the burden of youth violence was very unequally distributed across regions and countries: Latin America had the highest average rates of homicides committed by young people at Ages 15–24 with a rate of 36.6 per 100,000 inhabitants. In Europe, the average youth

TABLE 19.2 Homicide rates by youth and adults across WHO regions

	Youth (15–24)	Adults	Total
Africa	16.1	8.5	10.1
North America	12.0	4.6	5.6
Latin America	36.6	16.1	19.9
Asia	2.4	2.1	2.1
Caribbean	31.6	13.2	16.3
Europe	1.2	1.3	1.2
Oceania	1.6	1.2	1.3

Source: From *Global Study on Homicide: Trends, Context, Data*, by United Nations Office on Drugs and Crime, 2011, New York, NY: Author.

homicide rate was about 30 times lower, at 1.2 per 100,000 (Table 19.2).

Large-level differences between societies raise a number of questions for developmental research, many of which cannot currently be answered convincingly. We highlight three issues: First, from a developmental perspective, one would want to know the age at which these differences emerge. Do countries with high rates of homicide or robbery also have higher rates of ODD and CD in middle and late childhood? Recent work suggests that this may not be the case. For example, Murray, Anselmi, Gallo, Fleitlich-Bilyk, and Bordin (2013) conducted a systematic review of studies on the prevalence of conduct disorders in Brazil, a country with one of the world's highest homicide rates (about 30 per 100,000) and a large proportion of children living in poverty, being exposed to multiple environmental risk factors. They identified four studies of 7- to 14-year-olds that used the Development and Well-Being Assessment (DAWBA) as a diagnostic instrument. The studies showed average rates of 1.4% (CD) and 2.4% (ODD) in Brazil, rates that were remarkably similar to those found in high-income countries like Britain (1.5% and 2.3%) and Norway (0.5% and 2.3%), where the homicide rates were 30 times lower than in Brazil. Similarly, Canino, Polanczyk, Bauermeister, Rohde, and Frick (2010) conducted a worldwide review of studies on the prevalence of CD and ODD among children 18 years or younger. Their analysis included 25 studies from some of the least and most murderous social contexts in the world (e.g., Puerto Rico and Norway). There was no cross-cultural variation in the prevalence estimates of ODD and CD once methodological variations were taken into account. If corroborated by further evidence, this lack of meaningful cross-cultural differences in the prevalence of conduct disorders would suggest that macro-level variation in criminal violence is due to adolescent-specific risk factors rather than early developmental problems. For example, youth

violence may be a more adaptive behavior in contexts characterized by illegal drug markets, gangs, poor state functioning, or ethnic cleavages. Developmentally, this would imply that the near universal individual differences in aggressive potential in childhood are amplified during adolescence as a function of opportunity structures specific to adolescence.

Second, little is known about which of the many proximal risk factors are responsible for societal differences in violence. Emerging cross-cultural comparative work shows that the major developmental individual, family, and peer risk factors are broadly similar across cultures (e.g., Chen & Astor, 2010), although the effect sizes are unlikely to be invariant cross-culturally. Cross-national differences in youth violence may therefore emerge from several different processes: The exposure to one or several risk factors may vary between societies; the presence and combination of protective factors may differ between nation states; the effect size of any one risk or protective factors may itself be variable, possibly as a result of its cultural meaning or as a consequence of interactions with other risk factors. For example, high impulsivity is universally associated with youth aggressive behavior (Vazsonyi & Belliston, 2007), but it is currently very difficult to say whether the vast differences in lethal youth violence between, for example, Honduras and Chile can in any way be attributed to differences in self-control or some other developmental factor. Moreover, different processes are involved in different places. For example, early malnutrition increased the likelihood of externalizing behavior up to Age 17 in Mauritius, while exposure to war, especially when combined with poor parenting, predicted aggressive behavior in Palestine.

Third, we know little about how macro-level characteristics that account for variation in violence rates are linked to more proximal developmental dynamics. For example, Nivette and Eisner (2012) found that beliefs in the legitimacy of the state (i.e., that the state is fair and that its rules should be obeyed) is a highly significant predictor of cross-national variation in homicide rates. But how do findings that weak, failing, and illegitimate states have increased amounts of violence relate to questions about individual development? Empirical research on the causal cascades that may explain such links is only emerging. Thus, increasing evidence suggests that manifestations of organized violence such as vigilante groups, youth gangs, or drug cartels emerge when states fail to provide protection, the police are seen to be unfair, and criminal justice agencies are seen as inefficient or corrupt. In Ghana, for

example, Tankebe (2009) showed that citizens were more willing to engage in vigilante self-justice if they perceived the police as unfair and untrustworthy. Similarly, youth in Jamaica were more willing to cooperate with the police when they felt the police were fair and legitimate (Reisig & Lloyd, 2009). Such findings suggest that the functioning of state institutions has repercussions for the legal socialization of children and adolescents (Fagan & Tyler, 2005). In particular, the likelihood of violent self-help seems to depend, among other factors, on the extent to which a central authority is believed to provide protection, enforcing legitimate rules that reflect shared moral values fairly.

Emerging experimental research suggests that the legitimacy of social institutions is a direct causal force, and that preventive interventions can successfully promote cooperation by improving legitimacy. A meta-analysis by Mazerolle, Bennett, Davis, Sargeant, and Manning (2013) for the Campbell Collaboration examined 28 studies with experimental or quasi-experimental designs that had examined the effects of interventions aimed at improving police legitimacy and procedural justice. There was a highly significant average effect of this type of intervention on citizens' compliance with the law ($OR = 1.62$).

Trends in Violence

There is also significant gap between developmental research and macro-level scholarship in relation to trends in violence rates over time. Over the past 50 years, many macro-level indicators of violence show two main periods of change in many Western societies (United Nations Office on Drugs and Crime, 2011): The first involved a steep increase in serious interpersonal violence concentrated in the period between the early 1960s and the early 1980s and the second a sustained decrease in homicide and other manifestations of violence since the early 1990s (Zimring, 2006). In the United States, the homicide rate has declined by 60% from a peak of about 10 per 100,000 in 1991 to about 4 per 100,000 in 2012. Evidence for the decline can be found in all major indicators of violence including robbery, rape, assault, and child abuse (Blumstein & Wallman, 2006). Moreover, the decline extended to other indicators of teenage problem behaviors including teenage pregnancies, substance abuse, and binge drinking (Finkelhor & Jones, 2006).

An extensive literature has proposed various explanations for the later decline. They include economic prosperity, demographic changes, the end of the crack-cocaine epidemic, the legalization of abortion, increases in the

number of police officers, higher imprisonment rates, more effective pharmacological treatment, fewer environmental neurotoxins, and broad socio-cultural change (for discussions see, Finkelhor & Jones, 2006; Blumstein & Wallman, 2006).

Many of these explanations remain contested, in part due to the lack of convincing evidence linking macro-level variation to changes in individual-level behavior. A study by Collishaw, Gardner, Maughan, Scott, and Pickles (2012) illustrated the dilemma: This study used two national samples of British adolescents in 1986 and 2006 to examine whether trends in youth antisocial behavior could be explained by changes in parent-child relationships. The authors found that, in both waves, poor parental monitoring, low youth disclosure to the parents, low parental interest, and low quality time with parents were significantly associated with more conduct problems. This is in line with the wider literature on parenting and antisocial behavior. However, there was no evidence that the increased incidence of conduct problems was associated with a secular decline in parenting quality over time. In fact, initial descriptive trend analyses showed significant increases in parental monitoring and normative parental expectations. Furthermore, analyses suggested that the increase in conduct problems might even have been bigger if parenting had remained unchanged over the period. The authors argued that, while some parenting interventions have been shown to be effective in altering youth problem behavior trajectories, there was no evidence that population-level changes in parenting were associated with any major change in the incidence of conduct problems.

Period or Cohort Effects?

An important step toward understanding the American decline in interpersonal violence would involve clarifying whether it was due to a cohort effect or a period effect. A cohort effect would imply that younger cohorts had a consistently lower propensity for antisocial behavior. This would suggest that factors early in their lives influenced their long-term trajectories. A period effect would mean that, in the mid-1990s, the likelihood of committing crimes declined simultaneously in different cohorts. Fabio et al. (2006) addressed this question by comparing the youngest and the oldest birth cohorts of the Pittsburgh Youth Study. A comparison of these two cohorts is particularly salient because the older cohort was aged 15 in 1989, a period of steep increases in homicide rates nationally, while the younger cohort was aged 15 in 1995, when national

homicide rates had started a steep decline. The two cohorts differed significantly in their violent offending, with the younger generation having lower levels of violence than the older generation. However, the lower rate of the younger cohort could not be explained by differences in the exposure to individual and neighborhood-level risk factors, including gang membership and hard drug use. The authors also found little evidence of a cohort effect, as there was no consistent tendency for the younger cohort to have lower violence rates than the older cohort at the same age. Rather, the lower violence rates of the younger cohort were entirely due to period effects—social forces that influence different age groups at the same time. The authors were not able to identify the relevant period factors, but mention factors such as the waning of the crack-cocaine epidemic as potential explanatory candidates (Fabio et al. 2006, p. 158). These findings suggested that social factors can operate simultaneously on the behavior of young people of different ages. What these factors are and how they interact with developmental processes is currently poorly understood. It could be, for example, that shifts in moral beliefs and cultural values affected the behavior of different age groups in similar ways. Alternatively, changes in economic incentive structures such as illicit drug markets may have had ripple effects over an age range far broader than that of the young people directly involved in drug dealing (for a discussion of approaches see, e.g., Blumstein & Wallman, 2006).

Conclusions

There are huge differences between regions, states, cities, and neighborhoods in the extent to which young people are involved in violence. There is also compelling evidence that societal levels of interpersonal violence are subject to change, with the crime drop in the United States over the past two decades providing a particularly impressive example. But despite the tradition of ecological theories in developmental psychology, only limited progress has been made in our understanding of exactly how macro-dynamics are linked to individual development. The recent growth in mainly cross-sectional studies on child aggression and youth violence in various non-Western contexts has added significantly to our understanding of the extent to which the relevant causal mechanisms are universal. Also, important lessons on developmental cascades that link social context to individual development have been learned from longitudinal research examining neighborhood effects on the development of conduct problems (e.g., Leventhal &

Brooks-Gunn, 2000), although many causal mechanisms remain unclear (Galster, 2012). Clarification of the link between individual development and macro-level variation in violence may require cross-culturally comparative longitudinal studies. Ideally, such studies would comprise several sites that reflect theoretically meaningful variation, for example, in levels of violence or specific combinations of risk and protective factors. While expensive, such studies would yield unique data clarifying the link between macro-level characteristics and micro-level developmental dynamics.

CHALLENGES AND FUTURE DIRECTIONS

Research on the developmental dynamics of aggression and related manifestations of antisocial behavior is one of the oldest areas of developmental psychology. Over the past decade considerable progress has been made in several substantive areas: Overall, there has been a continued increase in genetic, neuropsychological and neurocognitive studies that have contributed to a better understanding of the biological mechanisms associated with aggressive behavior; the introduction of trajectory analysis has made a significant contribution to understanding normative trends in types of aggressive behavior over the life course, with an emerging consensus about the distinction of at least four main developmental patterns; the wider availability of high-quality longitudinal studies has helped to move beyond lists of risk and protective factors, and toward more sophisticated models of causal mechanisms that include reciprocal effects and cascades across different layers of a child's ecological environment; a still small but quickly growing body of research is based on data outside highly developed Western countries, leading to a growth in knowledge about the cross-cultural replicability of empirical findings; and the growth of research on effective prevention and intervention strategies has contributed to a better understanding of how aggression and violence can be reduced in various settings. Also, several new lines of empirical and theoretical inquiry have been opened. This includes, for example, work on the link between the development of moral and prosocial capacities and aggression (Malti & Krettenauer, 2013; Tomasello & Vaish, 2013), research on the interaction of genetic and environmental variables in the causation of antisocial behavior (Byrd & Manuck, *in press*), and studies on differential risk factors for subtypes of aggressive behavior (Cima et al., 2013).

While we have tried to review some of these new developments in developmental aggression research, we acknowledge major gaps in our discussion. To name just a few: We hardly covered the substantial volume of work on media consumption and aggression, we only briefly touched on the emerging field of developmental victimology and the links between victimization and aggression, and we were unable to discuss the body of work on neighborhood effects on the development of aggressive behavior and violence.

This chapter concludes by highlighting some of the areas where future research is needed.

- *Methodological challenges.* The valid and reliable measurement of aggression from infancy to adulthood remains a challenge: Multi-informant studies continue to show low to medium informant agreement, the causes of which have remained unclear (de los Reyes, 2011); associations between risk factors and aggression are often measurement-dependent, leading to a lack of confidence in the robustness of findings and difficulties for replication across studies; and attempts to identify different etiologies for various subtypes of aggression are hampered by the limited sensitivity of existing instruments (Little et al., 2003). Together these issues suggest a need for better measures of aggression that are sensitive to theoretically relevant subtypes of behavior (Vitaro et al., 2006). Recent innovations that can contribute to new insight include repeated administration of space-time budgets (Wikström, 2012), computerized experience-sampling tools in natural settings, and mixed-method strategies that combine multiple informants with behavioral observations in natural settings (Pellegrini & Long, 2002).
- *Time lag between cause and effects.* In developmental research the frame rate (i.e. the number of measurements taken per time period) determines the resolution at which causal mechanisms can be reliably discovered. For most studies on aggression this frame-rate is currently set at one picture per year, the most common cadence of data collections in longitudinal studies. If causal mechanisms exist with a cause-effect delay of minutes, hours, days, weeks or months, then conventional longitudinal designs don't have the capacity to discover them. Future research should pay more attention to designs that allow for causal dynamics at different time spans between cause and effect. Studies with multiple measurements during the year are still

rare, but can illuminate important medium-term processes (Roseth et al., 2007). Such studies with a high frame rates would be particularly important around life events (e.g., school entry, moving home) that are hypothesized to act as potential ‘turning points’ of problem behavior. Similarly important are fine-grained analyses of children’s real-time natural movements through action contexts in which aggression is an option, especially if embedded into longitudinal analyses (Wikström et al., 2012). Integrating the “long view” of slow developmental change of latent trait-like characteristics with the “short view” on recurrent patterns of interactions and conflicts and the real-time decision making dynamics remains an important challenge for future research (Anderson & Bushman, 2002; Granic & Patterson, 2006).

- *Genetic and biological research.* The neuroscience revolution has made it clear that explaining the development of aggression requires an understanding of the brain, the information-processing organ structured phylogenetically by human evolution and shaped ontogenetically by genetic and environmental influences (Raine, 2013). There are robust findings for a genetic component in between-individual differences in aggression and a link with psychophysiological and cognitive-emotional characteristics. But many findings on effects of specific gene polymorphisms, gene-environment interactions, and functional deficits have remained partly contradictory. For a developmental perspective on aggression and violence, we believe that much future research will need to be genetically and biologically informed. For example, more robust evidence is needed on the ways in which environmental experiences over the life course (e.g., malnutrition, victimization, poor attachment) have effects on brain functioning, which in turn influences aggressive behavior (Portnoy et al., 2013). Epigenetic research on the effects of the environment (e.g., child abuse) on the expression of specific genes will likely play an important role here (Tremblay, 2010). Also, emerging knowledge about how different components of brain functioning (e.g., “hot” versus “cold” executive functioning, moral emotions) normatively develop at different speeds will likely enrich our understanding of the age-specific manifestations of aggressive behavior (Prencipe et al., 2011).
- *Universal mechanisms involved in the causation of aggression.* Emerging evidence suggests that many mechanisms associated with the formation of aggressive

behaviors may be cross-culturally universal rather than culturally specific (Murray et al., 2013). But there are still large gaps in current knowledge, and we note an almost complete lack of longitudinal data in most societies outside the West. More robust evidence from diverse cultures is needed on, for example, the situational triggers for anger, the information processing mechanisms associated with aggressive problem solving, the peer and family risk factors associated with antisocial propensities, the individual cognitive and biological characteristics associated with violence, and the normative age-specific manifestations of aggression. Also, the focus on what causes aggression and violence has partly led to a neglect of the question of what causes desistance from aggression and violence. Better knowledge about why desistance from aggression is the normative pattern during much of childhood (Brame et al., 2001), how this process interacts with developing social, cognitive, and emotional competencies, and why a small group of children follows a persistent high trajectory (Frick & White, 2008) will be highly useful for developing better prevention strategies.

- *Morality and aggression.* Until rather recently, psychologists and criminologists have either shied away from including morality into models of antisocial behavior, or have simply equated aggression with evil, making a normative judgment that adds little to the scientific understanding of the causes of aggression. For about 10 years morality has become increasingly established on the landscape of aggression research. One reason is the growing volume of work that shows the importance of evolving notions of fairness, justice, and compassion in the development of children (Eisenberg, 2000; Malti & Ongley, 2014). This trend is echoed in the more sociologically informed work that emphasizes the importance of a legitimate—that is, fair, effective, and protecting—social order as a motivational basis for cooperation rather than fighting (Reisig & Lloyd, 2009). Both suggest developmental links between aspects of morality and aggression (Malti & Krettenauer, 2013). Future research in this area needs to better identify the developmental periods in which moral beliefs and emotions related to different types of aggressive behavior emerge. It also requires that investigators examine reciprocal dynamics between components of morality such as moral disengagement and aggression, as effects between both domains are likely bi-directional. Furthermore, it is important that comparative research

- better understands the link between structural, cultural and political characteristics of a social context and the normative development of moral beliefs about aggression and aggressive fantasies (Guerra, Huesmann, & Spindler, 2003).
- **Developmental research and experiments.** We note a continuing cleavage between developmental aggression research that mainly uses observational data and prevention and intervention research that relies on randomized controlled experiments. This gap is detrimental because experiments are the best instrument to test causal hypotheses about aggression and because good observational research is the best basis for making interventions more effective (Eisner & Malti, 2012). An exception is the work by Salmivalli and others (e.g., Salmivalli, 2010) on the dynamics of bullying within peer networks at schools. It demonstrates how innovative basic research on the influence of bystanders and other actors on bullying can help to develop research-based prevention programs, the evaluations of which in turn can act as a testing ground for the tenability of the original theory. Further progress along these lines requires more high-quality prevention and intervention research that is explicitly designed to test hypotheses about specific causal mechanisms and that is integrated into longitudinal studies so that, for example, hypotheses derived from developmental taxonomies can be tested empirically (Moffitt, 2005). Research has clearly shown that research-based family and school-based interventions can help reduce aggression in children and adolescents (Webster-Stratton, & Taylor, 2001). But we believe that more can be done to translate current state-of-the-art knowledge systematically into the design of interventions that aim to reduce aggression and violence.
 - **The micro–macro divide.** Lastly, we have emphasized that developmental research tends to focus on individual or proximal contextual factors that affect aggression and violence. Yet, macro-level comparative research suggests that cross-national or broad contextual differences help explain variations in aggression and violence. Interdisciplinary research is needed in order to determine which developmental mechanisms cause macro-level variations in levels of aggression and violence. For example, research should determine at what age reliable cross-national differences in serious violence emerge, as such knowledge can inform targets for prevention policy (Krug et al., 2002). Also, more work is needed about how illegal opportunities provided by protection

entrepreneurs, drug markets, distrust in state institutions and a sense of injustice interact during adolescence with early developmental risk factors such as poor cognitive functioning or parental abuse and neglect (Guerra, 2012; Tankebe, 2009). In particular, more progress should be made to understand the mechanisms of legal socialization from childhood to adulthood including attitudes toward legal authorities and perceptions about the legitimacy of the law (Fagan & Tyler, 2005).

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CHAPTER 20

Gendered Development

MELISSA HINES

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THEORETICAL OVERVIEW

The study of gendered development is the study of how gendered behavioral and psychological characteristics arise and remain stable or change over time. This topic is important in part because society views gender as an important category. For instance, we are often asked to indicate our gender, suggesting that gender conveys important information. In everyday life, people also typically like to know if they are dealing with men or women, and most of us are happy to provide this information, for example by wearing our hair and dressing in ways to indicate our gender. In addition, many psychiatric disorders are more common in one sex than the other, and understanding gendered development could aid in designing interventions to prevent or treat them. Many people also think that psychological or behavioral differences between males and females make

men or women particularly suitable for different jobs or social roles, or explain economic disparities between men and women. But how accurate are these beliefs? And, in those areas where men and women differ, how does this come to be the case, and how does it remain stable or change over time?

In this chapter, I attempt to answer these questions. I begin by framing the question of gendered development, and by defining some terms, such as sex and gender. Following this introductory material, the empirical evidence regarding the nature and sizes of behavioral and psychological differences between men and women, and boys and girls, is summarized. These are the gendered outcomes whose development we wish to understand. I then critically evaluate the evidence regarding the factors involved in the development of these gendered behaviors and psychological characteristics, focusing initially on influences as they unfold chronologically, beginning at conception. Where the available information allows, this discussion includes information on how different types of influences interact with one another, how they vary with

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context, and how they change or remain stable over time. In those instances where cross-cultural evidence is available, that too is described. It is worth noting at the start, however, that most of the available research is from North America and Western Europe, and its broader cross-cultural validity is often unknown. Following the review of behavioral research, research on gender differences in brain structure and function is evaluated. The chapter ends by outlining specific areas that are likely to be particularly productive for future research.

Current thinking on psychological development in general, and on the development of gendered characteristics in particular, is that developmental systems approaches will ultimately provide the most complete understanding of the factors producing stability and change over time, and the thinking behind this chapter is rooted in this perspective. In practice, however, there are few studies that have used developmental systems approaches to study gendered development. Where such studies exist, they are described in some detail. (For more information on developmental systems approaches, see Lickliter and Honeycutt, Chapter 5, and Witherington, Chapter 3, both in this *Handbook*, Volume 1.)

The gendering process involves many different types of influences, beginning at the moment of conception and continuing across the lifespan. These influences include genetic information on the sex chromosomes; fetal and neonatal concentrations of testosterone and perhaps other hormones; socialization by parents, peers, teachers and others; and self-socialization based on cognitive developmental processes associated with gender. Although discussions of gendered behavior often ask whether nature or nurture has the more important influence, this view of a primary force—either nature or nurture—driving gendered development is mistaken. As the developmental systems perspective suggests, not only are many different types of influences involved, but these influences interact with one another over time to produce stability and change in gendered characteristics. Gendered behavior can differ for a single individual in different contexts, and the factors that contribute to gendered development and their interactions can differ from one individual to another and from one time to another. The current state of knowledge is such that the elements of the developmental systems governing gender development are still being identified, but enough is known to be confident that these elements include some that would typically be classified as nature, such as genes, some that would typically be classified as nurture, such as socialization by parents, and some that do not fit clearly

into either of these two categories, such as the prenatal and neonatal hormone environment. Thus, not only is it unhelpful to try to choose between nature and nurture in understanding gender development, it is not even possible to clearly separate nature and nurture in this context.

Given the complexity of gendered development, it would not be possible for a single chapter in this *Handbook* to cover the topic in sufficient detail. In light of this, the *Handbook* includes two chapters that focus on gendered development. One of these includes in-depth information about social and cognitive factors involved in gendered development (see Leaper, Chapter 19, this *Handbook*, Volume 2), whereas the current chapter includes in-depth information about hormonal factors involved in gendered development. The current chapter also includes some discussion of social and cognitive factors, and how they work together with other types of factors, such as the early hormone environment, but interested readers are referred to the chapter by Leaper for a more detailed treatment of the social and cognitive processes involved in gendered development.

WHICH BEHAVIORS ARE GENDERED AND HOW LARGE ARE THE DIFFERENCES BETWEEN THE SEXES?

In this chapter, the term *gendered* is used to describe psychological characteristics or behaviors that differ on the average for groups of men and women or groups of girls and boys. Historically, sex and gender have been distinguished, with sex referring to a person's biological sex, as defined by characteristics such as whether the gonads are ovaries or testes or whether the 23rd pair of chromosomes is two Xs or an X and a Y, and gender referring to other differences. In keeping with this tradition, I use the terms *gender* and *gendered* to describe psychological and behavioral differences between males and females. I do not, however, use the term *gender* to imply that any particular type of factor, such as social or cultural influences, explains the difference between the sexes. In discussing gender differences, it is also important to remember that they are average differences between groups of males and females, and that there is typically a great deal of individual variability within each sex, as well as overlap between the sexes. In this respect, psychological and behavioral gender differences are similar to the gender difference in height. On the average, men are taller than women, but some women are taller than some men. In fact, the overlap

for the sexes is generally larger for gendered behavior than it is for height. So, although some sex differences in gendered behavior are larger than the sex difference in height, most are smaller. The next section of this chapter describes the nature and magnitude of sex differences in gendered behavior, in order of magnitude, beginning with those that show the largest differences.

The sizes of differences between the sexes can be quantified using “ d ” (d = the mean for one sex minus the mean for the other sex, this value divided by the pooled standard deviation). In terms of d , the size of the gender difference in height is about 2.0 for men and women in the United States (US) and in Great Britain (International Committee on Radiological Protection, 1975; Tanner, Whitehouse, & Takaishi, 1966). In the behavioral sciences, group differences with d values of 0.8 or larger are considered large, those of 0.5 are considered medium, those of 0.2, small, and those of 0.1 or less, negligible (Cohen, 1988). Put into a familiar context—group differences in IQ scores—a large difference ($d = .8$) corresponds to a group difference in IQ of about 12 points, a medium difference ($d = .5$) to an IQ difference of about 8 points and a small difference ($d = .2$) to an IQ difference of about 3 points.

Meta-analytic reviews have attempted to determine the size of behavioral and psychological differences between males and females, and have concluded that most differences fall in the small to negligible range (Hyde, 2005). In addition, the size of gender differences can depend on the context. For instance, a meta-analysis of helping behavior found that, when people knew that they were being watched, men were more helpful than women, and the effect size was substantial ($d = .74$). In contrast, when people clearly were not being watched, the gender difference was of negligible size ($d = .02$) (Eagly & Crowley, 1986). For some other characteristics, group differences vary with age. Vocabulary is a good example of this pattern. Girls acquire language earlier than boys, and from about 18 to 60 months of age, girls have larger vocabularies than boys do (Bornstein, Hahn, & Haynes, 2004). Earlier and later in life, however, there are negligible gender differences in vocabulary.

Gender Identity

Despite the overall pattern of similarity, there are some areas where large and consistent differences in the behavior or psychology of males and females are seen. The largest psychological difference between men and women, as well as between girls and boys, is in gender identity, or the

sense of self as male or female. Most men and boys have a male gender identity and most women and girls do not. The d value for this difference appears to be greater than 10.0 (Hines, Ahmed, & Hughes, 2003; Hines, Brook, & Conway, 2004).

Sexual Orientation

The second largest difference between the sexes is in sexual orientation. Most men have their primary erotic interest in women, whereas most women do not. The d value for this difference is about 6.0 (Hines, Ahmed, et al., 2003; Hines et al., 2004; Meyer-Bahlburg, Dolezal, Baker, & New, 2008).

Childhood Play

Another area of substantial difference between males and females is in childhood play. Most notably, girls and boys tend to prefer different toys. Boys prefer vehicles and weapons, whereas girls prefer dolls and tea sets (Maccoby & Jacklin, 1974; Pasterski et al., 2005; Sutton-Smith, Rosenberg, & Morgan, 1963). These differences emerge early in life, beginning to be apparent by the age of 12 months (Jadva, Golombok, & Hines, 2010; Snow, Jacklin, & Maccoby, 1983), and perhaps as early as 3 to 8 months (Alexander, Wilcox, & Woods, 2009), and they grow larger as children grow into toddlerhood and middle childhood (Golombok & Hines, 2002). In children aged 4 to 10 years, the gender differences for toys like vehicles and weapons (preferred by boys) and dolls and tea sets (preferred by girls) can be very large ($d = 2.0$) (Pasterski et al., 2005).

Children also sex-segregate in their play, and this difference grows larger as childhood progresses too. At age 4.5 years, children spend about 3 times as much time with same-sexed than other-sexed playmates, and at age 6.5 years, this difference has increased to about 10 times as much (Maccoby & Jacklin, 1987). The tendency of children to play with others of the same sex is seen in a range of cultures (Whiting & Edwards, 1975). Boys also are more physically active, and tend to engage in more rough-and-tumble play (playful aggression involving overall body contact) than girls; these gender differences are of moderate size ($d = 0.5$) (DiPietro, 1981; Eaton & Enns, 1986; Hines & Kaufman, 1994; Maccoby, 1988). Composite measures of toy, playmate and activity preferences can show very large gender differences ($d > 2.5$) (Hines, 2010).

Personality

For other psychological and behavioral characteristics, including personality characteristics, meta-analytic findings suggest that gender differences are smaller than those seen in height. For instance, males and females differ in the likelihood that they will show physically aggressive behavior, and this difference is manifested dramatically in the numbers of convictions for violent crime—over 90% of those incarcerated for violent crimes are men. Meta-analytic results (Hyde, 1984), however, suggest that, within the general population, the gender difference in tendencies to engage in physical aggression is of moderate size ($d = .5$). These meta-analyses also suggest that the gender difference in aggression is larger when assessed by direct behavioral observation, by peer report, or by projective tests, than when assessed by self-report or by parent or teacher report. The gender difference is also larger in children ($d = .58$) than in college students ($d = .27$).

Some questionnaire measures of other personality characteristics also show substantial differences between males and females. A meta-analysis of a broad range of personality inventories (Feingold, 1994) found that the largest gender differences were seen for traits labeled as Dominance—higher in males—and Empathy—higher in females. The Dominance construct includes measures of dominance, assertiveness and ascendancy and shows a gender difference of moderate size ($d = .50$). The Empathy construct includes measures of empathy, nurturance, and tender-mindedness, and shows a large gender difference ($d = .97$). The same meta-analysis also showed small gender differences in anxiety ($d = .28$) and trust ($d = .25$), with both higher in females. Other constructs, including impulsiveness, activity, openness to ideas, gregariousness, and order, showed negligible gender differences favoring males ($d = .03$ to $.15$).

Another conceptualization of personality includes 30 traits that contribute to five broad personality factors: Neuroticism (N), Extraversion (E), Openness to Experience (O), Agreeableness (A) and Conscientiousness (C). A meta-analysis using this approach examined gender differences in the United States and in 25 other cultural settings (Costa, Terracciano, & McCrae, 2001). This study found smaller gender differences in Dominance ($d = .19$ in the United States; $d = .27$ in other cultures) and Empathy ($d = .43$ in the United States; $d = .22$ in other cultures) than the Feingold meta-analysis, which was based on a broader range of personality assessment tools. The Feingold meta-analysis also included Cattell's 16 Personality

Factors Inventory, which shows large gender differences in Dominance and Empathy. Gender differences on other personality facets were small to negligible in Costa et al.'s cross-cultural study. This study also found that gender differences in personality were larger in North America and Western Europe than in Africa and Asia. The authors interpreted this result in the context of individuality versus communalism, suggesting that people in individualistic cultures attribute their behavior to personal characteristics, like personality traits, whereas people in communal cultures are more likely to make attributions to their social roles.

Interest in infants and in parenting is another area where males and females differ, but life stage is also important (Feldman & Nash, 1978, 1979; Nash & Feldman, 1981). Women who have infants respond more to infants in general than do other women, including mothers of older children, pregnant women, married women without children and single women. Similarly, grandmothers of infants respond more to infants than do women who have children who are adolescent or older, but who do not yet have grandchildren. Among men, those who are expecting a child or a grandchild are more interested in pictures of babies than men who are not expecting. Demand characteristics also influence expressions of interest in infants. For instance, males and females show similar psychophysiological responses, such as blood pressure and heart rate changes, to babies crying or smiling, but females show more behavioral responses than males do, a result interpreted to reflect female responses to the social expectation that they are interested in babies (Frodi & Lamb, 1978; Frodi, Lamb, Leavitt, & Donovan, 1978). Similarly, males and females show smaller differences in their self-report of interest in infants when they are in mixed sex groups or in private than when they are in single sex groups (P. W. Berman, 1976). Gender differences in interest in infants are also more obvious when the infants are relatives than when they are not, and when people are instructed to care for the infants (P. A. Berman, 1980).

Cognition

Based on meta-analytic findings, the largest cognitive gender difference documented to date appears to be that in mental rotation performance; males outperform females on speeded measures of the ability to mentally rotate visual stimuli (Linn & Petersen, 1985; Voyer, Voyer, & Bryden, 1995). This difference appears to be larger for rotation of three-dimensional (3D) than two-dimensional (2D)

objects, perhaps because tasks using 2D objects are easier. The difference is also larger in adults than in children, perhaps in part because different tasks are used at different ages. For example, children are almost always assessed using 2D tasks. For mental rotation of 3D depictions of objects in adults, the gender difference is large when strict scoring criteria are used ($d = .92$), though still less than half the size of the gender difference in height.

Meta-analytic results also suggest that another aspect of spatial ability, spatial perception, shows a difference favoring males. Spatial perception tasks require individuals to accurately position a stimulus (e.g., a line) within a distracting array (e.g., a tilted frame). The gender difference on measures of spatial perception, like that on mental rotations, appears to be larger in adults ($d = .56$) than in children ($d = 0.38$) (Voyer et al., 1995), although the use of different tasks at different ages may again be an issue. Also, one particular spatial perception task, adapted from the Benton Judgment of Line Orientation to increase its difficulty, may show a gender difference in college students that is similar in size to that seen for 3D mental rotations (Collaer, Reimers, & Manning, 2007).

For a third type of spatial ability, spatial visualization, meta-analytic results suggest only small to negligible differences between males and females ($d < .20$) (Linn & Petersen, 1985; Voyer et al., 1995). These types of tasks involve complex, sequential manipulations of spatial information and typically can be solved in more than one way. Individual measures require identification of simple figures within complex designs (e.g., Embedded Figures, Hidden Patterns), construction of specified shapes from three dimensional blocks (e.g., Block Design), and imagining what unfolded shapes would look like when folded to form three-dimensional objects (e.g., Paper Folding, Surface Development).

As for spatial ability, the mathematical performance of males and females has been compared using meta-analysis, with results suggesting that the several subcategories of ability differ with respect to the nature and magnitude of gender differences (Hyde, 2005; Hyde, Fennema, & Lamon, 1990). Measures of mathematical problem solving show small gender differences favoring males, at least among older, highly selected samples, such as college students ($d = .32$). Tests used to select students for admission to university in the United States also favor males. The Math subtest of the Scholastic Aptitude Tests (SAT Math) shows a small gender difference ($d = .38$), and the Math subtest of the Graduate Record Exam (GRE Math) shows a larger gender difference ($d = .77$). Individuals

taking these tests are self-selected, however, and more males than females drop out of education. Thus, these effect sizes may be inflated, because a smaller proportion of low achieving males than females are likely to take the tests. In childhood, girls show a small advantage on tests of computational skills ($d = .21$), although this advantage appears to be gone by adulthood ($d = .00$), perhaps again partly because the lowest scoring boys are more likely to drop out of education and testing. There also appears to be no appreciable gender difference in the understanding of mathematical concepts across the age range, although females score negligibly better than males ($d = .06$). In regard to scores on mathematics achievement tests, there is a negligible male advantage ($d = .06$) in Grades 4 and 8 (about Age 10 and 14 years) in the United States, though not necessarily in other nations (Lee, Grigg, & Dion, 2007) and NAEDP data explorer). Some of the implications of these cross-cultural differences will be discussed later in this chapter, where evidence regarding the causes of gendered behavior is evaluated.

Meta-analytic results (Hyde & Linn, 1988) suggest that verbal ability shows a negligible female advantage ($d = .11$) in both children and adults, but that some specific verbal tasks show larger gender differences. There is a small female advantage for speech production ($d = .33$) and a smaller male advantage for analogies ($d = .16$). There also is a moderate female advantage on measures of verbal fluency, such as the ability to list words that begin with a specific letter ($d = .53$) (Kolb & Whishaw, 1985; Spreen & Strauss, 1991). Girls appear to have greater writing proficiency than boys from about ages 10 to 18, and these gender differences are of moderate size ($d = .53$ to $.63$) (Salahu-Din, Persky, & Miller, 2007) and NAEDP data explorer). Vocabulary shows a negligible female advantage in adults ($d = .02$), although, as mentioned before, girls develop language earlier than boys, and know more words up until about Age 5.

Girls also excel on measures of perceptual speed. According to meta-analytic findings this difference, as assessed with the Differential Aptitudes Test (DAT), is of moderate size ($d = .48$) (Feingold, 1988). Similar measures from the Educational Testing Service show female advantages of similar size ($d = .49$) (Ekstrom, French, & Harman, 1976). The magnitude of the sex difference in perceptual speed, at least as assessed using the DAT, appears to have declined over the years, however, from $.62$ in 1947 to $.34$ in 1980 (Feingold, 1988).

Some other cognitive gender differences also appear to have declined from the 1940s to the 1980s (Feingold,

1988). The changes were linear rather than stepwise, so appear not to reflect changes in the tests (Feingold, 1988). One exception to this trend in Feingold's study was the SAT Math, which continued to favor males, especially at the upper end of the distribution. Other research suggests that even this gender difference is reducing, however. In 1982, the ratio of boys to girls scoring over 700 on the SAT Math at the age of 13 years was 13:1, whereas more recently it has been about 3:1 (Halpern et al., 2007). As noted above, the size of the observed gender difference on this type of test also is influenced to an unknown extent by more low scoring boys than girls leaving education, and so not taking the test.

The male advantage on 3D mental rotation tasks appears not to have changed from the 1970s to the 1990s (Sanders, Soares, & D'Aquila, 1982; Voyer et al., 1995). A gender difference in mental rotation performance also has been seen in infants as young as 3 to 5 months of age (Moore & Johnson, 2008; Quinn & Liben, 2008). In these studies, more male infants than female infants showed looking preferences suggesting the ability to distinguish rotated, identical objects from objects that are rotated and different.

Psychiatric Diagnoses

Another important area of gender difference involves the likelihood of being diagnosed with specific psychiatric disorders (American Psychiatric Association [APA], 2000; Rutter, Caspi, & Moffitt, 2003). Females are more likely to be diagnosed with depression than males are, at least from adolescence onwards. Males and females appear to be similarly likely to be diagnosed with schizophrenia, considered across the lifespan, but the age of diagnosis tends to differ. Males are diagnosed at a younger age on average than females are. Some psychological disorders appear to show dramatically skewed sex ratios. Classic autism is diagnosed 4 times more often in boys than in girls, and Asperger syndrome is diagnosed 9 times more often in boys than in girls (Rutter et al., 2003; Wing, 1981). Tourette syndrome, attention-deficit/hyperactivity disorder, and conduct disorder are also more likely to be diagnosed in males than in females (Alexander & Peterson, 2004; APA, 2000; Froehlich et al., 2007; Moffitt, Caspi, Rutter, & Silva, 2001). In contrast, females are more likely than males to be diagnosed with eating disorders, in addition, as mentioned above, to being more likely to be diagnosed with depression beginning in adolescence (APA, 2000). It has been suggested that, in general, males are more likely than females to be diagnosed with early-onset

disorders involving neurodevelopmental impairment, such as autism, whereas females are more likely to be diagnosed with emotional disorders that begin at or after adolescence, such as depression (Rutter et al., 2003). Understanding the developmental systems involved in gendered behavior more generally could inform understanding of these disorders that vary by sex.

INFLUENCES ON GENDERED DEVELOPMENT

Gendering begins before birth. Socially, expectant parents typically prepare somewhat differently for babies depending on whether they anticipate girls or boys. Different, largely nonoverlapping, pools of possible names are viewed as appropriate for each sex, and different clothes, toys and bedroom furnishings are selected based on the sex of the anticipated children. Physiologically, gendering begins early too, at conception, with fertilization of the ova by sperm carrying X or Y chromosomes. These chromosomes then influence gonadal development and gonadal hormone production, and even before birth, these hormones appear to influence neurobehavioral processes related to gendered behavior. Gendering continues postnatally, when social factors are even more prominent than they were before birth. External agents, including parents, peers, teachers, and strangers, encourage gender-typical behavior, and sometimes discourage gender-atypical behavior, particularly in boys. Children also self-socialize into gendered behavior. Once they understand that they are girls or boys, they learn what behaviors are expected of those of each sex and come to value complying with these expectations. Across the lifespan, our genes, our hormones, our social interactions, our context and our values continue to influence our gendered behavior.

This chapter discusses the evidence of these influences chronologically, beginning at conception. Gendered behavior in childhood has been studied most extensively in regard to the full range of factors that are thought to be important for gendered development, and children's play behavior will be discussed first in the context of describing each of these factors. Discussions of other gendered behaviors will follow, again in order of the magnitude of the gender differences. The aim is to elucidate the processes involved, not only in the development of psychological and behavioral differences between the sexes, but also those involved in individual differences in gendered behavior within each sex—in other words, why some of us are more gender-typical than others. In reviewing this information,

it is often necessary to discuss different types of influences in isolation, because this is the nature of the available research evidence. It should be kept in mind, however, that these influences are likely to interact in complex ways, that the nature of these interactions may differ at different life stages, and that these interactions remain largely unstudied.

Children's Gendered Behavior

As noted earlier, children's gendered behavior has been studied extensively and so is discussed first in regard to the various factors that are thought to play a role in human gendered development including genes on the sex chromosomes, gonadal steroids, particularly during prenatal and neonatal development, socialization by parents, peers and others, and self-socialization based on cognitive understanding of gender. In addition, the theoretical background that has led to interest in each type of factor in relation to gender development is introduced in the context of describing research on children's gendered behavior. This background is relevant to subsequent sections discussing the same factors in relation to other gendered outcomes, but is not repeated there.

Genetics and Gender

A person's sex is typically determined by the 23rd pair of chromosomes, sometimes called the sex chromosomes. This pair is generally either two X chromosomes, leading to the development of a female phenotype, including ovaries, or one X and one Y chromosome, leading to the development of a male phenotype, including testes. These chromosomes, and the physical phenotypes they produce, are important in part because they influence how the social environment responds to the individual. They are also important for other reasons, some of which occur before birth. Prominent among these are the different fetal hormone environments produced by testes as opposed to ovaries, and the influences of these hormone environments on gendered behavior are described more fully below.

There is as yet no evidence for direct genetic effects on gendered human behavior. In rodents, however, there are some gender differences in the brain very early in life, prior to gonadal differentiation, and so before the developing fetus can be identified as male or female other than by the sex chromosomes, suggesting a direct genetic effect on the brain and potentially on behavior (Arnold, 2009; Gatewood et al., 2005). There also appear to be direct effects of the sex chromosome genes on some aspects of aggressive behavior that are seen more often in male

than in female animals, and on some parenting behaviors that are seen more often in female than in male rodents (Gatewood et al., 2005). The study suggesting these effects used transgenic mice, with the phenotype of one sex but the genotype of the other, to separate direct genetic effects from hormonal effects and other gendered aspects of the phenotype. The results suggested direct involvement of information on the Y chromosome in the development of physically aggressive behavior and parenting behavior in mice. No comparable information is available for humans, however, and so possible direct effects of sex chromosome genes on human gendered development are not discussed further in this chapter.

Gonadal Hormones and Gender

Another, less direct, way in which the sex chromosomes influence gender development is by determining gonadal development. The primordial gonads have the potential to develop into ovaries or testes. The sex-determining gene on the Y chromosome (SRY), however, generally causes these bi-potential gonads to become testes, whereas in the absence of SRY, they typically become ovaries. By Week 8 of human gestation, the testes have begun to produce testosterone and other androgens, so that concentrations of these hormones appear to be higher in male fetuses than in female fetuses throughout gestation, but most markedly from about Week 8 to Week 24 (Smail, Reyes, Winter, & Faiman, 1981). These androgens act through receptors on cells in the tissues that become the external genitalia causing them to develop as penis and scrotum, whereas, in the absence of these hormones, the same tissues develop as clitoris and labia. The ovaries do not appear to produce large amounts of estradiol or other hormones prenatally, and the development of phenotypically female external genitalia—clitoris and labia—does not appear to require ovarian hormones before birth (Wilson, George, & Griffin, 1981).

Some neural cells also can respond to androgens, such as testosterone, or to hormones produced from testosterone. In addition, literally thousands of studies of nonhuman mammals, ranging from rodents to nonhuman primates, show that these hormones influence neural development during sensitive periods of prenatal and neonatal life (Arnold, 2009). For example, injecting testosterone into newborn female rats produces animals that later show increased potential for male-typical behavior and decreased potential for female-typical behavior. Similarly, removing testosterone from male rats shortly after birth produces animals that later show reduced potential for male-typical

behavior and increased potential for female-typical behavior. The behaviors that are influenced include reproductive behaviors, such as mounting of estrus females, as well as nonreproductive behaviors that differ on the average for male and female animals, such as rough-and-tumble play, which is more common in male than in female animals.

The same early hormonal manipulations also influence brain development, including brain anatomy. Several areas of the brain that have receptors for gonadal steroids show volumetric sex differences. The best known of these is perhaps the sexually dimorphic nucleus of the preoptic area (SDN-POA), a region of the hypothalamus that is larger in male than in female rats (Gorski, Harlan, Jacobson, Shryne, & Southam, 1980). Treating female rats with testosterone early in life enlarges the SDN-POA, whereas removing testosterone from male rats early in life reduces it (Jacobson, Csernus, Shryne, & Gorski, 1981). These effects occur in part because hormones produced from testosterone rescue cells in the SDN-POA from programmed cell death (Davis, Popper, & Gorski, 1996). A different neural region, the antero-ventral periventricular nucleus (AVPV), is larger in female than in male rats, and testosterone treatment during early development reduces the size of the AVPV, apparently by causing cell death (Forger, 2006). Thus, treatment with androgenic hormones early in life acts in several different ways to shape sex-related neural and behavioral development. Removal of the ovaries during early development appears to have little or no influence on gender related neurobehavioral development (Goy & McEwen, 1980), in contrast to removal of the testes.

An important and surprising detail regarding the influences of gonadal steroids on neural sexual differentiation is that male-typical development is accomplished, at least in rodents, largely by estrogen, produced from testosterone. Testosterone from the male gonads, the testes, enters the brain, where it is converted to estradiol by the enzyme, aromatase. Estradiol then acts through estrogen receptors to initiate cellular processes that produce male-typical neural and behavioral development (Hines, 2004; McCarthy, 2008). As a consequence, treatment of developing female animals with estrogenic hormones, including the synthetic estrogen, diethylstilbestrol (DES), has similar effects to early treatment with testosterone (Hines, 2004). It increases later potential for male-typical behavior and reduces later potential for female-typical behavior.

Although our understanding of gonadal hormone influences on mammalian neurobehavioral development has come largely from studies of rodents, the outcomes have been similar when nonhuman primates have been

studied. For instance, treating developing female rhesus macaques with testosterone increases their later potential for male-typical behavior, including juvenile rough-and-tumble play behavior, as well as male-typical sexual behavior, and reduces their later potential for female-typical sexual behavior (Goy & McEwen, 1980). Despite this general consistency of effects, there are areas of species difference, however, and similar effects on human behavior cannot be assumed. Instead, the possibility of similar effects must be evaluated directly in humans. The thousands of studies of nonhuman mammals have revealed some general principles that can guide these evaluations, including:

- The early programming influences of testosterone occur during sensitive periods of prenatal or neonatal life, meaning that the hormone does not have the same effect if exposure occurs before or after this period.
- The timing of these sensitive periods varies somewhat from one species to another, but generally corresponds to times when testosterone is higher in developing male than in developing female animals.
- Within these overall critical periods, there are subperiods when specific behavioral outcomes are influenced. For instance, in rhesus macaques, testosterone influences sex-typed grooming behavior early in gestation, but rough-and-tumble play later in gestation (Goy, Bercovitch, & McBrair, 1988). Because of these separable critical periods, a brief hormonal alteration could have effects limited to systems that were developing at the time of the alteration.
- Hormonal influences are graded and linear, so when more hormone is administered, there is a more dramatic effect.
- Hormones influence not only behavioral differences between the sexes, but also differences within each sex. For instance, some female rodents show more male-typical behavior than others do, and the animals who show more male-typical behavior tend to be those whose location in utero was such that they would have been exposed to hormones from their male littermates (Clark & Galef, Jr., 1998; Meisel & Ward, 1981).
- The behaviors that are influenced by the early hormonal environment are those that differ on the average for males and females of the species.

As noted above, there is a prenatal sex difference in testosterone in humans, most markedly from about Week 8 to Week 24 of gestation, although testosterone seems to

be less dramatically higher in male than in female fetuses later in gestation, as well (Constantinescu & Hines, 2012). In addition, there is a second period, neonatally, when testosterone appears to be higher in boys than in girls. This gender difference in testosterone is largest at about the first to the second month postnatally, with testosterone levels tapering off to baseline in both sexes by about 6 months of age (Lamminmaki et al., 2012; Smail et al., 1981). These two periods, gestation and the early neonatal period, are the most likely early sensitive periods for gonadal hormones to influence human gender development.

It is not easy to study the influences of early testosterone exposure on human behavior. Rigorous experiments similar to those conducted in other species, where animals are randomly assigned to have either a hormonal manipulation or a placebo procedure, are generally not possible because of ethical considerations. Some information has come, however, from clinical situations in which the early hormonal environment is atypical, either because of a genetic condition, or because a woman was prescribed hormones for medical reasons during pregnancy. In addition, information has come from studies where testosterone has been measured in typically developing individuals and related to later behavior.

Several genetic conditions cause abnormalities of testosterone beginning early in life. The most thoroughly studied of these conditions, in regard to gendered behavior, is classic congenital adrenal hyperplasia (CAH). CAH refers to a group of autosomal recessive disorders that involve an enzymatic deficiency, usually of 21-hydroxylase (21-OH). The enzymatic deficiency results in an inability to produce cortisol and a consequent overproduction of adrenal androgens. In classic CAH, these hormonal abnormalities begin very early in gestation.

Classic CAH with 21-OH deficiency is estimated to occur in 1 in 5,000 to 1 in 20,000 births in the United States and Europe (New, 1998; Speiser et al., 2010). Female fetuses with CAH show markedly elevated levels of androgens (Pang et al., 1980; Wudy, Dörr, Solleder, Djalali, & Homoki, 1999), and they are usually born with some degree of virilization of the external genitalia (e.g., clitoral hypertrophy, partial fusion of the labia), caused by the androgen elevation prenatally. The virilization is sometimes so severe that a girl with CAH is initially assigned as a boy, but in most cases the genitalia are ambiguous. This ambiguous genital appearance at birth typically leads to rapid diagnosis and female sex assignment. Male fetuses with CAH appear to have testosterone concentrations in the normal male range, but elevated levels of a weaker

androgen, androstenedione, at least at mid-gestation (Pang et al., 1980; Wudy et al., 1999). Assumedly, adrenal androgens are initially elevated in male fetuses with CAH, but feedback mechanisms reduce testicular androgen production, resulting in the largely normal levels at mid-gestation in males. Boys with CAH are born with unremarkable male external genitalia, and in areas without universal screening they generally are not diagnosed until they experience medical problems, such as salt-losing crises, or precocious puberty. Once diagnosed, both girls and boys with CAH are treated with glucocorticoids to regulate their hormone levels. Girls with the disorder also usually have surgery to feminize their external genitalia.

There are two forms of classic CAH, a salt-wasting form and a simple-virilizing form. The salt-wasting form is more severe and is associated with greater androgen production. The salt-wasting form is also associated with aldosterone deficiency and, if untreated or poorly treated, can cause salt-losing crises that can result in severe dehydration, and even death. There is also a third, nonclassic, form of the disorder, late onset CAH. Late onset CAH, unlike the classic forms of CAH, is thought to involve minimal prenatal androgen elevation and becomes evident only later in life.

Androgen insensitivity syndrome (AIS) is a second disorder that involves atypical androgen exposure during early development. Individuals with AIS have deficient androgen receptor responses (Grumbach, Hughes, & Conte, 2003), either complete (CAIS) or partial (PAIS). Both forms are transmitted as X-linked, recessive traits and so are seen almost always in XY individuals. An XY infant with CAIS typically has normal appearing female external genitalia, and is typically assigned and reared as female with no awareness of the underlying disorder. Breast development occurs at puberty, because the individual has undescended testes, and the testosterone that the testes produce is converted to estradiol, with feminizing physical effects at puberty. CAIS is often diagnosed when menstruation fails to occur, because of the lack of ovaries and other female internal reproductive structures. The physical phenotype in PAIS is highly variable. It can be similar to that in CAIS, can involve external genital ambiguity, or can involve even more subtle manifestations, such as hypospadias or infertility. CAIS is far rarer than CAH, but exact figures are unknown. The incidence of PAIS is also unknown, and in its milder forms, it may go undetected.

A third category of disorders causing early hormonal abnormality are androgen biosynthetic deficiencies in XY individuals. Deficiencies in either 5-alpha-reductase

(5-aRD) or in 17-hydroxysteroid dehydrogenase (17-HSD) in XY individuals typically produce female appearing external genitalia at birth. The disorder is often not detected until puberty, when masculine secondary sexual characteristics (e.g., phallic enlargement, broad shoulders, facial hair, low voice) emerge, caused by rising levels of androgens. These disorders, like CAIS, are extremely rare, but are seen with increased frequency in some cultural groups where consanguinity is not unusual. For instance, groups of individuals with 5-aRD have been identified in a village in the Dominican Republic (Imperato-McGinley, Peterson, Gautier, & Sturla, 1979) and in Papua New Guinea (Herdt & Davidson, 1988; Imperato-McGinley et al., 1991). Similarly a group of individuals with 17-HSD has been identified in Gaza (Rosler & Kohn, 1983).

There are also conditions that involve early hormonal abnormality, without ambiguous genitalia. One of these is idiopathic hypogonadotropic hypogonadism (IHH) in XY individuals. In this syndrome, hypothalamic hormones that induce testicular hormone production are deficient. At birth, the genitalia appear to be those of a healthy male infant, presumably because maternal hypothalamic hormones have stimulated testicular hormone production in the fetus. Individuals with IHH, therefore, are thought to experience androgen deficiency beginning at birth. A second condition involving early hormone abnormality, but unremarkable appearance of the external genitalia at birth, is Turner Syndrome. Individuals with Turner Syndrome have one intact X chromosome, but the second is absent or imperfect. This syndrome causes ovarian regression, usually prenatally, and so many girls with Turner Syndrome experience reduced concentrations of ovarian hormones beginning prenatally. Because ovarian hormones are not needed for prenatal differentiation of the external genitalia, however, girls with Turner Syndrome are born with normal-appearing female external genitalia.

A final set of very rare abnormalities involves XY infants who were assigned as female because of abnormalities of their external genitalia, despite apparently normal prenatal androgen production. Some such conditions are penile agenesis (aphallia), cloacal exstrophy, and ablation of the penis. In the first condition, the child is born with testes, but no phallus. In the second condition, the child has exposed abdominal organs (e.g., bladder, intestines) and the penis is typically small and split into two parts, one on either side of the body. Historically, most XY infants with either of these conditions have been surgically feminized and reared as girls. The third condition has occurred when typically developing male infants have lost their penis, for instance

in a surgical accident, and then been reassigned and reared as girls.

Information about hormonal influences on human gender development has also come from people whose mothers took hormones for medical reasons during pregnancy. The hormones that have been prescribed during pregnancy include some synthetic progestins that mimic the actions of androgens (androgenic progestins), some that interfere with the action of androgens (anti-androgenic progestins), and some that are estrogens or that mimic the actions of estrogen. Notable in this last category is DES, a synthetic estrogen that was prescribed to millions of pregnant women in the 1950s and 1960s (Heinonen, 1973; Noller & Fish, 1974).

Researchers have also related normal variability in the early hormonal environment to later gendered behavior. These studies have measured testosterone in maternal blood collected during pregnancy, in amniotic fluid collected during pregnancy, in umbilical cord blood at birth, or in urine samples collected from infants during the neonatal androgen surge in the first several months after birth.

Other approaches have not measured hormones directly, but instead have looked at characteristics assumed to correlate with early exposure to androgenic hormones. The most common of these approaches involves assessing the ratio of the second digit of the hand to the fourth digit (2D:4D), a ratio that is larger in females than in males (Manning, 2002). Consistent with an androgenic influence, two studies have found that this ratio is smaller in individuals with CAH than in typically developing controls (Brown, Hines, Fane, & Breedlove, 2002; Okten, Kalyonku, & Yaris, 2002), although a third did not find this result (Buck, Williams, Hughes, & Acerini, 2003). The ratio is also reportedly larger in XY individuals with CAIS than in other XY individuals (Berenbaum, Bryk, Nowak, Quigley, & Moffat, 2009), again suggesting a role for androgen. These studies all involved dramatic variability in the early hormonal environment due to disorder. In contrast, the 2D:4D ratio is typically used to measure small amounts of variability in androgen exposure among typically developing individuals. The evidence that it does so is not convincing. One study (Manning, Bundred, Newton, & Flanagan, 2003) reported that the 2D:4D ratio in 50 healthy men related as predicted to a repeat polymorphism in the gene that encodes the androgen receptor, a polymorphism that relates inversely to the ability of the androgen receptor to act. Others have failed to replicate this association, however, including a study of 152 men (Hampson & Sanker, 2012), and a study of 188 men (Hurd, Vaillancourt,

& Dinsdale, 2011). Another study sometimes interpreted to support a link between normal variability in androgen and the 2D:4D ratio correlated testosterone measured in amniotic fluid with finger ratios in a sample of 29 girls and boys (Lutchmaya, Baron-Cohen, Raggatt, Knickmeyer, & Manning, 2004). This correlation was not significant, but the authors found a significant correlation between the 2D:4D ratio and the ratio of testosterone to estradiol. Several considerations suggest that this finding is spurious, including the small sample size, the analysis of males and females together, instead of separately, the failure of the original predicted relationship to be significant, and the lack of an empirical basis for predicting the relationship that was significant.

The 2D:4D approach to measuring early androgen exposure is highly accessible and appears simple. Consequently, hundreds of published studies have looked at relationships between 2D:4D and gendered behavior (Voracek, 2011). The results of these studies have been inconsistent, however (Hines, 2011). For instance, many studies have related 2D:4D to sexual orientation. One of these studies involved more than 20,000 participants who measured their own 2D:4D and reported this and their sexual orientation online (Collaer et al., 2007). This study found that 2D:4D showed the predicted relationship to sexual orientation in males, but not in females. In contrast, a meta-analytic report on numerous studies, that did not include this large on-line study, found a somewhat different result (Grimbos, Dawood, Burriss, Zucker, & Puts, 2010). This time 2D:4D showed the predicted relationship to sexual orientation in women, but not men. This inconsistency, and similarly inconsistent results for other gendered behaviors, suggest that the gender difference in 2D:4D is too small, or its measurement contains too much error, to provide a useful assessment of individual differences in early androgen exposure. Consequently, studies using the 2D:4D approach are not discussed further in this chapter.

As noted above, gender differences begin to emerge during the first year of life, and include a gender difference in the ability to mentally rotate objects that has been documented by two independent research teams in infants as young as 3–5 months of age. There are occasional individual reports of earlier gender differences, such as in looking at a mechanical object as opposed to a human face (Connellan, Baron-Cohen, Wheelwright, Batki, & Ahluwalia, 2007), but these have yet to be replicated. In addition, the report on the preference for a mechanical object has been suggested to be of questionable reliability, because of weak

scientific control, demand characteristics, a lack of coder blinding, and similar studies that suggest a different conclusion (Escudero, Robbins, & Johnson, 2013; Spelke, 2005). There is as yet no information regarding the factors that contribute to the early emerging gender difference in performance on mental rotation tasks.

Early infancy is characterized by rapid behavioral change, and the brain continues to develop rapidly during the first 2 years after birth, providing much scope for the social environment to interact with other factors involved in gender development at this particular time. Two reports have studied parent-child interactions during this important period of early development using a developmental systems approach. One study assessed characteristics related to language development in 30 mothers and their 30 infants, half male and half female, on numerous occasions between the ages of 3 and 11 months (Sung, Fausto-Sterling, García Coll, & Seifer, 2013). Boys and girls did not differ in the frequency or duration of their nondistressed vocalizations at any time period, nor did vocalization contingent on maternal speech differ for boys and girls. There was some evidence suggesting that boys and girls might differ in their patterns of change over time, however. Boys generally remained static, whereas girls and mothers of girls showed significant behavioral changes over time, although it is not clear that the data for girls and boys differed significantly from one another. The same research team also studied disciplinary interactions involving eight male and eight female infant–mother dyads from the age of 5 to 12 months (Ahl, Fausto-Sterling, García-Coll, & Seifer, 2013). Male infants were more likely to cry or whine during discipline than female infants, and their mothers used longer vocalizations, more words, and more affectionate terms than did the mothers of girls. Although these studies involved small samples, and their replicability and implications are as yet unclear, they suggest that there may be numerous subtle differences in the dynamical systems involved in the development of boys and girls during infancy.

Gender differences in toy preferences also emerge early in life. These gender differences are highly reliable and have been studied extensively. The empirical evidence suggests that they result from numerous influences, including the early hormonal environment, postnatal socialization by others, and processes of self-socialization based on gender cues in the environment. These influences are discussed initially in the chronological order in which they begin to occur, and, where available, evidence regarding how these influences might interact are discussed.

There is reliable evidence that prenatal androgen concentrations influence children's gender-typed toy preferences, as well as other gendered aspects of children's play. This evidence comes from studies of children with genetic disorders causing hormonal abnormalities before birth, from studies of children whose mothers took hormones for medical reasons during pregnancy, and from studies relating individual variability in hormone levels prenatally and neonatally to subsequent gendered play behavior. Studies of nonhuman primates also suggest an inborn influence on gendered toy interests.

Girls exposed to high concentrations of androgens before birth, because of CAH, have consistently been found to show increased male-typical childhood play behavior (Hines, 2011). There are over a dozen studies reporting this finding, and these studies come from research teams working in New York, Baltimore, Los Angeles, and Chicago in the United States, as well as in Sweden, the United Kingdom, the Netherlands, Germany, and Japan. Researchers have used parental report, child self-report and behavioral observations to measure gendered play, and have used same-sexed siblings as controls, as well as controls matched for background factors, such as age, sex and parental education. Thus, the result seems robust. The typical pattern is that girls with CAH show increased preferences for toys that boys usually prefer, and decreased preferences for toys that girls usually prefer. In addition, they show increased preferences for boys as playmates, and for male-typical play styles, such as rough, active play.

The severity of the disorder also predicts the degree of gender-typical behavior in girls with CAH (Nordenstrom, Servin, Bohlin, Larsson, & Wedell, 2002), as does the degree of genital virilization at birth (Hall et al., 2004). Girls with the salt-losing form of CAH show more male-typical behavior than those with the simple-virilizing form, and the amount of physical virilization relates positively to the amount of behavioral virilization. Both of these findings strengthen the argument that androgen exposure, rather than other aspects of the CAH disorder, is responsible for the increased male-typical behavior.

Studies of the daughters of women who took hormones during pregnancy also suggest androgenic influences on gendered play. Like girls with CAH, these girls show high levels of male-typical play (Ehrhardt & Money, 1967). Girls whose mothers took anti-androgenic progestins during pregnancy show the opposite pattern of behavior, reduced male-typical and increased female-typical play (Ehrhardt, Grisanti, & Meyer-Bahlburg, 1977). These findings provide convergent evidence of an androgenic

influence on gendered behavior. These girls did not have a disorder, and so their behavioral changes, unlike those seen in girls with CAH, cannot be attributed to the nonhormonal aspects of the CAH disorder.

Genital virilization at birth, however, rather than hormonal influences on brain development, have been suggested to explain the behavioral differences seen in girls exposed to high levels of androgens before birth. Specifically, it has been suggested that genital virilization could alter girls' perceptions of their own behavior or could alter their parents' treatment of them in ways that would produce more male-typical behavior (Fausto-Sterling, 1992). The influences of anti-androgenic progestins on male-typical childhood behavior, mentioned above, argue against this suggestion, however, since these girls are born with normal, feminine-appearing external genitalia, but show reduced male-typical behavior. Also, medical personnel instruct parents to treat their daughters with CAH like any other girls, and parents' responses on questionnaires and in interviews suggest that they do so (Berenbaum & Hines, 1992; Ehrhardt & Baker, 1974). One study (Pasterski et al., 2005) observed parents playing with their children in a playroom, and recorded parental responses to their children's gender-typical and gender-atypical behavior. Both mothers and fathers discouraged their sons from playing with girls' toys. In addition, they gave their daughters with CAH more positive responses for playing with girls' toys than they gave to their unaffected daughters. These results argue against suggestions that parents are causing their daughters' reduced interest in girls' toys, although it could be argued that parents act differently when they are in the research laboratory than at home, or that they treated their daughters differently earlier in life. Indeed, parents of girls with CAH report encouraging more male-typical behavior in their daughters with CAH than in their unaffected daughters, and this encouragement has been found to partially mediate sex-atypical play in these girls (Wong, Pasterski, Hindmarsh, Geffner, & Hines, 2013). There is other evidence suggesting that this is not the sole cause of the girls' increased male-typical behavior, however, and we will return to this evidence below. For now, it is worth noting that parents in general tend to encourage whatever activities interest their children, so it would not be surprising if parents reported encouraging male-typical play behavior in their daughters with CAH, given that their daughters' enjoy engaging in those behaviors. Nevertheless this parental encouragement could further increase the girls' engagement in male-typical behavior in their day-to-day life. At the same time, however, parents might

encourage female-typical behavior in situations, such as in our laboratory, where they have access to girls' toys and the opportunity to encourage their daughters to play with these toys.

Normal variability in early concentrations of testosterone has also been related to later gendered play. In one study (Hines et al., 2002), maternal testosterone and sex hormone binding globulin (SHBG) were measured in blood samples taken for clinical purposes at mid-pregnancy ($M =$ week 16 gestation, $SD = 8$) in a longitudinal, population study involving almost 15,000 children and their parents (SHBG was measured as well as testosterone because it limits testosterone's ability to act). Parents of about 8,000 of the children completed a measure of their children's gendered behavior at age 3.5 years. This measure, the Pre-School Activities Inventory (PSAI) (Golombok & Rust, 2009), assesses engagement in gender-typical behavior and activities, and is standardized for children aged 2 to 7 years. It is specifically designed to assess behavioral differences within each sex, and the scoring is such that higher scores indicate more male-typical behavior. Six groups, of about 110 children each, were selected for study: highly masculine, highly feminine, and medium girls; and highly masculine, highly feminine, and medium boys. Among girls, mothers of highly masculine girls had the highest levels of testosterone and mothers of highly feminine girls had the lowest, with mothers of medium girls having levels between these two groups, and the linear relationship between testosterone and gendered behavior was highly significant. There was no relationship between gendered behavior and SHBG and the results remained the same when testosterone was adjusted for SHBG. In contrast to the results for girls, there were no differences in testosterone concentrations in the mothers of the three groups of boys. A second study related maternal testosterone during pregnancy to children's gendered behavior and did not find a significant relationship in either girls or boys (van de Beek, Van Goozen, Buitelaar, & Cohen-Kettenis, 2009). This study may not have had sufficient power to see the predicted relationships, however. It used a relatively small sample (56 girls, 56 boys), and assessed gender-typed toy play at age 13 months, before this aspect of gendered behavior has fully emerged. The effect sizes for gender differences in toy play in the van de Beek study were small to moderate in size ($d = .53$ for boys' toys; $d = .35$ for girls' toys), whereas the effect size for the gender difference on the PSAI at age 3.5 years was very large ($d = 2.8$).

Another study found that testosterone measured in amniotic fluid between Week 15 and 25 of pregnancy

related to later gender-typed behavior, again assessed using the PSAI (Auyeung et al., 2009). This study included 112 girls and 100 boys. Two other studies relating testosterone in amniotic fluid to childhood gender-typed play behavior have not found similar results (Knickmeyer et al., 2005; van de Beek et al., 2009), but these studies both used substantially smaller samples and less sensitive behavioral measures than the study producing positive results.

A third study examined testosterone during the early postnatal surge and related it to later behavior, assessed using the PSAI as well as by observing children's toy choices in a playroom (Lamminmaki et al., 2012). This study measured testosterone in urine samples from infants at day 7 postnatally as well as monthly from the first to the sixth month after birth. The PSAI was completed by parents when children were 14 months of age, and children's interests in gender-typed toys were observed at the same age. Testosterone was higher in boys than in girls at all seven time points, but was highest in boys 1 month postnatally and declined to near the level seen in girls by 6 months. The area under the curve for testosterone predicted PSAI scores in boys. Also, significant gender differences were seen in play with a train and a baby doll, and the area under the curve for testosterone positively predicted play with the train for girls and negatively predicted play with the doll for boys. These relationships were seen in relatively small groups of children (15 boys for the PSAI, 20 boys for the doll, 22 girls for the train), however, and, as yet, there have been no replication attempts.

This evidence that testosterone during putative critical periods for gendered development predicts later gendered play behavior in typically developing children could provide important additional convergent evidence that testosterone plays a role in the development of gendered human behavior. None of these children had endocrine disorders, and none had atypical genitalia at birth. Parents were unaware of their children's testosterone levels. Thus, altered self-perceptions, or altered parental perceptions or treatment, based on awareness of abnormality or genital virilization, cannot explain the observed relationships between testosterone and behavior. In addition, these findings are important, because they suggest useful approaches to studying how hormones work together with other types of factors to shape gendered behavior. It is challenging to conduct studies of interactive effects in individuals exposed to atypical hormone environments prenatally, because such individuals are not numerous, and studies of interactive effects require large samples. None of these

findings linking normal variability in the early hormone environment to later gendered play has yet been replicated independently, however.

Studies of nonhuman primates suggest that they also show gendered toy preferences, similar to those seen in children. A study of vervet monkeys found that female monkeys spent more time contacting girls' toys than male monkeys did (Alexander & Hines, 2002). Similarly, male monkeys spent more time contacting boys' toys than female monkeys did. There was no difference in contact time with neutral toys. A subsequent study of rhesus macaques replicated the finding for boys' toys and neutral toys. This study (Hassett, Siebert, & Wallen, 2008) used wheeled toys, generally preferred by boys, and plush toys, which both boys and girls enjoy. Results showed that the male monkeys preferred the wheeled toys, and that there was no difference between male and female animals for the plush toys. These preference patterns again resembled those seen in children.

Thus, there is convergent evidence of an inborn contribution to the development of gendered childhood play behavior. Girls exposed to higher than normal levels of androgenic hormones prenatally, either because of a genetic disorder or because androgenic hormones were prescribed to their mothers during pregnancy, show increased male-typical play behavior and reduced female-typical play behavior. Also, children whose mothers took anti-androgenic hormones during pregnancy show reduced male-typical behavior. Among typically-developing children, individual variability in testosterone, measured in maternal blood samples during pregnancy, in amniotic fluid at mid-gestation or in urine shortly after birth, also have been reported to predict gender-typed childhood behavior. Although the individual studies of typically-developing children have not been independently replicated, at least as yet, they, along with the findings for children exposed to anti-androgenic hormones, suggest that testosterone can influence human behavior in the absence of external virilization. Finally nonhuman primates show gendered toy preferences similar to those seen in children. Taken together, the evidence suggests that individual girls and boys have different propensities to engage in gendered play, based to some extent on inborn factors, and these factors are likely to include their early exposures to androgenic hormones.

Socialization and Gender

It is also well established that the social environment begins to shape gendered behavior early in life. Even

before a child is born, parents typically select names, buy clothes, and decorate rooms in different ways depending on whether they are expecting a girl or a boy. To the world outside the immediate family, gender is also an important social category. Friends typically ask new parents "Is it a girl or a boy?" before they ask anything else. In one study, this question was the first to be asked in 80% of the cases, whereas first questions concerned the health of the baby or the mother only 18% of the time (Intons-Peterson & Reddel, 1984). The tendency to dress boys and girls differently, and to add gender cues, such as a ribbon or a bow to a bald baby's head, suggests that parents want other people to know whether their child is a girl or a boy.

In addition to these general ways in which girls and boys are treated differently, there are specific differences in the gender-related responses and information that girls and boys receive. For example, girls and boys receive different responses from their parents when they play with gendered toys. Although parents generally encourage their children to engage in the activities that interest them, gendered toy play can be an exception. A meta-analytic study of parental responses to boys and girls (Lyttton & Romney, 1991) found that parents encouraged boys and girls similarly in regard to most behaviors, including behaviors related to independence and achievement. A main area of difference, however, involved reactions to children's engagement with gendered toys. Others also have looked at parental responses to play with same-gender and other-gender toys (Fagot, 1978; Fagot & Hagan, 1991; Langlois & Downs, 1980; Pasterski et al., 2005). Findings from these studies suggest that girls get more positive responses when they play with girls' toys than boys do, and boys get more positive responses when they play with boys' toys than girls do. In addition, although negative responses are relatively rare, boys, but not girls, get negative responses when they play with gender-atypical toys. This use of negative responses is remarkable, given that at the age of 12 months parents give about 39 times as many positive as negative responses to their children's toy play (Fagot & Hagan, 1991). Parental socialization of toy choices appears to be at its peak during the second postnatal year (Fagot & Hagan, 1991; Lyttton & Romney, 1991).

Once children enter preschool and begin to interact with teachers and peers, these individuals also encourage gender-typical toy interests and discourage cross-gendered interests (Fagot, 1977; Fagot & Patterson, 1969; Lamb, Easterbrooks, & Holden, 1980; Lamb & Roopnarine, 1979; Langlois & Downs, 1980). In general, the encouragement to make gender-typical toy choices and avoid cross-gender

choices is stronger for boys than for girls (Fagot, 1977; Fagot & Hagan, 1991; Pasterski et al., 2005).

These different patterns of reinforcement for girls and boys are assumed to shape their behavior, just as patterns of reinforcement shape other types of behavior. One study investigated this effectiveness for toy choices by observing parents interacting with their children in a playroom (Pasterski et al., 2005). The study included typically developing children as well as girls and boys with CAH. For the typically developing children, parental reinforcement correlated as anticipated with the children's gendered toy play. For girls with CAH, however, this was not the case. For these girls, who had been exposed to high concentrations of androgen prenatally and who preferred boys' toys, toy choices did not correlate with parental reinforcement patterns.

Other parental characteristics also predict children's gendered behavior among typically developing children. In a longitudinal, population study of thousands of parents and children, measures of gendered parental behavior (e.g., who takes out the trash, who cooks dinner) correlated positively with gendered behavior in offspring (Hines et al., 2002). Parents who adhered to traditional gender roles in these activities had children with more gender-typical behavior than did less traditional parents. In addition, the children of mothers who are highly educated and who work outside the home show less gender-typical behavior than the children of less educated mothers or mothers who do not work outside the home (Hines et al., 2002; Ruble & Martin, 1998).

Parents are not the only people who shape children's gendered behavior. Peers, in particular, encourage children to engage in gender-typical, but not gender-atypical, play (Fagot, 1977; Fagot & Patterson, 1969; Frodi et al., 1978; Lamb et al., 1980; Lamb & Roopmarine, 1979; Langlois & Downs, 1980). Children's tendency to play with children of the same sex also provides the opportunity to learn more gendered behavior. By engaging largely with children of the same sex, it has been suggested that children spend the majority of their time observing, practicing and being encouraged to engage in gender-typical behavior, with little time spent observing, practicing or being encouraged to engage in gender-atypical behavior (Leaper, 1994; Maccoby & Jacklin, 1987). Evidence supporting the influences of playing with same sex or other sex peers comes from a study that related the amount of play with peers of the same sex early in the school year to the amount of increase in gender-typical behavior by the end of the year (C. L. Martin & Fabes, 2001). This study found that the

children who played with more same-sexed peers showed a bigger increase in gender-typical behavior by the end of the year than those who played with fewer same-sexed peers.

Even strangers encourage children to engage in gender-typical play. For instance, strangers left to interact with a baby dressed in gender-neutral clothes, but told that the child is a girl or a boy, are more likely to offer the child a doll if they have been told that the child is a girl (Seavey, Katz, & Zalk, 1975; Sidorowicz & Lunney, 1980).

Cognitive Development and Gender

Another way in which children acquire gendered behavior is through self-socialization. This self-socialization relies on children's cognitive understanding of gender and their acquisition of male or female gender identities. Basic gender identity understanding can be measured in children beginning at about the age of 2 years, when most children can correctly identify themselves as girls or boys. By the age of 2.5 years, about 75% of children can tell you that they are girls or boys, and they can sort their picture, and pictures of others, into piles of males and females; 95% of children can do this by the age of 3 years (Thompson, 1975). Gender identity understanding continues to develop until children are about 6 to 7 years of age, with children first acquiring the additional understanding that they have always been and will always be male or female, called gender stability, and finally the understanding that if they adopted the characteristics of the other sex, such as wearing their clothing or engaging in their activities, their gender would not change, called gender consistency (Ruble et al., 2007).

There is some evidence linking self-knowledge of gender identity to children's gendered behavior. Achievement of the first two levels of understanding, gender identity and gender stability, has been found to relate to gendered behavior. For example, understanding of gender stability relates positively to knowledge of gender stereotypes and to rigidity about gender-related behavior (Ruble, Martin, & Berenbaum, 2006), and to wearing gender-typical clothing (Halim et al., 2014). Similarly, acquiring an understanding of gender consistency relates to reduced rigidity about gender-appropriate behavior. This may occur because children then know that their gender will not change if they engage in gender-atypical behavior (Huston, 1983; Ruble et al., 2007).

Equipped with gender understanding, children can observe the world around them, see what girls and boys and women and men do, and then preferentially model the behavior of others of their own sex. One study (Bussey

& Bandura, 1992) explored this process by asking 2- to 4-year-old children if they would feel good or bad after playing with a gender-appropriate toy, and after playing with a gender-inappropriate toy. The children were also asked to predict how they thought another child would feel about the same behaviors. Finally, the children were observed in a playroom with the same toys. Children showed gender-typical toy play and they said that other children would feel good about playing with gender-typical toys, but bad about playing with gender-atypical toys, and this was the case across the age range. In regard to themselves, however, only the 4-year-old children said that they themselves would feel these ways. Additionally, the difference between feeling good about playing with a gender-typical toy and feeling bad about playing with a gender-atypical toy predicted behavior in the playroom. The larger this difference, the more gender-typical was the children's play. These findings were interpreted to suggest that, early in life, children play with gender-typical toys because they are reinforced for doing so, and that, between the ages of 2 and 4, they begin to incorporate social expectations and values and come to value engaging in gender-typical behavior and attach positive emotions to complying with gendered expectations. These then become self-evaluations that add additional motivation to behave as girls or boys should.

The acquisition of gender identity also underlies other mechanisms by which children self-socialize gendered behavior. One of these mechanisms is imitating or modeling the behavior of others of the same sex. If shown models of one sex engaging in a particular behavior or choosing a particular object and shown models of the other sex engaging in a different behavior or choosing a different object, children subsequently indicate greater interest in the behaviors or objects that were modeled by individuals of their own sex (Masters, Ford, Arend, Grotevant, & Clark, 1979; Perry & Bussey, 1979). Similarly, if children are told that items of one color, say green balloons, are for one sex, and that other similar items, say orange balloons, are for the other sex, they subsequently show more interest, both verbally and behaviorally, in the items that they have been told are for their own sex (Masters et al., 1979). They also show increased preferences for objects and activities that have been endorsed by children of their own sex over those that have been endorsed by children of the other sex (Shutts, Banaji, & Spelke, 2010).

Information about stability and instability of behavior is relevant to understanding its development. For instance, some researchers have argued that situational influences

on children's gendered behavior should lead to relative instability over time (Maccoby, 2002). Studies examining stability in children's gendered behavior over time have often been interpreted to suggest low stability, but this may have been the result of methodological limitations, such as small samples and few observations, as well as weak statistical approaches (C. L. Martin & Ruble, 2009). One study looked at over 300 samples of behavior for each of 61 preschool or kindergarten children over 6 months of a school year and found considerable temporal stability in choices of playmates of the same versus the other sex (stability coefficients ranged from about .6 to about .9 for data aggregated over 12 weeks) (C. L. Martin & Fabes, 2001). Similarly, another study found stability across 2 school years in playmate preferences of 5- to 12-year-old children, as indicated by the children's selecting pictures of peers with whom they would prefer to play (Serbin, Powlishta, & Gulka, 1993).

A developmental systems approach has been used to examine the origins of children's tendencies to play with others of the same sex (C. L. Martin et al., 2013). This study followed 230 preschool children over a school year, recording with whom they played and the activities in which they engaged. Results suggested that children played with others of the same sex in part because doing so facilitated engagement in gender-typical activities, but that sex segregation was explained to a greater degree by children affiliating with others of the same sex, regardless of the activity in which they were engaged.

Playmate preferences are not the only aspect of childhood behavior that has been studied over time. One study found impressive stability on a broad measure of gendered behavior over a long period of time. This longitudinal study used the PSAI to measure several thousand children's gendered behavior at the ages of 2.5, 3.5, and 5 years, and then used a similar measure, the Child Activities Inventory (CAI) to measure comparable gendered behaviors that were age appropriate at the age of 8 years (Golombok et al., 2008). Stability coefficients were high—for instance, 0.5 from the ages of age 2.5 to 5 years. Similarly, children who were the most gender typical at the age of 3.5 years were also the most gender-typical at the age of 8 years, whereas those who were the least gender-typical early on remained so later in development as well. This study also examined the trajectory of change in gendered behavior, and found that children who were the most gender-typical or gender-atypical at the earliest ages became progressively more so over the course of development. This acceleration may occur because highly gender-typical behavior leads to

engagement in highly gendered activities and to extensive play with same gendered peers who also enjoy highly gendered activities, whereas highly atypical gendered behavior leads to engagement in gender atypical activities and extensive play with peers, including other gender peers, who enjoy these gender-atypical activities. Thus, a particular child's degree of gendered behavior is likely to influence the environments he or she chooses, and these environments may then amplify the behavioral tendencies that led the child to choose them.

To summarize, individual differences in gendered childhood behavior, including toy, playmate, and activity preferences, are influenced by numerous factors. The gendering of these childhood behaviors begins at conception, when egg and sperm join to produce an XX or an XY individual. Information on the Y chromosome then causes the gonads to differentiate as testes, and testosterone, as well as other hormones produced by the testes, begin to affect the physical development of the XY fetus. The tissues that are influenced include regions of the brain, as well as the external genitalia. Several lines of inquiry suggest that androgenic hormones influence gendered childhood behavior. Over a dozen studies from a number of independent research groups have found that girls exposed to unusually high levels of androgens prenatally, because they have the genetic disorder, CAH, show increased male-typical play behavior in childhood. In addition, girls with more severe forms of CAH, involving the most dramatic androgen elevation, show the most male-typical play, as do girls with more severe genital virilization, which also reflects more androgen exposure or androgen response. In addition, girls with no genetic disorder, but exposed to high levels of androgenic hormones before birth because these hormones were prescribed to their pregnant mothers, also show increased male-typical play, and girls similarly exposed to anti-androgenic progestins during gestation show reduced male-typical play. Normal variability in testosterone prenatally, measured in maternal blood during pregnancy, or in amniotic fluid, predicts normal variability in male-typical childhood play, as does normal variability in testosterone measured in the urine of infants from birth to 6 months of age. Also, although parents report encouraging the interests of their androgen-exposed daughters in their everyday life, even though the interests are sex-atypical, observations of parents playing with their androgen-exposed daughters in a laboratory playroom suggest that they encourage these girls to play with girls' toys when given the opportunity to do so. None of these types of studies on their own is as persuasive as rigorous experiments, with random assignment

to receive hormones or placebos, would be. Each type of approach has its own limitations. For example, CAH is a disorder with consequences other than androgen exposure, including external genital virilization, mothers who take hormones during pregnancy or who undergo amniocentesis may not be representative of the population at large, and mothers who have high levels of testosterone may encourage more male-typical behavior in their children than do mothers who have low levels of testosterone. Each of these approaches thus has different types of limitations. Taken together, however, and considering also studies showing sex-typed toy preferences in nonhuman primates, the existing evidence converges on the conclusion that there is an inborn contribution to individual differences in children's gendered behavior, most probably from the early hormone environment.

Postnatally, the social environment and children's self-socialization, based on their cognitive development and gender identity understanding, further shape individual differences in these same gendered behaviors. Parents, teachers, peers, and strangers encourage children to engage in gender-typical behavior, and discourage boys from playing with girls' toys. Children also come to understand that they are boys or girls and that this will not change. They imitate the behavior of models of the same sex and respond to information that certain items or activities are for girls or for boys by showing increased interest in those that are for their own sex. They value doing so, and playing with gender appropriate toys comes to make them feel good about themselves. These processes activate additional mechanisms that further channel children into typical or atypical pathways. Children generally play with others of the same sex, providing them with more opportunities to learn sex-typical than atypical behavior. In addition, parents generally encourage their children to engage in the activities that they understand their children to enjoy, including encouraging girls with CAH to engage in male-typical behavior. At the same time, when given the opportunity to encourage more gender-typical behavior in their daughters with CAH, they do so. These daughters may be resistant to this socializing influence, however, given that parental socialization correlates as expected with gender-typical toy choices in girls without CAH, but not in girls with CAH (Pasterski et al., 2005). Consistent with these canalizing processes, children who are gender atypical early in development become increasingly so as they grow older, and this increasing trajectory occurs for those who are gender typical as well. Thus, inborn predispositions, as well as postnatal socialization, including

self-socialization, contribute to the acquisition of gendered behavior in childhood, and the effects of early androgen exposure may modify the impact of postnatal socialization by parents. These interacting and complementary processes combine to produce average differences between the sexes, as well as individual differences within each sex in gendered childhood behavior.

Gender Identity

Gender identity is involved in the acquisition of gendered behavior, but it is also a gendered aspect of human psychology on its own. In fact, it may be a uniquely human aspect of gendered psychology. As far as can be determined, individuals of no other species are consciously aware of their gender.

Gender identity differs dramatically for males and females. Almost all individuals who have the physical appearance of males acquire a male gender identity, whereas almost all individuals who have the physical appearance of females do not. This is not always the case, however. Some people who look like males identify as females, and some people who look like females identify as males. These people are gender dysphoric in their natal sex and may seek medical treatment (e.g., gonadal hormone treatment, genital surgery) to acquire the physical appearance corresponding to their gender identity. The incidence of this strong gender dysphoria is not known with certainty, because no rigorous epidemiological studies have been conducted. According to the *DSM-IV*, about 1 in 30,000 natal males and 1 in 100,000 natal females change their gender (APA, 2000). These estimates are old, however, and the numbers of children, adolescents and adults reporting gender dysphoria and seeking treatment have been rising (Zucker & Lawrence, 2009), perhaps because it has become more acceptable to seek help for this concern. Data from Belgium suggest that about 1 in 13,000 natal males and 1 in 34,000 natal females underwent sex reassignment surgery between 1985 and 2003, data from the Netherlands that about 1 in 12,000 natal males and 1 in 30,000 natal females received hormone therapy for gender dysphoria between 1986 and 1990, and data from Spain that about 1 in 21,000 natal males and 1 in 48,000 natal females received diagnoses of transsexualism between 1996 and 2004 (Zucker & Lawrence, 2009).

What factors contribute to individual differences in gender identity? People who choose to change gender in adulthood often recall feeling different from others and engaging in gender-atypical behavior, for their natal sex,

beginning in early childhood (Green, 1987). It is unlikely that these early cross-gendered interests are a major contributor to adult gender dysphoria, however, because most children who wish to change gender in childhood do not wish to change sex as adults. Across studies that have followed gender dysphoric children into adolescence, only 16% persisted in their dysphoria (range = 2% to 27%). Thus the great majority desist (Steensma, Biemond, de Boer, & Cohen-Kettenis, 2011). The period between Ages 10 and 13 years appears to be important for awareness of continuing dysphoric feelings, with individuals noting that changes in their social environment, their bodies and their first experiences of sexual attraction and love influenced their gender identification (Steensma et al., 2011). Although the early cross-gendered interests do not typically persist, they could provide a clue as to the causes of gender identity problems. Perhaps the same factors that influence cross-gendered interests in childhood influence gender identity.

Could the early hormone environment be involved? Gender dysphoric individuals are not typically born with ambiguous external genitalia, and rarely show any other physical evidence of exposure to unusual hormone environments. One might speculate, however, that localized hormonal differences within the brain could have influenced their development. For example, the mammalian nervous system, including the human fetal nervous system, can make testosterone and other gonadal steroids (King, 2012), and these hormones could act locally on neural circuitry involved in gender identity. This possibility is currently impossible to evaluate, however, because there are no techniques for assessing production of testosterone or other gonadal steroids in the living human brain, and the neural circuitry involved in gender identity is unknown.

Consistent with a role of early androgen exposure, XX individuals with CAH are more likely than other women to choose to change gender in adulthood. Although the vast majority of women with CAH develop a female gender identity, about 2% choose to live as men, despite having been assigned and reared as girls (Dessens, Slijper, & Drop, 2005; Meyer-Bahlburg et al., 1996; Zucker et al., 1996). This number is several hundredfold higher than the 1 in 30,000 or fewer who choose to live as men among women in general. Also, among women with CAH who are not gender dysphoric, identification with being female is reduced compared to other women, and the strength of identification as female correlates negatively with recalled cross-gendered behavior in childhood (Hines et al., 2004; Meyer-Bahlburg, Dolezal, Baker, Ehrhardt, & New, 2006).

Other evidence also suggests an association between CAH and reduced female gender identity. Self-reports of girls with CAH suggest reduced satisfaction with being girls (Ehrhardt, Epstein, & Money, 1968), and 10%–20% of girls exposed to high levels of androgen prenatally, because of CAH or other disorders of sex development, have been reported to be gender dysphoric (Sliper, Drop, Molenaar, & de Muinck Keizer-Schrama, 1998). Because most gender dysphoric individuals desist before adulthood, however, these figures may be higher than those for adults with similar conditions.

Individuals with CAIS almost always evolve female-typical gender identities (Hines, Ahmed, et al., 2003; Wisniewski et al., 2000), despite their Y chromosome, suggesting that the combination of no effective androgen exposure, feminine physical appearance, and sex assignment and rearing as girls are sufficient to produce female gender identities, despite the lack of a second X chromosome or ovaries. There is a report, however, of one individual with CAIS, who was assigned and reared as a girl, but chose to live as a man in adulthood (T'Sjoen et al., 2011).

Many XY individuals with enzymatic deficiencies in the pathway for testosterone production change from living as females to living as males following the appearance of male secondary sexual characteristics at puberty. One study reported on 18 XY individuals with 5-alpha-reductase deficiency in an isolated village in the Dominican Republic. These individuals were reported to have had undervirilized external genitalia at birth, to have been assigned and reared as girls, and to have been content as girls during childhood. However, 17 of the 18 were living as men following virilization at puberty (Imperato-McGinley, Guerrero, Gautier, & Peterson, 1974; Imperato-McGinley et al., 1979). A subsequent review of all available reports on XY individuals with 5-alpha-reductase deficiency found that 56% to 63% of those assigned and reared as girls lived as men in adulthood and that 39% to 64% of those with 17-HSD deficiency assigned and reared as girls lived as men in adulthood (Cohen-Kettenis, 2005). This review also concluded that the likelihood of making this change did not appear to relate to the severity of genital virilization at birth. Explanations for the variability in gender change include possible ambiguity in the sex of rearing (Herdt & Davidson, 1988; Money, 1976), or the advantages of being men rather than infertile women in the cultural settings where these disorders occur frequently—usually areas of high consanguinity (Herdt & Davidson, 1988; Wilson, 1979). In these cultural settings, medical treatment to prevent the emergence of masculine characteristics at puberty

is not always available, and to some extent the decision to live as men may be practical. If you look like a man, it could be easier to live as a man rather than as a woman. In the United States and most of Western Europe, individuals with these disorders are often assigned and reared as girls, and have their testes removed prior to puberty or before extensive masculinization has taken place. These individuals are more likely to remain living as women than those who experience physical masculinization (Wilson, Griffin, & Russell, 1993; Zucker, 2002). The available evidence does not support the idea that early androgen exposure is responsible for the changes in gender identity seen in some individuals with these disorders. Androgen exposure at puberty, perhaps by producing a masculine physical appearance, is a more likely explanation. The advantages of being a man in certain societies might also help some individuals with these disorders choose to live as men, particularly when they have virilized physically.

XY individuals assigned and reared as girls, because of conditions including penile agenesis or cloacal exstrophy, typically develop female gender identities (Meyer-Bahlburg, 2005). Although one research group reported a high incidence of gender dysphoria for XY individuals with cloacal exstrophy who had been assigned and reared as girls at one clinic (Reiner & Gearhart, 2004), this is not typical.

There are two well-documented cases where XY infants lost their penis in surgical accidents. In one case, the surgery took place when the child was 8 months of age, and he was reassigned as a girl by 17 months of age. The child was reported to be happy with this assignment in early childhood (Money & Ehrhardt, 1972), but in adulthood was living as a man and reported having been unhappy with the female sex assignment for many years (Diamond & Sigmundson, 1997). This case has been widely publicized as indicating that the Y chromosome and exposure to testicular hormones during early development made a male identity inevitable (Colapinto, 2000). A second, similar case argues against this interpretation, however. In this second case, the surgical accident occurred when the child was 2 months of age, and the reassignment as a girl was made by the age of 7 months. This individual was assessed at the ages of 16 and 26 years and had a female gender identity at both ages (Bradley, Oliver, Chernick, & Zucker, 1998). This second individual provides evidence of the power of socialization, accompanied by a feminine appearance, to shape gender identity. This XY infant was exposed to male-typical concentrations of testosterone and other testicular hormones prenatally and in early infancy,

was reared as a boy for at least the first 2 months of postnatal life, and then was reassigned as a girl. The success of this reassignment in producing a female gender identity in adulthood suggests that gender identity is not inevitably determined by the sex chromosomes or the early hormone environment, either singly or in combination. Instead, it points to powerful shaping by physical appearance or sex of rearing.

There are as yet no data examining normal variability in testosterone in amniotic fluid, maternal blood during pregnancy, or urine in infancy in relationship to gender identity. There are also no data showing that variability in social reinforcement of gender-typical or atypical behavior in the general population causes alterations in gender identity. One study found that children with gender dysphoria showed delayed cognitive understanding of gender compared to typically developing children or children with other psychiatric disorders (Zucker et al., 1999), but it is not possible to know if the gender dysphoria caused the delayed cognitive understanding of gender, or vice versa, or if a third factor caused both.

Another clue to the possible origins of individual variability in gender identity, comes from data suggesting that gender dysphoria and autistic spectrum conditions (ASC) co-occur more often than would be expected by chance. One study (A. L. C. de Vries, Noens, Cohen-Kettenis, Berckelaer-Onnes, & Doreleijers, 2010) of 204 children and adolescents who had been referred for evaluation of gender dysphoria found that 7.8% of the children also had an ASC, a figure that is much higher than the approximately 0.65% that would be expected to have an ASC in the population at large (Fombonne, 2009). Adults with gender dysphoria also have been found to show increased autistic traits (Pasterski, Gilligan, & Curtis, 2014). In both studies, the association between gender dysphoria and autistic traits applied to females as well as males with gender dysphoria. The findings might suggest that the reduced cognitive flexibility associated with autism, combined with feelings of gender atypicality, might lead individuals to think that they should be the other gender. Thus, the types of thinking patterns associated with ASC might predispose gender-atypical individuals to have difficulties with gender identity.

In summary, many types of factors appear to play a role in gender identity development. Information from studies of clinical syndromes involving androgen abnormalities suggests that androgen exposure during early development contributes to gender identity development. The risk of severe gender dysphoria in XX adults exposed to high

levels of androgens prenatally because of CAH is increased, although it is still rare (about 2%), and most XX and XY individuals who are assigned and reared as females develop female gender identities, even if they were exposed to high concentrations of androgens prenatally. XY individuals who cannot respond to androgens, because they have CAIS, almost always develop female gender identities, although their feminine appearance and unambiguous rearing as females could contribute to this outcome. There is a report of one individual with CAIS who chose to live as a man, despite having been reared as a girl, and having a feminine appearance, but, thus far, this is a single case. Many men with enzymatic disorders that impair androgen production choose to live as men after they acquire male secondary sexual characteristics at puberty, whereas many others remain living as females, especially if physical virilization at puberty is prevented. In addition, the change to living as a man may occur more frequently in cultures where being a man has social advantages, particularly in comparison with being an infertile woman. Evidence associating gender dysphoria and ASC suggests that psychological characteristics associated with ASC, such as reduced cognitive flexibility, might increase the likelihood of gender dysphoria in individuals with gender-atypical interests. Overall, the evidence suggests that the early hormone environment, gender-typical socialization, physical appearance, cultural differences, and personality variables all contribute to variability in gender identity, but little or no research has yet examined how these factors might interact to influence gender identity.

Sexual Orientation

Sexual orientation has also been reported on in the two cases where male infants were reassigned as girls following surgical accidents that damaged the penis. The child who was reassigned by the age of 7 months subsequently had erotic interest in both men and women (Bradley et al., 1998), whereas the child who was reassigned later, by the age of 18 months, appears to have been exclusively heterosexual in adulthood, and lived with a female partner (Diamond & Sigmundson, 1997). These two outcomes differ from one another to some extent—one individual has a bisexual orientation, whereas the other was interested in female and not male partners, but both differ from typical females, who have primary sexual interests in men. Thus, for both of these individuals, sexual orientation appears to have been influenced in the male-typical direction by their Y chromosomes, their early androgen exposure, their early

socialization as male infants, or some combination of these factors.

Women exposed to high levels of androgens prenatally, because of CAH, are also more likely than women in general to show erotic interest in women (Dittmann, Kappes, & Kappes, 1992; Frisén et al., 2009; Hines et al., 2004; Meyer-Bahlburg et al., 2008). These studies suggest that about 70% of women with classic CAH are exclusively or almost exclusively heterosexual, compared to over 95% of women without CAH. In addition, the likelihood of not being exclusively or almost exclusively heterosexual is greater for women with the more severe forms of classic CAH than in those with less severe forms (Dittmann, Kappes, Kappes, Börger, Meyer-Bahlburg, et al., 1990; Meyer-Bahlburg et al., 2008), and for women born with more severe genital virilization (Gastaud et al., 2007), suggesting that androgen contributes to the behavioral outcome.

The genital virilization in women with CAH, and surgeries to feminize the genitalia, could be particularly relevant to their sexual behavior, however. Even with surgical feminization, the genitalia are not identical to those of other women, and the surgical outcomes can produce problems, such as pain at intercourse (Schober, 1999). In light of these issues, convergent evidence is particularly important. Some convergent evidence has come from studies of XY females with CAIS. Almost all women with CAIS are erotically interested in men (Hines, Ahlmed, et al., 2003; Money, Schwartz, & Lewis, 1984; Wisniewski et al., 2000), suggesting that their lack of effective androgen exposure reduced their sexual interest in women, despite their Y chromosome. Women with CAIS are almost always reared as females, however. Socialization as females might, therefore, explain their female-typical erotic interest in men, although no specific socialization experiences have been linked to sexual orientation.

Sexual orientation in individuals with enzymatic deficiencies that prevent production of the full range of androgens has not been studied systematically. It is generally assumed, however, that those individuals who change to live as men following virilization at puberty, are sexually interested in women, and in many instances are known to live with or marry women (Wilson et al., 1993; Zucker, 2002). In contrast, individuals with the same disorders, who are surgically feminized and have their testes removed prior to physical virilization at puberty, are thought to be sexually interested in men, and in many instances they are known to live with or marry men (Wilson et al., 1993; Zucker, 2002). These findings suggest that

the cultural context, or physical appearance as a man or a woman, can influence sexual orientation in individuals with these disorders.

There is, as yet, no information relating normal variability in hormones in maternal blood during pregnancy, in amniotic fluid, or in infants' urine to sexual orientation, so it is not known if normal variability in the early hormone environment relates to subsequent sexual orientation. There is some information, however, on sexual orientation in the children of women treated with hormones during pregnancy. Men treated with progestins or estrogens do not appear to show altered sexual orientation (Kester, Green, Finch, & Williams, 1980; Meyer-Bahlburg, Ehrhardt, Whitehead, & Vann, 1987), and this is not surprising, because treatment of male animals with similar hormones does not influence their sexual behavior. In contrast, treatment of women with the synthetic estrogen, DES, during pregnancy has been linked to reduced heterosexual orientation in their adult daughters (Ehrhardt et al., 1985; Ehrhardt, Meyer-Bahlburg, & Veridiano, 1987; Meyer-Bahlburg et al., 1985; Meyer-Bahlburg et al., 1995). This outcome was seen in three studies including a total of about 100 DES-exposed women and matched and some sibling controls, and would be predicted based on findings in other species, where exposing female animals to DES during early development reduces subsequent female-typical behavior. In the three studies of women, 16%–35% of the DES-exposed women versus 0%–13% of the controls reported themselves to be homosexual or bisexual. The studies also included 20 sister pairs, where one sister was exposed to DES and the other was not, and 40% of the DES-exposed sisters reported a bisexual or homosexual orientation, compared to 10% of their unexposed sisters. A study of several thousand DES-exposed and unexposed women by a second research team (Titus-Ernstoff et al., 2003) did not provide evidence linking prenatal DES exposure to sexual orientation. This replication attempt relied on a single question about the sex of sexual partners, however, whereas the three studies finding a link between DES and sexual orientation used extensive interviews to assess sexual orientation, including sexual orientation in fantasy as well as in behavior. Thus, weak measurement reliability could explain the failure to replicate. The results suggesting reduced heterosexual orientation in women exposed prenatally to DES are important, because DES exposure would be hypothesized to masculinize neurobehavioral development, but would not cause virilization of the external genitalia. Thus, if replicable, these results would provide important

convergent evidence supporting hormonal influences on the development of human sexual orientation.

What other factors have been linked to variability in sexual orientation? Information from twin studies suggests a genetic contribution, particularly for men. Heritability estimates are higher for studies that specifically recruit nonheterosexual twin pairs (Bailey & Pillard, 1991; Bailey, Pillard, Neale, & Agyei, 1993; Whitam, Diamond, & Martin, 1993) than for those working with twin registers or population samples (Bailey, Dunne, & Martin, 2000; Kendler, Thornton, Gilman, & Kessler, 2000), but both approaches suggest some heritability. One concern about twin studies is that they confound genetic similarity and rearing similarity, so information on twins reared apart is valuable. For men, reports on four such pairs of identical twins found that two pairs were concordant for a non-heterosexual orientation, supporting the results of studies of twins reared together, and suggesting some degree of heritability for sexual orientation (Eckert, Bouchard, Bohlen, & Heston, 1986; Whitam et al., 1993). In contrast, reports on four pairs of identical female twin pairs reared apart appear to argue against substantial heritability in that, in all four pairs, only one of the two in the pair was not heterosexual (Eckert et al., 1986).

Researchers have also searched for specific genes that relate to variability in sexual orientation. These studies have looked at possible candidate genes, at genes on the X chromosome, and at the whole genome. Sequence variation in the androgen receptor gene appears to be unrelated to sexual orientation in men (Macke et al., 1993). Similarly, the gene regulating aromatase cytochrome, the enzyme that converts androgen to estrogen, does not appear to relate to variability in sexual orientation among men (DuPree, Mustanski, Bocklandt, Nievergelt, & Hamer, 2004). In an extended family, where there appeared to be maternal transmission of homosexuality in male offspring, genes on the X chromosome were examined and a linkage was found to markers on Xq28 (Hamer, Hu, Magnuson, Hu, & Pattatucci, 1993). The same research group subsequently replicated this finding for men, but found no such linkage for women (Hu et al., 1995). A second research group failed to replicate the finding for men (Rice, Anderson, Risch, & Ebers, 1999), although this failure to replicate could have resulted from methodological differences. For instance, the failed replication attempt did not focus on individuals with evidence of maternal transmission. Similarly, a genome-wide scan failed to replicate the linkage (Mustanski et al., 2005), but again, methodological differences prevent firm conclusions. In particular, the

genome-wide scan had poorer resolution for markers in the Xq28 region than the Hamer study. The genome-wide scan suggested possible linkage to other regions, including D7S798 in 7q36, D8S505 in 8p12, and D10S217 in 10q26, and the authors suggested that future research might use denser linkage maps in these regions and in the Xq28 region. There is also evidence that homosexual men, but not women, have fewer maternal uncles than aunts (Turner, 1995). These results suggest increased fetal mortality in the brothers of homosexual men's mothers. Other authors have attempted to explain these findings in terms of genomic imprinting (Green & Keverne, 2000).

The number of older brothers also has been related to sexual orientation in men, but not women (Blanchard & Bogaert, 1996). The probability of not being heterosexual has been observed to be 2% for men with no older brothers, and to increase to 2.6%, 3.5%, 4.6%, 6% and 7.8% with one, two, three, four, and five or more older brothers (Blanchard, 2001). The effect does not apply if the older brothers are not biologically related to the younger brother, suggesting an influence of prenatal factors (Bogaert, 2006). One suggested explanation of these findings is that mothers produce progressively more antibodies to male fetuses with each pregnancy involving male fetuses, and that these antibodies somehow alter sexual orientation (Blanchard, 2004). For unknown reasons, the effect of older brothers on sexual orientation is seen in right-handed, but not left-handed, men. Men and women who are not heterosexual are also less likely to be right-handed than are heterosexual men and women (Blanchard & Lippa, 2007; Lalumiere, Blanchard, & Zucker, 2000).

The causes of variability in sexual orientation have been suggested to differ for men and women (see also Diamond, Bonner, & Dickenson, Chapter 21, this *Handbook*, this volume). For instance, as noted above, evidence of a genetic contribution is stronger for men than for women, and the influence of older siblings does not appear to apply to women. In addition, sexual orientation appears to be more variable over the lifespan in women than it is in men (Baumeister, 2000). One study (Diamond, 2008) followed 79 lesbian, bisexual, and "unlabeled" women over 10 years and found that two thirds of the women changed their sexual orientation label over this period and one third changed their label more than once. It has been suggested (Diamond, 2007) that a dynamic systems approach is likely to be particularly informative in studying factors influencing sexual orientation in women, in part because women can show rapid shifts in their sexual orientation identity, and dynamic systems analysis are

particularly suited to examining stability and change in behavior. Dynamic systems analyses have not yet been used in studies of sexual orientation, however.

In summary, studies from several independent research groups suggest that exposure to high levels of androgenic hormones prenatally increases the likelihood of bisexuality or homosexuality in women. There is some support for a similar influence of estrogen exposure prenatally, although there is, as yet, no independent replication of this finding. Also, prenatal exposure to high levels of androgens does not lead to a nonheterosexual orientation in all individuals. For instance, among women exposed to high levels of androgens before birth, because of the genetic disorder, CAH, sexual orientation is typically heterosexual, although the likelihood of being bisexual or homosexual appears to be about 30%, well above the less than 5% that would be expected in the general population. There is limited systematic information on sexual orientation in men with enzymatic deficiencies that limit androgen production, but it appears that those who choose to live as men also have a sexual orientation toward women. These findings suggest that reduced androgen in males during early development does not necessarily lead to reduced heterosexual orientation. When the testes are removed prior to puberty in individuals with the same disorders, sexual identity and, apparently, sexual orientation often remain female-typical. These different outcomes suggest that the effects of uncorrected androgen exposure at puberty, particularly the development of a male phenotype at this time, might make it easier to adopt an identity and sexual orientation that matches physical appearance. Other possible explanations of the link between androgenization at puberty and sexual orientation toward women include social and cultural factors that might make it desirable to be a heterosexual male. The sexual orientation of men does not seem to be influenced by prenatal exposure to the synthetic estrogen, DES, or to progesterone or synthetic progestins, but it does appear to have some heritability. Reduced likelihood of sexual attraction to women has also been related to the number of older brothers, at least among right-handed men, although the reason for this relationship is unknown. A similar effect of older siblings is not seen in women, and women's sexual orientation is more changeable over the lifespan than is men's, suggesting influences of as-yet-unidentified life experiences.

Personality

Girls and women with CAH show increased propensities to behave in physically aggressive ways. This has been found

in two studies, one comparing girls with CAH to their unaffected female relatives (Pasterski et al., 2007), and one of female adolescents and adults with CAH, again compared to unaffected female relatives (Mathews, Fane, Conway, Brook, & Hines, 2009). The first study used a standardized questionnaire involving maternal reports about their children's aggressive behavior, and the second used retrospective reports by individuals about their own behavior in late childhood, again using a standardized instrument. In both studies, girls, but not boys, with CAH were found to show increased propensities for physical aggression. Other studies have not found increased aggression in girls with CAH (Erhardt & Baker, 1974; Ehrhardt, Evers, & Money, 1968), or have produced inconsistent findings (Berenbaum & Resnick, 1997), perhaps because the studies used relatively small samples or interviews with the girls' mothers, instead of standardized assessment instruments. Oddly, one review (Jordan-Young, 2010) suggested that studies assessing aggression directly in girls with CAH do not find increased aggression, but this is not the case, unless maternal interviews are viewed as direct assessments. Consistent with the findings of increased aggression in females with CAH, a study of children whose mothers took progestins, most of which were androgenic, during pregnancy, found increased propensities for physical aggression, assessed using a standardized instrument, in both progestin-exposed girls and boys compared to same-sexed siblings born of pregnancies where no hormones were taken (Reinisch, 1981). In this last study, potential confounding influences of genital virilization did not exist because all of the girls in the study had been born with unremarkable female external genitalia. There are no published reports on correlations between normal variability in testosterone prenatally or neonatally and subsequent physical aggression.

For both boys and girls, extreme maltreatment is associated with increased aggressive behavior. Also, although history of maltreatment has been found in some studies to interact with genetic factors in influencing maladaptive outcomes, it appears that high levels of trauma also produce maladaptive outcomes regardless of genotype (Weder et al., 2009). Parenting behaviors, such as harsh discipline, low warmth, and neglect also predict children's aggression (Sameroff, Peck, & Eccles, 2004; Serbin & Karp, 2004), and these effects can be mediated by altered cognitive biases, such as propensity for hostile thoughts and attributions, and by social learning, including the modeling of parental aggression (Chang, Schwartz, Dodge, & McBride-Chang, 2003; Serbin & Karp, 2004). Thus, there are powerful influences of adverse environments on

aggressive behavior, but these do not necessarily appear to be gender specific, and so are unlikely to explain differences between males and females in physically aggressive behavior. Negative peers and poor school success are also associated with increased aggressive behavior, however (Sameroff et al., 2004), and these characteristics tend to be more common in boys than in girls. Similarly, some activities that attract boys more than girls, such as aggressive computer games and drug use, are also associated with aggression. In addition, the same kinds of social and cognitive mechanisms that shape gendered toy choices could operate to shape gender differences in aggression (Bandura, 1973). Generally, aggressive behavior is not encouraged in boys or in girls but more men than women behave aggressively, and so boys might model aggression as a masculine behavior. The classic study (Bandura, Ross, & Ross, 1961) in which children watched male and female models behaving aggressively with a pop-up "Bobo" doll, concluded that both boys and girls modeled physically aggressive behavior, particularly in male models, but that boys modeled the physically aggressive behavior of male models more than girls did. Social cognitive approaches to understanding the gender difference in aggressive behavior have found that girls are more likely than boys to think that the victims of their aggression suffer, and to think that they themselves will be punished for aggressive behavior (Perry, Perry, & Rasmussen, 1986). Both of these beliefs would be expected to reduce aggressive behavior.

Levels of testosterone in adulthood are widely assumed to influence aggressive behavior. In particular, the use of androgenic steroids, for instance among body builders, is thought to increase aggressive behavior. Because men have more circulating testosterone than women, testosterone-induced enhancement of aggression could explain men's higher levels of aggression. It has not been possible to demonstrate this type of effect empirically in humans, however. Correlations between testosterone and aggressive behavior in men are small (Archer, Birring, & Wu, 1998; Book, Starzyk, & Quinsey, 2001). In addition, because testosterone is released in response to experience, including stress and the experience of winning a competition, the small correlation could reflect an effect of behavior on testosterone as easily as an effect of testosterone on behavior. Studies in which men were treated with testosterone generally do not find that the treatment increases anger or aggression (Alexander et al., 1997; O'Connor, Archer, Hair, & Wu, 2002; Tricker et al., 1996). These results contrast with data from other species, such as rats, where changes in testosterone alter the likelihood of

aggression (Simon, 2002). Perhaps the strong socialization to avoid physically aggressive behavior in contemporary life overrides a similar link in humans.

Empathy has also been studied in relation to the early hormone environment. Females with CAH have been found to score lower than unaffected female relatives on a standardized personality measure of empathy (Mathews et al., 2009). Because females typically score higher on this measure than males do, this would represent a masculinizing effect of early testosterone exposure. Empathy has also been related to prenatal testosterone exposure as measured in samples of amniotic fluid. There are several studies, from one research group, relating amniotic fluid testosterone to empathy and these studies have operationalized empathy in various ways. One study found a negative relationship between testosterone and empathy assessed by questionnaire in boys but not in girls (Chapman et al., 2006). In the same study, some participants were asked to judge emotions from pictures of eyes, and empathy assessed using this measure was related to amniotic fluid testosterone in boys and in girls. In another subsample, amniotic fluid testosterone related to the frequency of using intentional statements to describe interactions between cartoon images of moving triangles in boys but not in girls (Knickmeyer, Baron-Cohen, Raggatt, Taylor, & Hackett, 2006). In this subsample, girls also used more mental and affective state terms than boys did to describe the interactions between the triangles, but use of these terms was unrelated to amniotic fluid testosterone in either sex. These somewhat inconsistent results for relationships between empathy and amniotic fluid testosterone may reflect a lack of power. For instance, amniocentesis cannot be done for experimental purposes and clinical amniocentesis provides only a single sample for measuring testosterone. In addition, testosterone concentrations vary with time of day, and this was not controlled for in the studies.

Other approaches to understanding individual differences in empathy have examined social and cognitive influences. For instance, empathy is considered to be a feminine characteristic and so females might want to appear empathic. They also receive more socialization to show empathy and other caring behaviors than boys do (Eisenberg, Fabes, & Shea, 1989).

Like empathy, parenting interest is viewed as more important for females than for males, and in most countries, women are eligible for more parental leave than men. There is no evidence, however, that single male parents, or two male parents, have children who are less competent intellectually or emotionally than those in

comparable female-parented families (Golombok, 2000). Three studies, using a small number of interview questions, have reported that girls with CAH show reduced interest in babysitting and other aspects of childcare, including having children of their own, however (Dittmann, Kappes, Kappes, Börger, Stegner, et al., 1990; Ehrhardt & Baker, 1974; Ehrhardt et al., 1968). A study using a questionnaire to assess interest in infants produced equivocal results (Leveroni & Berenbaum, 1998), but a subsequent study using the same questionnaire in a larger sample found that females with CAH showed reduced interest in infants (Mathews et al., 2009). There are no studies relating normal variability in the early hormone environment to interest in infants or in parenting. As noted above, there are also influences of life stage on interest in infants in both men and women, suggesting influences of the environment or of experience on gender differences in this area.

In summary, there are powerful environmental influences on propensities for aggressive behavior, and boys may acquire aggressive behavior in part by imitating other boys and men. Also, boys and men who socialize largely with other boys and men might be at increased risk of both engaging in and receiving physical aggression, because boys and men engage in behaviors, such as drug use, that are risk factors for aggression, more than do girls and women. In addition, the early hormone environment appears to contribute to differences in aggressive behavior, with prenatal exposure to higher than normal concentrations of testosterone associated with increased aggressive behavior in females. Prenatal exposure to higher concentrations of androgens also increases the likelihood that individuals will choose to play with boys as opposed to girls (Hines & Kaufmann, 1994). Thus, the early hormone environment could initiate processes that alter the social environment, and self-socialization processes, in ways that increase the risk of physical aggression. The common belief that testosterone in adulthood increases human aggressive behavior has not been supported empirically. Empathy and interest in infants are also influenced both by environmental and hormonal factors, with early androgen exposure appearing to play a role in reducing empathy and interest in infants. Life stage also seems to be particularly important for interest in infants. There is as yet little or no work attempting to integrate understanding of how different types of factors interact to shape empathy or interest in infants and in parenting, however, nor is there research directly examining these types of interactions in the context of gendered aspects of aggressive behavior.

Cognition

Studies attempting to identify the causes of gender differences in human cognition have investigated the contributions of genetic factors, the early hormone environment, and postnatal socialization and social experiences, as well as possible contributions of hormonal differences between men and women at or after puberty. In regard to genetic influences, it was once thought that genes on the sex chromosomes explained the male advantage on visuospatial tasks (Maccoby & Jacklin, 1974). Subsequent research, on larger and more representative samples, did not support this conclusion, however.

More recently, it has been suggested that differences in androgen concentrations in male and female fetuses might explain gendered performance on spatial tasks. Some studies have reported enhanced mental rotations performance (Berenbaum, Korman Bryk, & Beltz, 2012; Resnick, Berenbaum, Gottesman, & Bouchard, 1986), or enhanced performance on other spatial tasks (Berenbaum et al., 2012; Hampson, Rovet, & Altmann, 1998; Mueller et al., 2008) in girls or women with CAH. Other studies have not produced similar findings, however (Baker & Ehrhardt, 1974; Helleday, Bartfai, Ritzen, & Forsman, 1994; Hines, Fane, et al., 2003; Malouf, Migeon, Carson, Pertrucci, & Wisniewski, 2006; McGuire, Ryan, & Omenn, 1975). The study investigating mental rotations performance in the largest sample studied to date used two mental rotation tasks that showed large gender differences, but found no significant difference between females with and without CAH (Hines, Fane, et al., 2003). One possibility is that the studies finding links between spatial abilities and CAH in females relied on small samples, truncated age ranges and selective reporting of measures, leading to spurious findings.

Studies relating testosterone measured in amniotic fluid to cognition have also produced mixed results. One study found an unpredicted negative relationship between amniotic testosterone and block building in girls, and no relationship between testosterone and any of 11 abilities measured in boys at age 4 years (Finegan, Niccols, & Sitarenios, 1992). At age 7 years, the same researchers found no relationship between amniotic testosterone and mental rotation scores (Grimshaw, Sitarenios, & Finegan, 1995). They reported a positive relationship between testosterone and speed of rotation in a subset of girls who used rotational strategies, but speed of rotation did not differ by gender. The authors also reported a negative correlation between testosterone and speed of rotation in boys, although this relationship was in the opposite direction to

that anticipated, and only significant when some data points were removed from the analysis. These researchers also reported on two variables that showed gender differences, spatial play experiences and mental rotation response times, but scores on these variables did not correlate with amniotic testosterone. A study of a separate sample of children also related testosterone measured in amniotic fluid to later performance on measures of spatial ability, including a mental rotations task and a disembedding task (Auyeung et al., 2012). Although the mental rotations task showed the expected gender difference, mental rotations performance did not relate to amniotic testosterone in either males or females. Performance on the disembedding task did relate to testosterone and this task showed a large gender difference in this particular study, although disembedding tasks typically show small to negligible gender differences.

Another approach to measuring normal variability in the early hormone environment has been to assay hormones in umbilical cord blood at birth. A study using this approach found no relationship between testosterone or other hormones and cognitive performance at 6.5 years of age in boys (Jacklin, Wilcox, & Maccoby, 1988). In the same study, two androgens, testosterone and androstenedione, each showed a negative relationship to performance on a spatial task in girls, findings contrary to prediction. None of the cognitive tasks used in this study showed significant gender differences, however, hampering interpretation of the findings.

Historically, researchers have sometimes been quick to conclude that inborn factors cause differences between males and females in overall intelligence or in spatial and mathematical potential. This history deserves mention, because remnants of it remain in scientific debates today. The attribution of gender differences in spatial abilities to genes on the sex chromosomes provides one example. The attribution of these same gender differences to differences in testosterone prenatally may be another. A third example of this historical pattern involves studies of general intelligence in individuals with CAH and in individuals exposed to androgenic progestins prenatally. Early reports suggested that intelligence scores in these groups were elevated compared to population norms, and led to the conclusion that early androgen exposure produced enhanced intelligence (Ehrhardt & Money, 1967; Money & Lewis, 1966). Later, however, this apparent effect of androgen on intelligence was shown to be unreliable—the result of comparing patients to outdated or otherwise inappropriate norms. When individuals with CAH were

compared to their relatives or to well-matched controls, their intelligence scores did not differ (Baker & Ehrhardt, 1974; McGuire et al., 1975; Wenzel et al., 1978). Research investigating intelligence test scores in individuals whose mothers took androgenic progestins, anti-androgenic progestins or the synthetic estrogen, diethylstilbestrol (DES) during pregnancy has also found no differences between them and relative or matched controls (Hines & Sandberg, 1996; Hines & Shipley, 1984; Reinisch & Karow, 1977). These results are unsurprising, because general intelligence shows no appreciable gender difference and so would not be expected to relate to exposure to gonadal hormones. Finally, some studies have reported reduced intelligence in individuals with CAH compared to matched controls (Helleday et al., 1994; Johannsen et al., 2006). These reports probably reflect different selection biases in individuals with CAH and their families as opposed to individuals recruited from the general population. Among the general population, more intelligent or educated people may be more likely to volunteer for research, whereas among patients and their families, people may be equally likely to volunteer across the full spectrum of education and intelligence. Consistent with the idea that selection biases differed in the two groups, both studies reporting reduced intelligence in individuals with CAH found that a far larger percent of the eligible CAH population than of the eligible control population agreed to participate.

Performance on tasks at which females outperform males, including verbal fluency and perceptual speed, might be expected to be impaired by prenatal exposure to androgens, and thus girls or women with CAH might be expected to show reduced performance on these types of tasks. Generally, however, girls and women with CAH have been found to perform like female controls in these areas (Baker & Ehrhardt, 1974; Helleday et al., 1994; Malouf et al., 2006; McGuire et al., 1975; Resnick et al., 1986; Sinforiani et al., 1994). In contrast to most findings, one study reported impaired performance on a measure of perceptual speed in girls with CAH (Hampson et al., 1998), but the sample in this study was very small (seven girls with CAH and six unaffected girls). Thus, the finding could be the product of chance.

Some have speculated that the male advantage on some standardized tests of mathematical ability, like the SAT, are caused by the sex difference in androgen concentrations during prenatal development (Benbow, 1988; Benbow & Stanley, 1983). However, there are no empirical findings supporting that conclusion, and the limited evidence from studies of individuals with CAH argues against it. Several

studies have reported decrements in arithmetic and mathematical performance in children of both sexes with CAH (Baker & Ehrhardt, 1974; Perlman, 1973; Sinforiani et al., 1994). Although this is not always found (Helleday et al., 1994), there are no reports of enhanced arithmetic or mathematical performance in girls or women with CAH, and no reports associating normal variability in early testosterone exposure with later performance in these areas.

Prenatal exposure to high levels of estrogenic hormones does not appear to influence the development of cognitive abilities that vary by gender. Women exposed to DES, for example, perform like their unexposed sisters on a range of gender-related abilities, including mental rotations, spatial perception, verbal fluency, and perceptual speed (Hines & Sandberg, 1996; Hines & Shipley, 1984). Additionally, a large, double-blind study found that females exposed to DES prenatally did not differ from placebo-treated females in performance on any of four American College Testing subtests that showed gender differences. Among males, those treated with DES scored higher than those treated with placebo on one of the four tests, a test that males excelled at. This difference had not been predicted, and the authors attributed it to chance (Wilcox, Maxey, & Herbst, 1992). A study of 10 pairs of brothers in which one was exposed to DES, and the other was not, reported reduced performance in the DES-exposed boys on a composite of three subtests from the Wechsler Intelligence Scales—Picture Completion, Object Assembly, and Block Design. The 10 pairs of brothers did not differ on composites of verbal or sequencing subtests (Reinisch & Sanders, 1992). All of these subtests show small to negligible gender differences, and the results for the performance subtests are likely to have been spurious, particularly in light of the small sample.

Females with Turner Syndrome show some specific cognitive deficits, although they perform normally on measures of vocabulary and general intelligence (Garron, 1977). The best-documented deficit is in spatial abilities, although other abilities, including numerical ability, memory or attention, and verbal fluency, are also impaired (Ross & Zinn, 1999; Rovet, 1990; Temple & Carney, 1996; Waber, 1979). Males typically excel on some of the tests that show impairment, whereas females typically excel on others, and still others appear to be gender neutral. One study found that the impairments in females with Turner Syndrome were larger on tasks that show gender differences favoring either males or females than on gender neutral tasks (Collaer, Geffner, Kaufman, Buckingham, & Hines, 2002). The particularly marked impairments

on gendered tasks were interpreted to suggest that the cognitive deficits relate in part to gonadal hormonal deficiency. Impairment on tasks at which females excel may also support a role for ovarian hormones in feminization of some cognitive characteristics (Collaer et al., 2002). These findings of greater deficits on tasks at which males or females excel have not yet been replicated, however.

For men with IHH, reduced performance has been described on a variety of spatial tasks, including measures of mental rotations, spatial perception, and spatial visualization (Buchsbaum & Henkin, 1980; Cappa et al., 1988; Hier & Crowley, 1982). The first two categories of spatial tasks show appreciable gender differences favoring males, but the third does not. Men with IHH do not appear to show impairment on measures of vocabulary (Cappa et al., 1988; Hier & Crowley, 1982), but one study also reported that they showed reduced performance on a measure of verbal fluency (Cappa et al., 1988), a type of task at which females typically excel. Another study found that men who became hypogonadal after puberty showed no deficit in performance on spatial tasks, whereas those who had been hypogonadal from earlier in life did show this deficit (Hier & Crowley, 1982). This study also reported that treatment with testosterone in adulthood did not reverse the deficit in spatial performance. Because men with IHH appear to have normal concentrations of androgens before birth, but are deficient thereafter, these findings suggest that the early postnatal surge in testosterone that is seen in male infants might contribute to gendered aspects of spatial cognition. Evidence that boys and men with CAH show reduced spatial abilities, as well as reduced androgen concentrations shortly after birth, also supports this conclusion (Hines, Fane, et al., 2003).

Numerous studies have related variation in hormones after puberty to gendered patterns of cognition, but these studies also have not produced consistent outcomes. Although some reports suggested that hormonal changes across the menstrual cycle related to cognitive performance in predicted ways, for example, with women performing better on spatial tasks when estrogen was low (Hampson, 1990), and that treatment of XY individuals with estrogen as part of transitioning to live as women reduced spatial performance and increased verbal performance (Van Goozen, Cohen-Kettenis, Gooren, Frijda, & Van De Poll, 1995), these findings have not been replicated consistently (see, e.g., Epting & Overman, 1998; Gordon & Lee, 1993; Pomerleau, Teuscher, Goeters, & Pomerlau, 1994, for examples of failures to replicate menstrual cycle effects, and Miles, Green, & Hines, 2006; Wisniewski,

Prendevill, & Dobs, 2005, for failures to replicate the effects of estrogen treatment). Also, treatment of healthy men with testosterone in adulthood does not alter gendered cognition in expected ways. Instead, two studies have found that testosterone treatment has an effect opposite that predicted—improved verbal fluency, with no effect on spatial tasks (Alexander et al., 1998; O'Connor, Archer, Hair, & Wu, 2001). Similar treatment of hypogonadal men is also without effect on spatial abilities (Alexander et al., 1998; Hier & Crowley, 1982; O'Connor et al., 2001), as is testosterone treatment of boys experiencing delayed puberty (Liben et al., 2002).

Cognition has also been studied in individuals with CAIS. Ten patients with CAIS showed a deficit relative to their unaffected relatives on Block Design and other performance subtests of the Wechsler Scales (Imperato-McGinley, Pichardo, Gautier, Voyer, & Bryden, 1991). Because the Wechsler subtests show small to negligible gender differences, it is not clear that the deficit was related to the lack of androgen receptors. The small sample also limits confidence in the finding.

As discussed earlier, girls and boys tend to prefer different toys and activities, and these gender differences in the way children play could contribute to their development of different cognitive strengths. Activities that girls tend to engage in may promote verbal communication, for example, whereas those that boys tend to engage in may promote spatial abilities (Maccoby, 1966; Sherman, 1967). In support of this latter suggestion, girls who engage in boys' activities either spontaneously, or because of an experimental manipulation, have been found to show better spatial performance than those who do not (Sprafkin, Serbin, Denier, & Connor, 1983). In addition to these individual findings, meta-analytic results suggest that engagement in activities that males typically engage in is associated with better performance on spatial tasks (Baenninger & Newcombe, 1989).

Training also improves performance on spatial tasks, a finding that has been confirmed by meta-analysis (Baenninger & Newcombe, 1989). Training improves performance in both sexes, and does not always eliminate the gender difference in performance, although it has been suggested that it would do so if training continued to maximum performance (Terlecki & Newcombe, 2005). Computer and videogame usage are also associated with mental rotation performance, and play with videogames as part of an experiment protocol improves mental rotations performance (Feng, Spence, & Pratt, 2007; Terlecki & Newcombe, 2005). This effect can generalize to other

spatial tasks (Terlecki & Newcombe, 2005), and can eliminate the gender difference in mental rotations performance (Feng et al., 2007).

Cross-cultural evidence also suggests that social or cultural factors influence gender differences in cognitive performance. For instance, differences between the average child in two different cultures can be many times as large as the differences between girls and boys within a given culture. Looking at mathematics performance, for example, results from an international assessment in 2011 showed that students in Singapore performed the best, and that girls in Singapore performed somewhat better than boys, whereas boys in the United States performed somewhat better than girls (Mullis, Martin, Foy, & Arora, 2012). Gender differences were far smaller than cultural differences in performance. On the Numbers section of the test, girls and boys in Singapore scored 83 and 69 points higher than girls and boys in the United States. In contrast, in the United States, boys scored 10 points higher than girls. Other sections of the test, such as Geometric Shapes and Measures, showed cultural and gender differences similar in size to those seen on the Numbers section.

Similar findings have emerged from international testing on science performance (M. O. Martin, Mullis, & Foy, 2008). Here, again, the differences between cultures are far larger than the differences between boys and girls. Cross-nationally, girls outperformed boys. Singapore again scored the highest, and boys and girls in Singapore scored 46 and 51 points higher than boys and girls in the United States. The gender difference in performance in the United States was 12 points.

These cross-cultural differences do not appear to reflect genetic differences. The survey of science performance looked at some individual states in the United States, and found large differences in performance, despite similar genetic backgrounds. Students in Massachusetts were found to score like those in Singapore, and better than other students in the United States as a whole. Children in Massachusetts also showed a gender difference in performance favoring boys, whereas no gender difference was seen in Singapore. Taken together, these findings suggest that the educational environment in Massachusetts fosters high performance, but also introduces a male advantage, whereas in Singapore, high performance is fostered, with no difference between girls and boys.

There is also other evidence that the different patterns of mathematics performance in different countries are not the result of genetic differences. This evidence comes from studies of mathematics and reading performance in

15-year-old students from 40 countries. Overall, results showed a 10.5-point advantage on mathematics for boys, and a 32.7 point advantage for girls on reading (Guiso, Monte, Sapienza, & Zingales, 2008). More importantly, scores on a measure of gender inequality in individual countries positively predicted the size of the male advantage in mathematics performance, both for the sample as a whole and for the upper 1% of the distribution, so that countries that were less gender egalitarian showed bigger differences between males and females in math performance. These data suggest again that cultural factors contribute to the gender differences in this area. In addition, the size of the female advantage on reading related negatively to gender inequality, so that more gender egalitarian countries showed larger differences favoring females in reading. This study also compared subgroups of countries with high genetic similarity, and found the same pattern of results within these genetically similar countries, suggesting that the results cannot be explained by genetic differences between people from different countries.

Family factors and children's own expectations also play a role in the acquisition of gendered patterns of cognitive performance. In the United States, girls and their parents expect them to perform less well than boys on mathematics and such expectations relate to different performance (Eccles, 1994; Eccles & Jacobs, 1986, 1992; Eccles, Jacobs, & Harold, 1990). One specific way in which expectations can influence performance involves a process called stereotype threat. Stereotype threat can operate when negative stereotypes about a group's performance are activated. For example, as noted above, there is a stereotype in the United States that women are not as good at mathematics as men are. When this stereotype is activated, it is thought to have psychological consequences, such as increased anxiety, that impair performance. Stereotypes are generally known, but they can be made more salient by reminding people of them. If research participants are reminded of the stereotype that males perform better on certain tasks than females, females perform worse on the tasks than if they are told that males and females perform equally well (Cadinu, Maass, Rosabianca, & Kiesner, 2005; Good, Aronson, & Harder, 2008; Spencer, Steele, & Quinn, 1999). Stereotype threat can also be activated more subtly, for instance by having a woman take a mathematics test in a room with many men (Inzlicht & Ben-Zeev, 2000). The negative effects of stereotype threat are not limited to mathematics performance. Similar impairment has been seen in women's performance on other tasks that

are thought to favor men, including spatial tasks, such as mental rotations (Moe, 2009; Moe & Pazzaglia, 2006).

Stereotype threat is thought to act by limiting the resources available to perform tasks, by inducing stress and activating anxiety, and by leading to performance monitoring and attempts to suppress negative thought processes (Schmader, Johns, & Forbes, 2008). There is evidence suggesting that the effects of stereotype threat can be mitigated by training focused on emphasizing the ability to improve performance, or by training that helps individuals to see performance difficulties as caused by situational factors, such as moving to a new school or being assigned more difficult material, rather than by personal factors (Good, Aronson, & Inzlicht, 2003).

In summary, hormones, either during early life or after puberty, have been assumed to play an important role in the development of gendered cognitive performance. The evidence supporting this conclusion is not strong, however. In contrast, there is consistent evidence that training and videogame usage can improve the performance of females on spatial tasks at which males typically excel. In addition, stereotype threat appears to play a role in reducing the performance of females on these tasks and on measures of mathematical ability. There are also large cross-cultural differences in mathematics and science performance, and differences between the sexes are not consistent across nations. Nations where females perform more like males, or even better than males, on these types of tasks appear to be those that are characterized by more gender equality. The male advantage in mathematics correlates negatively with gender equality, and the female advantage in writing correlates positively with gender equality. However, there has been relatively little research on most aspects of cognitive performance at which females excel, such as verbal fluency, perceptual speed and writing. There has also been little research examining how the different factors that contribute to gendered aspects of cognition might work together or interact.

Psychiatric Diagnoses

Much research has attempted to discover the developmental origins of psychiatric conditions that differ by sex, but relatively little research has focused on the causes that might differ for males and females. In terms of the sex chromosomes, early hormone environment, social reinforcement, and cognitive developmental processes that are the framework of research on gendered development, the early hormone environment, particularly

concentration of androgens before birth, has received the most attention.

For instance, it has been suggested that prenatal exposure to the androgen testosterone contributes to the male propensity to be diagnosed with classic autism or other conditions on the autistic spectrum (Baron-Cohen, 2002). Initial studies provided some support for a contribution of early testosterone exposure to characteristics related to autism. Baron-Cohen's team reported that testosterone measured in amniotic fluid related positively to characteristics associated with autism, such as reduced empathy (Chapman et al., 2006; Knickmeyer et al., 2006). Also, girls and women exposed to high levels of androgen prenatally, because of CAH, have been found to show elevated scores on a questionnaire measure of characteristics related to autistic spectrum conditions (ASC) (Knickmeyer et al., 2006). None of the girls with CAH had scores sufficiently high to meet the criteria for diagnosis with an ASC, however. One study has looked directly for a link between testosterone measured in amniotic fluid and the likelihood of being diagnosed with classic autism or other ASC (Baron-Cohen et al., 2014). This study used information from a Danish Historic Birth Cohort, which stored amniotic fluid samples from individuals who could be linked to the Danish Psychiatric Central Register and so determine who later received an ASC diagnosis. Results suggested no difference in amniotic testosterone concentrations between 217 control boys and 128 boys diagnosed with classic autism or other ASC. The researchers measured several additional hormones in the amniotic fluid samples, including progesterone, 17alpha-hydroxy-progesterone, androstenedione, and cortisol, and they reported that a latent variable identified by a principal component analysis (which they labeled a steroidogenic factor) significantly predicted an ASC diagnosis. This factor could not be described as androgenic, however. This single significant relationship had not been predicted and so could be spurious. Regardless, the results did not support the idea that amniotic fluid testosterone concentrations contribute to the development of autism or other ASC. Other researchers have suggested that ASC and other developmental disorders that are more common in boys than in girls relate to genes encoded on the X and Y chromosomes (Reinius & Jazin, 2009; Skuse, 2006), although research to date is again inconclusive. There is no evidence that girls and boys are socialized in different ways that might lead boys to be more susceptible to ASC or other developmental disorders. Also, although ASC has been linked to altered gender identity development in the

form of increased gender dysphoria, this appears to apply to males and females equally and so is unlikely to explain the disparate sex ratio in ASC diagnosis.

As with autism, more males than females are diagnosed with obsessive compulsive disorder (OCD) and Tourette syndrome, and these disorders have also been suggested to relate to early testosterone exposure. Some support for this suggestion has come from evidence that individuals with these disorders are more masculine than other individuals in regard to other characteristics, such as childhood play interests, that have been related to prenatal testosterone exposure (Alexander & Peterson, 2004). There are no studies examining more direct links between early testosterone exposure and later diagnosis with OCD or Tourette syndrome, however. The possibility that these disorders relate to social or cognitive developmental processes that differ for males and females also has not been explored.

Just as testosterone has been suggested to contribute to disorders, such as autism, OCD, and Tourette syndrome, that are diagnosed more frequently in males than in females, testosterone has been suggested to protect against eating disorders, because these show the opposite gender pattern, being diagnosed more frequently in females than in males. One research team reported that female twins with male co-twins scored lower than those with female co-twins on a measure of disordered eating (Culbert, Breedlove, Burt, & Klump, 2008). This result was interpreted to suggest that females with male co-twins were exposed to some of their testosterone during fetal development and that this testosterone provided protection against disordered eating. The finding was not replicated, however, in a second twin study, using a different measure of disordered eating (Raevuori et al., 2008). Other research on the causes of the gender difference in eating disorders and other disorders that differ by gender have suggested that gender differences in emotion regulation may contribute (Nolen-Hoeksema, 2012). For instance, women tend to ruminate more than men do and this has been linked to greater depression and anxiety in women than in men. These findings do not elucidate the direction of possible causation, however, and they raise additional questions, such as why women ruminate more than men do. Again, as for other gender-linked disorders, links to social or cognitive processes involved in other aspects of gendered development have not been explored extensively.

The presence of substantial gender differences in many psychiatric diagnoses has been noted and highlighted as a possible clue to understanding the causes of these disorders (Rutter et al., 2003). There has been little systematic

research, however, applying understanding of the factors that produce gendered behavior more generally to guide research on the causes of disorders that differ by gender. What little research there is has focused largely on the sex chromosomes and on concentrations of testosterone during prenatal development. To date, this research has produced little convincing evidence to support contributions from either source. The main focus of the studies of contributions from early testosterone exposure, however, has been on testosterone measured in a single clinical sample of amniotic fluid, taken at an uncontrolled time of day, and this single measure may not provide a sufficiently sensitive measure of early androgen exposure (Constantinescu & Hines, 2012). There is also surprisingly little research looking at other types of factors known to influence the development of gendered behavior more generally, such as gendered patterns of social reinforcement or gendered cognitive frameworks. Thus, understanding of the factors that influence gender development more generally has yet to be utilized as effectively as it might be in exploring the causes of gender differences in psychiatric diagnoses.

THE GENDERED BRAIN

Understanding of the brain and its relationship to behavior has been an area of intensive recent research activity, and researchers interested in gender development have tried to identify aspects of brain structure and function that differ between males and females. One basis for this interest is the understanding that behavior requires the brain, so linking aspects of brain structure and function to gendered behavior could help identify neural regions that regulate gendered behaviors. Not too long ago, group differences in the brain, such as those between men and women, were also thought to suggest inborn, irreversible differences. The ways in which the brain changes both structurally and functionally in response to experience are now better understood, however, and the brain is now known not only to form new synapses, and grow and retract dendrites in adulthood, but also to produce new neurons. Thus, brain differences are no longer correctly interpreted to indicate inborn determination. Experience has to change the brain, otherwise we would not learn, and there is ample evidence of changes in brain structure as a consequence of a variety of experiences. It is useful to keep this concept of the changing brain in mind as you read about the gendered brain.

The most consistently replicated brain difference between men and women is that in overall brain size. The

male brain is about 11%–13% larger on average than the female brain (Luders et al., 2005; Pakkenberg & Voight, 1964). Although the sex difference in brain size was originally observed using brain tissue obtained at autopsy, it has also been found in studies using noninvasive approaches to visualize the brain. A 2014 meta-analysis of studies using noninvasive measures found that total brain volume was 11% greater in males than in females (Ruigrok et al., 2014), similar to the original findings based on autopsy material. This meta-analysis also noted that the great majority of studies of gender differences in brain structure have focused on adults, Ages 18 to 45 years, and so little is known about developmental trajectories. The size of the difference in the average adult male versus female brain also is similar in magnitude to the sex difference in adult body size, which is about 12%–15% (Peters, 1991). The implications of the gender difference in brain size are not known, although the larger brain could simply be one manifestation of the larger male body. Perhaps surprisingly, however, the correlation between brain size and height does not appear to be large ($r = .20$ in men and $r = .12$ in women) (Pakkenberg & Voight, 1964).

Subregions of the brain, like the entire brain, tend to be larger in males than in females, and the gender difference in overall brain size complicates the study of gender differences in its subcomponents (Luders et al., 2005). Some researchers have attempted to compensate for the larger male brain by dividing the size of subregions by total brain size, but this procedure tends to make most, if not all, subregions larger in the female brain—but perhaps only because they have been divided by total brain size.

More sophisticated approaches to adjusting for brain size, however, also suggest that numerous regions of the cerebral cortex are larger in the female than in the male brain, and that the female brain shows greater complexity and greater cortical thickness than the male brain (Luders et al., 2004, 2006). These differences cannot be explained simply by the larger male than female brain, however, because differences remain when male and female brains of equal size are compared (Luders, Gaser, Narr, & Toga, 2009). This study of male and female brains matched for size also evaluated very large male brains and very small female brains, and found no differences within either sex based on brain size. It also found no differences between the sexes in the proportion of gray matter, white matter, or cerebrospinal fluid. The comparisons of the male and female brains suggested three primary clusters of increased gray matter in the female brain. These were located in the left superior frontal gyrus, in the left superior

temporal gyrus, and in the right and left caudate, extending into adjacent areas of the basal ganglia and into the left orbitofrontal regions. Prior studies, using autopsy material and imaging of the living brain with other methods of adjusting for the larger male brain, have also found some areas of the brain that support language, including the superior temporal cortex and the dorsolateral prefrontal cortex, to be larger in female than in male brains (Harasty, Double, Halliday, Kril, & McRitchie, 1997; Schlaepfer et al., 1995). There is no evidence that any subregions of the brain are larger in males than in females when brains matched in size are compared (Luders et al., 2009). The relevance of areas of greater gray matter in the female than the male brain to behavior are largely unknown. As noted before, some brain areas that are larger in females than in males are involved in language processing and so the differences in these areas could potentially relate to the female advantage on tasks such as verbal fluency or reading. This possibility has not yet been explored, however.

Much research has also focused on the corpus callosum, the major fiber tract connecting the two cerebral hemispheres. A report on brains obtained at autopsy suggested that the posterior fifth of the callosum, as viewed in mid-sagittal section, was larger and more bulbous in female than in male brains (de Lacoste-Utamsing & Holloway, 1982). In addition, the maximal width of the splenium, the area of the splenium and total callosal area were all larger in females than in males, although these measurements were analyzed relative to brain size, which is, as discussed above, a problematic procedure. The same researchers replicated these results in a second sample of adult brains (Holloway & de Lacoste, 1986), and reported greater splenial width relative to brain size in female than in male fetuses (de Lacoste, Holloway, & Woodward, 1986). Subsequent narrative and meta-analytic reviews appeared to refute the existence of these gender differences (Bishop & Wahlsten, 1997; Byne & Parsons, 1993), but many studies included in these reviews used different methodology from that used in the original reports. For instance, some defined the margins of the splenium differently, or measured sections of the callosum without accounting for individual differences in curvature. Many studies also used clinical images, which were not necessarily designed to produce precise midline images. Because the fibers of the callosum fan out extensively after crossing the midline, such images could contain substantial error variability, reducing the power to detect differences. Some studies using procedures similar to those used in the original reports of gender

differences in the corpus callosum have also found gender differences, although these are smaller than they originally appeared to be. In addition, as noted above, the adjustments used to compensate for the larger male brain could have caused the apparent gender-related differences in the callosum. One study used template deformation morphometry (TDM) in an attempt to address this issue. TDM registers each subject to a template, avoiding the use of overall brain size to adjust for the difference in the overall size of the male and female brain, while still scaling volumes for overall size. This study found the splenium to be larger in females than in males (Dubb, Gur, Avants, & Gee, 2003).

The genu, or most anterior portion, of the corpus callosum also appears to show a gender difference, but in the opposite direction to that reported in the splenium. One study defined the genu as the most anterior fourth of the corpus callosum, as viewed in mid-sagittal section, and found that it was larger in men than in women (Reinartz, Coffman, Smoker, & Godersky, 1988). A second study focused on a smaller area of the anterior callosum, calling this the genu, and again found the genu to be larger in male than in female brains (Witelson, 1989). A third study, using TDM, found a similar gender difference in the genu (Dubb et al., 2003).

A third subregion of the corpus callosum, the isthmus, defined as the posterior third of the callosum minus the posterior fifth, both viewed in mid-sagittal section, has also been reported to vary by gender (Witelson, 1985, 1989), but for this gender difference hand preferences are important. The isthmus is smaller in people who use their right hand consistently across a range of motor tasks than in those who do not. Also, among these consistent right-handers, the isthmus is larger in females than in males, but among those who do not use their right hand consistently for motor tasks, there is no gender difference. These results, like those reported for the splenium, were debated and appeared not to be supported by other studies (Kertesz, Polk, Howell, & Black, 1987), but again, the methodology adopted in the failures to replicate was often different to that used in the original reports. Most notably, some studies used different procedures to define handedness groups, including defining groups based solely on the hand used for writing.

Corpus callosum anatomy has also been related to gendered cognitive functioning. Among women, the surface area of the posterior callosum, particularly the splenium, as viewed mid-sagittally, has been reported to correlate positively with verbal fluency, which is typically higher in women than in men (Hines, Chiu, McAdams, Bentler, & Lipcamon, 1992). This finding suggests a positive relationship between female-typical cognitive performance

and female-typical callosal structure. More recent studies, using improved technology, suggest that the corpus callosum is thicker in women than in men (Luders, Narr, Zaidel, Thompson, & Toga, 2006), and that its size, particularly in posterior regions, relates positively to general intelligence, controlling for overall brain volume (Luders et al., 2007).

Differences in the corpus callosum of males and females have also been studied in rodents, and in rodents rearing conditions appear to influence callosal anatomy (Juraska, 1991; Juraska & Kopcik, 1988). For instance, among rats reared after weaning in complex environments, involving group housing and new objects introduced into the cage daily, females develop more myelinated axons in the posterior callosum than males do. In contrast, among rats reared after weaning in isolation, involving no cagemates and no objects beyond those required to provide food and water, there is no gender difference. Similar differences in rearing conditions have been found to influence dendritic growth in several regions of the cerebral cortex, and these rearing differences can produce, enhance, reduce or reverse neuroanatomical differences between the sexes (Juraska, 1991). Thus, in rats, gendered brain structure can be altered by rearing conditions after weaning.

As noted above, neural gender differences have sometimes been assumed to have been in place since birth, and so to reflect inborn influences on gender-related development. In regard to the cerebral cortex, in particular, this assumption is unsafe. Many types of experiential factors appear to influence cortical anatomy. For instance, taxi drivers in London, who must memorize the routes between every possible London location, have larger hippocampi than other people, and the length of time that they have been driving a taxi positively predicts hippocampal size (Maguire et al., 2000). Similar differences are not seen among London bus drivers (Maguire, Woollett, & Spiers, 2006) who differ from taxi drivers in that they need to learn only a single route. Similarly, people who meditate have greater hippocampal and frontal gray matter volumes than people who do not (Luders, Toga, Lepore, & Gaser, 2009). The brain can also be changed by experimental manipulations of experience. People who are taught to juggle show a transient change in a neural region associated with complex visual motion (Draganski et al., 2004).

Subcortical regions of the brain that have been found to show gender differences in other species, such as the SDN-POA, have not been visualized in the living human brain. Three studies of brains obtained at autopsy, however, have reported a gender difference, similar to that in the rodent SDN-POA, in an apparently comparable region of

the human brain, called the third interstitial nucleus of the anterior hypothalamus (INAH-3). This region is larger in men than in women (Allen, Hines, Shryne, & Gorski, 1989; Byne et al., 2000; LeVay, 1991). Two studies have also found the SDN-POA to be smaller in homosexual than in heterosexual men, and similar in size to heterosexual women (Byne et al., 2001; LeVay, 1991). Another subcortical region, the central region of the bed nucleus of the stria terminalis (BSTc) has also been reported to differ by sex and gender identity, being larger in men than in women, and reduced in size in transwomen (natal men who have changed to live as women) (Zhou, Hofman, Gooren, & Swaab, 1995).

As noted above, some researchers study gender differences in the brain because they assume that any differences in brain structure are inborn and irreversible, although this assumption is incorrect. Similarly, correlations between gendered brain structures and gendered behavior do not necessarily mean that the brain regions are responsible for the behavioral outcomes. For instance, a third factor, such as early hormones or experiences, could cause both outcomes without there being a causal relationship between the two outcomes. The existence of these neural differences also does not mean that any related behavioral differences are inborn. As noted above, experience can influence cortical anatomy. Although less is known about possible experiential influences on the structure of subcortical neural regions, such as INAH-3 or BSTc, the possibility of similar effects cannot be ruled out. Surprisingly, the gender difference in the brain region that has been found to differ in transwomen is not present in children, although most transwomen report having felt gender dysphoric from childhood, suggesting that the neural difference appeared after the gender dysphoria, and so could not have caused the dysphoria.

In addition to investigating structural differences in the human brain, researchers have compared the function of male and female brains, using techniques such as functional MRI and positron emission tomography (PET). In general, it appears that male and female brains function similarly (Frost et al., 1999; Mansour, Haier, & Buchsbaum, 1996), including when they are performing tasks, such as mental rotation, on which one sex or the other excels (Halari et al., 2005). Although some differences in brain function have been reported, their significance is largely unknown, and results of these functional studies have been highly inconsistent.

Identifying functional differences in the brains of men and women is more complicated than it might appear. Many

methodological factors can influence the results obtained. These include, for example, the age of the individuals studied, their hand preferences, whether they are resting or conducting a task, the specific task that they are conducting, its difficulty level, their skill or prior experience with the task, the way responses are made, the specific imaging approach used, the procedures used to quantify neural functioning, and the statistical approach to analyzing the data. A 2013 review concluded that almost no two studies among the hundreds that have been conducted on human brain function used the same methodology (Button et al., 2013). It may, therefore, be unsurprising that there are as yet no consistent findings of gender differences in neural functioning that have been reliably related to gender differences in behavior.

In addition, there is some evidence that males and females may use different neural mechanisms to produce the same behavior. For example, a study assessing neural function using PET found that, among men, scores on the SAT Math correlated with activation in the temporal lobes, but that, among women matched to the men for mathematics performance, there was no correlation between performance and activation in this region or any other neural region (Haier & Benbow, 1995). Similarly, men and women have been reported to show different patterns of asymmetry of brain activation when performing similarly on a language task (Shaywitz et al., 1995). Performance on measures of intelligence have also been reported to correlate with the volume of different neural structures in men and women, with performance relating to frontal gray and white matter volumes in women, but to parietal regions in men (Haier, Jung, Yeo, Head, & Alkire, 2005). These are just a few examples of the numerous studies of this nature (for a review, see Halpern et al., 2007). It is important to note that these gender-related differences in neural activation or correlations of behavior with neural structure are typically reported for men and women showing similar behavioral performance, so they cannot explain behavioral differences between the sexes. It has even been suggested that differences between male and female brains help the sexes to function similarly (G. J. De Vries, 2004). From this perspective, some sex differences in the brain allow males and females to behave similarly, despite differing physiologically, e.g., in levels of circulating hormones.

In summary, several gender differences have been reported in the structure of the human brain, although the great majority have not been independently replicated. Exceptions are the larger male than female brain and the

larger INAH-3 in men than in women. The existence of these differences does not elucidate their origins. Any behavioral difference, regardless of the factors that produced it, will be reflected in brain structure or function. Thus, such differences, even if causally related to gendered behavior, could result from numerous types of influences or their interactions. Similarly, although correlations between some gender-related brain differences and some gender-related behavioral differences have been reported, neural plasticity and the inability of correlation to prove causation argue against interpreting these relationships as indicative of inborn influences. These studies of gender differences in the brain could help elucidate the neural mechanisms involved in generating gendered behavior, but the gender differences could result from inborn factors, or from life experiences, or, most probably, from interactions between different types of influences.

TOWARD AN INTEGRATED UNDERSTANDING OF GENDERED DEVELOPMENT

The genome, the early hormone environment, postnatal socialization by parents, peers, and others, self-socialization, and perhaps hormones at or after puberty all contribute to the development of gendered behavior. The specific combination of factors, and their weighting, appears to differ for different aspects of gendered behavior, however, at least in the cultural contexts where they have been studied to date. For instance, sexual orientation and gender identity appear to be less influenced by early androgen exposure than are gender-typed childhood toy preferences. In addition, gender differences in mathematics performance appear to be powerfully influenced by the social and cultural environment, and by expectations, with perhaps little or no role for androgen exposure, either early in life or after puberty. Genes on the Y chromosome, and other sex-determining genes, provide the foundation for all of these types of influences. They determine whether the gonads become testes or ovaries, which then produce differing concentrations of androgens that can influence the brain and behavior. In addition, gonadal steroids influence physical sexual differentiation, producing male or female phenotypes that then influence social responses to individuals based on their apparent gender. Children also develop an understanding that they are male or female and that males and females differ in their behavior, and they come to value adopting behaviors that conform to these differences.

Gender development involves systems interacting over time. The genetic, hormonal, social, cultural and cognitive developmental influences described above could provide components of such a system, but we have little information as to how these components work together. As outlined above, the available information suggests that differential treatment of children based on their gender begins as soon as that gender is known, with parents often selecting different names, clothes and room décor even before the child's birth. The newborn then enters a gendered environment, and is treated from the moment of birth somewhat differently, again depending on whether the child is a girl or a boy. This different treatment for girls and boys comes not just from parents but from many other people. Parents often dress children to signal their gender, for example, putting bows on the bald heads of daughters, thus facilitating this differential treatment by others. Eventually, children themselves signal their gender to others and value conforming to expectations of their behavior based on their gender.

In addition, children enter the world with propensities to develop somewhat different gender-related interests, based in part on their exposure to testosterone and perhaps other hormones prenatally. These different interests also influence parental behavior, because parents tend to encourage the activities that interest their children. These can be gender atypical activities, particularly for daughters. Children's individual interests also shape other aspects of their environments. Children with strong gender-typical (or atypical) interests are likely to gravitate toward other children with similar interests, thus pushing themselves further in the direction of strongly gender-typical (or atypical) behavior. The strength of children's gender identity also plays a role in their acquisition of gendered behavior. Children who are more strongly identified with their gender appear to do more self-socializing of gendered behavior. Gender identity is in turn influenced by exposure to androgens prenatally, and androgen could play a role in gendered development through the amplifying mechanism of gender identity.

QUESTIONS FOR FUTURE RESEARCH

Although some of the elements of the interactive systems involved in gendered development have been identified, still others may remain unknown. For instance, in mice, genes on the sex chromosomes appear to affect aggressive behavior and parental behavior, independent of gonadal steroids. Are there similar sex chromosomal influences

on human behavior? In addition, although much research has investigated social and cognitive influences on the development of children's gendered play, similar information about possible social or cognitive influences on other gendered behaviors, such as sexual orientation or gender identity, or the risk of receiving a psychiatric diagnosis that differs by gender, is less abundant. Also, normal variability in the early hormone environment has been related to subsequent individual variability in gendered play behavior in typically developing girls and boys. Similar influences of normal variability in hormones have not been investigated in regard to many other aspects of gendered behavior, including aggression, sexual orientation and gender identity, however. One challenge in conducting such studies has been finding a reliable method for assessing early hormonal exposure. Finger ratios that show a small sex difference have been used in many studies, but they appear to be unreliable reflections of the early hormone environment, even in large samples. Similarly, studies relating testosterone measured in amniotic fluid or umbilical cord blood to later cognitive outcomes have produced inconsistent results, perhaps because these sources of hormone measures have been available only on a single occasion, uncontrolled for time of day. Findings relating the area under the curve for testosterone measured repeatedly during early postnatal development to subsequent behavior (Lamminmaki et al., 2012) could provide a methodology for such studies, however. Testosterone can be measured in the saliva or urine of infants and can be obtained repeatedly at specified times of day, providing potentially stable estimates of early exposure, which could then be related to subsequent behavior. This methodology could enable dynamic systems approaches to hormone environment interactions during early development as well, since hormones, child behavior and parental behavior could be measured repeatedly during the first months of postnatal life—a period of great neurobehavioral plasticity.

One appealing aspect of a developmental systems perspective is that it can obviate the misleading nature versus nurture debate. The focus of developmental systems research is often on periods of change. The elements of the system at this time of change are examined and an attempt is made to discover how these elements combine to produce change at that time. The approach also can produce information that is directly relevant to intervention. For instance, such an approach to understanding the combinations of factors that influence girls to drop out of scientific or mathematical endeavors in adolescence could produce strategies for avoiding this drop out. Based on data suggesting that

gendered toy preferences emerge when children are Ages 12 to 24 months, this also would be an interesting period to study to understand the developmental systems involved in their emergence. Similarly, Ages 10 to 13 years might be of particular interest for studying persistence and desistance in individuals with gender dysphoria, and early to middle adolescence might be particularly relevant to studying systems involved in the greater incidence of depression in girls than in boys.

In general, identification of how the elements of interactive systems governing different aspects of gendered development work together would be a useful focus for future research. Such studies are challenging for many reasons, not least because boys and girls typically differ on several dimensions simultaneously. For instance, boys experience relatively high concentrations of testosterone during early development and then are socialized as boys, whereas girls experience relatively low concentrations of testosterone during early development, and then are socialized as girls. Individuals exposed to atypical hormone environments, such as girls with CAH, provide one approach to disentangling these factors, and studies of these girls have provided valuable information. However, more work of this kind would be useful. Other situations where one element of the system is altered, such as gender-typical socialization, would also be of value. Brain imaging has the potential to identify the neural systems related to gendered behavior, but, to date, has produced limited reliable information, partly because inconsistent approaches have been used across studies. It might be informative to explore possible changes in neural systems in response to alterations in the interactive systems involved in gendering. For instance, does playing videogames alter neural regions related to visuospatial abilities? Also, less effort has been devoted to understanding the feminine behavioral phenotype than the masculine behavioral phenotype. For example, more is known about the factors influencing sexual orientation in males than in females, and more is known about the origins of cognitive abilities at which males excel, such as mental rotations ability, than cognitive abilities at which females excel, such as verbal fluency or reading. The study of the feminine behavioral phenotype should be another fruitful area for future research.

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CHAPTER 21

The Development of Sexuality

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Historically, developmental science has adopted a relatively limited perspective on child and adolescent sexuality, perhaps best reflected by the fact that this edition of the *Handbook on Child Psychology* represents the first to include a stand-alone chapter on child and adolescent sexuality. The longstanding reluctance to systematically address issues of childhood sexuality represents the wider cultural view that child and adolescent sexual expression brings risks and dangers, and that optimal psychological development requires delaying sexual activity as long as possible, ideally until marriage. This view denies that sexual motivation, desire, behavior, and expression represent normative features of child and adolescent development that have the potential to foster and enhance the happiness, psychological development, and well-being of youth.

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An increasing number of researchers have challenged negatively oriented perspectives on sexual risk, arguing for more sensitive, in-depth, multimethod investigations into positive meanings and experiences of child and adolescent sexuality that will allow practitioners to identify and encourage healthy sexual-developmental trajectories. Our review reflects a balanced approach: Although we devote appropriate attention to the risks associated with early sexual behavior, such as pregnancy, sexually transmitted infections (STIs), and sexual coercion, we also highlight the normative and healthy features of child and adolescent sexuality.

Our primary focus in this chapter is on child and adolescent sexual feelings and behaviors, including developmental changes in sexual desire and motivation, participation in

partnered and unpartnered sexual behavior, prevention of pregnancy and sexually transmitted infections, and sexual coercion. We also review the unique experiences of young people with same-sex attractions and behavior, as well as with atypical gender expression (i.e., *transgender* youth). This discussion is consolidated in a single section at the end of the chapter, rather than woven throughout the chapter, to reflect the fact that the vast majority of empirical research on adolescent sexuality has been based on exclusively heterosexual samples (or at least, those presumed to be heterosexual). Hence, by dividing the chapter in this way, we hope to remind readers that the findings of research on heterosexual youth may not generalize to youths with same-sex attractions and behaviors, or to transgender youths.

THEORETICAL FRAMEWORK

This review is theoretically grounded in “cascade” models of human development, in which early traits and experiences continuously feed forward to shape individuals’ changing skills, capacities, and propensities over time. Most notably, we draw on Bronfenbrenner’s person-process-context model of human development (1986), which emphasizes the dynamic processes through which individual-level characteristics (such as attachment style, temperament, etc.) interact with contextual factors (such as family environment, socioeconomic status, etc.) to shape developmental outcomes. Importantly, we do *not* interpret this to mean that cultural and contextual factors simply tweak processes that have already been fundamentally determined by biological factors, but that certain environmental contexts are determinative themselves, altering the expression of genetically based traits and leading to lasting changes in developmental trajectories (see Lickliter and Honeycutt, Chapter 5, this *Handbook*, Volume 1).

Based on these theoretical frameworks, this review is guided by three implicit premises about sexual development. First, *the individual’s developmental status shapes his or her sexual feelings, motives, and experiences*. Through childhood, adolescence, emerging adulthood, middle adulthood, and later life, the individual’s changing developmental status (including endocrinological, physical, cognitive, and socioemotional factors) influences his or her sexual urges, motives, thoughts, fantasies, goals, behaviors, and relationships and also the meanings attached to these phenomena. Hence, the very same sexual experience (for example, masturbation) may have

different antecedents and implications when pursued by a 5-, 21-, or 50-year-old, and the meaning of any such phenomenon cannot be fully understood without attention to its total developmental context. Second, *sexual feelings, experiences, and relationships shape social and psychological development*. As children become aware of sexual feelings and begin to explore sexual behavior (both partnered and solitary), they are increasingly tasked with challenges related to self-regulation and impulse control, and must also begin the complex process of navigating their own urges, impulses, and desires with their local culture’s developmentally specific expectations. Sexual feelings and experiences also prompt individuals to consider and question their conceptions (and their local culture’s conceptions) of gender and gender differences. Hence, childhood and adolescent sexual experiences are both outcomes and drivers of development across the lifespan, promoting continued growth by eliciting a changing repertoire of developmentally specific tasks and abilities. As individuals repeatedly strive to understand and meet their own sexual needs and those of different partners, they become increasingly adept at balancing a complex interplay of motives, fears, goals, and skills. As a result, each successive sexual experience is influenced by the individual’s current cumulative developmental history and also feeds forward to shape future development across multiple domains of psychological functioning.

The third premise follows directly from the first two: Because sexuality represents both the “output” of prior development and the “input” for forthcoming development, it exerts *cumulative, context-specific, and dynamic* influences on mental and physical functioning over the life span (see also Overton and Molenaar’s model of relational developmental systems in Chapter 1, this *Handbook*, Volume 1). In essence, this amounts to a cascade model of sexual development, in which the individual’s total trajectory of sexual feelings, experiences, and relationships exerts a lasting press on his or her ongoing psychosocial development (although, of course, some experiences and some periods of life will prove more influential than others). In the ensuing review, we will repeatedly reconsider whether certain types of sexual experiences—both positive and negative—have notably different implications depending on where they occur within an individual’s total sexual-developmental trajectory, and the processes through which these trajectories change and stabilize over time.

Given that our theoretical approach emphasizes the individual’s total sexual-developmental history, we begin as “early” in development as possible, with a review of

children's sexual feelings and behaviors (a topic that remains woefully understudied due to longstanding cultural taboos, as we discuss). We then discuss the biological and social factors that come into play during the pubertal transition and their immediate and long-range impact on the changing sexual experiences and expectations of male and female adolescents. With regard to activity, we take care to discuss and distinguish among three different forms of sexual activity—masturbation, penile-vaginal intercourse, and partnered activities *other than* penile-vaginal intercourse—in order to emphasize the fact that *all* of a young person's sexual activities are developmentally relevant, despite the fact that penile-vaginal intercourse has received the lion's share of cultural and scientific attention. We highlight what is known about the developmental onset of different behaviors, children's and adolescents' subjective assessments of the *quality* of their sexual experiences, risks regarding pregnancy and sexually transmitted infections, and sexual coercion.

We also discuss what is currently known about parental influences on their children's sexual development, their exposure to sexual risks and rewards, and we highlight some of the new sexual-developmental challenges posed by the Internet age, including adolescents' access to sexually explicit images and their use of the Internet to meet potential partners. The discussion then turns to same-sex sexuality and gender expression, providing a comprehensive review of what is known about the long-term development of young people with same-sex attractions, same-sex behavior, lesbian/gay/bisexual sexual identities, or atypical gender presentations. We focus on the etiology of these phenomena and the special challenges that they pose for youth and their families.

Although we devote a separate section at the end of the chapter outlining directions for future research, we have highlighted productive and provocative future research directions throughout the chapter, embedded within specific topic areas, hoping to provide a roadmap to the next generation of scientific research on this critical—but still understudied—area of human development. It also bears emphasizing that we have chosen to address ethnic and cultural differences in sexual expression throughout the chapter, rather than treating ethnic and cultural variation as a distinct topic in and of itself. This is done in order to explicitly avoid casting white sexuality as normative and ethnic-minority sexuality as “other”; this has been the unfortunate practice of much previous sexuality research, particularly in light of the fact that ethnic minorities in many industrialized Western countries show greater

sexual risks than Whites, including earlier age of onset of penile-vaginal intercourse, greater number of partners, higher rates of adolescent pregnancy, and so forth (see Agocha, Asencio, & Decena, 2014). Extensive research indicates that these differences are mediated by the social disenfranchisement, social stress, socioeconomic burdens, and family practices encountered by ethnic minorities (see Caputo, 2009). In other respects, ethnic minorities and Whites undergo fundamentally similar processes of sexual development with similar timetables and underlying mechanisms. Hence, in discussing relevant ethnic, cultural, and even socioeconomic variations in child and adolescent sexuality, our guiding assumption is that basic sexual-developmental processes characterize all adolescents, but that the exquisite sensitivity of these processes to ongoing and cascading environmental inputs gives rise to substantial social and cultural variation in the developmental trajectories of young people. Hence, no single group can be considered to show either “normal” or “atypical” sexual development: All sexual development is context-specific and takes shape to meet the adaptive challenges that are unique to the individual's local conditions.

CHILDHOOD SEXUALITY

Manifestations of childhood sexuality can be seen as early as the first few months of life. Childhood sexuality is defined using the framework put forth by de Graaf and Rademakers (2011), which incorporates a range of different phenomena including displaying or touching one's own genitals, looking at or touching the genitals of another, and the variety of feelings and psychological experiences that both motivate and result from these experiences. Observational data collected from parents and caretakers have consistently documented sexual interest and behavior in children as young as 2 years of age (reviewed in depth by de Graaf & Rademakers, 2011), yet the collective base of knowledge on these experiences, their normative developmental time course, and their phenomenology (from the child's perspective) is woefully limited, given that cultural taboos have made it difficult for researchers to systematically study these experiences (Lamb, 2013). In fact, the vast majority of published papers on childhood experiences of sexuality focus on the sexual *abuse* of children, rather than children's own volitional sexual activity (de Graaf & Rademakers, 2011). The lack of attention to normative features of childhood sexuality not only hampers our basic understanding of life-span sexual development,

but also hinders our understanding of how exactly sexual abuse alters the sexual-developmental trajectories of youth. In the glaring absence of basic knowledge regarding normative childhood sexual expression, many parents and clinicians treat *any* overt sexual feelings or behaviors during childhood as markers that the child might have been abused (Bancroft, 2003). This is problematic not only for its inaccuracy, but because it contributes to a general social climate—readily interpretable by children themselves—that their sexual thoughts and feelings are “bad” and should be hidden or suppressed.

Although parents and clinicians often seek to distinguish between “normal/harmless” and “unusual/dangerous” sexual behaviors, the empirical grounding for such a distinction is lacking. de Graaf and Rademakers (2011) point out that “unusual” sexual behaviors may not be harmful at all, whereas “normal” behaviors that are undertaken in a context of fear and shame may have notable negative repercussions. In order to appropriately discern the implications of different types of childhood sexual experiences, we need to understand children’s own emotions, cognitions, and interpretations regarding these experiences. However, this requires a level of detailed questioning that has historically been viewed as harmful by parents and institutional review boards. Hence, although the collection of basic, foundational, descriptive data about childhood sexuality—especially the earliest years of childhood—remains a key priority for future research (as it has been for the past 30 years), it is likely to remain out of reach for cultural and logistical reasons.

Sexual Arousal and Desire

It is impossible to reliably discern when children begin to experience feelings that adults would classify as sexual desire, given obstacles in language, terminology, and communicative competence. Sexual desire is typically defined as “a wish, need, or drive to seek out sexual objects or to engage in sexual activities” (Regan, 1998, p. 346), and hence it is a fundamentally subjective experience that often diverges from physiological arousal. Accordingly, studies of sexual desire and arousal in adults typically rely on self-report, and these reports show remarkably diverse interpretations and phenomenologies (e.g., Diamond, 2008b). The same is likely true of children. Freud (1905/1962), of course, famously theorized that children’s sexual drives remain “latent” until puberty, but there is no empirical evidence to this effect (Lamb, 2002; Okami, Weisner, & Olmstead, 2002). Herdt and

McClintock (2000) argued that a key developmental transition for children’s sexual desires occurs between 6 and 10, when the adrenal glands reach maturation (denoted adrenarche), and begin to produce adrenal androgens such as DHEA, DHEAS, and androestione. DHEAS is thought to be the marker of adrenarche and gradually rises from mid-childhood to early adulthood, stimulating the growth of human pubic hair, axillary hair, as well as sweat and sebaceous glands. Developmental increases in DHEAS are thought to also trigger increases in erotic interest and attractions, and have been posited as an explanation for the fact that many adults recall their first memorable sexual attractions to peers as occurring around Age 10.

Within each developmental period, there is likely to be considerable diversity in experiences of sexual desire and arousal. In other words, sexual desire is not a uniform, unchanging experience, but one that takes different forms in different environments and at different stages. In particular, it is important to distinguish between an *interest* in sexual objects and a drive to *seek* sexual objects. This distinction has received much more attention in research on nonhuman primates than on humans (reviewed in Wallen, 1995). In the primate literature, the urge to seek and initiate sexual activity has been denoted *proceptivity*, whereas the capacity to become interested in sex upon encountering erotic stimuli has been denoted *receptivity* or *arousability*. Within-person and between-person variability in proceptive sexual desire has been shown to be tightly linked to corresponding variability in levels of gonadal hormones (specifically, testosterone in men and both testosterone and estrogen in women), whereas this is not the case for variability in arousability (reviewed in Diamond, 2006).

This difference may help to explain the distinction between childhood and adolescent sexual arousal and desire. Prior to puberty, children are clearly arousable, but do not show the intense sexual motivation and preoccupation with seeking sexual release that is partially attributable to pubertal surges in gonadal hormones (Udry & Billy, 1987). Social and cultural factors likely build upon these differences. Sexual arousal, desire, and behavior during the adolescent years receive widespread discussion by parents, educators, physicians, and the mainstream media, effectively “priming” youth to attend to increases in their sexual thoughts and urges. In contrast, childhood sexuality receives little explicit discussion, especially in front of children themselves, and hence some children may not even interpret their feelings or thoughts as sexual in nature.

The complex interplay between the cultural and biological determinants of maturational differences in sexual desire deserves substantive future study, and remains an important direction for future research (despite the ever-present cultural obstacles to such research). As argued by McClintock and Herdt (1996), sexual desire does not simply switch on at puberty, but instead undergoes gradual development over the course of childhood and adolescence, reflecting a progressive interbraiding of biological, social, and psychological transitions experienced within changing social contexts. Yet this general model leaves many details unspecified. For example, what are the contextual factors (ranging from family discussions of sexuality, media images, peer sex play) that influence children's abilities to reliably identify certain feelings and sensations as "sexual"? Do these influences change after the adrenarchal and pubertal transitions? How does the child's sexual phenomenology change as the "mix" of biosocial determinants changes? One intriguing (but untested) possibility is that prepubertal desires are akin to hormone-independent arousability, whereas postpubertal desires are akin to hormonally mediated (and more motivationally intense) proceptivity. Testing such possibilities, and investigating interindividual *variation* in maturationally specific sexual phenomenology, would not only contribute to the basic developmental science of childhood sexuality, but would also help us to understand how experiences of abuse, trauma, and neglect experienced at different ages have specific implications for the child's developing sexual self.

Sexual Activity

Perhaps the most reliable evidence of children's sexual interest and capacity for sexual pleasure is their participation in masturbation. Childhood self-stimulation is relatively common, with retrospective and observational studies suggesting that between 40% and 60% of children exhibit this behavior (Bancroft, 2003). Masturbatory behavior has been observed in children as young as 2 years old (Martinson, 1994) and genital touching has been observed in infants as young as 2 months, accompanied by signs of enjoyment such as flushing, sweating, and quick breathing (Leung & Robson, 1993). Importantly, we know little about children's motivations for self-stimulation (i.e., pleasure, relaxation, escape, curiosity, sexual release, etc.). Boys often discover self-stimulation accidentally, whereas girls are more likely to discover it through peers (Janssen, 2007). Little is known regarding children's interpretation of masturbation, and it is likely that parents' attitudes are

particularly influential in this regard: Small children may not perceive an inherent difference between scratching an itch and stimulating their genitals until their parents scold them for the latter and not the former. Gagnon (1985) interviewed 1,500 parents of prepubertal children, and found that most parents were aware of their children's masturbation, although less than half wanted their children to have positive attitudes about it, and these rates were even lower among highly religious parents. Peer disapproval of masturbation is also highly pervasive in many different cultures. For example, one study of Greek youth found that among the worst insults was to be accused by peers of masturbation (Papadopoulos, Stamboulides, & Triantafillou, 2000).

Like the research on children's masturbation, research on children's sexual activity with other children is largely based on parental observation and on retrospective reports collected from adults. Hence, these data reflect sexual activity that is observed, remembered, and reported to researchers, and not necessarily all of the activity that actually occurs. As with masturbation, these activities provide indirect evidence of children's sexual interest and capacity for sexual enjoyment, and are fairly widespread (although specific prevalence estimates vary widely across studies using different methodologies and assessing different behaviors). The most common sexual behaviors reported by and observed among children as young as 6 years of age include hugging and kissing other children or relatives, showing body parts to other children or viewing/touching other children's body parts (including genitals), masturbating with friends, making verbal comments to other children about sex, and playing role-play or fantasy games that incorporate these activities (Lamb, 2002; Pluhar, 2007; Thigpen, 2009). Studies have found no links between children's participation in wanted, consensual sexual activities and their future psychosocial adjustment (Okami, Olmstead, & Abramson, 1997), but it is important to note that adults retrospectively report widely different emotional responses to their childhood sexual experiences, and the nature of the specific activity pursued is a poor predictor of the individual's affective reaction to that experience (Lamb, 2002). Hence, as summarized by Lamb, adult categories of "trivial" versus "serious" sexual acts may be irrelevant for understanding how children respond emotionally to such acts, and the degree to which they experience them as positive and enjoyable. This issue touches on the larger question of how exactly children and adolescents define the construct of "sex," and how their definitions contrast with those used by adults. Lamb's interview research (2002)

suggests that whereas adults tend to define “mature” forms of sexual activity as those involving greater genital involvement, children define “mature” forms of sexual activity as those involving greater sexual arousal (as opposed to simple curiosity or play).

We will revisit the question of diversity in conceptions of “real” or “adult” forms of sexual experience in the context of adolescent sexual behavior, but we want to close this section by emphasizing, yet again, the importance of studying *children’s* sexual phenomenology, including their subjective experiences and interpretations of sexual activities. As with understanding the basic developmental maturation of sexual desire, we need a more comprehensive understanding of the factors that influence the changing motives for, and interpretations of, young people’s partnered and unpartnered sexual activities. Such knowledge can assist parents and clinicians in differentiating between typical and atypical trajectories of childhood sexual development, in identifying children with early developing sexual problems, and in reassuring parents and teachers about the benign nature of childhood sex play so that they do not introduce stigmatizing penalties for developmentally normative behavior.

THE PUBERTAL TRANSITION

Puberty has been historically treated as a milestone event in sexual development. Although the previous section demonstrates that prepubertal children clearly experience sexual feelings and engage in sexual exploration, the hormonal changes associated with gonadarche and adrenarche and the social and interpersonal changes that accompany early adolescence introduce new intensity into the sexual impulses and explorations of youth. Puberty consists of a complex cascade of neuroendocrine changes that promote development of the reproductive system and the transition to adulthood, including changes in height, weight, muscle mass, and fat distribution. In economically developed societies, this process begins around 10 for girls and 12 for boys and appears to be triggered in part by the achievement of critical body weight, weight-to-height ratio, and body fat ratio (Kasa-Vubu, Ye, Borer, Rosenthal, & Meckmongkol, 2006). Chemical and neural signals stimulate the hypothalamus to produce a signaling molecule, kisspeptin, which then stimulates secretion of GnRH (gonatropin-releasing hormone) from the hypothalamus. This leads to the release of LH and FSH from the pituitary gland, stimulating the production of gonadal hormones. In both boys and girls,

increased androgen levels are responsible for growth of pubic and axillary hair, and (in boys) muscular development and the deepening of the voice. Increased estrogen levels in both sexes produce increases in bone density, and in girls estrogen stimulates growth of the endometrium and breasts, widening of the pelvis, thickening of the mucosal surface of the vagina, and the onset of menarche.

Although researchers typically use menarche (i.e., the first menstrual period) as a marker of pubertal status, menarche is one of the last events in the overall sequence of girls’ puberty. Our culture has historically attached considerable significance to this event as the critical transition from “girl to woman,” despite the fact that a girl’s first year of menstrual cycles are typically anovulatory (Apter, 1980). The male equivalent of menarche is the first ejaculation (spermarche), which is marked by testicular growth and changes in texture of scrotal skin. In addition to the physical changes of puberty, there are notable social changes, especially given that pubertal changes in physical appearance tend to elicit changes in treatment from peers and family members, including increased rules and expectations from family, increased standing and expectations of maturity among same-sex peers, and increased sexual teasing, solicitation, and harassment from other-sex peers (McMaster, Connolly, Pepler, & Craig, 2002).

Variability in the Timing of Gonadarche

The average age of gonadarche for both girls and boys has been declining steadily in most developed countries since the mid-1800s, a phenomenon that Tanner (1978) called the “secular trend.” This trend (which is notably stronger for girls than for boys) is likely due to improved living conditions and nutrition, as the combination of extreme stress and malnutrition have been associated with pubertal delay (Dixon-Mueller, 2008). Extensive attention has been paid to psychosocial predictors of pubertal timing in contemporary society, and researchers have found that earlier puberty is associated with high levels of chronic family stress, experiences of maternal conflict in early childhood, and more internalizing problems in late childhood (Chisholm, Quinlivan, Petersen, & Coal, 2005; Kim & Smith, 1998). One particularly reliable predictor of early menarche among girls is paternal absence (reviewed in Ellis, 2004). Explanations for this effect center on evolutionary “life history” models. These models conceptualize girls’ pubertal timing as the endpoint of an evolved developmental strategy which *lengthens* the duration of childhood dependency if a girl has a high-quality

rearing environment with involved, engaged parents, but *shortens* childhood dependency if the rearing environment is neglectful or conflictual. According to Ellis (2004), the links between pubertal timing and contextual-psychosocial factors should be stronger for girls than boys because of the high energy demands of pregnancy and nursing. These demands create a starker trade-off for girls than boys between allocating resources to one's own physical growth and allocating resources to one's offspring.

The life-history perspective implies that variation in pubertal timing should be linked to variation in *subsequent* psychological and/or sexual development, and this view is supported by numerous studies. Early reproductive maturation predicts early dating, early participation in sexual behavior, more advanced sexual behavior, and (in girls) greater risk of pregnancy (Ellis, 2004; Mendle & Ferrero, 2012), although some of these associations are moderated by socioeconomic status and ethnicity (Cavanagh, 2004). Earlier pubertal maturation has also been linked to greater delinquency and rule breaking behaviors, and this association appears to reflect complex gene-environment interactions (Harden & Mendle, 2012). Specifically, data on twin pairs in the National Longitudinal Study of Adolescent Health indicate that early menarche, which is genetically influenced, renders girls more susceptible to nonshared environmental influences (i.e., those that differ between twins) on later delinquent behavior. Other studies have documented that individual differences in the basic levels of stress sensitivity of youth moderate links between maturation and later delinquency. For example, one study found that among later maturers, those with higher cortisol reactivity engaged in more rule-breaking behavior, whereas among early maturers, those with *lower* cortisol reactivity engaged in more rule-breaking behavior (Susman et al., 2010). These findings support the emerging view of "differential vulnerability," which postulates that risk and protective factors such as family environment and pubertal timing have different implications for later adjustment among children with different types and levels of stress sensitivity (Belsky & Pluess, 2009; Ellis & Boyce, 2008). Taken together, these findings indicate that links between pubertal timing and later development are moderated by a wide range of preexisting individual differences *and* social-environmental factors.

Adolescent Sexual Desire

It is commonly thought that sex drive is particularly potent during the adolescent years, due to the dramatic changes in hormone levels coupled with the increased cultural

emphasis on the emergent sexuality of youth. Although there is no definitive evidence that adolescents experience more intense sexual urges than either children or adults, some lines of brain research support this possibility. Adolescence is a key developmental period for the prefrontal cortex, which is critically involved in behavioral and emotional regulation, planning, and inhibitory processes. Moreover, adolescents appear to have a stronger subcortical responses and a weaker prefrontal (or regulatory) response to emotional stimuli. This "subcortical-PFC imbalance" (Somerville, Jones, & Casey, 2010) is thought to contribute to some of the emotional and behavioral changes associated with puberty. Hence, the combination of rapidly increasing gonadal hormone levels and subcortical sensitivity and underdeveloped inhibitory neural processes may render sexual urges particularly potent for adolescents.

Gender Differences

Gender differences in sex drive have long been a topic of research on adult sexuality (reviewed in Baumeister, Catanese, & Vohs, 2001), but little research has attempted to identify the specific role of puberty in their expression, and the relative (and interacting) roles of social and biological components of pubertal maturation (with some notable exceptions, such as Udry, 1988). Specifically, although research has long documented that adolescent and adult men report experiencing more frequent, intense, and preoccupying sexual desires than adolescent and adult women, the manner in which biological and cultural factors interact to shape this difference has been difficult to pin down. On the biological side, researchers have argued that the large postpubertal differences between boys and girls in circulating androgen levels helps to explain the fact that women tend to report less frequent and less intense sexual thoughts and feelings than do men. For example, Knoth, Boyd, and Singer (1988) found that male adolescents typically recall having experienced sexual arousal prior to Age 13, whereas girls report more variable timing. Many girls in their study recalled that their first experience of sexual arousal occurred several years *after* puberty, suggesting that adolescent girls' desire may depend more strongly on post-gonadarche changes in estrogen levels.

This possibility is consistent with research demonstrating the important role played by estrogen in female sexual motivation (Wallen, 2001), and also suggests the importance of attending to periodicity in girls' desires. Extensive evidence indicates that women's sexual desires, autoerotic activity, and motivation to initiate sexual activity

change as a function of fluctuating estrogen levels over the course of the menstrual cycle, peaking around the time of ovulation (reviewed in Diamond, 2006). We do not know, however, why some women appear to show more cyclic fluctuation in sexual motivation than others, and when such cyclicity develops. For example, one possibility is that it emerges as soon as women begin ovulating; another possibility is that it develops gradually, and may not fully emerge until young women have had a certain number of ovulatory cycles. Another unanswered question concerns pubertal changes in the basic female sexual arousal cycle. Although historical models of sexual desire have tended to view it as an innate, automatic, drive-like force that influences (but is not influenced by) sexual activity, research by Basson (2001) suggests that female sexual arousal is a more circular, responsive system, such that sexual activity sometimes provides a trigger for the experience of sexual arousal (rather than vice versa). Future research should investigate whether the female sexual arousal cycle has its own estrogen-dependent developmental trajectory. In other words, might girls and boys show similar arousal processes prior to puberty, but then diverge after the hormonal changes of puberty? Answering such questions would help to elucidate the potential biological basis of gender differences in sexuality, a topic of longstanding interest and debate.

Socialization and Sexual Scripts

By the time children reach puberty they have already encountered pervasive cultural messages suggesting that boys want sex more than girls do, and that a girl's role in the sexual marketplace is to be the "sexual gatekeeper," fending off boys' sexual overtures in order to guard themselves against pregnancy, STIs, and the appearance of being "loose" or "slutty." This view, of course, denies the realities of girls' own powerful sexual desires and their roles as sexual initiators. Fine (1988) criticized this cultural framework over 25 years ago in a seminal review of sex education discourses, noting that such discourses disempowered girls by casting them in a fundamentally receptive position and denying them the opportunity to explore and take responsibility for their own pleasure and desire. The result is that girls discount their own bodily experiences of sexual desire and dismiss their own motives for sexual contact (Tolman, 2002). For example, one study found that less than half of female teenagers reported that they could always detect when they were sexually aroused, compared to nearly *all* male teenagers (Knott et al., 1988). The cultural factors encouraging girls to discount and

dismiss their own capacity for sexual arousal continue to generate vociferous debate among youth advocates and developmental psychologists about the best way to encourage girls' sexual agency in a cultural climate that commercializes and commodifies their bodies and behaviors (APA Task Force on the Sexualization of Girls, 2010; Lerum & Dworkin, 2011).

Accordingly, one of the most important directions for future research on adolescent sexuality, and particularly girls' sexuality, involves the development of interventions and educational approaches that seek to reduce girls' sexual commodification and exploitation *without* inadvertently discouraging girls from expressing and embracing their own sexuality. Heated Internet debates in 2013 about sexually explicit performances by the former child star Miley Cyrus exemplify the difficulty of striking this balance. Cyrus first gained television fame as a young girl, and literally underwent sexual maturation in the public eye. At the age of 18, her use of near-nude costumes and sexually suggestive gestures and dance moves in her music performances generated widespread debate and criticism, with some commentators claiming that her early fame had left her with bad judgment, loose morals, and poor taste, others portraying her as the victim of mainstream sexual commodification, and still others championing her for showing that women could actively claim and act out their own sexual desires and fantasies. Many commentators were parents who wondered about the impact of Cyrus' developmental transformation on her young fans: What message about female sexuality was she sending? In truth, we know surprisingly little about how adolescent girls interpret the public shaming *and* public celebration of female sexuality, and whether there are certain messaging strategies that might prove effective in helping girls to navigate conflicting cultural messages as they chart their own healthy developmental trajectories. What is needed, instead of speculative complaints about various cultural "impacts" on adolescents, is rigorous research capable of documenting how the type, degree, context, and timing of adolescents' consumption of conflicting media messages about sexuality influences their developing sexual self-concepts.

ADOLESCENT SEXUAL BEHAVIOR

Adolescent Masturbation

Masturbation is the most common form of adolescent sexual behavior, and this activity tends to increase after gonadarche, particularly among boys (Herbenick et al.,

2010). Not only do boys generally engage in more masturbation than girls, but boys' rates of masturbation are more strongly associated with their pubertal status than is the case for girls (Bancroft, Herbenick, & Reynolds, 2003). Gender differences in masturbation appear to be sensitive to social and cultural factors: Bancroft et al. (2003) noted that social changes facilitating girls' sexual awareness and sexual self-expression have produced increases in girls' masturbation. Supporting this view, research by Shulman and Horne (2003) found that adult women reporting masturbation had higher levels of sexual self-awareness, greater expressiveness in their intimate relationships, and more resistance to sexual double-standards. Such findings suggest that as social restrictions on female sexuality continue to erode, adolescent girls will be more likely to masturbate and more willing to report doing so. This is consistent with the findings of Peterson and Muehlenhard (2007), who found smaller gender differences in masturbation within societies characterized by greater gender equality. Hence, the fact that researchers consistently find higher rates of masturbation among adolescent boys than adolescent girls appears to be more strongly driven by cultural factors (including cultural pressures on girls to underreport their masturbatory behavior) than by biologically based differences in girls' versus boys' desires for or enjoyment of sexual release.

Gender differences in masturbation are interesting not simply for what they tell us about basic differences between female and male sexuality, but also because they may have important health implications (Hogarth & Ingham, 2009). A small but growing body of research indicates that masturbation facilitates healthy sexual identity development and more satisfying partnered relationships by enhancing awareness of sexual needs and providing young people with satisfying alternatives to riskier sexual activities (Kaestle & Allen, 2011). Yet positive and health-enhancing views of masturbation may be relatively rare among contemporary adolescents, many of whom report guilt and shame regarding masturbation (Laumann, Gagnon, Michael, & Michaels, 1994). An important topic for future research concerns the potential effectiveness of sexual health interventions encouraging youth to replace partnered activities with masturbation in order to provide them with an outlet for sexual release that does not place them at risk for pregnancy and STIs. Currently, it is not clear whether—and for whom—such interventions might be effective, given that survey data indicate that adolescents who masturbate have higher rates of partnered sexual activities (Robbins et al., 2011). To be effective, it is likely

that public health approaches would have to make a specific case to youth about *replacing* partnered sexual activity with masturbation, rather than simply supplementing partnered activity with masturbation. This, of course, might be interpreted by many parents and educators as inappropriately "encouraging" masturbation among youth who have never done so. At the present time, we simply do not know whether such concerns are valid—nor do we know whether such interventions would be effective enough to warrant challenging social opposition. Hence, researchers should rigorously test the possibility of a "pro-masturbation" sexual health intervention, one that communicates to youth that they are entitled to sexual release, but tries to guide them toward solitary versus partnered activities for the time being. Decisions about the development and dissemination of such approaches should be based on solid empirical data on their risks and benefits, particularly for subgroups of youth at different stages of development and with different familial and cultural backgrounds.

Partnered Sexual Activity

The majority of youth report having participated in non-coital partnered activities such as mutual masturbation and oral-genital contact prior to Age 16, usually with partners of the same age (Bauserman & Davis, 1996). The question of whether adolescents tend to progress through noncoital activities in a particular order has been addressed by several national studies (Halpern, Joyner, Udry, & Suchindran, 2000; O'Sullivan, Mantsun, Harris, & Brooks-Gunn, 2007), and the results suggest that the most common sequence begins with mutual nongenital touching (such as fondling breasts) and then progresses to genital touching (first over and then under clothes), direct manual stimulation of the genitals, oral-genital contact, and penile-vaginal intercourse. Anal stimulation is relatively rare among adolescents, with participation rates around 10% (Lindberg, Jones, & Santelli, 2008), but becomes substantially more common in young adulthood, with one study finding that 30% of young adults had at least one experience with this activity (Leichliter, Chandra, Liddon, Fenton, & Aral, 2007). Hence, whereas most noncoital sexual activities tend to precede penile-vaginal intercourse developmentally, anal stimulation proves the exception, with most adolescents forgoing this activity until after they are older and more experienced.

Oral-genital stimulation appears to be increasingly widespread, although prevalence estimates range from less than 10% of youth to more than half (Chandra,

Mosher, Copen, & Sionean, 2011; Herbenick et al., 2010). Oral-genital contact tends to occur at the same age as first intercourse, but there is considerable variation in whether it is pursued before or after first intercourse (Chandra et al., 2011), given that some young people view it as more intimate and “advanced” than penile-vaginal intercourse whereas others view it as a precursor or substitute for intercourse (Cornell & Halpern-Felsher, 2006). Because adolescents tend to perceive oral-genital contact as a “safer” sexual activity than penile-vaginal intercourse, they are less likely to use protection against STIs (Prinstein, Meade, & Cohen, 2003). Furthermore, studies have found that although parent-child communication about the risks of intercourse predicts adolescents’ intercourse behavior, it does not predict their oral sex behavior; rather, young people’s oral sex behavior is more strongly influenced by whether they think their friends condone and participate in oral sex (Bersamin, Walker, Fisher, & Grube, 2006). In light of such findings, and in light of the increasing rates of oral sex among adolescents, a critically important direction for future research involves identifying the distinct motives, attitudes, myths, and concerns that youth bring to oral sex versus intercourse, the interpersonal contexts and social settings in which this behavior occurs, and the factors that facilitate or hinder the ability and willingness of youth to use protection against STIs. Such work will likely require an in-depth, narrative focus, such as that employed by Burns, Futch, and Tolman (2011) in their analyses of adolescent girls’ narratives of first fellatio experiences. Surprisingly, the authors found that half of their 98 interviewees invoked an “achievement discourse” when discussing their experiences and concerns with performing fellatio, expressing concerns over “doing it right,” obeying partner instructions, being evaluated positively, and simply “getting it done”—some girls explicitly likened the act to “homework.” Identifying and understanding such psychological contexts is critical for the development of educational interventions that can address young people’s questions, concerns, and motives for oral sex and facilitate their sexual decision-making. More substantive attention to gender differences is also critical. Contrary to the case of penile-vaginal intercourse, in which each act involves both genders, boys tend to receive more oral stimulation of their genitals than they provide to girls genitals (Chandra et al., 2011; Herbenick et al., 2010). This pattern is not surprising, given that it reflects longstanding power differentials between adolescent boys and girls that typically give boys more control over the selection of sexual activities. Yet given the increased rates of oral-genital contact,

research should specifically investigate whether gender imbalances in oral-genital contact within a couple have the effect of entrenching sexual scripts that cast girls in the role of “givers” but not “receivers” of sexual pleasure.

Coitus

The most widely researched form of sexual activity among adolescents is coitus, or penile-vaginal intercourse, reflecting the significant social and health implications of this behavior. Not only does coitus introduce risks for pregnancy and STIs, but it also serves as the cultural marker of “mature” sexuality. Perhaps the most important historical change regarding adolescent sexuality over the past 50 years is the increasing prevalence of premarital coitus, in both Western and non-Western countries (Centers for Disease Control, 2002; Dehne & Riedner, 2005). Cross-national data compiled by the World Health Organization indicate that most youth have engaged in coitus by the age of 20, although ages of first debut vary widely within each country, ranging from 12 to 24 (Dehne & Riedner, 2005). One of the persistent obstacles in tracking the timing of sexual debut concerns ambiguity among adolescents—both within and across cultures—regarding the specific acts that definitively “count” as sex. In a study by Peterson and Muehlenhard (2007), over one-third of respondents thought that they had engaged in sex if they had engaged in oral sex or mutual masturbation. Other young people claim that they have *not* had sex even if they have engaged in penile-vaginal penetration, as long as there was no thrusting and no ejaculation (a practice sometimes called “floating”). For youth living in restrictive cultural environments, adopting alternative definitions of sex allows them to retain their status as virgins and to maintain that they have not violated family, community, or religious guidelines forbidding premarital sex. Longitudinal studies have found that adherence to such guidelines motivates some youth to retract previous reports of virginity loss (Rosenbaum, 2006). Not only do such reversals create difficulties for researchers attempting to develop accurate models of adolescent sexual behavior, but they also pose difficulties for advocates attempting to educate adolescents about the risks of sexual activity. Youth who convince themselves and their peers that certain activities do not “count” as sex may have little motivation to use condoms or birth control. Perhaps for this reason, studies have found that adolescents taking a virginity pledge have STI rates that are just as high as youth who do not take such a pledge (Bruckner & Bearman, 2005).

The experience of orgasm also plays a role in young people's definitions of sex, depending on the relational context and on "who does what to whom." Some heterosexual college students believe that a man who penetrates a woman anally has only "had sex" if he experiences orgasm, whereas *vaginal* penetration is usually considered sex even if the man does not have an orgasm (Bogart, Cecil, Wagstaff, Pinkerton, & Abramson, 2000). Of course, vaginal penetration is always considered to be sex for the *woman*, regardless of whether she experiences orgasm, testifying to the historical inattention to women's experiences of sexual desire and satisfaction. As for oral sex, heterosexuals generally think that you "had sex" if you received oral sex, especially if you had an orgasm, but not if you were the one to *perform* oral sex (Sanders & Reinisch, 1999). These findings clearly indicate that adolescent sexual activity is not simply a sequence of physical acts, but a sequence of acts imbued with *personal and social meaning*. Accordingly, an important and vastly understudied direction for the next generation of research on adolescent sexuality involves assessing the multiple factors that inform the personal and social meaning that youth attach to penile-vaginal intercourse *and* a range of other sexual activities. Studies of adults reliably demonstrate that individuals with different social backgrounds, sexual orientations, and relationship histories place different value and importance on certain sexual acts, and these determinations do not always correspond to the perceived enjoyability or social acceptability of such acts. Currently, little is known about how young people at the beginning of their sexual-developmental trajectories move progressively from pre-event *expectations and motives* to their subjective experiences *during* sexual interaction to their postevent *interpretations, emotions, and cognitions*, all of which feed forward to direct future behavior. In line with our cascade model of sexual development, we believe that the value and meaning youth attach to different sexual experiences should be treated as critical developmental phenomena themselves, and investigators should develop and test hypotheses about specific developmental trajectories for certain sexual behaviors and certain types of relationships (for example, casual versus committed relationships). Such knowledge will not help us to identify, at an early age, youth who might be at risk for STIs, pregnancy, and sexual coercion, but may also help us to understand why some youth enter young adulthood with a strong sense of sexual pleasure and empowerment, whereas others enter young adulthood with a sense of sexual shame, anxiety, or disappointment. This knowledge may be particularly

critical for the treatment of adult sexual dysfunction, given that sexual dysfunction is known to be strongly influenced by a complex interplay among psychological, biological, and social/cultural factors (Laumann, Paik, & Rosen, 1999). By carefully attending to the progressive unfolding of children and adolescents' sexual cognitions and experiences, and to the ongoing revisions and elaborations in their desires, motives, and roles, we will be better able to model sexual function and dysfunction in adulthood as outcomes of lifespan developmental processes.

Timing of Coitus

Significant attention has been devoted to understanding factors predicting the timing of adolescents' sexual "debut" and the implications of early versus late timing. Contemporarily, the average age of sexual debut in the United States is approximately 16–17 (Cavazos-Rehg et al., 2009; Santelli, Lindberg, Finer, & Singh, 2007) and therefore young people whose first intercourse occurs after the age of 18 are generally considered "late" whereas those whose first intercourse occurs at the age of 15 or younger are considered "early." There are notable ethnic differences in the timing of sexual debut, with African Americans and Latino/a Americans showing earlier ages of debut and Asian Americans showing later ages (Cavazos-Rehg et al., 2009). Importantly, the designation of sexual debut after the age of 18 as "late" is a statistical category, rather than an ideological one. Many parents and educators would argue that there is no such thing as "waiting too long" to have coitus, and that adolescents should ideally forgo intercourse altogether until marriage. This approach is generally unsuccessful, given that 90% of youth under the age of 27 report having engaged in premarital coitus (Halpern, Waller, Spriggs, & Hallfors, 2006). Yet it bears noting that there have been declines in the rates of coitus among never-married youth in the United States (Centers for Disease Control, 2002), as well as notable declines in rates of adolescent pregnancy (Santelli et al., 2007). Even with these recent declines, U.S. rates of adolescent pregnancy and childbearing remain substantially higher than rates in other countries. For example, in 2009 the rate of teenage (Age 15–19) childbearing in the United States was 38 births per 1,000 girls, compared to 25 in the United Kingdom, 14 in Canada, 10 in France, and 5 in Japan (Kearney & Levine, 2012).

Studies have consistently found that youth whose first coitus takes place at earlier ages tend to show a variety of additional sexual risk factors and adjustment problems,

including lower rates of condom and contraceptive use, greater numbers of sexual partners, poorer grades, lower educational attainment, greater substance use, and greater delinquency (Haydon, Herring, Prinstein, & Halpern, 2012; Parkes, Wight, Henderson, & West, 2010). Yet early sexual debut does not appear to "cause" these outcomes: Rather, youth with early sexual debut appear to possess a range of characteristics that channel them into early sex *and* a host of other risky behaviors. For example, those with earlier pubertal maturation tend to show earlier sexual debut (Cavanagh, 2004), which may reflect the fact that they experience stronger hormonally mediated motivation to pursue sexual activity than their "on-time" peers, and that they tend to look more physically mature, increasing their desirability to older partners. Other studies have found that adolescents with earlier sexual debut tend to have higher levels of unconventionality, lower endorsement of prosocial norms, and that they come from families with lower incomes, less rule-setting, lower parental engagement and supervision, and lower parent-child relationship quality (Boislard & Poulin, 2011; Cavazos-Rehg et al., 2010; House, Mueller, Reininger, Brown, & Markham, 2010; Price & Hyde, 2009). One seminal study (Bingham & Crockett, 1996) followed a group of adolescents from a single school district in a rural community from 9th through 12th grade and found that the correlation between early sexual debut and later psychosocial problems was completely mediated by psychosocial problems *prior* to sexual debut. Such findings indicate that encouraging young people to delay sexual debut would not necessarily improve their adjustment outcomes or inoculate them against future risks. Rather, early sexual debut appears to be part of a trajectory of psychosocial risk that is set in motion long before pubertal maturation.

The longitudinal, biosocial research of Udry and colleagues (Udry, 1988; Udry, Talbert, & Morris, 1986) has focused on disentangling the relative impact of hormonal and social factors on girls' and boys' coital timing. Udry's work has used data on maturational changes in hormone levels in concert with detailed assessments of social-attitudinal factors, such as friends' participation in sexual activity, peer popularity, grades, sexual permissiveness, future orientation, parents' education, and locus of control. The results have revealed notably gender-specific patterns. Specifically, maturational changes in free testosterone levels were directly related to initiation of coitus for White males, to the exclusion of all social variables save for popularity among other-sex friends. Importantly, the pattern of results was the opposite among White girls.

Hormonal changes had no direct effect on girls' first coitus (although they significantly predicted girls' sexual thoughts and fantasies), and instead *every* social variable emerged as a significant and unique predictor of first intercourse. A different pattern of results was observed for African American girls. The single strongest predictor of sexual behavior was whether a girl *looked* physically mature to peers.

A number of additional studies (reviewed in Halpern, 2003) across different cultures and cohorts have yielded similar findings regarding the greater sensitivity of young women than men to social and environmental influences on participation in intercourse. In interpreting this pattern, Udry et al. (1986) have emphasized the fact that adolescent boys face a uniformly positive environment regarding their sexual behavior: Although parents may discourage teenage boys from participating in sexual activity, these boys receive consistent messages from their peers and from the media suggesting that sexual activity makes them desirable and mature. Hence, it makes sense that once their hormonally mediated sexual motivation increases, their behavior will follow suit. Yet adolescent girls face inconstant, highly differentiated environments that send an array of conflicting and confusing messages about the desirability and costs of sexual behavior. Some girls' social contexts portray adolescent female sexual behavior in the same positive light as adolescent boys' behavior, whereas other girls may occupy more restrictive social environments which portray sexually active girls as "loose" and not worthy of respect. Hence, given this diversity in attitudes and contexts, it should not be surprising that social and environmental factors prove stronger predictors of girls' behavior than their hormonally mediated sexual urges.

One important question for future research is whether associations between the timing of sexual debut and later psychosocial development vary according to the type of sexual activity pursued (i.e., oral sex versus coitus) and its interpersonal context (i.e., casual experimentation versus romantic involvement). Historically, most young people pursued their first sexual experiences within romantic relationships, but growing numbers of contemporary youth also pursue sexual activity during "hookups" (casual, one-time-only sexual interactions) or in "friends with benefits" arrangements (periodic sexual behavior among friends, with no expectations of romantic involvement) (Grello, Welsh, & Harper, 2006). Participation in sexual activity outside the context of established romantic relationships is sometimes associated with sexual and

psychological health risks, such as greater alcohol and drug use and greater numbers of sexual partners (reviewed in Manning, Longmore, & Giordano, 2005), but not in all circumstances, and not for all youths. The developmental status of young people, their motives and expectations, and the specific features of different relational contexts must be considered in order to discern the developmental significance of different types of sexual arrangements.

Quality of Intercourse Experiences

Another key factor that might moderate links between the timing of sexual debut and subsequent sexual trajectories is the subjective quality of young people's early experiences. If a 15-year-old girl finds her initial vaginal intercourse experiences to be enjoyable, exciting, and emotionally intimate, she is more likely to repeat this behavior and to maintain the relationship in which they occurred. These choices may influence her subsequent sexual and interpersonal development by increasing her likelihood of socializing with sexually experienced peers, her popularity, her time demands, and so forth. If, instead, she finds her initial vaginal intercourse experiences to be unsatisfying, embarrassing, awkward, and even regrettable, she may be less likely to repeat this behavior, and may find herself gravitating toward activities and peer groups that reduce opportunities for this behavior. These choices, too, will reshape her developmental trajectory in crucial ways. Hence, understanding the subjective quality of the initial sexual experiences of young people is important for accurately discerning the role of early sexual experiences in directing subsequent psychosexual development.

Relatively few studies have focused on the subjective quality of the sexual experiences of young people, and these studies reveal a diversity of correlates. One large longitudinal study of Scottish and English adolescents between 13 and 16 years of age found that the majority appraised their first sexual experience and their most recent sexual experience positively, but girls were more likely than boys to report lack of enjoyment during their most recent intercourse. Also, girls were more likely than boys to report that they experienced pressure during their first intercourse experience. In general, sexual experiences characterized by less control and more pressure are evaluated more negatively (Wight et al., 2008). The interpersonal context is also significant: Both boys and girls report more happiness, enjoyment, and satisfaction with their most recent sexual experiences, and less guilt and shame, when those experiences take place with steady and

significant partners (Wight et al., 2008). One consistent pattern is that girls generally evaluate the quality of their first sexual experience more poorly than do boys (Higgins, Trussell, Moore, & Davidson, 2010). This is likely due to multiple factors, including the low skill and sensitivity of their young partners, lack of knowledge about what to expect, lack of control over the timing and dynamics of the experience, women's lower likelihood of orgasm during penile-vaginal intercourse, and the greater shame and risk attached to sexual activity for women than for men (Higgins et al., 2010).

One important topic for future study concerns how young people's judgments of the subjective quality of their sexual experiences are influenced by the motives and expectations that they brought into the interaction, and how their motives and expectations are subsequently *changed* as a result of high-quality and low-quality experiences, in a cascading pattern over time. Previous research has found that crafting meaningful understandings of both positive and negative life experiences helps individuals to cope with and learn from stressors and challenges, particularly if individuals use their experiences to derive insights that can guide their future choices and self-knowledge (McLean & Pasupathi, 2007). Hence, youth who craft meaningful insights from stressful or disappointing sexual experiences, and who make an effort to determine what to do in the future to reduce the likelihood of such experiences, may actually show enhanced development relative to youth who avoid sexual activity altogether. Such processes may help to account for the mixed patterns of association that have been detected between sexual experience and adolescent well-being, with some studies showing greater happiness and self-esteem among more sexually experienced girls (Horne & Zimmer-Gembeck, 2005) and others showing the opposite (Cairano, Bonino, Kliewer, Miceli, & Jackson, 2006). The quality of young people's sexual experiences may prove to be the key unmeasured variable: Notably, one study found that girls who reported more satisfying sexual experiences had more positive, approach-oriented sexual self-concepts (Impett & Tolman, 2006). Another area for future research concerns the degree to which youth use their own histories of satisfaction with sexual activities to make conscious decisions about which activities they choose to pursue in the future. For example, girls with higher levels of assertiveness report having more cunnilingus partners over their entire sexual history as well as during the past 3 months, and report that both they and their partners enjoyed this activity. Hence, one possibility is that assertive, confident girls who find penile-vaginal intercourse disappointing

will make an effort to pursue the sexual acts that they *do* enjoy, and to seek out partners interested in pleasing them. Overall, a greater understanding of how young people subjectively evaluate and interpret their sexual experiences over the course of adolescence is important for understanding the larger role of sexuality as both a cause and an effect of multiple social developmental processes.

Reducing Risks for Pregnancy and STIs

According to the World Health Organization, the highest rates of STI infection occur among youth between the ages of 15 and 24, and adolescents face particular risks for HIV, chlamydia, and gonorrhea (Centers for Disease Control, 2002; Dehne & Riedner, 2005). Each year, nearly 750,000 teen girls aged 15–19 become pregnant, and the vast majority of these pregnancies are unplanned (Alan Guttmacher Institute, 2006). Notably, the United States has a disproportionately high rate of adolescent pregnancy in comparison to other Western industrialized nations, despite the fact that U.S. teens engage in coitus at approximately the same rates and ages as do youth in other Western industrialized countries (Teitler, 2002). Low rates of condom and contraceptive use are likely responsible: Studies of American adolescents have found that approximately one fourth of women and one third of men reported not having used any contraception during the first time they had intercourse (Kahn, Huang, Rosenthal, Tissot, & Burk, 2005) and approximately 20%–30% of adolescents reported not doing so the most recent time that they had intercourse (Santelli, Lowry, Brener, & Robin, 2000). Rates of condom and contraceptive use show wide cross-national variability. Across 15 different international surveys, the World Health Organization found that rates of condom use among adolescents varied from 5% in Tanzania to 33% in Singapore to 62% in Zambia, although across all cultures the most common pattern of condom use among adolescents was *never* (Dehne & Riedner, 2005). In all cultures studied, youth with better education are more likely to report condom use, but even they report problems with correct usage, social stigma, and availability (Dehne & Riedner, 2005).

Cultural taboos against premarital sex often stand in the way of efforts to increase access to condoms and contraception among adolescents, despite consistent evidence that increasing access can increase contraceptive use and reduce rates of pregnancy and STIs among youth (Blake et al., 2003; S. Ryan, Franzetta, & Manlove, 2007). In many countries, mandated parental notification provides

a significant disincentive for youth to seek and use contraceptives, but these youth continue to have sex and to face health risks: One national survey of family planning clinics asked adolescents how they would respond if clinics began requiring parental consent for contraception. Only 7% reported that they would stop having sex (Jones, Purcell, Singh, & Finer, 2005). The level of knowledge of young people about the mechanisms through which contraceptives work also contributes to their use, or lack thereof (S. Ryan et al., 2007). Young people who do not understand how exactly the birth control pill works are not able to judge the risks associated with skipping one or more pills. In light of the fact that adolescence is a period of significant maturation in cognitive and reasoning skills, future-oriented thinking, and the evaluation of hypothetical probabilities (Lehalle, 2006), young people may be poorly suited to make reasonable judgments about the specific risks and benefits of consistent condom use and contraception. Studies reveal that adolescents tend to focus on the *benefits* of forgoing condoms and contraception (such as immediate pleasure and feelings of physical and emotional connection to the partner) rather than the risks (Parsons, Halkitis, Bimbi, & Borkowski, 2000).

Adolescents' sensitivity to rejection and to social evaluation also plays a role in condom and contraceptive use. Some young people forgo condoms and contraception for fear of offending the partner, because they believe that they know the partner's history well enough to trust him/her, because they do not know how to bring it up, or because they are concerned about their reputation (Dehne & Riedner, 2005; O'Sullivan, Udell, Montrose, Antoniello, & Hoffman, 2010). Although one might expect that negotiation of condom and contraceptive use might be easier and more successful in committed romantic relationships, this is not necessarily the case. In fact, many adolescent couples *stop* using condoms once they view their current relationship as committed and monogamous (Matson, Adler, Millstein, Tschan, & Ellen, 2011). Power differentials within couples also play a role. One study found that 20% of young women believed that they did not have enough control within their sexual interactions to make their own decisions about contraceptive use, especially in cases where they wanted to use condoms and their partner did not (Rickert, Sanghvi, & Wiemann, 2002). Similar dynamics have been observed across the globe, with young women uniformly disempowered in the context of negotiated condom and contraceptive use (Dehne & Riedner, 2005). Ambivalence about pregnancy also provides a disincentive to contraceptive use and a strong predictor of unplanned

pregnancy (Sipsma, Ickovics, Lewis, Ethier, & Kershaw, 2011). Studies have found that adolescent girls with low socioeconomic status, low levels of education, high levels of generalized stress, and who live away from their natural parents are disproportionately likely to report that they sometimes want to have a baby (Cowley & Farley, 2001). In interpreting such patterns, some researchers have argued that youth with limited social and economic opportunities may seek early childbearing as an adaptive coping response which offers them meaning and purpose (Stevens-Simon & Lowy, 1995).

In light of the persistent difficulties with motivating youth to reliably use condoms and contraception, some youth advocates have argued that the best strategy for reducing sexual health risks is to promote 100% abstinence among adolescents. In the past decade, numerous “abstinence only” programs have been developed and implemented across the United States, as well as programs encouraging adolescents to take “virginity pledges” until marriage. Several comprehensive reviews of the effectiveness of these programs have been conducted. One such effort summarized the results of 13 scientifically rigorous trials involving over 16,000 youth (Underhill, Montgomery, & Operario, 2007) and found no evidence for significant effects on adolescents’ age of sexual initiation, their rates of participation in unprotected vaginal sex, their number of sexual partners, or their condom and contraceptive use. Similar null effects have been found in other studies (Kohler, Manhart, & Lafferty, 2008), and even when positive effects of these programs have been found, the effects rapidly disappear at follow-up assessments (Jemmott III, Jemmott, & Fong, 1998). In contrast, programs offering comprehensive sexual education have been found to be associated with reduced risks of pregnancy and STIs (Kohler et al., 2008). In light of these findings, many experts in the field have argued that abstinence-only programs and policies are not only ineffective, but unethical, as they withhold critically needed information from adolescents and undermine comprehensive sexual education efforts (Santelli, Ott, Lyon, Rogers, & Summers, 2006).

“Virginity pledges” also appear to be ineffective. One study found that 5 years after taking a virginity pledge, pledgers and non-pledgers showed no differences regarding age of sexual debut, participation in premarital sexual behavior, and number of sexual partners, but pledgers had lower rates of contraceptive and condom use (Rosenbaum, 2006). This is echoed by the findings of a study of Add Health respondents, which used urine samples to compare rates of human papilloma virus,

chlamydia, gonorrhea, and trichomoniasis among youth who did or did not take a virginity pledge: The results revealed that virginity pledgers had infection rates equal to nonpledgers (Bruckner & Bearman, 2005). The authors speculated that virginity pledgers might be at particular risk for condom nonuse at sexual debut, consistent with the findings of Rosenbaum (2006), and that they might also be less likely to be tested, diagnosed, and treated for sexually transmitted diseases. The willingness of virginity pledgers to deny or ignore the realities of their own health risks is exemplified by the fact that in Rosenbaum’s study, 82% of the virginity pledgers denied having taken the pledge to begin with.

These findings do not suggest that abstinence is a completely unworkable strategy, only that its implementation in the form of sex education, and its displacement of comprehensive information about condoms and contraception, appears ineffective. Notably, one longitudinal study tracking adolescent girls over a 4-year period found that the strongest predictor of girls’ abstinence was their own personal attitude about abstinence, even after controlling for peer norms about sexual behavior and family attitudes toward sexual behavior (Akers et al., 2011). Hence, it appears that the most effective strategies for encouraging the use of condoms and contraceptives for young people are those that seek to foster motives to avoid pregnancy and STIs, while providing youth with accurate information about—and confidential access to—condoms and contraception. Long-term, repeated messaging over time is also important, given that adolescents tend to show declining rates of condom use as they become more sexually experienced (Tanner, Hensel, & Fortenberry, 2010). The most successful interventions comprehensively integrate sexual health information and access across multiple dimensions of young people’s social lives, including youth development programs, clinical services, and school contexts (Kirby, Crosby, Santelli, & DiClemente, 2009).

PARENTAL INFLUENCES

The influence of parental practices on their children’s sexual attitudes and behaviors has been a longstanding topic of research. De Graaf, Vanwesenbeeck, Woertman, and Meeus (2011) comprehensively reviewed this literature, focusing on three of the most widely investigated parental characteristics—support, control, and monitoring. They synthesized the evidence linking these factors to the timing of sexual debut, the use of protection against

pregnancy and STIs, and psychological attitudes and enjoyment regarding sexuality. They found consistent evidence that high parental support (which in some studies was operationalized as high warmth, affection, and familial cohesion) predicts later onset of sexual intercourse (especially among particularly young adolescents), greater use of protection from pregnancy and STIs, more positive feelings about sexuality, and greater competence within sexual interactions (for example, efficacy in discussing condoms and contraception and efficacy in refusing unwanted sexual activity). Parental control (operationalized as clear, fair, and consistent rule-setting) also shows consistent associations with delayed sexual activity and use of protection against pregnancy and STIs. Associations with young people's psychological experiences regarding sexuality, however, appear sensitive to instances of overcontrol (i.e., cases in which parental discipline is perceived as arbitrarily harsh and authoritarian), and youth with overcontrolling parents show greater feelings of guilt regarding sexuality, poorer competence in sexual communication, and more involvement in unwanted sexual activity. Lastly, parental knowledge shows the most consistent patterns of association, such that adolescents whose parents have accurate knowledge of their whereabouts and activities (through consistent monitoring) show later sexual debut, greater use of protection from pregnancy and STIs, and more satisfaction, confidence, and assertiveness regarding their sexual activities.

Yet in summarizing these results, de Graaf et al. pointedly remark that although it is typical to interpret such findings as indicating that parental practices "lead" to certain patterns of adolescent sexual behavior, this conclusion is overly simplistic. It is a truism that parenting practices influence child outcomes, but the mechanisms through which specific parenting dimensions shape specific adolescent sexual outcomes remain largely untested. Some mechanisms are easier to intuit than others: It is relatively straightforward to posit that high parental monitoring makes it more difficult for adolescents to engage in early sexual behavior, but why does parental warmth show the same pattern of association, and why is parental warmth positively associated with young people's competence within sexual interactions? De Graaf et al. (2011) suggest the possibility that youth raised by warm and supportive parents may be more psychologically adjusted in general, rendering them better able to make sound sexual choices, deal responsibly with sexual risks, and effectively communicate their needs during sexual negotiations. Yet as they note, there is little *direct* evidence for such mechanisms,

given that most research linking parenting practices to adolescent sexual outcomes has devoted more attention to documenting such associations than to systematically explaining them.

In particular, de Graaf and colleagues note the underattention to reciprocal effects. The casual arrow is typically presumed to operate in one direction only—from parents to children—despite evidence for reciprocal influences (Ream, 2006). Although parental attitudes and behaviors certainly influence their children, parents are also influenced by their children, and often tailor their parenting practices (both consciously and unconsciously) in response to their child's emerging and evolving strengths, weaknesses, and traits. Hence, as de Graaf and colleagues point out, the fact that unsupportive parents have children who engage in early sexual behavior might reflect the fact that parents whose children begin to experiment with sexuality at an early age may begin to distance themselves from these children, showing both subtle and overt signs of rejection and disapproval. Similarly, parents may begin monitoring their children less consistently, and seeking less information about their activities and whereabouts, once they realize that their children are involved in activities they do not condone and do not know how to control. Little research has attempted to uncover the nature of such potential reciprocal effects, and the manner in which parental behavior and adolescent sexuality unfold in a dynamic dialectic over time. Yet such information is critical not only for informing potential family-based interventions designed to foster healthy adolescent sexual development, but for developing a fundamental understanding of the diverse "drivers" of adolescent socio-sexual development.

The quality of parents' communication with their children has also received extensive study, and results suggest that, although the quality of parent-child communication appears to influence the behavior of youth, in some cases it has unintended consequences. Parents who overemphasize the negative consequences of sexual activity may end up discouraging their children from talking to them about sex at all. Notably, culture and ethnicity appear to moderate these effects. O'Sullivan, Meyer-Bahlburg, and Watkins (2001) conducted focus groups with African American and Latina American mothers and daughters and found that African American mothers placed a high priority on preventing pregnancy and STIs, and therefore used their conversations with their daughters to seek information about their daughter's activities. Latina American mothers, however, were more likely to discourage *all* sexual activity whatsoever, which had the effect of discouraging their

daughters from frank discussion of sexual matters, and inadvertently sending them to peers to seek information on sexual health. One notable finding from the study by O'Sullivan and colleagues is the role played by adolescents in effectively “shutting down” their parents’ efforts to communicate openly about sex. A persistent issue raised by the mothers in this study was the antagonism they faced from their daughters when they initiated discussions of sexual matters. Girls reported actively withholding information from their mothers, in direct resistance to their perception that their mothers were overly negative and controlling, and that their parents only wanted them to disclose sexual activities for the purpose of restricting them. Such findings suggest that research on parent-child communication about sex needs an increased focus on the interpersonal dynamics of these conversations, and how they unfold in families with different cultural and religious backgrounds, different histories of warmth and discipline, and different communicative skills and habits. Such research is important for providing families with tailored information on how best they can achieve communicative practices with their children that are successful and beneficial for *both* the parents and children, and which set up lines of communication that children will make use of throughout their adolescent years.

SEXUAL COERCION

Around the globe, many children and adolescents have been victims of coerced sexual activity at the hands of relatives, strangers, acquaintances, and intimate partners (Basile, Chen, Black, & Saltzman, 2007; Dehne & Riedner, 2005). A random representative phone survey of nearly 10,000 American adults found that 10.6% of women reported at least one incidence of forced sex during their lifetime, and the most common age range for such experiences (comprising 35% of accounts) is between 12 and 17 (Basile et al., 2007). Adolescent girls are substantially more likely than boys to report experiences of sexual coercion, but it is not known whether some of this difference is attributable to underreporting by boys (Wekerle & Wolfe, 1999). Existing statistics also likely underrepresent experiences that fall short of conventional social definitions of *force*. Researchers have increasingly come to view sexual assault as part of a broader continuum of coercive attempts to gain sexual access to an unwilling partner, which includes physical force on the high end, but pleading, bullying, manipulation, and the provision

of drugs or alcohol on the low end (O’Sullivan, 2005). Psychological forms of coercion are particularly common in established romantic relationships, whereas forcible rape is more commonly committed by acquaintances (Testa & Livingston, 2000). From a developmental perspective, it bears noting that many individuals describe their *very first* sexual experiences as being unwanted. In their representative study of adults, Laumann et al. (1994) found that 25% of women and 8% of men described their first intercourse experience as unwanted, but not coerced.

Adolescent sexual coercion is associated with a range of negative outcomes, including greater hopelessness, sadness, and risk behaviors such as alcohol or drug use (Coker et al., 2000; Howard, Wang, & Yan, 2007). Among girls, forced sex is also associated with more romantic involvement, greater overall exposure to violence, emotional distress, earlier initiation of coitus, multiple sexual partners, and nonuse of contraceptives and protection against STIs (Howard et al., 2007). The psychological consequences of participation in unwanted or mildly coercive sex are less severe than for forcible sexual assault, but they nonetheless pose significant risks to well-being, especially when the coercion is chronic; these risks include psychological distress and trauma, guilt and shame, low relationship satisfaction, and problems with sexual functioning (Testa, VanZile-Tamsen, Livingston, & Koss, 2004). The prevalence of sexual coercion in established relationships appears to be attributable to the fact that established couples tend to presume an implicit contract ensuring mutual sexual availability (Basile, 2002). Hence, many men—and their female partners—view sexual pressure or persuasion as acceptable activities, and do not even consider them coercive (O’Sullivan, 2005). Adolescents may be particularly vulnerable to these distorted perceptions, given their lack of experience in romantic relationships and their lack of familiarity with “normal” standards governing sexual access. As a result, adolescent girls may acquiesce to a male partner’s implicit or explicit pressure, with little open resistance, for the sake of preserving the relationship or because they feel it is their duty (Basile, 2002; Vannier & O’Sullivan, 2010).

Greater attention to the personal, interpersonal, and contextual factors that foster unwanted sexual activity, and the long-range implications of this activity for the socioemotional development of young people, is one of the most important directions for future research on adolescent sexuality. The longstanding (and well-justified) focus on the starker cases of sexual violence may have inappropriately blinded us to the types of ambiguous sexual situations

that potentially serve as precursors for later abuse. One of the most important questions for future research concerns whether coercive sexual dynamics are best conceived as relationship phenomena or individual phenomena. Although researchers commonly conceptualize sexual violence as a trait of individuals (such that these individuals will pursue coercion within all of their relationships), it is possible that “lower levels” of coercion, such as pleading, manipulation, and guilt-induction, are better understood as properties of *relationships* rather than individuals, born of the interpersonal dynamics created when certain personalities, carrying forward their own unique expectations regarding relationship roles and obligations, come together under charged and interpersonally demanding circumstances. In understanding such dynamics and their implications for later development, researchers must also take care to investigate sexual coercion *not* simply as the “cause” of future negative outcomes, but as the outgrowth of complex, longstanding patterns of psychosocial vulnerability which may stretch back to early childhood, often involving violence in the family of origin (H. A. Sears & Byers, 2010).

NEW CHALLENGES: SEXUALITY IN THE INTERNET AGE

Access to Sexually Explicit Images

Parents and educators have long considered the positive and negative implications of media exposure for child and adolescent development (Anderson & Kirkorian, Chapter 22, this *Handbook*, Volume 2), but these concerns have increased in recent years due to adolescents’ increasing use of digital media (Calvert, Chapter 10, this *Handbook*, Volume 4). The Internet is now the dominant source of adolescents’ exposure to sexual information and images (Roberts, Henriksen, & Foehr, 2009). One representative survey found that 95% of adolescents have access to the Internet, either through computers or mobile phones (Pew Research Center, 2013) and are therefore able to seek out sexually explicit materials with a far greater degree of ease and confidentiality than past generations. Undoubtedly, unlimited access to sexually explicit material on the Internet constitutes one of the most significant historical changes in the social context of child and adolescent sexuality. Although children and adolescents have always been curious about—and have made efforts to procure—sexually explicit materials such as

books, magazines, and films, their access to these materials was once quite limited. Contemporarily, adolescents with access to a computer can instantly view *every single pornographic image imaginable*, including live-streaming videos of real-time sexual activity and images of sexual violence and abuse, with a click of the mouse. Even the mouse may soon be out of date in this context, as studies show that adolescents increasingly use smartphones as a primary means for accessing the Internet, especially adolescents from lower income households who might not have a home computer with Internet access. Historically, Internet access and usage has been lower among ethnic-minority adolescents and those in lower income households, but this gap in usage has been closing due to adolescents’ increasing access to and use of smartphones. A study conducted by the Pew Center (Pew Research Center, 2013) found that 78% of American teens currently have a cellphone, and approximately half of those phones are smartphones. In all, 93% of teens have access to the Internet through a computer in their home, but approximately 25% of teenagers say that they primarily access the Internet through their phone (compared to only 15% of adults). Notably, ethnic-minority youth and those from lower income families are more likely to use smartphones to access the Internet. Hence, although there continues to be a “digital divide” with regard to home Internet use, Internet access through smartphones has substantially closed this divide among contemporary American youth. Internet use is also on a sharp rise around the globe, at far faster rates than those observed in North America. Whereas North American Internet use has increased approximately 150% since 2000, European Internet use has increased nearly 400% since 2000, to a rate of 63% in 2012. In Latin America and the Caribbean, Internet use has increased 1,300% since 2000, to a 2012 rate of 43%. The most dramatic increases are in Africa (3,600% increase since 2000, to a 2012 rate of 15.6%) and the Middle East (2,700% increase since 2000, to a 2012 rate of 40%). It also bears noting that although North America boasts the highest within-population rates of Internet use, North Americans account for only 11% of Internet users worldwide. In contrast, 45% of Internet users are Asian and 22% are European (Internet World Stats, 2012). The increasing use of the Internet worldwide makes it increasingly important to understand how Internet use influences—and is influenced by—young people’s concurrent sexual development.

Importantly, the factors that render some individuals disproportionately likely to seek sexually explicit material on the Internet appear to be the same for adolescents

and adults: Peter and Valkenburg (2011b) found greater rates of usage among males, those with high levels of sensation-seeking, and sexual minorities. Hence, when considering the “effects” of Internet use, it is important to remember that there are powerful selection effects at work, making it difficult to determine whether Internet use “pushes” the sexual interests and cognitions of youth in a certain direction, or whether young people with certain patterns of sexual thought and behavior disproportionately seek out Internet materials that reflect and condone those patterns. The question is an important one, given that studies have found higher rates of sexually risky behavior (specifically, multiple lifetime sexual partners, more than one sexual partner in the past 3 months, and substance use during sexual encounters) among youth who have been exposed to sexually explicit websites (Braun-Courville & Rojas, 2009). Yet other studies have failed to find consistent associations between risky behaviors and the use of sexually explicit Internet materials among youth (Luder et al., 2011), and hence it is likely that the degree of association between Internet use and young people’s sexual attitudes and behaviors varies for different subgroups of youth with different temperamental characteristics and different cultural and family contexts. One (untested) possibility is that access to sexually explicit materials on the Internet poses the greatest risk for youth with psychosocial deficits (for example, low impulse control and low social competence) who are raised in families characterized by low supervision and low openness regarding sexuality. These young people might have particularly strong motivations to seek sexual information privately on the Internet, given their inability to seek accurate information from their parents. Their low background knowledge of sexuality, combined with the lack of a strong peer group to provide a “reality check” on the information that they discover, potentially renders them highly susceptible to influence. A key direction for future research is to identify youth and situations that are associated with particularly negative risks regarding Internet use and to understand the mechanisms underlying these links.

It is not yet clear whether the use of Internet materials by young people shows fundamentally different patterns of association with psychosocial outcomes than their use of other media. For example, Ybarra and Mitchell (2005) found that adolescents who intentionally sought out pornographic materials were significantly more likely to report delinquent behavior and substance use in the past year, regardless of whether the materials were “online” or “offline,” but those who sought online materials reported

twice as many depressive symptoms and lower emotional bonding with their parents than did youth who sought offline materials. Rather than reflecting the fact that exposure to Internet materials “makes” young people more depressed and impairs their social functioning, this may reflect the fact that those who have these characteristics find it easier and more comfortable to obtain explicit materials through the privacy and anonymity of the Internet. An unanswered question is whether there are cascading effects of Internet use that unfold over longer stretches of time: For example, if lonely and depressed youth are more likely to satisfy their sexual curiosity through Internet use than through playing explicit video games with large groups of friends, the amount of solitary time that they spend viewing these materials might exacerbate their feelings of loneliness and isolation, which might then encourage additional Internet use. Such cascading effects are difficult to capture, given that they require repeated, detailed assessments of adolescents’ feelings, motives, and cognitions before, during, and after multiple sessions of Internet use, but collecting such data is critically important for understanding the *developmental* impact of Internet use, especially for youth of different ages. One possibility is that these cascading influences are likely to be stronger among children than among adolescents. In order for parents and schools to develop appropriate policies about Internet use and to develop effective interventions for youth with problematic patterns of use, such process-oriented, developmental data are indispensable.

Cascading effects might also be evident in the context of young people’s use of the Internet to meet sexual partners. The risks of online sexual solicitation of children and adolescents have raised considerable concern, despite the fact that rates of unwanted sexual solicitation of youth have declined since the early days of the Internet (Mitchell, Wolak, & Finkelhor, 2007). Adolescents continue to face greater risks for online solicitations than adults, but adolescents appear to share adults’ perceptions of these solicitations as risky, and those who report being solicited online do not show higher levels of sexual risk behaviors (Baumgartner, Valkenburg, & Peter, 2010b). Additionally, short-term prospective research suggests that risky online sexual behaviors (searching online for someone with whom to talk about sex, searching online for sexual partners, sending photos or videos to someone online, and sending personal contact information to acquaintances who are known exclusively online) do not appear to change young people’s norms and attitudes about acceptable sexual behavior. Young people’s perceptions

of their friends' involvement in these behaviors and their perceptions of their own vulnerability longitudinally predicted their future participation in these behaviors, but the reverse causal pathway (from behaviors to perceptions) was not found (Baumgartner, Valkenburg, & Peter, 2010a). This suggests that young people's Internet experiences—even when these experiences are highly risky—do not appear to distort their preexisting sexual perceptions and attitudes. Of course, however, a 6-month follow-up assessment may not be long enough to capture longer-term shifts in the attitudes, perceptions, and self-concepts of young people that might accompany long-term Internet use, and that might be linked to actual experiences of pleasure and danger in online interactions. As with Internet use more generally, research must attend to feedback loops between adolescents' pre-existing attitudes and dispositions and their Internet experiences over time in order to accurately understand the risks associated with online social interactions.

It also bears noting that not all adolescent Internet use is intentional. One study found that over two-thirds of youth who reported having viewed sexually explicit materials on the Internet described this exposure as "unwanted" (Wolak, Mitchell, & Finkelhor, 2007). Unwanted exposure rates were higher among girls, young people who reported histories of interpersonal victimization (offline), young people who reported sexual harassment or solicitation online, and those with higher depressive symptoms. Unwanted exposure might prove particularly harmful when the images viewed include violence, degradation, and domination, commonly directed against women. Some researchers have investigated whether the viewing of stereotypic images of women appears to increase adolescents' belief in these stereotypes (e.g., that women say "no" to sex when they actually mean "yes," a phenomenon known as "token resistance"). One study found that adolescents who supported traditional gender roles were more likely to believe that women engaged in token resistance, but there was no association between use of sexually explicit websites and belief in token resistance (Peter & Valkenburg, 2011a). Among adults, however, there was a significant association between use of sexually explicit websites and the belief that women engage in token resistance. One possibility is that self-selection effects may be stronger for adults than adolescents in this regard (i.e., adults who already believe in women's token resistance may be more likely than adolescents to seek sexual images on the Internet that confirm this perception); another possibility is that links between Internet use and perceptions of women

may be "dose-dependent," such that these links strengthen and cascade over time. Given growing debate over the developmental impact of both Internet and mainstream media portrayals of women, and particularly the "sexualization" of ever-younger girls (APA Task Force on the Sexualization of Girls, 2010; Lerum & Dworkin, 2011), prospective study of the influence of Internet use on both boys' and girls' perceptions of gender roles in the context of sexuality warrants continued scrutiny.

Electronic Communication

Researchers have been increasingly concerned with the implications of online communication for sexual health. Despite concerns about sexual solicitation, noted earlier, online communication may actually provide a unique opportunity to facilitate adolescents' sexual knowledge and comfort, especially because the anonymity provided by online communication allows adolescents to address sensitive sexual issues that they might have trouble addressing directly with peers and parents (Valkenburg & Peter, 2011). For example, adolescents often seek advice about sexual health online (Suzuki & Calzo, 2004) and engage in discussions of emotional and moral issues about sexuality (Subrahmanyam, Greenfield, & Tynes, 2004). Additionally, online communication presents new opportunities for youth questioning their sexual orientation, who use the Internet to meet lesbian, gay, and bisexual peers and to discuss issues of openness and disclosure (DeHaan, Kuper, Magee, Bigelow, & Mustanski, 2012; Jamil, Harper, & Fernandez, 2009). Yet the long-term benefits and outcomes of such communications are largely unknown. One study examined adolescents' display of sexual references on their Internet profile pages, and found that 24% of young people's profiles contained references to personal sexual preferences, disclosures of sexual experiences, or sexual photographs (Moreno, Parks, Zimmerman, Brito, & Christakis, 2009). Girls tended to display sexual content more frequently than boys, and youth with same-sex attractions made more references to sexual behaviors than heterosexual youth. In contrast, those who displayed religious, sports or hobby involvement were less likely to make sexual references. Another study compared sexual risk behavior among college freshman who displayed sexual references on Facebook and those who did not. They found that youth who made sexual references on Facebook reported greater intentions to have intercourse, but these youth did not have greater rates of sexual behavior, greater numbers of sexual partners, or lower

rates of condom use (Moreno, Brockman, Wasserheit, & Christakis, 2012). Hence, as with exposure to sexually explicit media, young people's own preexisting intentions and motives may influence their Internet use more than the reverse.

Considerable concerns have been raised about the sending and receiving of sexually explicit photos through text messaging, commonly called *sexting*. One study found that approximately 20% of youth report having sexted a sexually explicit photo, and more than 30% reported having been the recipient of a sexually explicit photo (Strassberg, McKinnon, Sustaíta, & Rullo, 2013). Far fewer young people report disseminating sexually explicit photos than report having received such photos, indicating that a relatively small number of youth may be responsible for sexually explicit images of peers that go viral, becoming widely disseminated across large networks of peers (largely due to the ease with which sexually explicit images and messages can be sent and forwarded to multiple recipients at once). In general, boys appear more likely than girls to receive explicit pictures, and older adolescents are more likely to engage in sexting than are younger adolescents (Strassberg et al., 2013).

Motivations to engage in sexting appear to vary across adolescents. A national study of 10- to 17-year-old youth (Mitchell, Finkelhor, Jones, & Wolak, 2012) found that most of the individuals who had appeared in explicit photographs that were disseminated via text messaging had created the pictures themselves. When they were asked about their motivations, common responses included "I was dating a boy. He wanted a picture, so I sent him one," "I was curious as to what my body would look like to other people," and "We were just messaging around and being guys." Responses associated with receiving a sexually explicit image included "Someone set me a picture of my boyfriend and another girl, and he is no longer my boyfriend" and "A boy had four pictures of naked girls—he was showing everybody in the classroom." Moreover, the researchers found that 28% of the youth who had appeared in photographs and 25% of the youth who had received photographs felt upset, embarrassed, or afraid. Additionally, most young people who had received sexually explicit photos claimed that they did not forward these photos to others.

The long-term implications of sexting are not clear: As with the other risky behaviors discussed, it is not clear whether sexting influences the sexual behavior of young people or whether those who are predisposed to certain patterns of behavior are more likely to engage in sexting.

One study examined sexting in 35 U.S. high schools (Dake, Price, Maziarz, & Ward, 2012) and found that adolescents who reported sexting also reported higher rates of oral sex, anal sex, and intercourse, more numerous sexual partners, and less condom use. Yet another national sample of young adults aged 18–24 found no relations between sexting and sexual risk behavior (Gordon-Messer, Bauermeister, Grodzinski, & Zimmerman, 2013). Again, we need prospective research examining how sexting influences *and* is influenced by young people's sexual attitudes and behaviors. Such research becomes increasingly important given that adolescents' growing use of cellphones and smartphones makes sexting increasingly accessible. Another critical area for future research is the long-term effect of the shame and embarrassment young people may feel after their sexually explicit photos are publicly disseminated, and the impact of "cyber bullying," in which young adults use online communication (such as text messaging or social networking) to spread sexually related information about their peers. Youth are increasingly undergoing their most significant sexual-developmental milestones (first kiss, first girlfriend or boyfriend, first breakup, first sexual intercourse) *in public*, documenting their experiences in a permanent digital record, and opening themselves up for enduring comment and critique. Such behavior is not surprising, given that adolescence is known to be a time of self-centeredness, but the widespread dissemination and permanence of young people's digital sexual archives is historically unprecedented, and we know little about how the current cohort of youth will view these archives, and the degree of their exposure to peers, as they progress through adulthood. Long-term prospective studies of this phenomenon are a critical topic for future study.

SEXUAL-MINORITY YOUTH

Attention to the experiences of *sexual-minority* youth (i.e., those with same-sex attractions and/or behaviors) has increased dramatically over the past 30 years. Between 1980 and 1990, fewer than 150 articles were published in peer-reviewed psychological journals on the topic of sexual orientation and same-sex sexuality among children and adolescents. Between 1990 and 2000, the number of publications on this topic doubled, and since 2000 it has more than doubled again, reflecting greater awareness of and interest in this topic from psychologists as well as society more generally. Furthermore, the tone of social scientific research on sexual-minority children and

adolescents has changed markedly, especially since the removal of homosexuality from the *DSM*'s list of mental disorders in 1973. Prior to this point (and stretching back to the 19th century), same-sex sexual behavior or interest among *both* adults and children was treated as an indicator of pathology, maladjustment, or developmental dysfunction. Yet contemporarily, the most common question asked regarding sexual-minority youth is no longer "what went wrong?" but "what are their needs and experiences?" It is now widely recognized that a substantial number of adolescents deviate from conventional norms positing exclusive and uniform heterosexuality, and that although they are not intrinsically "disordered," they nonetheless face distinct developmental challenges. Scholars have therefore turned significant attention to the factors that predict both positive and negative psychosocial development across the lifespan.

Below we review this emerging body of research. Importantly, our review includes *sexual-minority* youth (i.e., those with same-sex attractions, fantasies, or behaviors) as well as *gender variant* youth (i.e., those whose appearance, behavior, interests, or identity violate traditional norms for masculinity or femininity). The latter group also includes *transgender* youth, who adopt a gender identity that does not conform to their biological sex. Although sexual-minority and gender-variant youth are often conflated with one another (for example, gender-nonconforming children are frequently suspected of being gay), they represent distinct populations. We discuss both of these populations in this chapter because of what they have in common: a set of complex psychosocial challenges deriving from the fact that their very existence challenges many of our culture's most deeply held beliefs about "normal" sexual and gender development. It would be impossible in a single chapter to comprehensively review everything that is currently known about sexual-minority and gender-variant adolescents, and hence we focus on aspects of their experiences that are most relevant from a sexual-developmental perspective. We specifically highlight the diversity of sexual-minority populations, especially regarding the prevalence of nonexclusive rather than exclusive same-sex attractions and the diversity of young people's identity labels and self-concepts. We also discuss the mental health implications of young people's exposure to stigma and social marginalization.

Defining the Population

Most empirical research on sexual-minority and gender-variant youth speaks of "lesbian and gay" or "lesbian/

gay/bisexual" or "lesbian/gay/bisexual/transgender" youth, but these terms can be misleading and usually underrepresent the population of interest. Numerous large, representative surveys conducted in a variety of countries have found that the majority of individuals with same-sex attractions do *not* openly identify as lesbian, gay, or bisexual, but instead maintain a heterosexual identity label despite their same-sex attractions and/or behaviors (Chandra et al., 2011; Hayes et al., 2012; Savin-Williams, Joyner, & Rieger, 2012; Wichstrom & Hegna, 2003). Each of these studies has also found that the majority of individuals with same-sex attractions actually experience attractions to *both* sexes and not exclusively to the same sex. Perhaps most intriguing (and most problematic, from the perspective of research aiming to establish the population prevalence of same-sex sexuality), the majority of individuals with same-sex attractions do not report tidy correspondences among sexual desires, romantic feelings, sexual behaviors, sexual relationships, and sexual identity, but instead report mild to moderate discrepancies among these domains (i.e., desires that are never acted upon; same-sex sexual liaisons in the absence of lesbian-gay-bisexual identification, etc.). Hence, knowing about one specific dimension of a young person's same-sex sexuality (for example, frequent sexual fantasies about same-sex partners) cannot provide reliable information about other dimensions (such as romantic feelings or relationships, self-identification, sexual behavior, etc.).

This is why researchers increasingly focus on documenting different manifestations of same-sex sexuality during childhood, adolescence, and adulthood rather than attempting to identify reliable predictors of same-sex sexual orientations. The construct of sexual orientation denotes a multifaceted sexual predisposition for the same sex, the other sex, or both sexes, encompassing sexual attractions, fantasies, affectional feelings, and behavior. Despite common assumptions to the contrary, there is little evidence that adolescent experiences of same-sex attraction or behavior provide reliable predictors of enduring same-sex predispositions. Some youth with same-sex attractions and behaviors have generally heterosexual predispositions, whereas some with exclusively heterosexual attractions and behavior will end up discovering in adulthood that they have a same-sex predisposition. Hence, in most cases there is simply too little information on which to make claims about adolescents' sexual orientation; statements about adolescent same-sex sexuality, however, are more empirically valid because they can be directly assessed (through self-report) without requiring presumptions about

the respondents' enduring sexual orientation. Although some might argue that the only forms of same-sex sexuality that warrant significant research attention during the adolescent years are those that signal the emergence of a young person's same-sex orientation (as opposed to those that may prove transient or experimental) we would argue to the contrary. Same-sex attractions and behaviors are increasingly common phenomena among contemporary youth, and they warrant just as much attention (with regard to prevalence, motives, developmental course, and long-term implications) as do behaviors such as oral and anal sex (which, like same-sex behavior, may be pursued more frequently during adolescence than during adulthood). By using the broad umbrella term "same-sex sexuality" instead of sexual orientation, we convey our focus on *all* forms of same-sex sexuality during childhood and adolescence, regardless of whether the participants eventually identify as lesbian, gay, or bisexual.

How common are such behaviors? The National Longitudinal Study of Adolescent Health found that 13% of American girls and 6% of American boys reported same-sex attractions, same-sex relationships, or nonheterosexual identities (Savin-Williams, 2005). The National Survey of Family Growth, with a representative national sample of nearly 14,000 American individuals, found that 5.2% of male teenagers and 12.5% of female teenagers reported same-sex sexual contact (Chandra et al., 2011). Importantly, longitudinal research indicates that same-sex behavior in adolescence is not necessarily a precursor to a sexual-minority identity. Savin-Williams and Ream (2007) found that, among the adolescents in the National Longitudinal Study of Adolescent Health who reported same-sex behavior at Wave 1 (at a mean age of 16), very few (1 in 5 females and 1 in 25 males) described themselves as "homosexual," "mostly homosexual," or "bisexual" by Wave 3 (at a mean age of 22), and the overall percentage of youth adopting one of these descriptors was low (2.4% of males and 3.8% of females). Similarly, in the National Survey of Family Growth, 2.8% of 18- to 19-year-old males and 7.7% of 18- to 19-year-old females identified as gay, lesbian, or bisexual (Chandra et al., 2011). These findings concord with other research conducted with large samples of adolescents, indicating that the vast majority of youth reporting same-sex attractions or same-sex behavior present themselves as heterosexual (Chandra et al., 2011; Garofalo, Wolf, Wissow, Woods, & Goodman, 1999).

These findings have important implications for interpreting the findings of previous research on sexual-minority

youth. The majority of extant published research on the developmental and clinical issues facing sexual-minority youth is based on relatively narrow samples of youth who openly identify as lesbian/gay/bisexual (often recruited from social service organizations that serve these populations). Although these studies have provided critically important insights into the unique needs of this population, they underrepresent youth who are less open or less certain about their sexual and/or gender identity, and who may therefore be facing altogether different social-developmental concerns. Also, researchers have argued that samples of lesbian/gay/bisexual youth recruited from social service organizations might actually over-represent the most troubled youth, given that these agencies tend to draw youth who *need* their services (Savin-Williams & Ream, 2003). Studies have also tended to underrepresent bisexual, ethnic-minority, rural, and working-class youth, hampering the generalizability of research findings.

Nonexclusive Patterns of Attraction

The underrepresentation of individuals with bisexual (or "nonexclusive") attractions is particularly problematic, given the increasing body of research indicating that such individuals represent the *vast majority* of those with same-sex attractions. For example, in Wave 4 of the National Longitudinal Study of Adolescent Health (during which participants were in early adulthood), 6.4% of men and nearly 20% of women reported same-sex attractions, and of these individuals, 95% of the girls and 74% of the boys reported attractions to *both* the same sex and the other sex. Similar results have been found in adults (Chandra et al., 2011) as well as internationally: A random sample of British adults found that 5.2% of men and 6% women reported a nonheterosexual orientation, and of these individuals, 90% of the women and 80% of the men reported attractions to both sexes. In a large cohort study of New Zealanders, 5.6% of men and 15.9% of women reported some degree of same-sex attraction, and of these individuals, 95% of the women and 79% of the men reported attractions to both sexes (Dickson, Roode, Cameron, & Paul, 2013). Hence, directly contrary to the conventional wisdom that individuals with exclusive same-sex attractions represent the prototypical "type" of sexual-minority individual, and that those with bisexual patterns of attraction are infrequent exceptions, the opposite is true: Individuals with nonexclusive patterns of attraction are indisputably the "norm," and those with exclusive same-sex attractions are the exception. This is critically

important information to convey to young people who have begun to question their experiences of same-sex attraction and who may believe that their nonexclusive attractions make them “strange” or “different.”

The specific distribution of attractions to same-sex versus other-sex partners also warrants attention: In every large-scale representative study that has been conducted, the single largest group of individuals with same-sex attractions—typically accounting for between 50% to 80% of individuals with same-sex attractions—are those who describe themselves as predominantly, but not exclusively, heterosexual (Chandra et al., 2011; Laumann et al., 1994). We might think of such individuals as “Kinsey 1s” or “mostly straight” (following Thompson & Morgan, 2008). On the Kinsey scale, zero represents exclusive heterosexuality and 6 represents exclusive same-sex sexuality. Hence, individuals who consider themselves “Kinsey 1s” perceive themselves as having enough same-sex attractions to rule out a completely heterosexual identity, but not enough same-sex attractions to warrant bisexual or lesbian/gay identifications. What is particularly interesting about the high prevalence of these individuals from study to study is that they have historically been treated with the *most* skepticism and denigration from scientists and laypeople alike, and hence we know little about the long-term course of their sexual development. Over the long term, it appears that many such youth eventually adopt a heterosexual identity, despite continuing to acknowledge a propensity for periodic same-sex attractions (Ott, Corliss, Wypij, Rosario, & Austin, 2011). Importantly, such long-term change is not unique to this group: Substantial longitudinal variability has been observed among *all* youth with same-sex attractions, whether they are closer to a Kinsey 1 or a Kinsey 6 (Dickson et al., 2013; Savin-Williams & Ream, 2007).

Studies employing in-depth qualitative interviews suggest that youth with “mostly heterosexual” patterns of attraction often resist adopting a bisexual or gay identity label because they have internalized cultural messages telling them that their same-sex attractions are not exclusive enough to “count” as nonheterosexual. The dominant cultural model of sexual orientation continues to posit two and only two categories of sexual orientation—exclusive homosexuality and exclusive heterosexuality—neither of which represents their experiences. Even the “bisexual” label seems a poor fit, given that many individuals assume (albeit incorrectly) that bisexuality must entail roughly equal degrees of attraction to both men and women. Furthermore, bisexuality continues to be widely dismissed

in the culture at large as a “false” or “transitional” identity (reviewed in Diamond, 2008a). Accordingly, individuals with “mostly straight” patterns of attraction generally find that none of the available identity labels represents their experiences, and many conclude as a result that their same-sex attractions may represent a transient aberration, perhaps attributable to confusion or curiosity, rather than an important component of their overall sexual disposition.

Such experiences are substantially more likely to occur among women than among men, considering that substantially more women than men describe their attractions as “mostly opposite-sex.” In Chandra et al.’s study (2011), for example, fully 12% of American women described their attractions as “mostly other-sex,” whereas 5.1% endorsed “both sexes,” “only same-sex,” or “mostly same-sex.” Among men, this difference was not as stark (3.7% endorsing “mostly other-sex” compared to 3.4% endorsing the other categories). Similar gender differences have emerged from other studies. Fergusson, Horwood, Ridder, and Beautrais (2005) found in a large New Zealand birth cohort that 12% of women but only 4%–5% of men described their attractions as predominantly other-sex and described their identity as “mostly heterosexual.” In a random, representative survey of American adolescents, nearly 11% of young women described themselves as “mostly heterosexual but somewhat attracted to people of the same sex,” whereas only about 4% of male adolescents endorsed this description (Udry & Chantala, 2006). In Laumann et al.’s 1994 study, women with “mostly heterosexual” attractions accounted for 62% of all women reporting any same-sex attractions, whereas men with mostly heterosexual attractions accounted for 40% of those with any same-sex attractions. In the Adolescent Health data reported by Savin-Williams, Joyner, and Rieger (2012), “mostly heterosexual” individuals accounted for 80% of women but 55% of men with same-sex attractions. In a sample of nearly 2,000 Montreal high school students, over 9% described their sexual identity as either “unsure” or “heterosexual with same-sex attraction,” and 69% of these students were female.

These data indicate that parents, educators, clinicians, and advocates seeking to provide support and affirmation for young people with same-sex attractions should understand that this population may be larger and more “hidden” than previously thought. Contrary to stereotypes portraying sexual-minority youth as gender-atypical “loners” showing little or no interest in heterosexual peers, the average sexual-minority youth experiences heterosexual attractions, participates in heterosexual relationships, and

identifies as heterosexual, making them difficult to identify. Yet the fact that these young people might appear so “typical” on the surface does not mean that they do not need support and—in some cases—intervention. Studies indicate that young people and adults with bisexual patterns of attraction actually have *greater* risk for adjustment problems than young people and adults with exclusively same-sex attractions (reviewed in Diamond, Butterworth, & Savin-Williams, 2010). The reasons for this enhanced risk are not clear, but one likely possibility is the increased stigma that such individuals face from *both* heterosexual and sexual-minority communities, with each social network potentially questioning and delegitimizing the individual’s personal identity and journey.

Same-Sex AtTRACTIONS Versus Same-Sex Orientations

A common question posed about youth with same-sex attractions and/or behavior is whether these phenomena represent a transient phase or whether they signal an underlying same-sex orientation. Currently, there is no way to answer this question because there is no scientific consensus on the exact constellation of experiences that definitively qualify an individual as lesbian, gay, or bisexual. Sexual orientation is typically considered multidimensional, incorporating sexual attractions, romantic feelings, sexual behavior, and sexual fantasies, and studies have reliably documented notable discrepancies across these domains among both adolescents and adults. Studies have revealed no definitive strategies for differentiating between young people whose same-sex interests and activities will persist into adulthood and those whose interests and activities will not. For example, longitudinal research on adolescent and young adult sexual-minority women has found that factors such as age of first same-sex attractions, age at first sexual questioning, and age of first same-sex contact failed to distinguish women who ended up, by their mid-30s, maintaining lesbian-bisexual versus heterosexual identities (Diamond, 2008a).

A significant body of research conducted in the late 1980s and early 1990s attempted to chart the normative process through which same-sex orientations emerged in adolescence by asking youth and adults to recollect the process by which they first came to be aware of their same-sex attractions and first began to question their sexual orientations. Although the stated aim of this research was to identify uniform “milestones” of sexual-minority development, it has become clear over the years that such milestones show far too much variability to yield

any definitive developmental models. Some youth report becoming aware of their same-sex attractions as early as 9 or 10 years of age (which notably corresponds to the surge of adrenal androgens that typically accompanies the prepubertal maturation of the adrenal gland, as argued by Herdt & McClintock, 2007), whereas other young people do not report any awareness of same-sex attractions until late adolescence or early adulthood. Some youth question their sexuality after pleasurable experimenting with same-sex sexual behavior, whereas others complete the entire process of sexual questioning and sexual-minority identification without ever having acted on their same-sex attractions (Dubé & Savin-Williams, 1999; Rosario, Schrimshaw, & Hunter, 2008). Hence, researchers have largely jettisoned the aim of charting the normative timescale across which same-sex orientations unfold, in favor of documenting the diversity of young people’s sexual-developmental trajectories and understanding both the antecedents and implications of different trajectories (Savin-Williams, 2011).

Given that most research on the process of sexual questioning is conducted by collecting self-report data from openly-identified LGBT adolescents, little is known about the prevalence and implications of childhood experiences of sexual questioning, and the degree to which they reliably indicate an emergent same-sex orientation. One notable study, however (Carver, Egan, & Perry, 2004), directly tackled this understudied topic. As they noted, the increasing availability of media images and information regarding same-sex sexuality makes it increasingly likely that children—regardless of whether they have actually experienced same-sex attractions—will actively question their own interest in same-sex sexuality. Some of these children will eventually adopt a sexual-minority identity, whereas others will not, and the study by Carver, Egan, and Perry sought to understand whether there were any reliable psychosocial predictors of the questioning process. In essence, their approach treated sexual questioning not simply as a uniform precursor to same-sex sexuality, but an important social-cognitive developmental experience in and of itself, which might bear its own unique and important relationship to the child’s overall psychosocial developmental context. This approach is particularly valuable for situating sexual-developmental processes within a larger body of parallel developmental processes that may have little to do with sexuality per se, but which a child’s emerging sexual feelings may serve to highlight or “trigger.” For example, sexually questioning children, like sexually questioning adolescents, tend to report feeling

“different” from their peers, but these feelings may have little to do with their sexuality. In some cases the specific reasons for these feelings cannot be identified, and in other cases they have more to do with gender atypicality than with sexual desires (Carver et al., 2004).

One question that warrants future attention is whether the very nature of the questioning process is developmentally distinct. Adolescent sexual questioning typically involves straightforward reflections on same-sex and other-sex attractions and (in some cases) sexual behaviors, and consideration of whether these experiences signal gay, lesbian, or bisexual sexual orientations. In childhood, however, experiences of sexual desire and attraction are typically less intense, more ambiguous, and have highly diverse triggers that prove unreliable signposts of stable predispositions. Accordingly, Carver, Egan, and Perry (2004) elected not to ask their 9- to 13-year-old respondents direct questions about same-sex attractions, and instead they asked respondents how confident they were that they would feel heterosexual attractions and have heterosexual relationships in the future. Hence, “sexual questioning” in this context was operationalized as low confidence and security in one’s heterosexual identity. They assessed sexual questioning at both the beginning and the end of the school year, and found that initial levels of sexual questioning predicted declines in social competence from fall to spring. Yet, importantly, there was no evidence that adjustment problems at the beginning of the year (specifically, low self-worth, low social competence, and low acceptance by both same-sex and other-sex peers) prompted increases in sexual questioning over the course of the year. Hence, sexual questioning did not simply serve as an indicator of broader underlying maladjustment.

This study also found no evidence that sexual questioning stemmed from initial gender nonconformity, since youth with high or increasing levels of gender nonconformity did not show increases in sexual questioning over time. Rather, children who initially reported questioning their heterosexuality showed increases in self-perceived gender nonconformity over time. Importantly, there are multiple potential explanations for such an association. Although some scholars have posited that same-sex sexuality and gender nonconformity may share a common causal pathway (reviewed in Bailey, Dunne, & Martin, 2000), such that gender nonconformity might simply be a late-appearing “symptom” of same-sex sexuality, it is also possible that children who begin to question their sexual orientation might intentionally explore gender-atypical appearance and behavior as part of their questioning

process. Given widespread cultural and media messages portraying nonheterosexual individuals as gender atypical, youth who question their sexuality may assume that they are *supposed* to be gender atypical, and that the best way to meet other nonheterosexual youth is to display their nonconformity.

Change Over Time

It is commonly thought (by laypeople as well as social scientists) that sexuality and sexual orientation are fundamentally stable traits that express themselves in a fairly uniform manner over the lifespan. Yet in actuality, most sexual minorities recall having undergone notable shifts in their patterns of sexual attractions, behaviors, and/or identities over time (Kinnish, Strassberg, & Turner, 2005; Weinberg, Williams, & Pryor, 1994). Of course, retrospective reports of change have obvious shortcomings, and much more reliable data on the phenomenon of change have come from a number of prospective studies (Diamond, 2008a; Dickson, Paul, & Herbison, 2003; Ott et al., 2011). All of these studies have documented notable changes over time, especially among women. For example, Savin-Williams et al. (2012) examined stability of self-reported same-sex attractions in Waves 4 and 5 of Add Health, and found an increase in the percentage of respondents who reported same-sex attractions, especially among women. In Wave 4, 86% of the women and 94% of the men described their attractions as exclusively heterosexual, but by Wave 5, 6% of these women and 1% of these men switched out of this category and reported same-sex attractions. Dickson et al. (2003) sampled a cohort of approximately 1,000 New Zealanders born in the early 1970s. Of participants who reported any same-sex attractions at Age 21, 35% of men and 55% of women underwent a major shift in their attractions by Age 26 (the three categories they could endorse were “occasional attraction to the same sex,” “major attraction to the same sex,” and “only attracted to the opposite sex”). Additionally, of the individuals who described themselves as “only attracted to the opposite sex” at 21, 12% of the women but only 2% of the men shifted to one of the same-sex attraction categories by Age 26. Similar patterns (greater change in women than among men) have been found in every other large-scale prospective study of same-sex sexuality that has been published, on samples ranging from adolescence to early adulthood (Mock & Eibach, 2012; Ott et al., 2011; Savin-Williams et al., 2012; Savin-Williams & Ream, 2007).

Other widely replicated patterns include the propensity for individuals with nonexclusive patterns of attraction to show more change than those with exclusive patterns of attraction (Diamond, 2008b; Mock & Eibach, 2012; Ott et al., 2011; Savin-Williams et al., 2012), and for more individuals to move *toward* nonexclusivity than away from it over time. Hence, contrary to the notion that bisexual attractions are transitional states, and that most individuals' attractions become narrower and more specialized over time, the data suggest the opposite: Over the course of adolescence and adulthood, individuals tend to show broader rather than narrower patterns of attraction, even if their sexual behaviors and relationships remain stable and limited. This is particularly true for women. All of the prospective studies summarized earlier found that women were more likely than men to shift toward greater nonexclusivity. In the study by Dickson et al. (2003), men were equally likely to transition to the "occasional same-sex attraction" category as they were to transition to the "only opposite-sex" or "major same-sex" attraction category. Women, in sharp contrast, were twice as likely to transition to the "occasional same-sex category" as to the "only opposite-sex" or "major same-sex" attraction categories. Although this study did not differentiate between exclusive and nonexclusive forms of "major" same-sex attractions, it supported the notion that women's changes are more likely to involve movement toward nonexclusivity than toward exclusivity.

Similar findings were reported by Ott et al. (2011), who examined changes in a large prospective cohort study of over 13,000 young people. They found that, between the ages of 13 and 23, the percentage of women adopting nonexclusive identity labels (bisexual or mostly-heterosexual) increased by nearly 10%, representing more than a threefold increase (from 4.6% to 14.4%), whereas the percentage adopting "mostly or completely homosexual" identities increased by a single percentage point (from 0% to 1%). In contrast, among men there was an 11-fold increase in the percentage of men identifying as mostly/completely homosexual, from .3% to 3.5%, but only a twofold increase in the percentage identifying as bisexual or mostly heterosexual (from 2.8% to 5.9%). Again, the pattern is clear: Men start out with more exclusive patterns of same-sex sexuality than do women, and over time they tend to become more exclusive. Women start out with more nonexclusive patterns of same-sex sexuality, and over time they tend to become even more nonexclusive. The fact that these findings have been consistently replicated in numerous large-scale studies using different

sampling frames and assessing men and women at different ages is particularly striking. Some have argued that they point to a greater capacity for "fluidity" and "plasticity" in women's desires (Diamond, 2008b), but there is little research directly comparing men's and women's capacities for "fluid" sexual desires at different stages of the lifespan. Hence, the size of the potential gender difference in sexual fluidity, and the manifestations of sexual fluidity during childhood and early adolescence, remains an important topic for future research.

Given that experiences of change directly contradict conventional models of sexual orientation, young people experiencing changes in their attractions and/or behaviors are likely to wonder what these changes mean, and whether they signal underlying maladjustment. As with bisexual patterns of attraction, young people need to know that changes in their sexual feelings are perfectly normal, and that their current constellation of feelings and behaviors does not necessarily reflect their future feelings and behaviors. Such information is critically important given that young people with same-sex attractions already tend to feel different and deviant, and hence may be particularly sensitive to aspects of their experiences that appear to diverge from widespread norms. Simply reassuring young people that their "crazy," "mixed up," "unstable" feelings are common may be one of the most important forms of support that adults can provide such youth.

Mental Health of Sexual-Minority Youth

Do young people with same-sex attractions, behaviors, or identities show greater mental health problems than their heterosexual counterparts? The answer is *perhaps*—it depends on which populations are being sampled. Numerous studies have found that sexual-minority youth, lumped together as a unitary unit, often report heightened feelings of stress, loneliness, anxiety, and depression, and heightened use of drugs and alcohol, and that stigmatization and victimization—more broadly known as *minority stress*—play critical roles in these problems (Horn & Nucci, 2006; Mallon, 2001; Rosario, Schrimshaw, & Hunter, 2006; Russell & Consolacion, 2003). Minority stress represents the unique strain experienced as a result of occupying a socially marginalized category (Meyer, 2003). The fundamental tenet underlying the conceptualization of minority stress is that individuals learn about themselves and develop their self-concepts partly on the basis of how they are treated and perceived by others. Hence, chronic negative evaluations, at the level of both

concrete interpersonal interactions and broad-based cultural norms, have detrimental effects on sexual minorities' self-evaluations and, accordingly, their mental well being. Given that adolescence is a period during which young people show heightened concerns about how they are viewed and treated by others, and during which their self-concepts undergo rapid and frequent revision, experiences of sexual-minority stress may be particularly acute (see Marks, Ejesi, McCullough, and García Coll, Chapter 9, this *Handbook*, this volume, for a discussion of similar processes among ethnic-minority youth). Yet, importantly, stigma, discrimination, and minority stress are *not* uniform experiences. Not only do sexual-minority adolescents face vastly different exposure to minority stress, depending on their individual family backgrounds, social class, geographic environments, etc., but they are also equipped with vastly different coping resources, due to personality characteristics, familial and school resources, and institutional protections from harassment and discrimination. This variability helps to explain why some studies have *not* found significantly greater mental health problems among sexual-minority individuals than among their heterosexual counterparts. Because different studies capture different subgroups of sexual-minority youth, with different psychosocial risk factors, different degrees of exposure to prejudice and discrimination, different sets of family issues, and different coping mechanisms, such variability in the findings is to be expected. Furthermore, social attitudes toward same-sex sexuality have been gradually changing over the years, reducing some sexual-minority individuals' exposure to minority stress. Hence, while some sexual-minority youth continue to face unrelenting stigma in their local communities as a result of their same-sex sexuality, others are able to live lives that are relatively free of harassment, shame, and denigration, and may enjoy full support, validation, and acceptance from friends, family members, and coworkers. In this respect, sexual-minority youth in Europe and North America appear to be better off than sexual-minority youth in countries where there is substantially less acceptance and visibility of same-sex sexuality, and where there are often fewer social support resources for sexual-minority adolescents and adults (Chan, 2010; J. T. Sears, 2005a, 2005b).

Yet one point bears emphasis: Among the diverse forms of stigmatization that sexual-minority youth may experience, the single most pernicious is familial rejection. One influential study of a diverse sample of sexual-minority youth aged 21 to 25 (C. Ryan, Huebner, Diaz, & Sanchez, 2009) found that family rejection was reliably rated to

poorer physical and mental health outcomes, including an eightfold increase in the risk of suicide attempts, a 6-fold increase in the risk of depression, and more than a threefold increase in the risk of substance use and unprotected sexual intercourse. Notably, boys were more likely to report familial rejection than girls, and Latino American male youth reported the highest rates of family rejection overall, suggesting that cultural variations in notions of gender and sexuality must be taken into account when considering young people's differential exposure to minority stress. Yet perhaps even more striking, this study found that increased risks for mental and physical health problems and suicide attempts were also found for youth reporting familial disapproval rather than outright rejection: They measured reports by youth of their families' negative reactions to their sexuality, and found a linear relationship between the negativity of families' responses and children's health outcomes. This is a particularly important finding given that many youth report that although they have disclosed their sexuality to their parents, their parents refuse to discuss it openly, and often make their disapproval known in numerous subtle ways (D'Augelli, Grossman, & Starks, 2005). Clearly, sexual-minority youth appear to be highly sensitive to their family's responses to their sexuality, and even mildly negative responses have potentially negative implications for young people's adjustment and development. Future research is clearly needed on the long-term processes through which families—and particularly parents—gradually progress from initial disapproval of a family member's same-sex sexuality to increasing acceptance.

Gender-Nonconforming Youth

Much of the stigmatization that sexual-minority youth face from their immediate peers as well as the culture at large is inextricably tied in with an explicit or implicit condemnation of gender nonconformity (reviewed in Toomey, Ryan, Diaz, Card, & Russell, 2010). Adolescence is a developmental period during which gender norms take on increased salience and significance, and a young person's peers can be unforgiving enforcers of gender-appropriate behavior. In this scenario, gender nonconformity and same-sex sexuality come to be conceptualized as proxies for one another. A girl who appears too "mannish" is taunted as a lesbian, and a gay boy is considered "not a real man." Gender-nonconforming adolescents often face the same stigmatization and condemnation that are typically heaped upon openly identified lesbian/gay/bisexual

adolescents, regardless of whether they experience same-sex attractions. Similarly, young people with same-sex attractions who also happen to be gender-nonconforming are disproportionately likely to be suspected of homosexuality and hence targeted for harassment and victimization (Grossman, D'Augelli, Howell, & Hubbard, 2005). Thus, it becomes critically important to take account of the range of gender-linked traits and behaviors comprising a young person's personal and externally perceived gender identity in order to make sense of his or her particular psychosocial developmental trajectory.

With this in mind, certain clarifications are in order. Gender identity refers to an individual's internalized psychological experience of being male or female, whereas gender nonconformity refers to the degree to which an individual's appearance, behavior, interests, and subjective self-concept deviate from conventional norms for masculinity/femininity. This distinction is critically important, because although research has found that some lesbian/gay/bisexual individuals are more gender-nonconforming than heterosexuals on certain traits, this does not typically extend to their core sense of internalized maleness or femaleness (Lippa, 2000). Thus, although it has long been common to view gay men and lesbians as "reversed" in their gender identity because they possess "reversed" sexual desires, this is not generally the case. Furthermore, research has found notable diversity regarding the sexual orientations of transsexual individuals (i.e., individuals whose gender identities are discordant with their biological sex). For example, there are biological males with female gender identities who are sexually attracted to women, biological males with female gender identities who are sexually attracted to men, and so on (Cole, Denny, Eyler, & Samons, 2000; Devor, 1993).

Research on gender-nonconforming youth lags far behind research on sexual-minority youth, and thus many basic questions such as "how many adolescents are gender-nonconforming" remain unanswered. One large-scale study of 6- to 10-year-old children (Sandberg, Meyer Bahlburg, Ehrhardt, & Yager, 1993) found that approximately 23% of boys and 39% of girls showed 10 or more different gender nonconforming behaviors. It is difficult to make inferences about the prevalence of adolescent gender nonconformity from these data, however, because there is evidence that, as children grow older and begin to perceive the social implications of gender nonconformity, they consciously modify their own behavior, sometimes becoming extremely gender-stereotyped in order to avoid and compensate for

prior stigmatization (Hunter, 1993). At the same time, some young people who were relatively gender-typical in childhood may go through a gender-nonconforming phase during adolescence as they work through changes in their internalized sense of masculinity/femininity brought about by the biological and social transitions of sexual maturation (Bancroft, 1990).

One of the most salient factors differentiating adolescents' experiences of gender nonconformity is gender itself. Mild forms of gender nonconformity are more common among women, less stigmatized, less likely to be treated as an indicator of psychiatric disturbance, and less strongly perceived to be associated with same-sex sexual orientation (Kosciw, Greytak, & Diaz, 2009; Zucker & Bradley, 1995). For example, young "tomboys" are often extremely popular with both peers and teachers, and their behavior does not typically trigger extreme parental concern unless it persists in marked form well into adolescence (reviewed in McGann, 1999). In contrast, "sissies" face more outright condemnation and social rejection, and their behavior is more likely to be considered potentially pathological by parents, teachers, and physicians (Zucker & Bradley, 1995).

In addition to the obvious issues of stigmatization, social ostracization, and harassment, it is important to consider the internal psychological sequelae of gender nonconformity during the adolescent years, particularly the concerns of young people about the nature of their sexual identity. As noted above, as a result of cultural associations between gender nonconformity and homosexuality, gender-nonconforming youth are not only frequently suspected of being lesbian/gay/bisexual, but often wonder themselves whether this is the case, even in the absence of same-sex attractions, reflecting the fact that there is more cultural space for a notion of gender-typical sexual minorities than for gender-nonconforming heterosexuals (Hunter, 1993). In other words, although people may no longer unilaterally presume that all gay men are hyperfeminine, it is still commonly presumed that any man who is hyperfeminine is likely to be gay. Thus, in addition to confronting the same risks for stigmatization, isolation, and harassment that are confronted by sexual-minority youth, gender-nonconforming youth also face the problem of having their sexual identity defined for them, often before they have even had a chance to reflect upon it themselves.

On this point, it bears noting that the association between gender nonconformity and sexual orientation is not altogether fallacious. Sexual-minority adolescents and adults

recall significantly more gender-nonconforming ideation and/or behavior in childhood than do heterosexuals, as well as reporting significantly more contemporaneous gender nonconformity (Lippa, 2000). The perennial question, of course, is why. One possibility (consistent with most folk wisdom on the issue) is that gender nonconformity and same-sex sexual orientation have a common biological etiology, whereas another possibility is that the widespread cultural conflation of these two phenomena creates a socially induced self-fulfilling prophecy, such that sexual-minority individuals end up recalling and adopting the very gender-nonconforming behaviors that everybody expects them to recall and adopt (see Bailey, 1996). Both possibilities may be operative. The most important point is not to *assume* direct correspondence between a young person's gender nonconformity and his or her sexual identity.

Transgender Youth

Whereas gender-nonconforming youth deviate from gender norms and stereotypes while maintaining a clear-cut sense of their personal identity as male or female, transgender youth are those whose gender-related *identification* does not conform to conventional standards presuming a coherent, singular, and unambiguous self-concept as male or female. Historically, most research on transgender individuals focused exclusively on *transsexuals*, who typically reported feeling that there was a fundamental mismatch between their psychological sense of gender and their biological sex, and who sought to resolve this misalignment through a combination of physical transformation (via clothes, makeup, demeanor, hormones, or surgery) and formal changes in legal status (Henton, 2006; Lawrence, 2007). Yet although transsexualism might be the most widely known form of transgender experience (among both psychologists and laypeople alike), it is certainly not the only one. In fact, the word and concept *transgender* came into use specifically because many individuals with more complex and ambiguous experiences of gender identity felt that they were poorly described by models of transsexualism.

In fact, one of the most important developments over the past several decades of research on gender identity expression has been the increasing appreciation of the diversity of the transgender population (Ekins & King, 1999; Gagné, Tewksbury, & McGaughey, 1997; Halberstam, 2005; Roen, 2002). Contrary to the widespread assumption that most

transgender individuals are distressed by, and hence seek to resolve and eliminate, discrepancies or ambiguities in their psychological experience and physical expression of gender, research has revealed that many transgender children, adolescents, and adults *embrace* their fluid, shifting, and ambiguous gender identifications, and do not seek unambiguous identification as male or female. For example, Gagné et al. (1997) charted multiple forms of gender identity in their diverse sample of transgender participants. Although some sought a complete and clear-cut switch from one gender category to the other, others maintained various mixtures of male and female attributes, sometimes aided by the selective use of surgery and hormones and sometimes not. The diversity of contemporary transgender experience is reflected by the wide array of identity terms adopted by transgender youth and adults, including gender blender, gender bender, gender outlaw, gender queer, drag king/queen, trans, transgender(ist), and queer (Ekins & King, 1999).

In embracing the complexity and fluidity of their gender identities, transgender youth pose an inherent challenge to traditional assumptions that the normative and healthy endpoint of transgender identity development must involve the adoption of a stable, integrated, unambiguous identification as 100% male or 100% female (Diamond, Pardo, & Butterworth, 2011). After all, as early as 1987, the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R*; American Psychiatric Association, 1987) recognized a lack of coherent identity as a risk factor for poor mental health outcomes (Poston, 1990). Yet there have been important conceptual and theoretical advances to researchers' understanding of gender and transgender identity development. For example, Denny, Leli, and Drescher's model (Denny, 2004) deemphasized the rigid gender binary that characterized conventional models of gender identity development, and instead presumed the existence of parallel gender continuums inclusive of male and female dimensions. Despite these changes, psychologists tend to express ambivalence about whether it is healthy for young people to embrace permanently liminal, flexible senses of gender, instead of moving progressively toward the goal of consistently identifying as male or female (reviewed in Mallon & DeCrescenzo, 2009). Yet there is no empirical data directly speaking to this question. In contrast to the extensive body of research on conventional gender identity development (Ruble et al., 2007), little research has focused on the basic developmental processes of transgender identity development in nonclinical populations (Gagné et al., 1997), or has

explored normative and resilient outcomes in this population. This is clearly an important topic for future research.

Exposure to Stigmatization

One finding regarding the mental health of transgender adolescents is unambiguously clear: Social stigmatization, including physical victimization, poses the preeminent threat to the mental and physical health of transgender youth. These findings concord with the *minority stress* model of sexual-minority health (Meyer, 2003), which specifies that sexual minorities' acute exposure to environmental stressors such as verbal or physical abuse, institutional discrimination, interpersonal harassment, and general social marginalization confers cumulative psychological stress. This stress, in turn, negatively affects both mental and physical well-being. Transgender and gender-variant individuals are subjected to widespread psychological and physical abuse (Feinberg, 2006). A recurring survey conducted by the National Coalition of Anti-Violence Programs (NCAVP) of bias-motivated violence against gender and sexual minorities has found that hate crimes against gender-nonconforming adolescents and adults accounted for one-fifth of all documented murders (National Coalition of Anti-Violence Programs, 1999, 2007). A survey of 515 trans-identified people (392 male-to-female, 123 female-to-male; Clements-Nolle, Marx, & Katz, 2006), reported that 28% of the respondents had been in an alcohol or drug treatment program, 62% had experienced gender discrimination, 83% had experienced gender-related, verbal discrimination, 59% had experienced sexual assault (rape), and 32% had reported attempted suicide. Among the sample's youth (<25 years of age), nearly half had attempted suicide as a result of gender-based victimization.

Transgender and gender-variant adolescents are particularly vulnerable to environmental stressors. Such youth routinely face verbal and physical harassment at the hands of peers (Sausa, 2005), sometimes several times a day, leaving them feeling fundamentally unsafe at school. Even youth who escape victimization in school must contend with heightened psychosocial stress in their daily lives. In addition to the normative stressors associated with adolescent social and psychological development, gender nonconforming adolescents often struggle with an inability to articulate to others *why* they feel different, and hence frequently report feeling isolated, depressed, hopeless, or utterly invisible to friends and family (Swann & Herbert, 1999). To cope with feelings of shame and isolation,

transgender and gender-variant youth may display a range of externalizing problems, including running away from home, dropping out of school, abusing substances, or self-harm (Sausa, 2005).

In the context of these risks and stressors, what conclusions might we draw about different trajectories of transgender identity development? One likely possibility is that during the adolescent years, it may be difficult—or impossible—to tell whether a particular young person is “headed” for one trajectory or another. Although some adolescents may self-identify as transsexual at fairly early ages, expressing clear desires to permanently change their gender, it is important to remember that such youth may perceive that this is the *only* outcome of gender questioning. The possibility of adopting a more fluid, liminal sense of gender may never have occurred to many youth; in addition, they are unlikely to have any visible models of such forms of gender fluidity. Hence, their ability to craft a meaningful autobiographical narrative that contains—and makes sense of—their conflicting and changing experiences of masculinity and femininity is impaired. Given this limitation, the healthiest identity trajectory for transgender adolescents may be one that makes no presumptions about desirable outcomes, and sets no timetables for resolution, but instead remains open to multiple possibilities over potentially long periods of time. Young people need time, support, information, and autonomy as they grapple with their own sense of gendered selfhood and seek a comfortable and personally authentic constellation of female-typed, male-typed, and gender-neutral traits. *Changes* in this constellation—at the level of cognition as well as appearance, and occurring during adolescence as well as adulthood—may be part and parcel of the identity development process.

One thing, however, is abundantly clear: Neither transgender youth nor adults can embark on this process without a basic sense of safety. As long as transgender individuals are forced to navigate their school and family worlds with an ever-present, debilitating fear of stigmatization, ostracization, humiliation, and physical violence, they cannot be expected to achieve a healthy sense of self-determination, whether such self-determination involves switching their gender identity or making peace with a lasting sense of gender fluidity. Supportive adults can play a key role in facilitating resilience and positive development (Mallon & DeCrescenzo, 2006; C. Ryan et al., 2009). Decades of research on resilience, conducted with mainstream as well as at-risk populations, has shown that adults can strengthen youth by teaching them how to respond positively to

adversity (Luthar, Crossman, & Small, Chapter 7, this *Handbook*, this volume). With respect to transgender youth in particular, adults may require special education and awareness. For example, learning the preferred names and pronoun usage of transgender youth is critical to gaining their trust and supporting their own developmental pathways. Similarly, ensuring and maintaining confidentiality is critical for demonstrating to transgender youth that their safety will not be compromised, given the risks that these youth typically face for discrimination and violence. Finally, research on resilience suggests that young people flourish when they know that adults believe and nurture their capacity to succeed, and hence it is important to encourage transgender and gender nonconforming youth to be visible and proud leaders and role models for others just like them. It bears noting that most of what we know about the developmental needs of transgender and gender-nonconforming youth comes from research conducted in North America. Although similar processes for fostering resilience and healthy development likely operate across cultures, much more research is needed on the culturally specific needs of young people with diverse gender identities and presentations.

FUTURE DIRECTIONS

In reviewing the historic record on approaches and attitudes regarding adolescent sexuality, Maccoby (1998) concluded that the legendary sexual revolution of the 1960s and 1970s involved a realization by youth that they have a right to sexual pleasure and fulfillment, and a right to resist restrictive social standards regarding “good” versus “bad” sexual behaviors and pursue their own standards. Yet despite these dramatic changes, contemporary society continues to hold ambivalent and fearful views of adolescent sexuality, and these views have hampered our understanding of the best ways to promote the sexual well being of young people (Lerner, Lerner, Bowers, & Geldhof, Chapter 16, this *Handbook*, Volume 1). In short, it is difficult to foster positive sexual-developmental trajectories among adolescents if we have no idea (and no empirical evidence) about what such trajectories look like. Clearly, one of the consequences of our culture’s historical emphasis on negative aspects of adolescent sexuality is that researchers have spent comparatively little time developing coherent, evidence-based models of healthy, positive sexuality that involve more than the simple absence of negative outcomes. Given the long-standing tendency

for researchers to conceptualize adolescent sexuality as a constellation of discrete and dangerous behaviors and experiences, insufficient attention has been paid to the total psychological and physical experience of erotic and affectional desires, cognitions, and behaviors of young people. The next section outlines some of the most important and pressing areas for future research that can help scientists, educators, advocates, and parents to identify and foster positive sexual-developmental trajectories from childhood to adulthood.

Attention to Early Stages of Sexual Development

Perhaps the most pressing area for future research concerns the sexual feelings, cognitions, and experiences of young children, including the processes by which they consciously question and consider *both* same-sex and other-sex feelings and experiences. As noted above, the logistical obstacles to such research are daunting: Our culture generally frowns on direct assessments of children’s sexual thought and feelings, and assessments of *same-sex* thoughts and feelings are even more taboo, prompting fears that they might “nudge” children in a same-sex direction. Yet a decade after Carver et al.’s groundbreaking study of children’s sexual questioning (discussed earlier) was published in *Developmental Psychology* (Carver et al., 2004), the key questions that they identified as critical “next steps” remain unanswered. Specifically, we still do not know the basic factors that lead children to begin questioning their sexuality; the degree to which (or situations under which) childhood questioning predicts adolescent or adult same-sex sexuality; whether sexual questioning has different causes or consequences when undertaken by heterosexual versus sexual-minority youth; the mental health risks and benefits associated with questioning; and how best adults can support and assist children undergoing sexual questioning.

Of the publications that have cited Carver et al.’s paper since its publication, nearly all focus on childhood gender atypicality, rather than sexual questioning, and the studies that specifically address sexual questioning focus on adolescents and young adults. Hence, there remains an enormous blind spot in our understanding of the phenomenology, antecedents, and implications of *childhood* experiences of sexual questioning, despite considerable evidence (from the retrospective reports of adults) that sexual questioning often begins in childhood. Importantly, this blind spot hampers our understanding of the development of *heterosexual* orientations just as much as it hampers

our understanding of the development of gay, lesbian, or bisexual orientations. Longitudinal studies indicate that adolescents often express as much ambivalence and uncertainty regarding their *other-sex* attractions as their same-sex attractions (Diamond, 2008b; Savin-Williams & Ream, 2007). Basic questions about the process and time course by which children begin to link their erotic impulses to a stable set of gender-linked attributes, and the subsequent process of linking those impulses to the phenomenon of emotional attachment (i.e., romantic love) have never been systematically addressed. We know that children experience relatively amorphous sexual impulses in their early years, and that their emotional ties are divided between friends (which are usually same-sex) and family (which include both same-sex and other-sex members). We know that, by the end of adolescence, their most intense and involving emotional bonds are typically formed with sexual partners, typically opposite-sex partners, and that their sexual feelings typically center on the opposite sex partners as well (with the exception of approximately 10% of the population who experience consistent sexual attractions for both sexes, and a much smaller percentage who experience all of their attractions for the same sex). But how do children get from Time 1 to Time 2? What are the intermediate, childhood stages of sexual development that are specifically relevant to sexual orientation? Retrospective accounts by adults provide some information, but this information is always filtered through adult knowledge, language, and experience. Understanding the development of both heterosexual and nonheterosexual orientations *from the child's unique phenomenological point of view*, and having accurate scientific data on the long-term developmental implications of this process, would provide parents, clinicians, and educators with the information that they need to provide appropriate support and scaffolding for all youth undergoing the normative transitions of sexual development.

More Integrative Biosocial Models

Historically, biological research on adolescence focused predominantly on developmental changes in gonadal hormones. Yet contemporary scientists studying the biological changes of childhood and adolescence focus on a much broader range of processes, including changes in brain structure and functioning, epigenetic processes, and stress-regulatory systems (in this *Handbook*, see de Haan, Chapter 18, Volume 1; Gunnar, Doorn, & Esposito, Chapter 4, this volume; Lickliter and Honeycutt, Chapter 5,

Volume 1; Marshall, Chapter 7, Volume 1; Stiles, Brown, Haist, & Jernigan, Chapter 2, Volume 2). Too little of this groundbreaking work has been applied to the study of sexual development and expression, perhaps reflecting the degree to which developmental scientists have tended to treat sexuality as a “special topic” rather than a fundamental, integrative component of normative child and adolescent experience.

Among the most promising topics for future study is the role of adolescent brain development for adolescent sexual development. There is now an extensive body of neurobiological research on sexuality (most commonly using functional magnetic resonance imaging, or fMRI, but also PET, or positron emission tomography, and less often EEG, or electroencephalography). One of the most important and provocative topics of inquiry in this domain concerns the degree of overlap between brain regions involved in adolescent experiences of romantic love and attachment and brain regions involved in sexual arousal (reviewed in Diamond & Dickenson, 2012). Findings from research on adults currently suggest that romantic love and sexual arousal are neither neurobiologically independent nor wholly overlapping. The specific pattern of brain regions that show activation for love versus desire suggest that differences between the subjective experiences of “targeted” arousal (i.e., sexual arousal in response to a specific love object) versus generalized arousal might be neurobiologically mediated. If so, then developmental changes in the brain structures involved in sexual desire may correspond to developmental changes in young people’s subjective experiences of sexual desire. Investigating this question can make tremendous contributions to the basic developmental science of sexuality, and can elucidate the degree to which other aspects of neural development (for example, maturation in structures related to decision-making, future-oriented thinking, self-regulation) interact with the brain regions involved in sexuality to shape trajectories of sexual behavior and other behaviors in young adults. Hence, the next major “wave” of research on adolescent sexual development may involve the integration of traditional hormonal and self-report assessments with neuroimaging.

Integration of research on adolescent sexuality with research on adolescent stress-response systems offers another important area of study. A growing body of research has investigated whether individual differences in autonomic nervous system (ANS) and hypothalamic-pituitary-adrenocortical (HPA) reactivity to stress predispose children to be differentially sensitive to environmental

challenges. Most of this research has adopted a diathesis-stress or “dual-risk” perspective, positing that negative rearing environments have disproportionately negative effects on children with exaggerated ANS and HPA responses to stress (reviewed by Boyce & Ellis, 2005). Yet, as noted earlier, recent work adopting a “differential susceptibility” perspective (Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007; Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2011) has demonstrated that, for some outcomes and some contexts, heightened stress reactivity not only increases children’s sensitivity to the risks of negative environments, but *also* increases their sensitivity to the benefits of positive environments. The potential evolutionary basis for differential sensitivity has been laid out in the adaptive calibration model of stress responsivity (Del Giudice, Ellis, & Shirtcliff, 2011), which posits that, during the first year of life (and also potentially during certain transitional “windows” of development, such as puberty), humans’ stress-response systems encode and filter information about the degree of advantage and adversity in the immediate environment, in order to “calibrate” relevant stress response systems toward greater or lesser vigilance in the service of overall adaptation. According to this model, children born within adverse environments will develop highly reactive stress-response systems that allow them to quickly detect and respond to potential threats. Yet this heightened reactivity *also* renders young people more “open” to positive environmental influences. Hence, the heightened sensitivity of infants born into adversity offers both risks and benefits as these children progress through adolescence and adulthood, rendering them more sensitive to environmental deficits and strengths.

Thus far, research testing the differential vulnerability model has focused on conventional adjustment outcomes such as mental health and social competence (for example, Diamond, Fagundes, & Cribbet, 2012). Yet it is likely that individual differences in stress-response systems also shape young people’s susceptibility to positive and negative influences on their sexual development and expression. Normative developmental increases in sexual desire and behavior, with their attendant emotional and self-regulatory challenges and opportunities, place heightened demands on stress-regulatory systems that are still “under construction” on a neurobiological level (Dahl & Spear, 2004), potentially increasing some young people’s susceptibility to the repercussions of positive and negative emotional experiences. Hence, greater assessment of individual differences in the physiological stress reactivity of young people,

in concert with detailed assessment of their early rearing environments and their current environmental contexts, can reveal long-range patterns of adaptation and adversity that help to explain how different youth may undergo similar sexual experiences in adolescence, and yet show markedly different adjustment outcomes. In particular, research investigating the mechanisms underlying positive and negative family and peer influences on adolescent sexuality (reviewed above) should systematically consider *which* young people (i.e., those with certain reactivity profiles) are most susceptible to such influences, and how this information can be integrated into attempts to develop health-promoting interventions.

Greater Use of Mixed Models

Although the vast majority of previous research on adolescent sexuality has relied on quantitative self-report assessment, a key direction for future research involves the application of more diverse methodologies, particularly mixed qualitative/quantitative modeling (Tolan & Deutsch, Chapter 19, this *Handbook*, Volume 1). Although researchers have collected increasingly detailed and reliable data on adolescent sexual behavior around the globe, we lack sufficient information on the motives, needs, expectations, and interpretations of young people as they move through successive sexual experiences from childhood to adulthood. A 15-year-old working-class girl in Ireland might report the same number of weekly intercourse experiences as a 15-year-old middle class boy in South Africa, but the underlying *reasons* for their behavior might differ markedly, as will their developmental implications. Detailed data on the sexual experiences of young people should ideally be integrated with assessments of the degree to which young people *intentionally* sought certain types of sexual experiences and relationships. Additionally, we lack information on how they interpret sexual experiences after they are over, and how they understand the reasons why one experience might be more satisfying or stressful than another. The processes through which young people make sense of their unfolding sexual thoughts and feelings—both privately and in interaction with peers and family members—may vary markedly as a function of age, gender, social class, religion, and ethnic background, and yet we understand little about such processes and their potential impact on future adjustment.

Hence, future research should complement the collection of quantitative data on the sexual experiences of young people with *qualitative interview data* assessing their

motives and expectations regarding different types of experiences and their interpretations and evaluations of those experiences after they have occurred. The work of Tolman provides an important model for this approach, with its longstanding emphasis on using qualitative interviews to investigate young people's subjective interpretations of their sexual/romantic experiences and to understand the specific implications of these subjective interpretations for mental and sexual health (Tolman, 2002, 2006). The most important direction for future research involves greater *integration* of qualitative, phenomenological data with conventional quantitative measures of adolescent sexual behavior and functioning, and the application of this mixed modeling approach to longitudinal studies. Such studies have the potential to reveal how the motives, expectations, and interpretations of young people regarding their sexual experiences relate reciprocally to the unfolding of their sexual-developmental trajectories over time. Bidirectional patterns of association between behavior and meaning-making are likely, in concert with cascade models of cumulative adversity and advantage (Ryff, Singer, & Seltzer, 2002). Specifically, the motives, expectations, and interpretations of young people are expected to shape their decisions, intensions, and actions in subsequent relationships, and the quality of these subsequent relationships will necessarily feed forward to shape future motives, decisions, intensions, and actions. Hence, by integrating longitudinal quantitative data on the sexual/romantic trajectories of young people with longitudinal interview data, researchers will be able to investigate how and why young people transition from one type of sexual relationship to another over the course of adolescence, how and why their desires may change, and whether their interpretations of specific experiences predict the future direction of their trajectories.

This information will be particularly useful for understanding cases in which the sexual-developmental trajectories of youth "change course," as when they experience unexpectedly positive or negative sexual experiences. Deriving beneficial insights from otherwise negative experiences appears to be particularly important for psychosocial adaptation (for example McLean, Breen, & Fournier, 2010). In the case of sexuality, young people who craft meaningful insights from sexual experiences that prove stressful, disappointing, or traumatic might be best equipped to achieve higher-quality sexual relationships in the future. Hence, understanding these processes can directly contribute to the future development of health-promoting interventions aimed at fostering the abilities of young people to form and benefit from

healthy sexual relationships during the adolescent years and beyond.

Integration of Dyadic Approaches

Ideally, application of the mixed modeling approach recommended above should incorporate the perspective of adolescents *and their current sexual partners*. Historically, studies of child and adolescent sexuality have treated the individual as the unit of analysis, even though partnered sexual interactions are inherently dyadic phenomena. Thus, in attempting to predict an adolescent's pattern of sexual activity from his or her biology, personality, motives, environment, or personal history, we are effectively assuming (incorrectly) that *partners* are blank slates without biological predispositions, personalities, motives, environments, or personal histories of their own. Dyadic approaches have been increasingly applied to studies of adolescent peer and romantic relationships (Furman & Rose, Chapter 22, this *Handbook*, this volume), and warrant similar integration into studies of sexuality. The lack of simultaneous data collected from *both* members of adolescent sexual dyads may represent the single most important "missing link" in the study of child and adolescent sexual development. The reasons for this missing link are numerous: To the extent that it is challenging to convince young people to reveal personal, potentially sensitive information about their sexuality to researchers, it is doubly challenging to convince young people to invite their sexual partners to do the same, especially when these sexual partners are "hookups" or "friends with benefits" instead of established boyfriends or girlfriends. Normative adolescent concerns about social evaluation make it unlikely that young people would feel comfortable participating in a study in which they and their partner reported on their feelings and experiences *with each other*, and these concerns are likely more pronounced among sexual-minority youth. Youth in longer-term relationships may prove less susceptible to such concerns, and may present the most promising possibilities for dyadic research. Ideally, future research should investigate the push-and-pull between each partner's motives, expectations, personalities, priorities, and fears, from the initial decision to pursue sexual activity to the negotiation of condom and contraceptive use to the moment-by-moment unfolding of different acts to "post-coital" interactions. Of course, the well-known problem of statistical nonindependence between reports of partners in a dyad has historically made it difficult to conduct valid and interpretable dyadic analyses, but there are now well-validated techniques for analyzing dyadic and other

forms of nested data, such as structural equation modeling and multilevel random coefficient modeling (sometimes called hierarchical linear modeling). Such techniques make it possible, for example, to test hypotheses about the degree to which each adolescent's personal characteristics contribute to characteristics of the sexual dyad (e.g., latency to begin sexual activity within a particular relationship).

Even in cases of seemingly "individual" phenomena such as sexual desire, fantasy, and masturbation, researchers should attend to young people's cognitions and motives regarding dyadic sexual contact. Van Anders (2012) has found that the hormonal underpinnings of dyadic desire (i.e., desire for sexual activity and release *with another person*) differs significantly from the hormonal underpinnings of solitary desire (i.e., desire for sexual release without a partner). Although most research fails to even acknowledge this distinction, van Anders' work has shown that in adults, the distinction has important biobehavioral implications. Specifically, she found that women's testosterone levels were positively linked to their solitary desires, and that masturbation frequency moderated this link. Yet testosterone levels were negatively correlated with dyadic desires in women, once concurrent levels of cortisol and self-reported stress were controlled for. These provocative findings suggest that even before adolescents begin acting on their desires with other individuals, the very *idea* of dyadic sexual activity may engender different neuroendocrinological processes, and may have altogether different social and behavioral moderators than desires for solitary sexual release. Investigating these distinctions among adolescents, and charting their developmental time course, provides a provocative and potentially groundbreaking direction for future research on sexual development. For example, one possibility is that the very distinction between solitary and dyadic desire may only become meaningful after the pubertal transition, due to the changing levels of gonadal hormones. Another area for future study concerns youths' own interpretations of solitary versus dyadic desires, and the factors that render some youth better able to discern whether they simply want sexual release (which can be easily accomplished with masturbation) or whether they want sexual *partners*.

CONCLUSION: MOVING TOWARD MODELS OF POSITIVE SEXUAL DEVELOPMENT

The researchers whose work we reviewed in this chapter adopt diverse perspectives on positive, healthy sexual development during childhood and adolescence, but we

think that most would hew to the interpretation offered by the World Health Organization (2004), which convened a meeting on sexual health in 2002 to clarify such definitions. According to WHO, sexuality "is a central aspect of being human" that incorporates eroticism, intimacy, pleasure, reproduction, and one's own gender identity. Manifestations of sexuality include not only sexual behaviors, but wishes, desires, fantasies, attitudes, roles, and relationships. WHO also views sexuality as inherently multidimensional, integrating biological, cultural, social, economic, psychological, ethical, and spiritual factors. "Positive" or "healthy" sexuality, then, requires that individuals have adequate freedom and knowledge to pursue safe and satisfying sexuality. In the compelling words of WHO, "Sexual health is a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence" (2004, p. 3).

Importantly, positive sexual development cannot simply be switched on at sexual maturation. Rather, positive sexual-developmental trajectories have their origins much earlier, in pathways of positive interpersonal and psychosocial development that become established in childhood. The transitions of sexual maturation weave together different strands of psychological, physical, and social development in powerful and potentially transformative ways. Unless those individual strands already contain the foundations for healthy self-concepts, feelings of agency, and social competence, it is unlikely that young people can suddenly repair prior deficits and craft new and healthy sexual pathways to adulthood. Thus, advocacy for positive *lifespan* sexual development must begin with an expanded research focus on positive *child and adolescent* sexual development.

Such an approach does not entail that we deemphasize sexual risks, but that we place them in context. As reviewed by Baumgartner et al. (2010a), risk behaviors can be defined as *any* behaviors with the potential for negative consequences. According to this perspective, *all* sexual behavior is risk behavior, given that all sexual behaviors (even those between married, consenting adults) involve the potential for sexually transmitted infections, embarrassment, and exploitation of vulnerability, misunderstanding, and disappointment. Hence, from a developmental perspective, the right question is not "how do we eliminate risk from adolescent sexuality," but "what sexual risks are appropriate and reasonable

at different stages of development, and what types of factors (including personality traits, relationship factors, family background, and sociocultural context) augment or ameliorate these risks?" Approaching sexual development from this perspective opens up the possibility for broader conversations about risk/benefit balances in all dimensions of life, most notably intimate relationships. Murray, Derrick, Leder, and Holmes (2008) have argued that processes of risk regulation play a fundamental role in close relationships, given that individuals cannot experience the benefits and rewards of interpersonal closeness and intimacy without taking the risk of making themselves vulnerable to their partner and thereby exposing themselves to the potential for pain, rejection, shame, and betrayal. Similar dynamics are at play with sexual intimacy, and we need more systematic research on how children and adolescents gradually begin to understand the risk/benefit trade-offs in their own sexual expression at different stages of development.

The importance of developmental change cannot be overemphasized: One of the weaknesses of previous research on adolescent sexuality is the implicit presumption that child and adolescent sexuality simply represents an "underdeveloped" version of adult sexuality, and that growth and maturity can be charted by simply measuring young people's desires, attitudes, beliefs, and behaviors against those of adults. Although there are certainly many aspects of child and adolescent sexuality that fit this overall model (for example, developmental increases in the ability of young people to control their sexual impulses and make conscious decisions about their expression), there are other aspects of child and adolescent sexuality (for example, the content of adolescent fantasies, the nature of childhood sex play) that may best be treated on their own terms, as "fully mature" forms of sexual expression *for certain developmental stages*. Hence, instead of encouraging adolescents to "grow out" of their interest in pornography, their frequent masturbation, or their urge to publicly disseminate sexual information about themselves to their peers, we might instead devote greater attention to understanding the factors that render certain sexual feelings and behaviors normal, healthy, adaptive, and appropriate during certain developmental periods, even if these practices might appear, from an adult perspective, to be unconventional, immature, confusing, or disturbing. Furthermore, we must devote greater attention to the full range of young people's sexual experiences, including their romantic and sexual fantasies and beliefs, rather than focusing exclusively on sexual behavior. As stated by de Graaf et al. (2011) in their

review of research on predictors of first sexual intercourse, "sexual experience *per se* is not a very good measure of sexual health" (p. 28).

We maintain that a developmentally sensitive, positively valenced approach is best suited for developing accurate, unbiased, evidence-based models of sexual development that contain the information needed by parents, educators, and clinicians to foster child and adolescent well-being. The earlier in development that parents, teachers, and clinicians convey positive, self-enhancing messages about sexuality to children, the more likely that children will develop positive developmental trajectories that are enhanced by frequent and open dialogue with their parents. Carpenter (2001, p. 128) noted that "sexuality constitutes a central feature of identity: individuals are to a great degree defined by themselves and others, both socially and morally, in terms of their sexuality." For this reason, attempts to foster optimal child and adolescent development cannot afford to *ignore* issues of sexuality and their lifelong interconnectedness with other dimensions of well-being.

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CHAPTER 22

Friendships, Romantic Relationships, and Peer Relationships

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INTRODUCTION

In this chapter, we discuss the current state of the literature on children and adolescents' dyadic peer relationships.

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We focus primarily on children's and adolescents' romantic relationships and same-sex friendships because of their particular significance to development. However, we also discuss other dyadic peer relationships, such as other-sex friendships and antipathies. We discuss the links between dyadic peer relationships and the broader peer group, but a more comprehensive review of peer group interactions can be found in Rubin, Bukowski, and Bowker (Chapter 5, this

Handbook, Volume 4). Our aim is not to provide a comprehensive review of the topic—an impossible task given the breadth of the literature—but to describe recent important findings in the field and identify promising directions for future research. Accordingly, we focus on research that has appeared in 2005 or later. Further information on friendships and romantic relationships can be obtained from other reviews (e.g., Brown & Larson, 2009; Collins, Welsh, & Furman, 2009; Connolly & McIsaac, 2009; Rubin, Bukowski, & Laursen, 2009; Rubin, Bukowski, & Parker, 2006).

We propose a unified relational perspective for conceptualizing all dyadic peer relationships. This perspective has four key features. First, friendships and romantic relationships need to be studied as relationships. By relationships we mean an ongoing set of interactions between two people. They are dyadic phenomena with a history. That is, they are influenced by each person's characteristics, the interaction of their characteristics, and the pattern of their interactions over time. Each person affects the other person's behavior within an occurrence of interaction, and each occurrence affects subsequent occurrences. Such relationships acquire meaning, which is reflected in the participants' cognitions, emotions, and behavior and in subsequent relationships.

Second, children's and adolescents' friendships, romantic relationships, and other dyadic peer relationships share common features. They have been studied as separate phenomena and typically by different investigators. Yet, they are all peer relationships. Many adolescents consider their romantic partner to be friends; many romantic partners were once friends, and, less commonly, some friends were once romantic partners. Friendships, romantic relationships, and other dyadic peer relationships differ in some respects, but both similarities and differences must be identified to understand which processes are specific to one type of peer relationship and which are common to different types of peer relationships or perhaps all close relationships.

If we are to fully understand any particular type of peer relationship, we need to simultaneously consider all of these relationships. We believe that many of the same issues, problems, and insights that have emerged in studies of one relationship apply to the others. Some topics have received considerable attention with regard to one relationship, but could profit from additional attention in the study of other relationships. Thus, one goal of our chapter is to help research on one relationship learn from the research on other relationships. In effect, we hope to promote the integration of the different relationship fields.

Third, any particular relationship is embedded in a network of dyadic relationships. For example, any particular friendship is embedded within a network of other relationships, including other friendships, romantic relationships, and relationships with family members. We review literature on the associations between dyadic peer relationships and family relationships as well as between friendships and romantic relationships.

Finally, our unified perspective not only emphasizes the importance of networks of close dyadic relationships, but also other contextual influences as well. These include the broader peer group, media, and culture. Dyadic peer relationships cannot be understood without consideration of the contexts in which they occur.

With regard to context, an important limitation of the current literature is that the work primarily has been conducted in North America and secondarily in Europe. Thus, we are not able to generalize to other countries. Moreover, many studies in North America and Europe try to obtain samples that are representative in terms of ethnicity, race, or social class. However, these studies often do not examine differences among the ethnic/race or social class subgroups within the sample. Therefore, the conclusions apply to the culture overall but not necessarily to each of the ethnic, racial, or SES subcultures within the sample.

The friendship and romantic relationship literatures also are limited by their primary focus on one type of relationship. Friendship research focuses on same-sex friendships, and the romantic literature focuses on heterosexual romantic relationships. Sometimes other-sex friendships and same-sex romantic relationships are included in studies of friendships or romantic relationships, but these studies usually do not examine differences between same- and other-sex relationships. Therefore, their conclusions apply to friendships or romantic relationships overall but not necessarily to specific subtypes of friendships and romantic relationships.

Using this unified relational perspective, the current chapter reviews research on dyadic peer relationships. In each section, we first review promising new research on friendships and then discuss promising new research on romantic relationships. Next, we compare and contrast the literatures on the two types of relationships with the idea that work on each type of relationship could profit from the work on the other.

Our unified relational perspective also is reflected in the topics we review. We recognize the importance of relationship history by beginning with a discussion of the development of dyadic relationships in childhood and

adolescence. We review research from early childhood through late adolescence. Research on early adulthood is generally considered beyond the scope of the review. The chapter then reviews characteristics of individuals and their partners that influence their relationships. This includes a section on gender and a section on other self and partner characteristics. These sections are followed by discussions of the contexts in which dyadic peer relations are embedded, including family relationships, broader peer group dynamics, media, and cultural contexts. The links between dyadic peer relationships and adjustment are also considered. In each section, future directions are proposed in terms of the specific topic considered. Then, in a separate section, we consider broader future directions in regards to the study of dyadic peer relationships. This includes identifying definitional, conceptual, methodological, analytical issues and understudied topics. We conclude by discussing the merits of a unified relational perspective.

RELATIONSHIP DIMENSIONS

An understanding of relationships requires a multifaceted framework. In this chapter, we primarily examine the following facets: (a) presence and number of relationships, (b) relationship features, including relationship qualities, cognitions and emotions, (c) characteristics of the self and partner, and (d) the history of the relationship.

The presence of a relationship and number of relationships simply refers to whether one has a particular kind of relationship, and, if so, the number of such relationships. In the romantic relationship field, investigators have sometimes examined whether one has a current romantic relationship or not, and sometimes whether one has had such a relationship during some recent period. In the friendship literature, the number of friends one has is often considered.

Relationship features include the quality and content of relationships, relationship cognitions, and emotions. In regards to quality and content, most close personal relationships can be characterized along four dimensions: (1) positive relationship qualities, such as affiliation, warmth, closeness, support, disclosure, and affection; (2) negative relationship qualities, which include conflict and antagonism; (3) relative status/power; and (4) relationship comparisons (i.e., comparisons of the relationship with other relationships, which may be reflected in features such as jealousy, rivalry, or desires for exclusiveness).

Most research has focused on positive and negative features, and less is known about power/status or relationship comparisons. Relationship cognitions and emotions refer to the thoughts and feelings someone has about him/herself in the relationship, about the partner, and about the relationship. We include not only feelings towards one another, but also expectations or representations of oneself in the relationship, of the partner, and of the relationship.

The characteristics of the person and the partner refer to the personal attributes that each person brings to the relationship and their attributes during the course of the relationship. Not only is it important to consider the characteristics of the person and the partner but also the interplay between the two individuals' characteristics.

The final dimension is the history of the relationship over time. Relationships change over time, and the current status of the relationship cannot be fully understood without knowing the history. Individuals develop an affective bond to each other, and have the prospect of future interactions, which are features that distinguish such interactions from those with whom one does not have an ongoing relationship. Despite the importance of history to understanding relationships, this dimension has received little attention, as will be evident in our review.

Finally, it is important to recognize that multiple perspectives exist regarding any particular relationship. An individual has one perspective, the partner has another, and an outsider, such as a social scientist, has a third perspective. There is no such thing as *a* relationship. There are *multiple* relationships. The person has one relationship, the partner has a different one, and outsiders witness another. Even if we had methodologically perfect measures of the different perspectives, they would not converge completely because they ultimately assess different relationships. The key point is that different perspectives provide different information about the relationship due to meaningful differences in perspectives.

Although we have described number, features, person and partner characteristics, and history as separate facets, it is important to examine their interrelations. Similarly, it is important to study how different interactions within particular relationships affect one another in order to understand how relationships function as a whole. In other words, our theories and methods need to take into account the idea that relationships are self-organizing systems. A relationship-centered approach is needed to complement the variable-centered approach that is usually taken.

DEVELOPMENT

In this section we discuss: (a) how the characteristics of relationships change with age and (b) how a particular relationship may change over time in terms of its initiation, growth, and dissolution. We refer to the former as developmental changes in relationships and the latter as within-relationship development.

Friendships: Developmental Changes

Theories of developmental change in friendships highlight the importance of proximity and play in early childhood, helping and shared activities in middle childhood, and intimacy and self-disclosure in adolescence. These developmental differences are generally confirmed by empirical studies (see Rubin, Bukowski, et al., 2006). Recent extensions include: (a) additional evidence of the salience of friendships in early childhood, (b) longitudinal (versus cross-sectional) work on developmental changes in middle childhood and adolescence, and (c) greater attention to the idea that different friendship types may develop as opposed to one universal friendship trajectory.

Recent work suggests that dyadic friendships in early childhood have more in common with friendships of older youth than originally thought. For example, although proximity and play typically have been emphasized in young children's friendships, even early childhood friendships can be differentiated from other peer relationships on the basis of qualities typically assessed later in development, including intimacy, support and conflict (Sebanc, Kearns, Hernandez, & Galvin, 2007). Moreover, among preschoolers, kindergarteners, and first graders, friendship dyads high on positive features are more likely to be stable across the school year.

Research indicates developmental trends in friendship qualities. Although many cross-sectional studies indicate developmental changes in friendship features (see Rubin, Bukowski, et al., 2006), fewer longitudinal studies exist that address these changes. According to recent longitudinal research with samples of Latino/a American, Asian American, and African American youth and Dutch youth, friendship support increases from middle to late adolescence, stabilizing in early adulthood (De Goede, Branje, & Meeus, 2009; Way & Greene, 2006). Negative interactions, including conflict, decrease with age throughout adolescence and stabilize in early adulthood. In addition,

adolescents report more adaptive responses to anger than school-aged children (von Salisch & Vogelgesang, 2005). Specifically, adolescents are less likely than children to report that they would confront, harm, or ignore a friend when angry. Adolescents are more likely than children to report that they would try to explain themselves, reconcile, and, interestingly, use humor to diffuse the situation.

The research previously described adopted a variable-centered approach and is complemented by person-centered studies that highlight different kinds of friendships. For example, three friendship types can be identified on the basis of middle childhood and early adolescents' characteristics in the broader peer group—the socially withdrawn type, the prosocial type, and the antisocial type (Güroğlu, van Lieshout, Haselager, & Scholte, 2007). Friendships consisting of antisocial youth are more common in adolescence than middle childhood, perhaps suggesting greater acceptance of antisocial behavior in adolescence. Socially withdrawn friendships are relatively common among girls in both middle childhood and adolescence. However, for boys, socially withdrawn friendships are rare in middle childhood and more common in adolescence. Prosocial friendships are more common among girls than boys in both middle childhood and adolescence.

Friendships: Within-Relationship Development

How friendships are initiated, maintained, and dissolved has received less attention. Little research exists on how a friendship is initiated. However, the results of one study of preschoolers highlight the social dynamics of friendship formation in early childhood (Schaefer, Light, Fabes, Hanish, & Martin, 2010). Children tend to reciprocate social ties, playing with children who initiate play with them. Over the course of the year, they also tend to form closed triads; that is, one child playing with two other children increases the likelihood that those two children will become friends.

The motivations of children and adolescents for forming friendships have been studied as well. Motivations include intrinsic motivation, or wanting to make friends because it is enjoyable, and extrinsic motivation, or wanting to make friends because they think that adults desire them to have friends (Ojanen, Sijtsema, Hawley, & Little, 2010; Richard & Schneider, 2005). Preadolescents and early adolescents with greater intrinsic motivation form higher-quality friendships (Ojanen et al., 2010) and are less

lonely (Richard & Schneider, 2005). Surprisingly, extrinsic motivation is not related to friendship quality or loneliness.

The maintenance of friendships also has received some attention (see Poulin & Chan, 2010). Same-sex and same-race/ethnic friendships of school-aged children are more stable than cross-sex or cross-ethnic/race friendships (Lee, Howes, & Chamberlain, 2007). Best friendships of early adolescents are more stable than other friendships, and friends who interact both in and out of school have more stable friendships than those who interact in only one context (Chan & Poulin, 2007). Similarity between adolescent friends is important for friendship stability (Hafen, Laursen, Burk, Kerr, & Stattin, 2011). Friends who are more similar in terms of delinquent behavior, frequency of intoxication, achievement motivation, and self-esteem are more likely to maintain their friendship over a year. Moreover, the degree to which the youth are similar to one another before they become friends also predicts greater stability. Less research focuses on how friends' interactions with one another influences the longevity of the relationship.

Romantic Relationships: Developmental Changes

Although some school-aged children may have interests in romantic relationships (Carlson & Rose, 2007), romantic experiences and relationships typically begin in adolescence or early adulthood, depending on the culture. Earlier investigators have delineated the typical developmental course of such experiences in Western societies (see Collins & van Dulmen, 2006; Furman & Winkles, 2012; Seiffge-Krenke & Shulman, 2012). In middle childhood, most friendships are with same-sex peers in Western societies. Early adolescents interested in the other sex engage in affiliative activities in a group context (e.g., go to dances and parties). Subsequently, they begin to go out on "dates" with others, often as part of a group. Finally, they form dyadic romantic relationships, which become more intimate and supportive as they grow older.

More recent work has extended the literature in several directions. Romantic fantasies and infatuations have been examined. Such fantasies are very common in adolescence, occurring more often than either romantic relationships or other-sex friendships (Bowker, Spencer, Thomas, & Gyoerkoe, 2012; Tuval-Mashiach, Walsh, Harel, & Shulman, 2008). They may be even more common earlier, as the relative proportion of unreciprocated (versus reciprocated) romantic relationships decreases from childhood to middle adolescence (Carlson & Rose, 2007).

Past findings based on cross-sectional research have been strengthened by new longitudinal findings. Early and middle adolescents tend to follow a sequence of steps of having: (1) no relationship, (2) one casual relationship, (3) multiple casual relationships, and finally (4) a steady relationship. However, skips in steps are common as is movement back toward a step that typically occurs earlier (Meier & Allen, 2009). Feelings of passionate love, emotional rewards, instrumental support, and dating confidence increase through adolescence and early adulthood. Efforts to influence the partner and actual influence increase with age as well (Giordano, Manning, Longmore, & Flanigan, 2012).

In addition, in Western cultures, romantic cognitions and experiences in adolescence are predictive of subsequent ones. Adolescent attachment styles regarding friendship and romantic relationships are moderately stable over two years; stability is higher when they are in the same best friendship or romantic relationship (Doyle, Lawford, & Markiewicz, 2009). A youth in the United States who is involved in a steady relationship of long duration in adolescence is more likely to be married at 25 than one who is casually dating or not dating; a youth who is not dating is less likely to be cohabiting in early adulthood and have had fewer relationships (Meier & Allen, 2009). Having fewer romantic partners and higher-quality romantic relationships in middle adolescence is predictive of higher-quality romantic relationships in early adulthood (Madsen & Collins, 2011). Thus, these early experiences in romantic relationships may have an enduring effect on the timing and nature of committed relationships in adulthood.

Research on same-sex romantic relationships is also beginning to appear, but findings are still quite tentative (see Russell, Watson, & Muraco, 2012). In North America and Europe, adolescents who are attracted to the same-sex are more likely to have same-sex relationships than in past times. Such relationships are often less public because of concerns of being stigmatized. In fact, relationships with other-sex partners are common among youth attracted to same-sex partners as they serve as a way to explore their sexual identity or conceal their same-sex attraction. In regards to development, the emergence of same-sex relationships may be linked more strongly to the development of sexual identity than age per se. Moreover, the developmental paths may differ for male and female adolescents. Male same-sex relationships may be more likely to develop from sexual encounters, whereas female same-sex relationships may be more likely to develop from friendships and may be closer and more intimate.

Recent work also has begun to recognize the heterogeneity of romantic experiences. Although romantic experiences and relationships change substantially over the course of development, a single normative pattern does not exist. Both within and across cultures, youth vary in terms of when they develop romantic interests, begin to date, and establish romantic relationships. For instance, having a mature physical appearance predicts earlier initiation of romantic relationships in middle adolescence (Zimmer-Gembeck, Siebenbruner, & Collins, 2004). Similarly, the degree of romantic involvement and the sequence of experiences vary across youth. For example, greater satisfaction with physical appearance and friends' greater romantic involvement are related to both greater casual and serious dating in middle adolescence (Furman & Winkles, 2010). Finally, not all individuals end up in committed relationships, nor is that necessarily desired.

Consistent with these ideas, two investigative teams independently identified two dimensions of romantic involvement that seem quite similar (Dhariwal, Connolly, Paciello, & Caprara, 2009; Furman & Winkles, 2010), although the former team studied young adults in Italy and the latter team studied middle adolescents in the United States. The first is casual or exploratory. Those who are high on this dimension have multiple relationships, on and off relationships, breakups, and a high diversity of activities. The second is serious or consolidated. Those high on this dimension have long, more serious relationships in which a high proportion of time they are in love and engage in frequent sexual activity. Interestingly, the casual (exploratory) and serious (consolidated) dimensions are only minimally correlated with each other, underscoring the potential diversity of experiences.

Cluster analyses also yield different types of romantic relationships in adolescence: (a) serious relationships with sex, which are relationships with a high degree of participation in many activities, including sexual intercourse, (b) serious relationships without sex, which are relationships in which there is almost as high a range of different activities, but sexual intercourse has not occurred, (c) group-oriented relationships, which emerge out of friendship groups and typically entail going out together in a group, (d) physically oriented relationships, which primarily entail sexual activity, and (e) low involvement relationships, which involve little interaction and are relatively rare (Crissey, 2005).

Characteristics of middle adolescent dyads also fall into different types: (a) commensurate relationships, in which both members are high in affiliation and romantic feelings

and preoccupation; (b) affiliative relationships, in which both members are high in affiliation and low in romantic feelings and preoccupation; (c) romantic relationships, in which both members are high on romantic feelings and preoccupation and average or low on affiliation; (d) nonlove relationships, in which both members are low in affiliation and romantic feelings and preoccupation; (e) female-oriented relationships, in which females are average in affiliation and romantic feelings and preoccupation, whereas males are low on both; (f) male-oriented relationships, which is the reverse of female-oriented relationships (Seiffge-Krenke & Burk, 2013). The presence of such types underscores the heterogeneity of romantic relationships.

Romantic Relationships: Within-Relationship Development

Relatively little is known about the developmental course of a romantic relationship, but preliminary information is available. When asked what they find desirable in potential partners, adolescents place most emphasis on positive personality characteristics, such as reliability, honesty, and kindness; the relative importance of different characteristics is quite similar for males and females, although males rate attractiveness as relatively more important (Ha, Overbeek, & Engels, 2010). Like adults, early adolescents are attracted to others who are similar to them (Simon, Aikins, & Prinstein, 2008).

In general, social events, such as spending time with a partner in a group or alone or meeting a partner's parents, occur earlier than romantic events, such as declarations of being a couple or being in love. Genital sexual activity tends to occur after these events (O'Sullivan, Cheng, Harris, & Brooks-Gunn, 2007). However, how consistent the sequence of events is across adolescents and what is predictive of different sequences are not known.

Little is known too about what factors lead to changes in romantic qualities over time. Certainly, studies have examined associations among different features of relationships, but evidence regarding the causal links among features is less apparent as few studies examine the same relationship over time. Higher levels of caring and enmeshment, however, predict subsequently engaging in sexual intercourse (Giordano, Manning, & Longmore, 2010).

Some descriptive information exists on the dissolution of middle adolescents' relationships. Such relationships most commonly end because of unfulfilled intimacy or

affiliative needs in middle adolescence (Connolly & McIsaac, 2009). Also cross-ethnic/racial relationships in adolescence are less stable (Wang, Kao, & Joyner, 2006). Otherwise, little is known about dissolution.

Future Directions

The literatures on the development of friendships and romantic relationships share some similarities with respect to what has been learned and remains to be learned. How features of these relationships change with age in childhood and adolescence in Western cultures is relatively well documented. Long-term longitudinal studies have significantly advanced our knowledge of the developmental course of both relationships through adolescence, but work describing the developmental course into adulthood is needed (Furman & Winkles, 2012). Investigators have also described how romantic relationships emerge within peer networks (see Furman & Collins, 2009), but aside from the initial emergence of romantic relationships, we know little about how developmental changes in romantic relationships, same- and other-sex friendships, and the general peer group are interrelated. More generally, we do not know much about the developmental processes underlying the age changes in relationships. Such an understanding will require a comprehensive examination of developmental tasks. For example, the establishment of a long-term commitment may involve coordinating career paths and life plans with those of a romantic partner (Shulman & Connolly, 2013). Three important steps toward a unified relational perspective will be: (1) identifying interrelations in developmental changes in different dyadic peer relationships, (2) identifying developmental processes underlying such changes, and (3) considering the broader life context in which relationships occur.

Given developmental changes in the features of friendships and romantic relationships, it also is likely that developmental changes in the causes and consequences of these relationships exist. For instance, a child who is not interested in intimate disclosure may not be disadvantaged in forming friendships in childhood but may have difficulties as an adolescent. Likewise, variables that are linked to romantic relationships in adolescence may differ from those that are linked in adulthood. For example, parent-child relationship processes are less strongly related to romantic relationship quality in middle adolescence than early adulthood (Madsen & Collins, 2011). Similarly, greater romantic involvement is associated with poorer adjustment in adolescence, but better adjustment in early adulthood (Furman & Collibee, in press).

The literatures on both friendships and romantic relationships reflect increasing awareness of the heterogeneity in these relationships. The traditional normative model not only fails to capture the experiences of those who deviate from its parameters, but also does not do justice to those who follow the more common paths. Efforts to identify different dimensions or types have made progress; further work is needed on the developmental course of the different dimensions or types and on the underlying developmental processes and consequences associated with these dimensions or types.

On a related note, some longitudinal studies have assessed relationship features at multiple times. For some individuals these relationships are the same ones at different time points, but for others, they are different. Often these are not differentiated in the analyses, yet it seems likely that consistency within and across relationships differs.

Much more information also is needed on the initiation, development, and termination of specific friendships and romantic relationships. We know little about the actual events or interactions that increase the likelihood of children and adolescents moving from being acquaintances to friends. Similarly, little is known about the processes that lead to the initiation of romantic relationships. Moreover, although we know that a notable proportion of friendships dissolve during any given year, we know little about the process of termination. Some friends may simply grow apart, whereas other friendships may be severed more abruptly by an argument or betrayal. Additionally, some dissolutions are likely mutual, and others may be one-sided. When the termination is one-sided, some friends may have an interaction in which they specifically dissolve the relationship, whereas others may send more subtle signals. Research also is needed regarding the termination of romantic relationships, although some initial work has been done (Connolly & McIsaac, 2009). Friendship researchers could use that work as a preliminary guide for learning more about how and why friendships dissolve. For both friendships and romantic relationships, more work is needed regarding whether and when the nature of the dissolution affects children's and adolescents' well-being and their expectations regarding future relationships.

We not only have limited understanding of the changes in the course of a relationship, but our assessments of a relationship are surprisingly static in nature. To assess within-relationship development, investigators have either seen what features are associated with length or degree of commitment, or compared features at two time points. Little attention has been paid to the processes that lead to change and development within a relationship.

Conceptualizations of the nature of change are essential for selecting the appropriate analytic technique for assessing either within-relationship development or developmental changes (Young, Furman, & Laursen, 2011).

Most work on within-relationship changes focuses on actor or partner characteristics; some of these characteristics are relatively stable in nature; thus, they may not be promising candidates for explaining why relationships develop over time. We need to consider how relationship events, relationship features, or the history of a relationship affect its development. We need to consider what processes may lead to change in a relationship and what characteristics are simply reflections of the current state of a relationship. Finally, we need to consider how within-relationship development changes with age.

Notably, studying the development of relationships is challenging in that relationships may start at any time and many are short-lived, making it unlikely that repeated assessments of the relationship will occur in a typical longitudinal study. More intensive data collection techniques will be required to capture such changes and their implications for development.

Finally, one striking omission is the absence of literature on the development of romantic relationships in non-Western cultures. The emergence of romantic relationships often does not occur until adulthood in other cultures. Some initial forms of romantic relationships in Western cultures, such as casual or group dating, may simply not exist. In cultures where marriages are arranged, a series of romantic relationships may not occur. Moreover, the within-relationship development of arranged and nonarranged relationships may take different forms. For example, feelings of love may emerge after marriage in arranged relationships. A global perspective is needed to better understand which features of relationship development are universal and which are culture specific.

GENDER

Considerable work has examined gender differences in same-sex friendships (Rose & Rudolph, 2006). This section reviews promising new directions on such differences. We also review the limited work on gender differences in adolescent romantic relationships.

Friendships

Females' friendships involve greater disclosure, support, and closeness than males' friendships. Engaging in joint

activities plays a more central role in males' friendships. Recent extensions include examining gender-typical versus atypical styles, more extreme forms of sex-typed behavior, and social cognitions.

Having a gender-atypical style may be linked with poor adjustment. Early adolescent females are more likely than males to have preoccupied friendship styles in that they monitor friendships closely and feel distress at separations; early adolescent males are more likely than females to have avoidant styles in that they downplay the importance of friends, deny distress at separation, and act distant when they have problems (Menon, 2011). Adolescent males with preoccupied styles and females with avoidant styles are at risk for low self-esteem, low perceived social competence and elevated depression. Although female-typed styles confer risk for males, some male-typed styles may confer risk for males as well. Adolescent males who focus on activities with friends, avoid talking to friends, and fight to gain respect are at risk for depression, low self-esteem, and poor friendship quality (Gupta et al., 2013). Work is needed to identify friendship styles that are adaptive for males.

Gender-linked behaviors at extreme and moderate levels also have been considered. For example, among middle adolescents, females who "compete to win" have fewer and lower-quality friendships, but "competing to win" is unrelated to friendship characteristics for males; simply "competing to excel" is unrelated to the characteristics of both males' and females' friendships (Hibbard & Buhrmester, 2010). Similarly, hypercompetitiveness (i.e., competing to demonstrate superiority and experiencing distress at losing) is positively related to companionship for early adolescent Canadian males but negatively related for females (Schneider, Woodburn, del Toro, & Udarvi, 2005). Gender differences in moderate levels of competitiveness are less striking. Thus, gender differences may be more apparent at extreme levels of a characteristic. Although these gender differences exist in North America, hypercompetitiveness is not linked with positive friendship outcomes for early adolescent males or females in Latin America (Schneider et al., 2005). Perhaps competition is less accepted in collective cultures, which underscores the role of culture in determining gender differences.

Research on co-rumination considers an exaggerated form of another gender-typed behavior, talking about problems. Co-ruminating friends rehash problems, speculate about problems, and dwell on negative feelings (Rose, 2002). Adolescent females co-ruminate with friends more than males (e.g., Hankin, Stone, & Wright, 2010; Stone, Hankin, Gibb, & Abela, 2011). Co-ruminating adolescent friends are close and have high-quality relationships but

are also at risk for internalizing symptoms (e.g., Hankin et al., 2010; Rose, Carlson, & Waller, 2007; Stone, Hankin, Gibb, & Abela, 2011). Moreover, co-rumination may be linked with positive friendship adjustment more strongly for males and with internalizing symptoms more strongly for females (Rose, 2002; Rose et al., 2007). If so, co-rumination may not only be more common for females but also carry fewer benefits and greater costs for females.

Recent work on social cognitions also provides insight into gender differences in friendships. For example, when early adolescents have problems, females take the friends' perspective more than do males, which may account for females' greater positive friendship quality (Smith & Rose, 2011). However, females' greater perspective taking also may contribute to greater empathetic distress, wherein they experience the friends' distress as their own. Females are also more likely than males to have positive expectations for the outcomes of talking about problems (Rose et al., 2012), including expecting to feel cared for and understood. Males are more likely than females to expect that talking about problems will make them feel like they are wasting time. These gender differences may account for females' greater disclosure to friends. Interestingly, despite females' positive social cognitions in response to friends' problems, females react especially negatively to minor friendship transgressions (MacEvoy & Asher, 2012). In this context, females are more likely than males to feel devalued and controlled and to judge the violations as severe.

Romantic Relationships

Although many investigators have examined gender differences in marriages and other romantic relationships of adults, almost no work has been done on gender differences in adolescent romantic relationships. The results of one large longitudinal study suggest that females have greater dating confidence than males throughout adolescence and early adulthood (Giordano et al., 2012). Early adolescent males and females have similar levels of communication awkwardness, but females show greater decreases in the adolescent and early adulthood years. Females find romantic relationships more emotionally rewarding. In early adolescence, females provide less instrumental support to their partners than do males, but by early adulthood they provide at least as much as males. Females report making more attempts to influence the other and having more actual influence and decision making power. Aside from this study, gender has primarily been used as a control variable in studies, which means we do not yet have a

good picture of the role of gender in adolescent romantic relationships.

Future Directions

The role of gender has received considerably more attention in the study of friendships than romantic relationships. More work is needed on romantic relationships, especially as the existing findings regarding power and confidence are unexpected based on gender stereotypes. Furthermore, mean level comparisons cannot provide a complete picture of the role of gender. Work is needed examining how patterns of associations with romantic experiences differ as a function of gender. The promise of such work is illustrated by research showing that the link between co-rumination and friendships differs by gender (e.g., Rose, 2002).

Additional work on friendships is also needed. Research identifying gender differences in social cognitions in friendships suggest these may be underlying processes that explain gender differences in behavior. Investigators could also examine males' and females' perceptions of competitive behaviors in friendships. Whether females who engage in extreme competitive behavior are aware of their behavior and understand that their behavior may carry costs for their friendships is not known. Whether perceptions of these behaviors depend on the gender of the perceiver is also of interest. Males may be more accepting of extreme forms of competitive behavior in their friendships with both males and females. Alternatively, friends of both genders may be more accepting of extreme competitive behaviors when displayed by male friends than female friends.

Other individual differences, such as gender-role traditionality and schemas, may also contribute to gender-typed behavior in peer relationships. The degree of socialization pressure from parents and peers also likely varies and may contribute to gender-typed behavior in these relationships.

Comparisons of gender differences in same-sex and other-sex friendships and romantic relationships would contribute to a unified relational perspective. When interacting with other-sex peers, males and females may adopt interactional styles at least somewhat typical of the other sex in order to facilitate cross-sex interaction. If they adopt more gender-neutral styles in other-sex relationships than same-sex relationships, it would be interesting to know whether this is strategic or whether having a cross-sex partner simply pulls for these changes. If youth adopt more gender-neutral styles in both same- and other-sex romantic relationships than in same- and other-sex friendships, this would suggest differences in the nature of romantic

relationships and friendships (rather than differences driven by gender).

The role of culture and historical time also needs greater attention. The friendship literature has produced interesting findings indicating that gender differences may be enlarged in some cultures and minimized in others. Gender differences in adolescents' romantic relationships are almost certainly more pronounced in traditional cultures than in Western cultures. Moreover, as traditional cultures become more influenced by Western cultures, females' and males' behaviors in romantic relationships may become more similar.

THE ROLE OF THE SELF AND PARTNER

The characteristics of the person and the partner each play major roles in determining whether a relationship will occur and what the features of the relationship are. Early work typically gathered data from one person, and thus focused on the role of the self. Recent work has examined the role of the partner, and the interplay of the two individuals' characteristics.

The Self and Friendships

Investigators have considered how the behaviors of individuals affect their friendships. Those who are verbally and physically aggressive toward their peers have difficulties in friendships (Rubin, Bukowski, et al., 2006). Recent research indicates that relationally aggressive early adolescents have friendships that are high in both negative and positive qualities (Banny, Heilbron, Ames, & Prinstein, 2011). Friends who talk in relationally aggressive ways about peers increase in both positive friendship quality and conflict over 6 months. Perhaps friends experience increased intimacy and solidarity as a result of aggressing together against a shared victim.

Although socially withdrawn children have difficulties in the larger peer group, they may find dyadic contexts less intimidating and fare better in friendships. In middle childhood, a shy/withdrawn child is just as likely as other children to have a stable reciprocal friendship (Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce, & Burgess, 2006). However, the friendships are of lower quality and likely to be with other shy/withdrawn and victimized children. The friendship difficulties of shy/withdrawn children may emerge in part because their reasoning about what

makes a friendship close and lasting is less advanced than that of other children (Fredstrom et al., 2012). Nonetheless, not all solitary children have friendship difficulties. In middle childhood, anxious/solitary children, who want to play with others but are too shy or afraid, have fewer, less stable friendships than other children (Ladd, Kochenderfer-Ladd, Eggum, Kochel, & McConnell, 2011). In contrast, unsociable children, who prefer to play alone, have just as many friends and friendships that are just as stable as those of other children.

Other work focuses more directly on specific friendship competencies, such as knowing how to help a friend. In two studies, youth ranging in age from middle childhood to middle adolescence were presented with vignettes in which a friend has a stressful encounter with peers (e.g., being teased or picked on). Results showed that those who endorse avoidant or hostile strategies in response to these vignettes have fewer friends and lower-quality friendships concurrently (Rose & Asher, 2004) and over time (Glick & Rose, 2011). Moreover, having more friends predicts decreases in avoidant and hostile strategies, and high-quality friendships predict increases in emotionally engaged strategies, such as giving support (Glick & Rose, 2011). Thus, not only do social competencies affect friendships, but friendships provide a context for the development of social competencies.

The Partner and Friendships

With regard to partner effects, adolescent females with friends who engage in excessive reassurance seeking experience the relationship as lower in positive friendship quality one year later (Prinstein, Borelli, Cheah, Simon, & Aikins, 2005). Similarly, adolescents with friends who consistently turn the focus of conversations toward themselves experience the relationship as low in positive qualities (Schwartz-Mette & Rose, 2009). Excessive reassurance seeking and conversational self-focus are both common among youth with depressive symptoms. These findings are consistent with interpersonal theories of depression suggesting that depressed friends engage in aversive behaviors, leading others to withdraw from these relationships.

Another way in which partner effects are considered is by examining selection and socialization effects. Such studies examine whether select friends with similar characteristics and friends socialize each other so that they become more similar over time. Most studies, however, focus on selection and socialization effects on adjustment, which is covered in a subsequent section.

The Self and Romantic Relationships

The literature on actor effects in romantic relationships is not very systematic. Demographic characteristics, such as gender, ethnicity, race, or social class are commonly included, but primarily as control variables. Certainly, investigators have examined different characteristics, such as personality characteristics or attachment styles, but usually only a couple of studies have been conducted examining each particular characteristic. Moreover, these few studies typically examined different aspects of romantic relationships. A few characteristics have, however, received more attention.

An adolescent who is physically mature and attractive is more likely to have a romantic relationship, whereas body weight is inversely related to having one (McCarthy & Casey, 2008). For each point on the Body Mass Index scale, the probability of an adolescent female having a romantic relationship decreases by 6% (Halpern, King, Oslak, & Udry, 2005). A female in a romantic relationship in which sexual intercourse has not occurred is more likely to be dieting than one not in a relationship or in a relationship in which intercourse has occurred. Perhaps she believes her attractiveness is more important in retaining a boyfriend when they have not had intercourse. Alternatively, sexual activity may make her feel more confident about her attractiveness, or a sexually active female may enter a relationship with more confidence about her appearance.

Like research on social withdrawal in friendships, research on romantic relationships has examined shyness and dating anxiety. Shy early adolescents are less likely to have initiated dating, whereas those who derive pleasure from novel, intense activities are more likely to date (Ivanova, Mills, & Veenstra, 2011). Dating anxiety in middle adolescence is related to the quality of best friendships, whether they have or have had a romantic relationship, and the quality of romantic relationships (La Greca & Mackey, 2007).

The Partner and Romantic Relationships

One of the earliest partner effects to receive attention in regards to romantic relationships was the age of the partner. Early adolescents with older partners are at risk for multiple problems. Recent work sheds light on why they are at risk. Links between pubertal maturity and risk behaviors are mediated by having a romantic partner, particularly an older one (Halpern, Kaestle, & Halfors, 2007). In addition, the association between having an older partner

and engaging in sexual intercourse as an early adolescent can be explained by exposure to peer norms favoring sex and being in situations conducive to sexual behavior, such as parties without adults (Marín, Kirby, Hudes, Coyle, & Gómez, 2006). An adolescent female who has an older partner is prone to become depressed, which may stem from an increase in substance use (Haydon & Halpern, 2010). This line of work nicely illustrates a movement from simply identifying a phenomenon (the risk of an older partner) to identifying underlying processes.

Actor and partner effects can be simultaneously examined by using actor-partner interdependence models. For example, middle adolescents' working models of romantic relationships affect their own behaviors in the relationship (actor effects) and their partners' behavior toward them (partner effects; Furman & Simon, 2006). Specifically, adolescents with secure working models display positive communication skills, whereas adolescents with dismissing working models display poorer skills. Adolescents with preoccupied working models engage in more conflictual behavior and tend to display more negative affect. Adolescents with dismissing models display less positive affect. Such actor effects are more common, but partner effects are also present. For example, adolescents with more secure working models have partners who display positive communication skills.

Other research also shows that actor effects are more common, but that partner effects occur too. For example, a middle adolescent female's own behavior during conflict, but not the partner's behavior, predicts her expression of autonomy; however, both the male's own and the partner's behavior predicts his expression of autonomy (McIsaac, Connolly, McKenney, Pepler, & Craig, 2008). Similarly, both genders' affiliative experiences are linked with better conflict resolution skills, and females with more frequent affiliative experiences have partners with better conflict negotiation behavior in middle adolescence (Seiffge-Krenke & Burk, 2013). In related research, middle and late adolescents who are self-silencing by not expressing feelings and thoughts have poor communication skills, such as giving in during conflicts with partners. They also have partners who are frustrated and uncomfortable (Harper & Welsh, 2007). Other work on partner characteristics involves adjustment and is covered in a subsequent section.

Future Directions

More work on actor effects has been done on friendships than romantic relationships. Peer relations research has

long focused on social competence. Although past work focused primarily on how generally well-liked children or adolescents are, recent work indicates that social competence also influences dyadic friendships. Parallel work is needed on romantic relationships. Some social skills may be required for both friendships and romantic relationships, but others may be unique to friendships or romantic relationships. Studies simultaneously examining actor (or partner) effects in both friendships and romantic relationships would provide valuable information about the consistency and nature of such effects and contribute to a unified relational perspective.

Many characteristics of individuals have received little attention. Particularly needed are studies of interpersonal characteristics that may affect the interchanges in relationships, such as empathic understanding (Haugen, Welsh, & McNulty, 2008) or dating goals (Kelly, Zimmer-Gembeck, & Boislard, 2012).

In addition, most studies of partner effects have focused on the effects on the current relationship. Some work reviewed in a later section also indicates partners' influences on global outcomes, like adjustment. However, less is known about whether partners' influences carry over to subsequent relationships. Work is needed to address the degree to which social skills and interactional styles learned from one partner in one relationship carry over to the next. In addition, existing work on the interfacing of self and partner characteristics has primarily focused on selection and socialization effects on adjustment. As yet, we know little about how the interfacing of the two individuals' characteristics affects their pattern of interaction or relationship.

Finally, most of the work, especially with partner effects, is cross-sectional. For nearly all of the studies considered, it would be reasonable to think that the relationship affects the person instead of, or in addition to, the person affecting the relationship.

FAMILY PROCESSES

The associations between many different family processes and peer relationships have been studied. These processes include parents' marriage, parent-child relationships, attachment, parenting styles, and sibling relationships. We focus on several particularly promising lines of research.

Friendships

Recent research builds on previous studies through the use of longitudinal designs and the consideration of processes

that may explain associations between family relationships and friendships. Secure attachment to parents is associated with positive experiences with friends in childhood (e.g., McElwain, Booth-LaForce, Lansford, Wu, & Dyer, 2008; McElwain, Booth-LaForce, & Wu, 2011) and adolescence (e.g., Doyle et al., 2009; Y.-L. Liu, 2008). The relationship between parents is also important. Parents with a more positive marriage when their child is 1 month old have a more securely attached child, and this predicts friendship quality in fourth grade (Lucas-Thompson & Clarke-Stewart, 2007).

Factors that may help explain the association between parent-child attachment and later friendships are of interest. For example, infants' secure attachment predicts their mothers talking with them about cognitions at 24 months, which predicts greater positive friendship quality at 54 months (McElwain et al., 2011). Young children with secure attachments also demonstrate greater peer competence in middle childhood, which predicts more secure friendships in adolescence (Simpson, Collins, Tran, & Haydon, 2007).

Other aspects of the parent-child relationship have received recent attention as well. Preschoolers with parents who respond supportively to their negative emotions show more coordinated play with friends (McElwain, Halberstadt, & Vollung, 2007); parental sensitivity in the first 3 years of life predicts positive interactions with friends in the early school years (McElwain et al., 2008). Mediators have been considered too. Parental sensitivity at 36 months predicts affective mutuality in the mother-child relationship and children's language ability at 54 months and peer competence in first grade, which predicts positive friendship quality in the third grade (McElwain et al., 2008). Importantly, this work incorporates linguistic variables, which have received little attention in the relationship literature.

Work with older youth corroborates studies of young children, indicating that the parent-child relationships influences youths' characteristics in ways that affect friendships. For example, parental psychological control during late childhood predicts poor emotional security in early adolescence, which in turn predicts lower friendship competence in middle adolescence (Cook, Buehler, & Fletcher, 2012).

Although work is generally motivated by the idea that parents influence their children's friendships, these friendships also may influence parent-child relationships. For example, throughout adolescence, parent-child relationship qualities predict changes in the qualities of friendships

(De Goede, Branje, Delsing, & Meeus, 2009). However, the magnitude of the effect of parent support on youths' friendships decreases with age. Moreover, support and power in friendships predict changes in those qualities in the parent-child relationships, and the effect of negative friendship interactions on negative parent-child interactions becomes stronger with age. In other research (Van Doorn, Branje, van der Valk, De Goede, & Meeus, 2011), conflict resolution styles with parents predict friendship conflict resolution styles throughout adolescence. By middle adolescence, friendship conflict resolution styles also predict conflict resolution styles with parents. Together, these findings suggest that the influence of parents on friendships may be strongest in early adolescence, but that, by later adolescence, parents and friends may be similarly influential.

Finally, although family systems theorists have long argued for considering multiple relationships within the family, research on family relationships and friendships has focused almost exclusively on parent-child relationships. However, sibling relationships also share an important connection with friendships. For example, children who interact positively with a friend before a sibling is born have more positive interactions with the sibling in childhood and even into adolescence (Kramer & Kowal, 2005).

Romantic Relationships

Several longitudinal studies of young children have now been going on long enough to examine links between early family relationships and romantic relationships in adolescence and adulthood. Parent-child relationships as early as the toddler years are linked with romantic experiences in adolescence and young adulthood. Those who are more secure with respect to proximity seeking in infancy have less anxious romantic relationship styles. Although maternal sensitivity in infancy is not predictive of late adolescent anxious or avoidant romantic attachment styles, increases in maternal sensitivity over early and middle childhood are associated with less avoidant and anxious styles (Fraley, Roisman, Booth-LaForce, Owen, & Holland, 2013). Higher average levels of maternal sensitivity in early and middle childhood are also related to higher-quality romantic relationships in middle adolescence (Roisman, Booth-LaForce, Cauffman, Spieker, & The NICHD Early Child Care Research Network, 2009). Interestingly, however, higher maternal sensitivity is related to lower romantic involvement in middle adolescence. This suggests that marked romantic involvement in adolescence may be premature (also see Furman &

Collibee, in press). In addition, other research indicates that higher quality parenting at two years of age predicts the security of romantic representations, positive perceptions of the relationships, and observed quality of romantic relationships in early adulthood; attachment security at 1 year was less consistently predictive (Haydon, Collins, Salvatore, Simpson, & Roisman, 2012). Moreover, adults' working models of their parents and their working models of romantic partners are both uniquely linked to positive perceptions of their romantic relationship quality and the observed quality of romantic relationships. These findings suggest that representations of romantic relationships and experiences in romantic relationships are not only influenced by each other, but also by early parent-child relationships.

Family processes in adolescence are also related to later romantic relationship experiences. For example, the quality of middle adolescents' family relationships predicts discord, conflict tactics, and connectedness in young adults' romantic relationships (Crockett & Randall, 2006). Marital hostility during middle adolescence, as well as hostility in friendships, is predictive of hostility in romantic relationships in late adolescence (Stocker & Richmond, 2007).

Investigators have also attempted to identify intermediary processes that may explain the associations between family relationships and romantic relationships. Some studies have predicted later romantic experiences using regression analyses in which the predictor variables are entered in chronological order; for example, early childhood experiences first, then middle childhood experiences, and finally adolescent ones. This sequence tests whether more proximal variables contribute over and above variables representing earlier experiences. For example, child abuse and witnessing intimate partner violence in early childhood predicts dating violence in early adulthood; boundary violations and negative interactions in parent-early adolescent relationships are also predictive even controlling for early childhood experiences; finally, friendship quality in middle adolescence is predictive of dating violence even controlling for both early childhood and early adolescent experiences (Linder & Collins, 2005). Similarly, early supportive care predicts early adulthood romantic relationship quality, and early adolescent parent-child interactions are predictive as well, even after controlling for early supportive care and peer competence in middle school. Similarly, after controlling for these earlier experiences, adolescent romantic quality positively predicts early adulthood romantic quality, and the number of recent romantic partners in middle adolescence negatively predicts early adulthood romantic

quality (Madsen & Collins, 2011). Although these studies indicate that more proximal variables contribute after accounting for the effects of the variables assessed earlier, whether the effects of earlier variables are mediated through the more proximal variables, or whether the earlier variable have direct effects on the outcomes, is not known.

Some studies also have considered how early experiences predict relationship experiences in middle childhood or adolescence, and how those experiences then predict later romantic experiences. As mentioned, secure attachment in infancy is related to childhood peer competence, which predicts adolescent friendship security, which then predicts the emotional tone and observed relationship quality of romantic relationships in early adulthood (Simpson et al., 2007). Similarly, poor quality parent-child relationships in early to middle childhood predict conflict with parents in adolescence, which predicts poor romantic relationship quality in early adulthood (Overbeek, Stattin, Vermast, Ha, & Engels, 2007). Such findings underscore the importance of identifying intermediary or proximal processes that occur in childhood or adolescence; at the same time, the findings indicate that these processes may have roots in early childhood. In both of these studies, however, the early childhood processes did not directly affect romantic relationship quality in adulthood, suggesting that the distal links described in the prior paragraph may be mediated through more proximal relationship processes.

Finally, other studies have considered mediating and moderating processes other than specific relationship characteristics. For example, parents' emotion dysregulation predicts their adolescent sons' emotion dysregulation, which predicts the sons' romantic relationships in early adulthood (H. K. Kim, Pears, Capaldi, & Owens, 2009). Additionally, processes that may underlie the link between interparental conflict and romantic relationships are of interest. Potential mediators of this link include adolescents' emotional reactivity in friendships (Cook, Buehler, & Blair, 2013), difficulties in social information processing (Fite et al., 2008), and appraisals of interparental conflict (Simon & Furman, 2010).

Future Directions

Synergy exists between studies of the influence of parent-child relationships on friendships and romantic relationships. Many of the same positive aspects of parent-child relationships are associated with positive experiences in later friendships and romantic relationships. However, the links between early family experiences and

adolescent friendships are better established than the links between early family experiences and adult friendships. For romantic relationships, evidence is stronger for links between early family experiences with adult romantic relationships than with adolescent romantic relationships. Research on the links with adult friendships and adolescent romantic relationships would allow for comparing and contrasting family predictors of friendships and romantic relationships and foster integration of the work on the two relationships, contributing to a unified perspective.

Research reviewed above also suggests that early experiences with parents predict friendship experiences, which predict romantic relationship outcomes. More such studies are needed to determine whether the impact of early parent-child relationships on later romantic relationships is direct or mediated by experiences with friends. Moreover, with few exceptions (e.g., Stocker & Richmond, 2007), family variables are assessed at earlier ages than friendship variables in studies predicting romantic relationships. As a consequence, it is difficult to determine whether differences in the predictive power of family and friendships stem from the type of relationship considered or the time that the relationship was assessed. Early relationships could be more influential if they serve as prototypes for subsequent relationships; however, more recent relationships could be more influential as they may be more similar to later relationships or because less time has passed. Finally, more research is needed to examine the direction of effects. As noted, relatively little is known about how peer relationships affect family processes.

More research is needed regarding how parent-child relationships, friendships, and romantic relationships coexist in later adolescence and early adulthood when they need to be simultaneously managed. One study considered two time points in adolescence and two time points in early adulthood (Meeus, Branje, van der Valk, & de Weid, 2007). Those who shifted from indicating that their most important peer was a friend to indicating that their most important peer was a romantic partner showed increases in commitment to the romantic partner and decreases in emotional problems. A stronger commitment to a romantic partner in early adulthood, but not in adolescence, was also associated with fewer emotional problems (see Furman & Collibee, in press, for a similar association). Moreover, stronger parental support in early adulthood was associated with greater commitment to a romantic partner. These findings suggest that romantic relationships become more psychologically meaningful than friendships in late adolescence and early adulthood and suggest that links

between relationships with parents and romantic partners become stronger when the romantic relationships become more committed. Additional research is needed to understand how youth healthy romantic relationships, while maintaining healthy relationships with parents and friends.

Other aspects of family relationships also need to be considered. Although social scientists increasingly have examined multiple facets of parenting in the same study, more work is needed. Particularly promising may be studies integrating family structure and family process. Socioeconomic and structural characteristics of the family may set the context for different processes to occur. For example, many middle- or upper-class parents may approach childrearing in terms of “concerted cultivation” in which they attempt to promote children’s skills and talents through organized activities; many working-class parents may approach childrearing as the “accomplishment of natural growth” in which they provide children with the conditions to grow, but leave leisure activities for the children themselves (Lareau, 2011). The time and nature of experiences with extended family and peers may also differ, and such a difference may moderate links between family processes and dyadic peer relationships. Finally, family structure is not static and may change repeatedly over time; the number of transitions in family structure in childhood and adolescence predicts having a current romantic relationship and the number of subsequent romantic relationships (Cavanagh, Crissey, & Raley, 2008). Conceptualizations and studies of the family need to take into account the dynamic processes involved.

Also, most research on links with family processes has considered involvement in friendships or romantic relationships or the characteristics of the relationships. Less research has considered the characteristics of the friends or romantic partners. However, parents likely affect the types of friends and romantic partners youth choose. Moreover, the degree to which parents approve of friends and romantic partners likely influences the parent-child relationship.

In addition, although most children have siblings, few studies have examined associations between sibling relationships and friendships, and even less is known about the associations between sibling relationships and romantic relationships. Studies should explore the idea that having other-sex siblings may increase the comfort and social competence of heterosexual youth with other-sex peers.

Finally, research to date does not represent the wide array of family types. As with other topics, virtually all of the research has been conducted in North American and

European cultures. Although work is increasing on racial and ethnic minority families in these cultures, we know little about how variations within and across families of different backgrounds are associated with children and adolescents’ experiences with friends and romantic partners. Moreover, the families that have been studied tend to be traditional ones. Little is known about immigrant families or families with GLBT parents. Such work would enhance our understanding of the links between children and adolescents’ family experiences and their experiences with friends and romantic partners.

PEER PROCESSES

In this section, links are considered among friendships, romantic relationships, and peer group processes. Associations between experiences in friendships and romantic relationships are considered first. Associations between broader peer group experiences and friendships are discussed next, followed by a discussion of associations between broader peer group experiences and romantic relationships.

Friendships and Romantic Relationships

Considerable work indicates that having higher-quality friendships is associated with having higher-quality romantic relationships (see Connolly & McIsaac, 2009; Furman & Collins, 2009). Recent research has focused on more complex associations, including mediation, moderation, trajectories of growth, and within-subject associations. In the previous section on family processes, we discussed how friendships may mediate the links between family processes and romantic relationships. With regard to moderation, having deviant peer friends is associated with higher rates of dating violence perpetration in early adolescence, but this effect is particularly strong when parents support aggressive solutions to conflict (S. Miller, Gorman-Smith, Sullivan, Orpinas, & Simon, 2009).

Virtually all research has only examined predictor variables at one time point, but growth curves have been examined in one instance (Fraley, Roisman, Booth-LaForce et al., 2013). Higher levels of positive friendship quality in middle childhood and increases in positive friendship qualities from middle childhood to middle adolescence were predictive of less avoidant romantic attachment styles in late adolescence.

Another new direction involves examining both between- and within-person effects. Between-person associations refer to instances where differences between people on one variable are associated with differences on another variable. For example, adolescents who typically have friends who engage in dating violence engage in more dating violence throughout adolescence; those who typically have high-quality friendships, and females who typically have friends with prosocial beliefs engage in less dating violence throughout adolescence (Foshee et al., 2013). Within-person associations refer to instances where variations within a person over time on one variable are associated with variations within a person over time on another variable. For instance, adolescents engage in more dating violence than usual when they are higher in social status than usual; levels of dating violence are lower than usual at times when they have more friends with prosocial beliefs than they typically do (Foshee et al., 2013). Thus, studies of within-person effects can provide information about *when* activities occur (versus who is likely to engage in them). Such studies are central to many psychological theories, because social scientists, especially developmentally oriented ones, are often interested in changes within a person in addition to differences between people. Knowing both who and when are essential to understanding developmental processes.

Friendships and Peer Groups

The characteristics of friendships are also associated with processes in broader peer group, such as peer group acceptance, perceived popularity, and victimization. In terms of peer acceptance, children and adolescents with friends and high-quality friendships are well-accepted by peers (see Rubin, Bukoski, et al., 2006). Recent work indicates that school-aged children with friends are better accepted than children without friends, even when the friends have undesirable characteristics, such as aggressive tendencies (Palmen, Vermande, Deković, & van Aken, 2011).

In regards to perceived popularity, having perceived popular friends increases individuals' own perceived popularity in childhood (Logis, Rodkin, Gest, & Ahn, 2013) and adolescence (Dijkstra, Cillessen, Lindenberg, & Veenstra, 2010). However, early adolescents who are liked by peers perceived to be popular, but are not friends with them, are better accepted than those with a friend perceived to be popular (Dijkstra et al., 2010). Prospective research also indicates that children (Logis et al., 2013) and adolescents

(Dijkstra, Cillessen, & Borch, 2013) become more similar to friends in perceived popularity over time.

Recent work has also addressed links between friendship and victimization. Earlier work indicated that children and adolescents with friends are less victimized and that having friends buffers them from the negative effects of victimization (see Rubin, Bukoski, et al., 2006). Recent studies further consider the timing and directionality of these associations. Having poorer-quality friendships predicts later victimization in middle childhood and early adolescence (Kendrick, Jutengren, & Stattin, 2012; Malcolm, Jensen-Campbell, Rex-Lear, & Waldrip, 2006). Children who are chronically friendless or who lose friends across a school year during middle childhood also experience increases in victimization, whereas children who have stable friendships or who gain friends do not experience increased victimization (Wojslawowicz Bowker, Rubin, Burgess, Booth-LaForce, & Rose-Krasnor, 2006).

Other recent work has considered whether associations between friendships and victimization are bidirectional. Previous research was largely motivated by the idea that having few friends leaves children and adolescents vulnerable to victimization (Rubin, Bukoski, et al., 2006). However, the stress of victimization could deplete the social and emotional resources youth bring to friendships, and peers may be concerned that friendships with victimized youth will lead themselves to be victimized. In fact, during middle childhood and early adolescence, victimized individuals are less likely to form new friendships, and the friendships of victimized girls are less stable (Ellis & Zarbatany, 2007). Other research, though, found that victimization is not associated with decreases in friendship quality in middle childhood and early adolescence (Malcolm et al., 2006; Kendrick et al., 2012). More research is needed to determine whether victimization leads to friendship problems.

Last, whether findings for older youth apply to young children has been considered (Hanish, Ryan, Martin, & Fabes, 2005). Even kindergarteners with reciprocal friends are less victimized than their friendless peers. However, reciprocal friends do not protect preschoolers from victimization. Instead, preschoolers who engage in more social play and are in classrooms with higher levels of overall aggression are likely to be victimized. These findings suggest that preschoolers may aggress somewhat indiscriminately toward peers who happen to be nearby, whereas older aggressors may be more strategic and avoid children with friendship alliances.

Romantic Relationships and Peer Groups

Early research on peer group processes and romantic relationships primarily focused on who was more likely to establish romantic relationships. This work indicated that those who interact more with the other-sex, have more other-sex friends, or are popular are more likely to subsequently develop romantic relationships (see Connolly & McIsaac, 2008; Furman & Collins, 2009). More recently, it has become clear that multiple pathways lead to having romantic relationships (S. Miller, Lansford, et al., 2009). For example, popular youth (i.e., those who are well-accepted) and controversial youth (i.e., those who receive high numbers of liked-most and liked-least nominations from peers) are both more likely to have romantic partners in early adolescence than neglected youth (i.e., those who receive few liked-most and few liked-least nominations). Given the ubiquity of friendships and romantic relationships in our lives, it seems quite likely that numerous pathways exist. As statistical techniques continue to become better able to identify multiple pathways, more pathways are likely to be identified.

Much of the recent focus on links between the peer group and romantic relationships has been with regards to dating violence. Associating with adolescent peers who engage in dating violence or other forms of aggression predicts engaging in dating violence oneself (see Capaldi, Knoble, Shortt, & Kim, 2012). Importantly, whether youth aggress in the peer group is related to their tendency to aggress against a dating partner. For example, in one study (Foshee et al., 2011), 40% of the early and middle adolescent females and 19% of the males who were aggressive toward their peers were aggressive toward a dating partner. In contrast, among youth who were not aggressive toward peers, only 10% of females and 4% of males were aggressive toward a dating partner. Such work suggests that a significant number of youth are at risk for multiple forms of violence, and prevention programs focusing on multiple forms of aggression may be more efficient.

Future Directions

Some similarities exist between work on friendships and romantic relationships in regards to connections with the larger peer group. Those who are well-accepted or perceived as popular fare well in regards to both friendships and romantic relationships. The friendship literature has also considered links between friendship features and victimization by peers, and the romantic relationship

literature has considered links between dating violence and connections with deviant peer groups. Future work would benefit from integrating these literatures. Longitudinal work could test whether youth who are victimized peers are likely to be victims of dating violence. Whether supportive friendships can protect youth from dating violence similar to how friendships protect youth from victimization is also unknown.

Additionally, most research on the links between friendships and romantic relationships has considered characteristics of the relationships. Less is known about the similarities or differences in the characteristics of friends or romantic partners. Adolescent friends and romantic partners are similar in delinquency, attractiveness, popularity, and depression (Lonardo, Giordano, Longmore, & Manning, 2009; Simon et al., 2008), but what is less understood is why this is the case. It may simply reflect similarities in an adolescent's selection of peers, or be the results of the adolescent's socialization of both, or the friend and partner socializing each other. Understanding the interplay of the dynamics in friendships and romantic relationships will be key for developing a unified relational perspective.

In addition, future research should examine the processes through which friends may influence romantic relationships. Conceptual papers exist on how friends may influence romantic relationships (e.g., Brown, 1999). For example, friends may approve or disapprove of potential partners, introduce peers to potential dating partners, facilitate or disrupt relationships, provide advice about relationship issues, or keep an eye on a partner's behavior. Similarly, partners may engage in comparable behaviors regarding friends. These processes might be considered analogous to parental monitoring and are in need of empirical attention.

MEDIA

In this section, we consider how use of media by children and adolescents is linked with their experiences in friendships and romantic relationships. This is an important topic given the sheer amount of time youth devote to media use and the advances in technology that allow youth to use digital media (e.g., texting) to communicate with friends and romantic partners.

Friendships

Adolescents are much more likely to communicate online with real-life friends than with people whom they know

only over the Internet (Reich, Subrahmanyam, & Espinoza, 2012; Smahal, Brown, & Blinka, 2012). Moreover, Internet communication is associated with higher friendship quality for early and middle adolescents who communicate primarily with face-to-face friends versus with those known only online (Valkenburg & Peter, 2007). Adolescents who instant message also show increases in positive relationship quality in face-to-face friendships and romantic relationships (Blais, Craig, Pepler, & Connolly, 2008; Valkenburg & Peter, 2009a). The effect for friendships is accounted for by online self-disclosure (Valkenburg & Peter, 2009a), that is, preadolescents and adolescents who instant-message more and disclose more about personal feelings in their messages, which predicts later positive friendship quality. In contrast, using the Internet for chat rooms, games, and general entertainment predicts decreases in some positive friendship and romantic relationship qualities (Blais et al., 2008). In summary, interacting online with preexisting friends can strengthen relationships, but online activities that do not involve communicating with friends may detract from friendships.

Two hypotheses address who benefits from communicating online with friends (see Valkenburg & Peter, 2009b). According to the rich-get-richer hypothesis, socially competent youth are most likely to seek out online communication as one more platform for enhancing friendships. In contrast, the social compensation hypothesis suggests that less socially competent youth feel more comfortable communicating online because there is no face-to-face contact and more time to compose responses. Support exists for both hypotheses. Consistent with the rich-get-richer hypothesis, socially anxious early and middle adolescents may be less likely to communicate online than those who are not socially anxious (Valkenburg & Peter, 2007). However, consistent with the social compensation hypothesis, socially anxious adolescents feel more comfortable talking about more topics and more sensitive topics online than face to face (Valkenburg & Peter, 2007). Moreover, the negative impact of middle adolescent males' social anxiety on friendship quality is not significant for friends who interact on the computer together (Desjarlais & Willoughby, 2010).

Less research has considered whether positive friendship adjustment may contribute to greater online communication. However, those who interact positively with friends in early adolescence are especially likely to have a social networking webpage in early adulthood and to have a large number of friends on their webpage (Mikami, Szwed, Allen, Evans, & Hare, 2010). In contrast, relationships with

parents that are problematic also may increase Internet use (Willoughby, 2008). Compared to other youth, early adolescents whose mothers fail to support their autonomy and relatedness are more likely to have formed a friendship with someone they met online during early adulthood (Szwe, Mikami, & Allen, 2011). Perhaps youth who experience poorer parenting are less likely to develop the skills necessary for success in face-to-face friendship interactions.

Romantic Relationships

The depiction of sex in the media has received significant attention for some time. However, that literature has not focused on sexual behavior in romantic relationships per se. In fact, only half of the individuals depicted having sexual intercourse on television have an established relationship (Kunkel, Eyal, Finnerty, Biely, & Donnerstein, 2005). Instead, the focus of research has been on the high frequency of sexual content overall and the limited consideration of sexual risk and responsibilities. Work has been done regarding how adolescents' media diet of sex is linked to sexual attitudes and behavior in general, casual sexual behavior, or sexual risk taking, but little has been done on the links to sexual attitudes and behavior in romantic relationships per se. Indeed, relatively little consideration has been given to the depiction of romantic relationships in the media.

Content analyses reveal that a heterosexual script is commonly portrayed in adolescents' favorite primetime network television programs (J. L. Kim et al., 2007). Males are depicted as preoccupied by females' bodies and consumed by sexual thoughts, desires, and experiences. Males are portrayed as initiating sexual activities, whereas females set sexual limits and are judged by their sexual conduct. Males use active and powerful strategies to win females' affection; females use passive, alluring strategies. Males are seen as wanting and needing independence, whereas females are depicted as wanting and needing relationships, boyfriends, or husbands. Males are portrayed as preferring sexual fulfillment over emotional commitment and as homophobic. Such descriptions may affect whom adolescents are attracted to romantically and how they interact in romantic relationships. Consistent with this idea, watching romantic television programs is associated with having more traditional gender role attitudes about romantic relationships; watching nonromantic programs is associated with middle adolescent youth having less traditional attitudes; watching soap operas is associated with earlier age of starting to date and having a larger number of partners (Rivadeneyra & Lebo, 2008).

Little work has focused on the new media and romantic relationships. Qualitative descriptions suggest that digital media may influence adolescents' romantic relationships (Ito et al., 2010). Social network sites may increase opportunities for meeting potential romantic partners. Such opportunities may be particularly important for GLBT youth. Long-distance relationships may be easier to develop or maintain. Whether near or far apart physically, adolescents can be in frequent, if not continuous, contact with romantic partners, which may lead to expectations of being available and responsive at almost any moment. At the same time, text messages and social networking provide individuals opportunities to compose messages before communicating. Moreover, adolescents may find it easier to meet others or have romantic relationships about which their parents have little knowledge. Of course, some parents may oversee or access their adolescent's social network sites or text messages. Certainly, communications are commonly accessible by partners or friends, intentionally or unintentionally. Romantic partners may find it easier to know of each other's activities, especially given the ease of sharing videos and pictures. A suspicious or jealous partner may have easier means of checking on a partner's behavior; this may not only provide opportunities for determining instances of infidelity or troubling behavior but also may lead to misperceptions of a partner's intentions. The restricted channels of communication in digital media may lead to misperceptions of what is said or perhaps greater opportunities for deliberate ambiguity. Finally, relationships can be ended quite indirectly. At the same time, a former lover may find it relatively easy to keep track of or even stalk an ex-partner.

Byproducts of the new media have raised concerns. A 2010 survey of adolescents in the United States showed that in the past year 2.5% of preadolescent and adolescents "sexed," or sent a nude or nearly nude image via electronic media; 7% received one (Mitchell, Finkelhor, Jones, & Wolak, 2012). Ten percent of early and middle adolescents in the United States reported being victims of cyber dating abuse (Zweig, Dank, Yahner, & Lachman, 2013). The most common form is using a social networking account without permission. Receiving texts/e-mails soliciting unwanted sexual acts, being pressured to send sexually explicit photographs, receiving threatening text messages, or receiving intimidating numbers of text messages/e-mails also occur. Importantly, victims of cyber dating abuse are more likely to also have experienced physical, sexual, or psychological dating abuse; perpetrators are more likely to report perpetrating other forms of abuse.

Future Directions

The literatures on media use on friendships and romantic relationships are strikingly different. Substantially different questions have been addressed in the two fields, which illustrates the importance of a unified relational perspective. Some similarities between media use in friendships and romantic relationships are likely, but what are they and what are the differences? For example, does Internet use affect socially anxious adolescents' romantic relationships differently from their friendships? Coordinated work in the two fields may lead to a better understanding of the role of media in each relationship.

In addition, more work is needed on multiple types of media use and face-to-face interactions. Because adolescents typically use multiple forms of media and face-to-face contact to communicate with friends, separating out the influences of each will be challenging. Variation in the relative use of particular media forms could be considered, but this variation is likely conflated with the characteristics of the individual, partner, and relationship stage.

Although the frequency of media use is important, the content of use, motives for use, and the degree of identification with the media figure also warrant more consideration (see Ward & Friedman, 2006 for an example). Cohort effects are also likely to be striking; indeed, the changes in new media are so rapid that the size of a cohort is becoming increasingly smaller, as youth close in age may use media in substantially different ways.

Several topics have received little attention. Many adult relationship researchers have been interested in how online dating affects romantic relationships. Some online dating sites specifically cater to adolescents, but we are unaware of any work on their effects on adolescents' relationships. In addition, virtually all of the research described in this section has been conducted in technologically advanced cultures; the role of media in other cultures remains to be studied. Finally, just like the technology, research on digital media is rapidly developing. The speed of the research and the technology provide extra challenges for researchers, yet exciting opportunities for much growth in our knowledge in the upcoming years.

CULTURE

Cultural context affects friendships and romantic relationships. By culture we mean both countries or societies and subcultures within countries or societies. Such subcultures would include different ethnicities and social classes.

Most of the research we reviewed was conducted in North America and secondarily in Europe. Investigators have used Asian and other understudied cultures to examine issues that have been studied in North America or Europe; however, the rationale has often been that few studies have been conducted in that culture, and little information about the culture is reported in the study. Virtually all of these investigators are remiss as well in discussing how their country's culture may affect their results; similarly, studies of European Americans rarely consider how their subculture affects their results. For studies to shed light on culture, cultural processes need to be explicitly considered. In a minority of studies, investigators have discussed how the cultural context may influence the results. In most of these instances, however, the cultural processes are not measured. Consequently, we know relatively little about cultural context. Instead of describing the limited and disparate literature on cultural context and friendships and romantic relationships, we present examples of work that illustrate its potential for insights into friendships and romantic relationships.

Countries and Societies

One promising strategy has been to conduct studies comparing friends or romantic relationships across more than one country. For example, compared to a child in the United States, an Indonesian child is more likely to disengage from friendship conflicts, such as by avoiding the other child or changing the conversation or activity (French, Pidada, Denoma, McDonald, & Lawton, 2005). A child in the United States is more likely to negotiate or compromise. Notably, in Indonesia only, disengagement is associated with being well-accepted, suggesting that disengagement is not only more common among Indonesian children but more adaptive as well. Interpersonal relationships are highly valued in Indonesia, and avoiding overt conflict is seen as one way to maintain positive relationships.

In regards to romantic relationships, a middle adolescent in Canada is more likely to have had a romantic relationship and had more relationships than an adolescent in China (Li, Connolly, Jiang, Pepler, & Craig, 2010). Canadian adolescents' romantic relationships are also perceived to involve more trust and companionship than the romantic relationships of Chinese adolescents. Canadian females perceive their romantic relationships as more intimate than do Chinese females. Finally, friendship qualities are more strongly related to romantic experiences in Canada than in China. Canadian adolescents may have romantic partnerships that

are more intimate due to the relative emphasis on nonfamilial (versus familial) relationships in Canada versus China. The salience of nonfamilial relationships in Canada may also help to explain the greater interconnectedness between friendships and romantic experiences.

As another example, rates of dating aggression in middle adolescence are similar in Canada and Italy, but the links with other relationship characteristics differ (Connolly et al., 2010). In Canada, dating aggression is related to romantic conflict. In Italy, dating aggression is also related to romantic conflict but to a lesser extent. In Italy, imbalances in power are also associated with dating aggression, perhaps because gender roles are more traditional in Italy. Importantly, these studies also provide some insight into possible commonalities across cultures (e.g. rates of dating aggression).

To date, most studies have compared two countries, but some multi-country studies exist. For example, friendship conceptions were assessed among youth ranging from middle childhood to middle adolescence in former East Germany, Iceland, China, and Russia (Gummerum & Keller, 2008). The results showed that youth from Iceland and East Germany have less mature friendship conceptions than Chinese and Russian youth. Iceland and East German are more individualistic than China and Russia, and individualist countries may foster less sophisticated relationship cognitions.

Seiffge-Krenke et al. (2010) examined reports of romantic stress in early and middle adolescence in 17 countries grouped into seven regions. The results showed that adolescents in Middle and Southern Europe report greater romantic stress than do adolescents in Northern and Eastern Europe, South Africa, South America, and the Middle East. Stress may be higher in these European regions as the development of a romantic relationship plays an important role in the process of separating from the family and leaving home in those cultures. Stress may be lower in other regions because family rules regarding romantic relationships are clearer or stricter, making opportunities for choices regarding romantic experiences more limited. Finally, the differences may arise because adolescents in South America and the Middle East are more concerned about other stressors, such as identity concerns.

Multi-country studies have particular promise, as they allow multiple comparisons among countries, which may shed light on cultural processes that affect friendships and romantic experiences. Although such cross-cultural comparisons present some challenging methodological and conceptual issues regarding equivalence of measures,

samples, and constructs, we believe that such work can provide intriguing insights into the nature of dyadic relationships, as cultures vary markedly on a number of important dimensions.

Another promising direction is to directly measure the processes believed to explain cultural differences. For example, a process-oriented approach could involve considering youth of a single ethnicity who differ in the degree to which they are socialized in Westernized contexts. One study compared late adolescent Indian youth in homeland single-sex colleges, Indian youth in coeducational colleges in India, and Indian youth whose parents had immigrated to Canada (Dhariwal & Connolly, 2013). The results show that all desire romantic experiences. Those attending college in Canada, however, engage in more romantic activities than youth in other contexts. They also have more autonomy in selecting partners than those in coeducational schools in India, who have more autonomy than those in single-sex schools. The three groups also differ in the amount of Western and social media they consumed, their number of other-sex friends, friends having permissive expectations, and the intimacy of their conversations with friends. Importantly, when differences in the media and friendships are taken into account, differences in romantic activities and autonomy no longer exist. Exposure to Western media and intimate conversations with friends may induce acculturation, which may explain the greater romantic involvement of youth in these contexts. This study was one of the first to attempt to deconstruct culture and to identify processes, such as the influence of friendships and media, which might be responsible for cultural differences in romantic experiences.

Race, Ethnicity, and Social Class

Cultural context also plays a role within particular countries or societies. Subcultural differences exist as a function of race/ethnicity, social class, or neighborhood. Most past work was done with European American middle-class samples. Most studies today try to obtain more representative samples in terms of ethnicity or race, although this seems to be less true for social class. However, even studies that are representative of race, ethnicity, or social class often do not examine subgroups within the sample (see Crissey, 2005; Giordano, Manning, & Longmore, 2005, for exceptions). More typically, race, ethnicity, or social class is included, but only overall mean differences are reported. Thus, generalizations can be made about the population overall, but not about particular ethnic/racial groups or social classes.

There are at least two notable challenges when conducting and interpreting research on racial/ethnic differences. One is that race/ethnicity is often confounded with SES or neighborhood. Another is that research on race/ethnicity differences often describes mean-level differences but does not adopt a process-oriented approach. A few studies attempt to address process by considering whether the ethnic group differences exist in the links between variables such as those among different relationships. For example, ethnic minority Dutch adolescents (primarily of Turkish or Moroccan origins) who have more committed romantic relationships have poorer-quality relationships with parents (Ha, Overbeek, de Greef, Scholte, & Engels, 2010). This association is not found for native Dutch adolescents. The association may emerge for ethnic Dutch adolescents because ethnic Dutch parents place more limits on romantic relationships, and a very committed relationship may be problematic from their perspective.

An even more effective strategy is to assess the cultural processes that may affect friendships or romantic relationships in different ethnic/racial groups or social classes. Studies directly assessing such processes are uncommon, but noteworthy exceptions exist. One approach is to examine cultural models, or themes that members of a cultural group use to describe relationships. The more a theme is discussed, the more relationships are thought to be organized around that theme. Cultural models have been examined through qualitative interviews of Mexican American and African American middle adolescents (Milbrath, Olson, & Eyre, 2009). Five cultural model factors have been identified: (1) Hispanic cultural mores, such as *familismo, respeto, marianismo, and machismo*; (2) conceptions of care, which include directives about appropriate male behavior and idealized models of romance and courtship; (3) expectations in serious romantic exchanges, including expectations regarding sexual exclusiveness and knowing what the other wants; (4) ways of having multiple partners and strategies for managing a partners' fidelity; and (5) gaming, which involves verbal persuasion and social manipulation. Mexican Americans talked more about cultural mores and romantic care, whereas African Americans talked more about serious exchanges and gaming, suggesting that relationships in the two racial/ethnic groups are organized around different dimensions. This research did not examine the degree to which individuals from different ethnic backgrounds adhered to or disagreed with these cultural themes, but future work could examine these individual differences and test whether they account for racial/ethnic differences in romantic relationships.

Another approach involves examining individual differences in the degree to which children or adolescents within a single ethnic group adopt values that are especially salient for that group. For example, Mexican American adolescents who adopt *familistic* values that emphasize interpersonal harmony in the family also tend to adopt solution-oriented conflict resolution styles with friends, which involve discussion and working together to solve problems, as opposed to nonconfrontational strategies or controlling strategies (Thayer, Updegraff, & Delgado, 2008).

Cross-Race/Ethnic Relationships

Homophily is a driving force in the selection of dyadic peer relationships. Friendships tend to be between same-race/ethnic peers from early childhood through adolescence (Rubin, Bukowski, et al., 2006). Most adolescent romantic relationships are between same-race/ethnic individuals; for example, one set of estimates revealed that over 90% of African American and European American relationships are same-race/ethnic relationships, and over 60% of Hispanic and Asian American relationships are (Wang et al., 2006).

Research is mixed regarding differences in the quality and stability of same-race/ethnic and cross-race/ethnic friendships (McGill, Way, & Hughes, 2012; Schneider, Dixon, & Udarvari, 2007). However, factors that increase the likelihood of cross-race/ethnic friendships have been identified. Asian American and Latina/o American middle adolescents whose families have lived in the United States for longer and are more fluent in English are more likely to have cross-race/ethnic friends (Hamm, Brown, & Heck, 2005). African American adolescents with relatively stronger academic orientations and European American adolescents with relatively weaker academic orientations are more likely to have cross-race/ethnic friends. Social cognitions also play a role in the formation of cross-race/ethnic friendships. During middle childhood, children with more positive perceptions of different racial/ethnic groups are more likely to have cross-race/ethnic friendships (Feddes, Noack, & Rutland, 2009).

Other work considers the idea that cross-race/ethnic friendships introduce children and adolescents to new peer groups and increase their social perspective taking and social skills. Cross-sectional studies during middle childhood suggest that children with cross-race/ethnic friends are especially well-liked, leaders, and inclusive of others (Kawabata & Crick, 2008; Lease & Blake, 2005). In middle childhood, children with more cross-race/ethnic

friends also experience decreases in relational and physical victimization and increases in perceived support from friends across the school year (Kawabata & Crick, 2011). Interestingly, the effects for physical victimization and peer support hold only for classrooms that are especially diverse. Additional longitudinal work is needed to test whether socially competent children and adolescents are especially likely to form cross-race/ethnic friendships.

Having cross-race/ethnic friends during early adolescence is also associated with more positive attitudes about peers of other races/ethnicities (Knifsend & Juvonen, 2013). However, the benefits may differ for majority and minority children and adolescents. For example, for the majority German children, having more Turkish friends predicts more positive attitudes about Turkish children across the school year. The same effect does not emerge, though, for minority Turkish children (Feddes et al., 2009). The out-group attitudes of Turkish children may be based on broader experiences in society and not as malleable to the influence of specific friends. Similarly, although having cross-race/ethnic friends contributes to feeling safe at school among preadolescents (Graham, Munniksma, & Juvonen, 2013), these effects also may vary by majority/minority status. Having cross-race/ethnic friends is related to feeling safe at school for preadolescent and early adolescent Latina/o Americans when they are in the majority at the school (Munniksma & Juvonen, 2012), but not for European American adolescents when they are in the minority.

Interestingly, in multiracial/ethnic settings, having more same-race/ethnic friends may have mixed effects. Having more same-ethnic friends is linked with having a positive ethnic identity, including feeling good about one's ethnic group (Graham et al., 2013). However, having more same-ethnic friends is also associated with more stressful perceptions of cross-race/ethnic relations. Specifically, during middle childhood, African American children who have more African American friends are especially likely to report that African American children will be discriminated against (Rowley, Burchinal, Roberts, & Zeisel, 2008). The authors speculated that African American children who affiliate with same-race/ethnic peers may be discriminated against more often or may be socialized within their friendship networks to expect discrimination.

Less work has considered cross-race/ethnic romantic relationships. However, adolescents in cross-race/ethnic relationships are less likely to talk to their mothers or other people about these relationships (Wang et al., 2006). They are also less likely to meet their partners' parents.

These findings suggest that society and parents are less approving of such relationships, or at the very least adolescents think they are. Such cultural factors may lead to instability in cross-race/ethnic romantic relationships and greater homogamy in romantic relationships.

Finally, efforts have been made to identify processes underlying social class and neighborhood effects. Work on romantic relationships has considered the idea that relationships in the context of low-income neighborhoods may be more culturally heterogeneous. That is, more variation may exist in the lifestyles of residents of low-income neighborhoods than in higher-income neighborhoods (Harding, 2007). Consequently, children and adolescents may be exposed to heterogeneous models of relationships in these neighborhoods. Indeed, low-income neighborhoods have greater heterogeneity in attitudes about getting pregnant and the ideal sequence of events in romantic relationships, such as declarations of love, meeting parents, sex, pregnancy, or marriage. Such heterogeneity is associated with less consistency between adolescents' attitudes about pregnancy or romantic events and their actual behavior, even taking into account average neighborhood income levels.

Future Directions

One of the key propositions of our unified relational perspective is that dyadic peer relationships are embedded in a cultural context. The existing research provides clear evidence of such contextual effects, but more work is needed, especially research that disentangles processes underlying cultural differences (e.g., Dhariwal & Connolly, 2013). Research on such processes is important as too many cultures exist to compare them all, and focusing on processes will promote the integration of research in different cultures and contribute to a unified relational perspective.

Only a few friendship studies have examined developmental processes that reflect cultural variables, such as acculturation, experiences of racism, or ethnic identity. To the best of our knowledge, these variables have not been explored in regards to romantic relationships. More attention also needs to be paid to specific contexts in which these relationships occur, such as the school or neighborhood. The racial/ethnic make-up of the school context influences peer-group dynamics and the prevalence of cross-racial/ethnic friendships (see Graham, Taylor, & Ho, 2009). However, almost nothing is known about how the diversity of the school context affects romantic relationships. The degree of diversity in the school context likely affects not only the prevalence of cross-racial/ethnic

romantic relationships but also the degree to which they are accepted. Classmates' perceptions of cross-racial/ethnic romantic relationships, in turn, may influence who chooses to engage in these relationships and how they influence youths' adjustment.

Existing work on dyadic peer relationships in the United States has focused on African Americans, Asian Americans, and Latina/o Americans. Less is known about Native Americans, multiracial youth, or immigrant youth.

In addition, although work has focused on different ethnic/racial groups, religious differences are also important. One study considered Muslim and Christian Indonesian early adolescents (Eisenberg et. al., 2009). Like research on cross-race/ethnic friendships, this work suggests some benefits for youth with cross-religion friendships. Given that racial/ethnicity and religious subcultures are often confounded in countries and societies, work is needed to disentangle the influence of each on close peer relationships.

Historical contexts have also been understudied. Historians have written about changes in relationships, particularly romantic relationships. Today greater opportunities exist for social scientists to examine such changes. Not only are there a number of large-scale surveys that are periodically conducted, but investigators have more opportunities to gather data that corresponds to previously collected data. Taking into account historical changes may be especially important when considering differences across cultures. Globalization may be influencing the degree and nature of differences across different countries. Increased globalization likely provides new opportunities but also new challenges as the values of Western cultures often clash with other cultures. Similarly, immigrants must reconcile differences in the values, behaviors, and traditions of their old and new countries in their relationships.

Examining historical changes may be especially important when considering associations between behavioral traits and adjustment in relationships. Traits such as sociability, shyness/inhibition, behavioral control, and aggression are valued differently and associated differently with peer group status across different countries (see X. Chen & French, 2008). Associations of these traits with friendships and romantic relationships may also differ across countries. Notably, though, the nature of these cultural differences has changed over the past two decades (J. Liu, Chen, Li, & French, 2012). Earlier findings indicated that shyness was associated with lower peer status in the United States but not in China. However, urban China has experienced marked economic and cultural changes, and current findings indicate that shyness now is related to

lower peer status in China. Such studies of historical change provide new opportunities for examining how changes in cultures may be linked to interpersonal relationships.

ADJUSTMENT

In this section, we consider associations between children's and adolescents' friendships and romantic relationships and their psychological adjustment. We focus on internalizing and externalizing symptoms as that work illustrates the directions the field has taken.

Friendships

Friendship Involvement. The importance of friendships for adjustment is well-accepted (see Rubin, Bukoski, et al., 2006). Friendless children and adolescents are at greater risk for internalizing than externalizing problems (recent examples include Engle, McEwan, & Laski, 2011; Pedersen, Vitaro, Barker, & Borge, 2007; Waldrip, Malcolm, & Jensen-Campbell, 2008). Having friends also mitigates the impact of other risks. Rejection sensitivity is related to social anxiety most strongly for friendless early adolescents (Bowker, Thomas, Norman, & Spencer, 2011); during middle childhood, social isolation is related to later internalizing and externalizing symptoms most strongly for friendless children (Laursen, Bukowski, Anuola, & Nurmi, 2007). *Developmental cascades* are also present during middle childhood such that children who are excluded by peers experience exponentially increasing depressive symptoms, especially if they are friendless (Bukowski, Laursen, & Hoza, 2010).

Friendship Features. Not all friendships are similarly protective as friendship quality is also related to adjustment. Friendship quality is associated with emotional adjustment most strongly when early adolescents experience stressors, such as victimization (Woods, Done, & Kalsi, 2009). Supportive friendships also mitigate the impact of other risks, such as the effect of rejection sensitivity on emotional problems during middle adolescence (McDonald, Bowker, Rubin, Laursen, & Duchene, 2010). However, prospective effects of friendship quality on later emotional problems sometimes fail to emerge. Prospective associations may only be present under specific circumstances (e.g., for poorly accepted preadolescents and early adolescents; Waldrip et al., 2008; or preadolescents and early adolescents who engage in aversive behaviors; Prinstein et al., 2005).

Friendship qualities may also not be related consistently to emotional adjustment due to variation in the emotional adjustment of youth with high-quality friendships. Although high-quality friendships may protect some youth from internalizing problems, those ranging in age from middle childhood to middle adolescence who have high-quality friendships and co-ruminate may exacerbate their symptoms (Rose et al., 2007). Co-rumination is also linked with clinical levels of depression in middle childhood and adolescence (Stone et al., 2011; Stone, Urlass, & Gibb, 2010).

Alternatively, the other direction of effect may be stronger, such that emotional problems are more predictive of problematic friendship quality. That is, children's and adolescents' depressive symptoms may predict changes in friendship quality more consistently than friendship quality predicts changes in depressive symptoms (Oppenheimer & Hankin, 2011; Prinstein et al., 2005; Rose et al., 2011).

Findings are mixed regarding the relation between friendship quality and externalizing symptoms. Cross-sectional associations exist between poor-quality friendships and externalizing problems in early childhood (Engle et al., 2011) and middle childhood/early adolescence (Waldrip et al., 2008). However, friendship quality is not a consistent predictor of changes in externalizing symptoms (Engle et al., 2011). Like internalizing symptoms, friendship quality may be related to externalizing symptoms for only some youth, such as middle adolescents with particular attachment styles (McElhaney, Immele, Smith, & Allen, 2006) or children and early and middle adolescents who experience particular parenting styles (Yu & Gamble, 2010).

Friends' Characteristics. In recent years, interest in friends' influence has increased (Brechwald & Prinstein, 2011; Dishion & Pihler, 2009). Similarity between friends can occur because those who are similar become friends (selection), because friends become more similar over time (socialization), or because those who are dissimilar cease to be friends (deselection). All are important processes in friendships.

In terms of internalizing problems, selection effects are present such that adolescents who are similar in depressive symptoms are likely to become friends (Giletta et al., 2012; Kiuru, Burk, Laursen, Nurmi, & Salmela-Aro, 2012; van Zalk, Kerr, Branje, Stattin, & Meeus, 2010; for an exception see Giletta et al., 2011). Moreover, deselection effects also exist such that friends who are less similar in depressive symptoms are more likely to terminate their friendships.

Parallel selection effects are present for externalizing behaviors. Adolescents choose friends who are similar to themselves in aggression (Dijkstra, Berger, & Lindenberg, 2011; Sijtsema et al., 2010) and substance use (de la Haye, Green, Kennedy, Pollard, & Tucker, 2013; DeLay, Laursen, Kiuru, Salmela-Aro, & Nurmi, 2013; Giletta et al., 2012; Popp, Laursen, Kerr, Stattin, & Burk, 2008).

Investigators also find socialization effects with friends becoming more similar to one another over time. In terms of internalizing symptoms, this process is often referred to as contagion. Some studies indicate depression contagion within one specific friendship for each person (Giletta et al., 2011; Prinstein, 2007; Stevens & Prinstein, 2005). Social network analyses allow contagion effects to be tested simultaneously for all dyads within social groups, while controlling for selection effects. This approach indicates that adolescents become increasingly similar in depressive symptoms to peers with whom they spend time, suggesting that contagion effects are present within broad networks of affiliated peers (Kiuru et al., 2012; van Zalk et al., 2010). It is reasonable to suspect that contagion effects are stronger in closer relationships, but the evidence is mixed (Conway, Rancourt, Adelman, Burk, & Prinstein, 2011; Giletta et al., 2011; Giletta et al., 2012; Prinstein, 2007).

Recent research also highlights processes that may account for the contagion of internalizing symptoms. Having depressed peers predicts increases in middle adolescents' anticipation of failure, which predicts increases in depression (van Zalk et al., 2010). Having depressed friends also predicts co-rumination, which predicts increases in early and middle adolescents' depression (Schwartz-Mette & Rose, 2012).

A long line of research indicates that having friends who engage in deviant or delinquent behavior or use substances increases youths' own deviant/delinquent behavior and substance use (for recent examples, see Giletta et al., 2012; Piehler, Véronneau, & Dishion, 2012; Selfhout, Branje, & Meeus, 2008; Vitaro, Brendgen, & Wanner, 2005). These effects are typically found for adolescents, but even kindergarteners who have friends with externalizing symptoms develop more school conduct problems (Snyder et al., 2005).

Recent extensions also include considering context, friend, and relationship characteristics that exacerbate the risks of having deviant friends. Regarding contexts, socialization effects for risk attitudes, such as liking to smoke, skip school, and damage property, are especially strong for early adolescents who are in classrooms in which the

perceived popular youth hold these attitudes (Rambaran, Dijkstra, & Stark, 2013).

Parental engagement may also reduce risk. Children and early and middle adolescents with high-quality friendships exhibit less delinquency when parental monitoring is high but more delinquency when parent monitoring is low (Yu & Gamble, 2010). Likewise, early adolescents whose friends drink are more likely to start drinking if they spend unsupervised time together (Light, Greenan, Rusby, Nies, & Snijders, 2013). However, parents' forbidding particular friendships increases contact with deviant peers and delinquent behavior among early and middle adolescents (Keijsers et al., 2012). More work is needed to pinpoint the most protective forms of parent involvement because effectiveness may depend on the type of involvement, developmental stage, and the youths' initial levels of deviant behavior (Tilton-Weaver, Burk, Kerr, & Stattin, 2013).

In terms of adolescent friends' characteristics, the older friend is more influential than the younger friend (Popp et al., 2008) and the better-accepted friend is more influential than the less-accepted friend (Laursen, Hafen, Kerr, & Stattin, 2012). Evidence is mixed regarding whether deviant friends pose greater risks for adolescents in reciprocal (as opposed to nonreciprocal) friendships or higher- (versus lower-) quality friendships (Giletta et al., 2012; Selfhout et al., 2008). However, research on conversational processes suggests that deviant friends pose greater risks in well-functioning friendships (Dishion & Piehler, 2009). Deviancy training, in which friends respond positively (e.g., laugh) to rule-breaking talk, predicts escalating externalizing behavior in later childhood and adolescence and has even been observed in kindergarten (Snyder et al., 2008; Snyder et al., 2005). Friends in middle adolescence are at the greatest risk when the deviant talk is characterized by responsiveness, reciprocity, and cooperation (Piehler & Dishion, 2007).

Romantic Relationships

Romantic Involvement. Current or past romantic involvement is associated with depressive symptoms in adolescence, particularly for early adolescents and females (see Davila, 2008). Similarly, romantic involvement is linked to externalizing symptoms and substance use (Furman & Collibee, in press). Most research has been done in North America, but similar results have been found in China (Z. Chen et al., 2009).

Several explanatory models have been proposed (Davila, 2008): (a) a normative trajectory model—early or

precocious romantic experiences places one at greater risk for depression or other adjustment problems than adhering to developmentally appropriate norms; (b) an attention impairment model—romantic involvement takes time or attention away from other important areas of life, causing difficulties which lead to depression; (c) a stress and coping model—romantic experiences are inherently stressful, which place adolescents, especially those with poor coping skills, at risk for depression; and (d) an individual differences model—certain personality or interpersonal characteristics affect romantic experiences, leading to depression.

The normative trajectory model needs some revision because romantic experiences are linked with depression in adolescence even when they occur at an age that is typical or normative (see Davila, 2008). The alternative developmental task model proposes that romantic involvement is an *emerging* developmental task in adolescence, such that precocious involvement could undermine development (Roisman et al., 2009). Romantic involvement eventually becomes a *salient* developmental task in adulthood, and, as it does, such involvement should be linked to concurrent and subsequent adaptation. Consistent with this idea, having a romantic relationship is associated with poorer adjustment in adolescence but better adjustment in early adulthood (Furman & Collibee, *in press*).

The other three models have received support in studies examining moderators and mediators (see Davila, 2008). For example, co-rumination with friends predicts increases in depressive symptoms for early adolescent females with more romantic experiences and decreases for females with fewer romantic experiences (Starr & Davila, 2009). If romantic experiences are stressful, co-ruminating about them may be depressogenic; on the other hand, if females are not co-ruminating about romantic experiences, the experiences may be less stressful and not depressogenic. The findings also are consistent with an individual differences explanation in that females who co-ruminate are more likely to have more romantic experiences and be more depressed.

Romantic Relationship Features. Not all adolescents who are romantically involved are equally at risk. An important direction for research has been to identify the characteristics of romantic relationships that are linked to such problems. Middle adolescents with romantic relationships characterized by fewer supportive and more negative interactions are more likely to have adjustment problems (Collibee & Furman, 2013; La Greca & Harrison, 2005).

In contrast, an adolescent who reports being in love with a partner is less likely to engage in delinquent behavior (McCarthy & Casey, 2008).

Investigators have also begun to examine developmental changes in the patterns of associations between relationship characteristics and adjustment. The links between positive characteristics (e.g., support, commitment, & relationship security) and adjustment are sometimes stronger in early adulthood than in adolescence (Collibee & Furman, 2014; Meeus et al., 2007; van Dulmen, Goncy, Haydon, & Collins, 2008). Such findings are consistent with the idea that romantic relationships become increasingly important with age, and indeed are salient developmental task in early adulthood.

Romantic Partner Characteristics. Characteristics of romantic partners are also influential. In terms of substance use, the more adolescents are exposed to smoking by a close romantic partner, the more likely they are to initiate smoking and the less likely they are to stop smoking. Conversely, the more time they spend in a close romantic relationship with a nonsmoker, the more likely adolescents are to stop smoking (Kennedy, Tucker, Pollard, Go, & Green, 2011). Romantic partner substance use also predicts adolescents' subsequent substance use a year later and 6 years later (Gudino-Miller, Lewis, Tong, Tu, & Aalsma, 2012); such findings are noteworthy because most of the relationships had dissolved before a year had passed. At the same time, it is unclear if these effects on smoking and other substance use reflect selection or socialization.

Investigators have demonstrated that adolescent romantic partners are similar in adjustment, most typically in terms of externalizing behavior (e.g., Lonardo et al., 2009). However, most studies are cross-sectional and cannot address whether the similarities stem from selection or socialization effects. In a noteworthy exception, Simon et al. (2008) assessed early adolescent and romantic partner adjustment prior to and after the initiation of the relationship. Prior to their relationship, pairs were similar in depressive symptoms, indicating selection effects. An overall effect of socialization was not found, but some adolescents were socialized. Those who dated less depressed partners became less depressed; those who dated more depressed partners did not change. Moreover, only those who were high in depression showed change when paired with a partner low in depression; those who were low in depression did not change, regardless of the partner's level of depression.

Such findings are noteworthy for several reasons. The study was one of the few to examine whether some partners

are more influential than others and if some adolescents are more open to influence than others. It also illustrates the potential for healthy influences by romantic partners. This is particularly noteworthy because these romantic relationships only lasted three months on average. Finally, the observed associations were evident even after taking into account the socializing effects of friends, illustrating the unique influences of different types of dyadic peer relationships (see also Lonardo et al., 2009).

Interestingly, not only friends and romantic partners but also friends of romantic partners may be influential (Kreager & Haynie, 2011). Early and middle adolescents' prior drinking and their partners' prior drinking 18 months earlier are predictive of drinking. Notably, the adolescents' and partners' prior drinking are not very related to each other, suggesting that the partner effects are socialization effects, not selection. Friends' drinking is predictive, but not once the adolescents' prior drinking is taken into account; suggesting that the adolescents select friends with similar drinking habits. Most important, partners' friends' prior drinking is more predictive of adolescents' drinking than partners' drinking is. These associations hold after taking into account adolescents' prior drinking, suggesting that this is not a selection effect. Instead, romantic partners may serve as a bridge or liaison, connecting adolescents to new peers who promote changes in drinking behaviors and allow such behaviors to spread across peer networks.

Dating Violence

Although considerable research has examined associations between romantic experiences and internalizing or externalizing problems, one aspect of many romantic relationships is recognized as a serious problem in itself—dating or intimate partner violence. Until this century, virtually no research examined psychological, physical, or sexual dating violence in adolescence, but now the topic may be the most extensively studied topic in the field of adolescent dating and romantic relationships.

Recently, the Partner Abuse State of Knowledge Project systematically reviewed the literature on adolescent and adult intimate partner violence. Several conclusions were drawn. First, approximately half of intimate partner violence is bidirectional (Langhinrichsen-Rohling, Misra, Selwyn, & Rohling, 2012). Such findings led to an increased recognition of the importance of a dyadic perspective for understanding dating violence (O'Leary & Slep, 2012). Second, physical and psychological violence have detrimental effects not only on psychological

well-being, but also on physical health and health behavior, particularly for females (Lawrence, Orengo-Aguayo, Langer, & Brock, 2012). Third, risk factors for dating violence include minority group status, acculturation stress and other types of stress, violence between parents, experience of child abuse, antisocial behavior, and substance use problems (Capaldi et al., 2012). Family conflicts are also a risk factor, whereas parental monitoring, involvement, and support are protective. Similarly, associating with aggressive peers is a risk factor, whereas higher friendship quality is protective. Hostility toward women, relationship beliefs justifying violence, and relationship conflict are important proximal predictors.

As the number of risk factors increases, the likelihood of perpetrating violence in multiple romantic relationships in middle adolescence increases (Williams, Connolly, Pepler, Craig, & LaPorte, 2008). Moreover, different pathways exist for the recurrence of dating aggression in multiple relationships. Delinquency, aggression, and associating with aggressive peers predict recurrence for those who are accepting of dating aggression. These factors are not predictive for those who are not accepting of dating aggression. Instead, being previously involved in a conflictual and hostile relationship predicts recurrences. Perhaps the conflictual style or a sensitivity to rejection in the prior relationship is brought forward to the new relationship.

As the list of risk factors suggests, dating violence is linked with other forms of violence. At the same time, only some of those who are aggressive toward peers aggress toward a dating partner. Early and middle adolescents who are aggressive toward a dating partner as well as peers are high in depression, substance use, and family conflict and have more peer models and peer approval of deviant behavior (Foshee et al., 2011). These findings provide valuable information about factors that lead to aggression toward a dating partner in particular, and not just aggression toward nonromantic peers. Further work on identifying factors that lead specifically to dating violence is needed. Also work has begun on mediators, or developmental processes underlying dating violence. For example, feelings of stigmatization after sexual abuse are predictive of anger five years later, which predicts adolescent dating violence (Feiring, Simon, Cleland, & Barrett, 2013). Further work on underlying processes is needed. Particularly needed are studies of protective factors.

Developmental changes also may occur in risk factors. For example, heavy alcohol use increases the likelihood of dating violence by any early adolescent, but in late adolescence heavy alcohol use particularly increases the

likelihood of dating violence for those who are embedded in violent family or peer contexts (Reyes, Foshee, Bauer, & Ennett, 2012). More generally, adolescent intimate partner violence is likely to differ in nature from that which occurs in adult committed relationships. Far fewer adolescents are constrained by being married or cohabiting, having children, or relying financially on their partners. Thus, it may be easier to leave a relationship, although the desire to have a relationship may keep some adolescents in violent relationships. Adolescents also may be less socially skilled or experienced than adults; accordingly, they may have less established ideas about what appropriate behavior is for themselves or their partner. Thus, the risk factors, processes underlying the violence, and outcomes may differ, but we know relatively little about such differences.

Early interventions for intimate partner violence were relatively unsuccessful. Recently, more effective programs have been developed; changes have occurred in knowledge and attitudes, and, in some instances, violent behavior (see O'Leary & Slep, 2012; Whitaker, Murphy, Eckhardt, Hodges, & Cowart, 2013). In fact Safe Dates and the 4th R are listed in SAMHSA's National Registry for Evidence-Based Programs and Practices (<http://nrepp.samhsa.gov>). Innovative approaches have also emerged, including a family-based prevention program (Foshee et al., 2012), a program to make school buildings a safe place where sexual victimization does not occur (Taylor, Stein, Mumford, & Woods, 2013), and a program in which coaches encourage athletes to intervene when they witness dating violence-related behaviors (E. Miller et al., 2013). These and other promising programs differ from earlier ones in three important respects. First, they focus on preventing intimate partner violence, rather than treating it. Second, most target young adults and especially adolescents, the time when aggression is most likely to first occur. Finally, they recognize that intimate partner violence is most commonly mutual and thus a dyadic phenomenon; in fact, it may prove most effective to focus on both individuals' behavior, even when violence is unidirectional and solely the responsibility of one person.

Future Directions

Both similarities and differences exist in how the friendship and romantic relationship literatures have considered associations with adjustment. Both have examined the influence of having a friend or a romantic partner. Of course, the implications are different in that having friendships is a developmentally appropriate task throughout childhood

and adolescence, whereas the optimal level of involvement in romantic relationships for youth of particular ages is not clear and almost certainly varies across cultures. Both literatures reveal benefits of having high-quality relationships. Both have examined the influence of the relationship on adjustment more often than the reverse. Neither field has examined the links between the history of a relationship and adjustment. The trajectories of a relationship's features over time may be important predictors of adjustment. For example, increases in conflict may predict adjustment problems.

The romantic relationship literature indicates that ties between quality and adjustment increase with age, but we know less about developmental changes in the links for friendship. There may be developmental stages during which friendship difficulties are especially likely to forecast later relationship and adjustment problems. Specific aspects of friendships also may influence adjustment differently at different developmental stages.

The friendship literature has begun to highlight ways in which better-functioning relationships actually confer risk. Perhaps ironically, through connected and cohesive conversations, friendships can confer risk for internalizing problems through co-rumination and exacerbate risks of deviant talk on externalizing problems. Having more experience with romantic relationships is associated with both risky behaviors and psychosocial competence (Furman, Low, & Ho, 2009). Future research should consider whether there are additional hidden risks of high-quality romantic relationships as well.

Future studies are also needed to shed light on influence processes in regards to positive behaviors. One study showed that adolescents with friends who engage in prosocial behavior toward peers begin to engage in more prosocial behavior themselves (Barry & Wentzel, 2006). Additional work could examine socialization of other positive behaviors, such as volunteering in the community.

Little is known about the long-term links between dyadic peer relationships and adjustment. Dating in early adolescence is predictive of depression, but these effects dissipate over time (Natsuaki, Biel, & Ge, 2009). Similarly, conflict and poorer problem solving in romantic relationships in middle adolescence are not predictive of the long-term course of depression, but depression in middle adolescence is predictive of romantic relationship quality over the course of the next five years (Vuyeva & Furman, 2011). Aside from this work, little is known.

Violence and abuse have also been investigated in romantic relationships but not in friendships. Some children

and adolescents are victimized in friendships; whether these interactions rise to the level of violence or abuse experienced in some romantic relationships is not known. Violence may be less common in friendships than romantic relationships, but some youth might stay in very damaging friendships.

Another important direction is to identify mechanisms that underlie selection and socialization effects. For example, do individuals actively seek out similar peers for relationships or are they simply likely to meet one another because they find themselves in similar contexts? Do people change their behavior because of the partner's disapproval and the risk to the relationship? Do changes occur because of the effect on one's daily life? In regards to romantic relationships, do changes occur because of thoughts about what being in a more committed relationship entails about one's own identity?

Additionally, most work has examined how friendships or how romantic relationships are linked to adjustment, but do not consider both relationships simultaneously (see Lonardo et al., 2009; Simon et al., 2008, for recent exceptions). Supportive relationships of one kind may buffer the impact of problems in the other. Additive or interactive effects of the different relationships on adjustment may also occur. A unified relational perspective is essential to understand the interplay among the developmental trajectories of friendships, romantic experiences, and psychological adjustment.

Finally, few empirically supported programs for promoting healthy friendships or romantic relationships exist other than those that have aimed to prevent dating violence. Friendship skills are sometimes taught as part of programs to enhance peer acceptance, but no program has focused on friendships *per se*. Aside from the dating violence programs, those related to romantic relationships have focused on marital education more broadly. In fact, often the education programs are part of a broader curriculum, which may be offered as family and consumer science classes, character education programs, abstinence education programs or community-based initiatives (Karney, Beckett, Collins, & Shaw, 2007). Relatively few evaluations of the education programs exist, and most of these are quasi-experimental designs. A review of these programs characterized the results regarding their effectiveness as "at most suggestive" (Karney et al., 2007). One of the few randomized control trials of a relationship education curriculum found changes in middle adolescents' attitudes and knowledge but not behavior a year later (Kerpelman, Pittman, Adler-Baeder, Eryigit, & Paulk, 2009). Additional

evaluations and new programs are needed to determine how to promote healthy dyadic relationships.

OTHER DYADIC PEER RELATIONSHIPS

Other-Sex Friendships

The vast majority of children's and adolescents' friends are same-sex friends (Mehta & Strough, 2009). However, the proportion of other-sex friends increases with age in adolescence, especially for females (Poulin & Pedersen, 2007). Interestingly, females tend to have more other-sex friends in their out-of-school friendship networks than males do. Females' other-sex friends also tend to be older than males' other-sex friends.

Similarities and differences occur in same- and other-sex friendships. Children and adolescents see same- and other-sex friendships as similar in terms of companionship (Hand & Furman, 2009; McDougall & Hymel, 2007). However, they perceive same-sex friendships as more intimate and see themselves as more similar to or compatible with same-sex friends. Interestingly, they comment positively on other-sex friends' personalities more than those of same-sex friends'. Other-sex friends also provide opportunities to learn about other-sex peers. Compared to same-sex friendships, adolescents are more concerned about ambiguity in other-sex friendships (e.g., if one friend develops romantic feelings) and that others will misunderstand the relationship (Hand & Furman, 2009).

Notably, females may be disadvantaged in other-sex friendships (Rose, 2007). Females may alter their interpersonal styles more than males to match other-sex friends (McDougall & Hymel, 2007). Females report greater common activities in other-sex friendships than in same-sex friendships, perhaps because of the focus on common activities in males' same-sex friendships. In contrast, males do not report greater intimacy in other-sex friendships than same-sex friendships, despite females' focus on intimacy in same-sex friendships. Moreover, adolescent males seek and receive more help from other-sex friends than do females (Poulin & Pedersen, 2007; Sears, Graham, & Campbell, 2009). These studies may not be generalizable to all cultures, however. Chinese middle adolescent females report greater help and security in their other-sex friendships than do males (Cheung & McBride-Chang, 2011).

Males are more likely than females to perceive heterosocial benefits of other-sex friendships. They are also more likely than females to perceive other-sex friendships

as venues for meeting other-sex peers and to see physical attraction in other-sex friendships as a benefit of the relationships (Hand & Furman, 2009). In fact, other-sex friendships may serve as models for developing skills for romantic relationships. Middle adolescents with more other-sex friends have lower dating anxiety (La Greca & Mackey, 2007), and those with higher-quality other-sex friendships are especially likely to be in romantic relationships (Cheung & McBride-Chang, 2011).

Having other-sex friends also may be particularly risky for females' adjustment. Early adolescent females with more other-sex friends are more likely to use alcohol at age 18 (Poulin, Denault, & Pedersen, 2011); females in middle adolescence with more other-sex friends are especially likely to be smoking 1 year later (Mrug, Borch, & Cillessen, 2011). Females who increase their proportion of other-sex friends through early and middle adolescence experience increases in their alcohol and drug use (Poulin et al., 2011). These effects are not significant for males. In fact, middle adolescent males with other-sex friends are less likely than other males to be smoking 1 year later (Mrug et al., 2011). Similar findings emerge for antisocial behaviors (Arndorfer & Stormshak, 2008; Haynie, Steffensmeier, & Bell, 2007). The greater risk for adolescent females may occur in part because females' other-sex friends tend to be older, out-of-school friends (Poulin & Pederson, 2007). These friends are more likely than females' agemates to be experimenting with alcohol and drugs. In addition, because males are more likely than females to engage in antisocial or violent behavior, males may elicit these behaviors in the females.

Antipathies

Antipathies are relationships in which two individuals dislike each other. Children and adolescents with antipathies are less well liked by peers, more victimized, and have more externalizing and internalizing problems than those without antipathies (Card, 2010). The two individuals in early adolescent antipathies tend to be dissimilar in terms of perceived popularity (Berger & Dijkstra, 2013) and behavior (Güroğlu, Haselager, van Lieshout, & Scholte, 2009). Many antipathies involve one person who is antisocial and another who is withdrawn. The withdrawn one may be especially at risk for maltreatment. An early adolescent is especially likely to be victimized within an antipathy if the other youth is physically strong and aggressive and is not victimized by others (Card & Hodges, 2007). Moreover, being the more aggressive youth within an antipathy

increases risk for behavioral problems. During middle to late childhood, a child with an antipathy becomes more aggressive over time if the person who she or he dislikes is generally not aggressive, but not if the disliked one is aggressive (Erath, Petit, Dodge, & Bates, 2009). Disliking, and perhaps aggressing against, a nonaggressive peer may be more reinforcing than sharing mutual dislike with a peer who responds with aggression. This finding illustrates the importance of a relational perspective. It is important not only to examine the characteristics of the individuals, but also to consider the combination of characteristics of individuals within a dyad.

Future Directions

More work is needed on these understudied relationships. For example, more information is needed on factors that contribute to the development of other-sex friendships. Children and adolescents with interpersonal styles more characteristic of the other sex may be especially likely to have other-sex friends. However, the interplay between the partners is also likely to be important. Cross-sex dyads with similar interpersonal styles may be likely to become friends. Implications for adjustment also need to be better understood. Having other-sex friends carries risks, especially for females. However, positive experiences in other-sex friendships should foster skills needed for high-quality romantic relationships. These lines of research need to be integrated to identify how children and adolescents can reap the benefits of other-sex friendships while minimizing the risks.

A better understanding of antipathies is also needed. We need to know how antipathies develop, the nature of interactions between antipathies, and whether antipathies are ever resolved amicably. According to retrospective reports, many antipathies were formerly friends and mutual dislike developed through perceived friendship transgressions (Card, 2010; Casper & Card, 2010). Longitudinal work is needed to track the development, dyadic nature, and implications of these relationships.

Some other types of relationships have received virtually no attention. Although work on same-sex romantic relationships in adulthood has increased, little is known about such relationships in adolescence (see Diamond & Lucas, 2004, for an exception). Similarly, both the scientific field and media have focused on "friends with benefits," which young adults' characterize as relationships with ongoing sexual exchanges, often between friends (Furman & Shaffer, 2011). This work has focused on college students,

and we know virtually nothing about such relationships in adolescence, even their prevalence. Finally, although most adolescents and young adults' interactions on the Internet are with friends with whom they also interact face-to-face (Reich et al., 2012; Smahal et al., 2012), some friendships may only entail online communication; we know little about such "virtual friendships."

Although the distinctions among different types of relationships have much merit, it is important to recognize that boundaries among categories can be unclear. Someone may be uncertain whether a relationship is a romantic relationship or a friend-with-benefits relationship; certainly, two members of a dyad may disagree about the status of the relationship. Moreover, an individual may consider a relationship to fall into two categories—for example, a friendship and a romantic relationship. Overlaps between friends and biological relatives, such as cousins or siblings, may be particularly likely in non-Western cultures. In some instances, it may be valuable to focus not on friendships or romantic relationships *per se*, but to study the relationships youth consider most important (Kerr, Stattin, & Kiessner, 2007).

Further research on these understudied relationships will contribute to a unified relational perspective. As we learn more about the different types of dyadic peer relationships, we will acquire a better understanding of what features and developmental processes are specific to particular relationships and which are shared by different ones.

ISSUES FOR FUTURE RESEARCH

Definitional Issues

Many studies have simply considered the influence of peers without specifying the nature of their relationships with different peers. Yet peers are a heterogeneous group; some are close friends, some friends, some acquaintances, and some antipathies. Making differentiations among these different relationships and studying their unique contributions to development is critical for building our understanding of what is specific to friendships and what reflects effects of the general peer group.

In addition, in studies of friendship, an adolescent may list a romantic partner as a friend unless the investigator explicitly said not to do so. As a consequence, some studies of friendships may actually be studies of both friendships and romantic relationships. One could argue that romantic relationships are friendships and should be included; however, the point is that investigators should make clear to participants what kind of relationship they are studying.

Theoretical and Conceptual Issues

Although some work has been based on Eriksonian or Sullivanian theory, most research on dyadic peer relationships in childhood and adolescence has not been guided strongly by theory. Theories such as attachment theory, behavioral systems theory, evolutionary theory, the investment model, and social exchange theory have guided work on close relationships in adulthood, and seem just as applicable to children's and adolescents' relationships. More theoretically guided work would help us accumulate a more systematic body of knowledge. Mini-theories or theoretical explanations of particular phenomena are also valuable. Davila (2008) presented four possible explanations for why adolescent romantic involvement is linked to depression. Subsequent work has tested such explanations, leading to faster progress on the topic (see "Adjustment" section).

Also, much of the literature focuses only on one aspect of relationships, such as a conflict style. Focused in-depth studies of particular phenomena are essential but need to be complemented by studies that examine multiple facets of relationships, multiple predictors, or multiple consequences of relationships. If not, our understanding of relationships will be fragmented. Moreover, research simultaneously examining involvement, relationship quality, partner characteristics, and relationship history is needed. Failing to take into account all of the dimensions can lead to incorrect inferences about associations with particular dimensions.

In addition to simultaneously examining multiple variables, key variables need to be identified and isolated. In one study, for example, 13 different variables were all correlated with perpetrating dating violence, but when all were entered in the same logistic regression, only four remained as unique predictors (Banyard, Cross, & Modecki, 2006). This does not mean that the other nine variables are unimportant; whether a variable uniquely contributes is highly dependent on the other variables under consideration. However, this example illustrates the challenge of identifying key relations in complex networks of variables.

Structural equation modeling may help identify the common, potentially core, components that underlie our variables and underlie the links among constructs. For example, Kogan et al. (2013) measured three aspects of parenting in middle childhood (warmth, monitoring, & inductive reasoning) and three aspects of relationship quality in early adulthood (satisfaction, lack of verbal conflict, & absence of violence). All nine correlations between the three manifest parenting variables and the three manifest relationship

quality variables were below .22. Yet the path between a latent parenting variable and a latent relationship quality variable exceeded .50. In effect, SEM allowed measurement error to be controlled and identified underlying constructs that were linked.

Another factor that contributes to a piecemeal understanding is that separate fields of study have emerged around specific topics of interest. For example, the literature on dating violence is quite separate from that on normative aspects of romantic relationships. Similarly, sexual behavior and romantic relationships developed as separate fields, although some recent progress has been made toward integrating them. Most literature on all dyadic peer relationships has focused on specific age periods, limiting our understanding of developmental changes in the nature and function of different relationships. Literature spanning the transition from adolescence to adulthood is particularly limited (see Furman & Winkles, 2012). Indeed, the child/adolescent and adult literatures on relationships historically have had little contact with each other. This bifurcation is problematic as the literature on adults' relationships, especially their romantic ones, is quite extensive, and different from that on children's and adolescents' relationships. Fortunately, several long-standing longitudinal studies now span the transition, and developmental scientists are increasingly interested in emerging or early adults' relationships. Finally, psychology, sociology, and other disciplines are also rather isolated from one another, although the emergence of the field of relationship science has promoted interdisciplinary contact.

Methodological Issues

The increasing availability of large scale, long-standing longitudinal data sets has greatly advanced the field. At the same time, they pose methodological challenges. In our review, we repeatedly noticed differences in the specific variables examined in studies using the same data sets. For example, one paper may report results on one relationship variable, whereas another reports on a different, yet seemingly similar, variable. It is often unclear why different variables were used. The practice raises questions about the robustness of the findings. The inclusion of indices that are similar from paper to paper would strengthen the inferences that can be drawn from the study.

Data collection points in most longitudinal studies also tend to be far (e.g. a year or more) apart. This approach provides invaluable information about the development and long-term consequences of relationships, but wide-spread

time points may not be ideal for studies of mediation or process because the durations over which many variables have their strongest impact are much shorter. Short-term longitudinal studies with many points of data collection may be required to assess processes of change in friendships or romantic relationships. This work is particularly important in our field because many relationships do not even last for a year. Few such studies currently exist, but more may shortly appear as investigators begin to use smart phones and other electronic means for collecting such data.

Analytic Issues

Our analytic toolbox is much greater than a decade ago. Of particular relevance are advances in techniques for studying dyads (see Card, Selig & Little, 2008; Kenny, Kashy, & Cook, 2006). As can be seen in this paper, studies using techniques such as the Actor Partner Interdependence Model or Sienna are increasing in number. Few investigators, however, have taken advantage of sequential analyses or time series data to identify patterns of interaction in dyads. State space grids that analyze event sequences need to be explored more (Hollenstein, 2007).

Contemporary analytic tools, such as growth curve analyses or analyses of between- and within-person effects, allow for examination of the developmental course of particular relationships, a topic that has been neglected. Such techniques can also be used to examine how trajectories of predictors are associated with relationships and how trajectories of relationships are associated with outcomes (e.g., Fraley, Roisman, & Haltigan, 2013; Vuyeva & Furman, 2011).

In addition, recently developed statistical models permit the identification of trait and state elements of behavior. Specifically, trait-state-occasion and trait-state-error models allow one to determine how much a characteristic is stable over time (i.e., a trait) and how much varies from occasion to occasion (Cole, Martin, & Steiger, 2005). Moreover, what variables are predictive of the trait and occasion components of behavior can be examined to determine how stable characteristics of individuals contribute to patterns of interaction. For example, approximately 50% of the variation in late adolescent and young adults' negative behavior toward a friend or romantic partner can be attributed to a trait component, whereas the remaining proportion is occasion specific (Hatton et al., 2008). Moreover, the trait component is predicted by a mother's earlier negative behavior toward the adolescent and the adolescent's self-evaluation, negative emotionality, and

security of romantic representations; none of these factors predicted the occasion-specific variance. The difference in the predictors of the trait and occasion components illustrates the challenges of determining what underlies particular interactions in relationships.

More work testing mediation is also needed. We have made great progress identifying variables that are associated with different facets of dyadic peer relationships, but we know less about why they are related. This chapter includes a number of examples of such process-oriented work that illustrates its potential. Process work should prove particularly valuable for dyadic phenomena, such as mutual dating violence, where each person may play a role.

Existing studies of mediation have made progress in that more studies incorporate three time points rather than one. However, virtually all of these studies have assessed the predictor at time one, the mediator at time two, and the outcome at time three, which is not as strong as designs in which all three variables are assessed at all three times (Cole & Maxwell, 2003). Without such an assessment, it is difficult to determine if the mediator is actually involved in the process or simply covaries with the variables that are responsible. Indeed, few studies have examined multiple potential mediators, leaving it unclear clear whether the studied mediators are key processes or are simply associated with key processes. Moreover, the nature of the associations between predictors and outcome variables is often not clear. That is, if the variables treated as predictors at time one had been assessed at time three, they might have been predicted by the variables treated as outcomes if those variables had been assessed at time one. As noted, most studies examining family variables have examined how family processes predict subsequent friendships or romantic relationships and have not examined how friendships or romantic relationships predict family processes. Similarly, most studies examine how friendships predict romantic relationships, whereas only a few examples of the reverse exist.

Whether early experiences with friends or romantic partners have enduring effects on competence is also of interest. An early experience could anchor a child's developmental trajectory and directly influence later behavior by processes such as cognitive representations that are consolidated early in development. Alternatively, seemingly long-term effects may be indirect; that is, an experience may affect competence at an early age, which affects subsequent competence. Moreover, seemingly long-term effects could stem from consistencies in experiences over

time. Statistical techniques now exist for differentiating such models (Fraley, Roisman, & Haltigan, 2013).

Understudied Topics

Genetic Factors

Recent work suggests that the examination of genetic factors has promise (see Brendgen, 2012). A few studies have examined gene-environment correlations, or the degree to which different dimensions of friendships are associated with the genetic make-up of individuals. Genetic factors appear to be weakly related (van Lier et al., 2007) or unrelated (Brendgen et al., 2008) to young children's tendency to have aggressive friends. However, genetic factors contribute to young children's tendency to have socially reticent friends (Guimond et al., 2013), and older children and adolescents choose friends based on their own genetic makeup (see Brendgen & Boivin, 2009).

A few investigators have also examined gene by environment interactions, or whether experiences with friends exacerbate or mitigate genetic risks. For example, children with a genetic predisposition toward depression are less likely to be depressed if they have friends (Brendgen et al., 2013). Children with a genetic predisposition toward physical aggression are especially aggressive if they have aggressive friends (Brendgen et al., 2008; Van Lier et al., 2007). We know of only one study that has used molecular genetic techniques to study adolescent peer relationships (Fraley, Roisman, Booth-LaForce, et al., 2013); that study found little evidence for genetic antecedents of late adolescent romantic attachment styles. Clearly, more work is needed on genetic factors. Such work also would provide information about nonshared environments as discrepancies between monozygotic twins may stem from nonshared environmental influences.

Psychophysiological and Neurological Processes

Research on psychophysiological, neurological, and other biological processes has exploded in the past decade; however, only a few studies have considered such processes in children or adolescents' friendships or romantic relationships. This work primarily focuses on the neuroendocrine and autonomic nervous systems (see Murray-Close, 2012). Notably, friendship experiences can mitigate physiological stress responses. A child's physiological response to stress as reflected in cortisol levels is mitigated when a best friend is present (Adams, Santo, & Bukowski, 2011). In addition, children who are rejected by classmates have a flattened diurnal cortisol rhythm, suggesting

hypothalamic–pituitary–adrenocortical (HPA) axis dysregulation. Importantly, this flattened diurnal rhythm is most pronounced for children with few or low-quality friends (Peters, Riksen, Walraven, Cillessen, & de Weerth, 2011). Thus, work on psychophysiological processes in regards to dyadic peer relationships is in its infancy. Moreover, although marked advances have been made in neuropsychology, we are unaware of research that examined neurological processes and the dyadic peer relationships of children or adolescents.

Adolescent Parents

Studies of adolescent romantic relationships have focused on youth who are not residing with their partners, yet a significant minority of adolescents cohabit with their partners, often raising children together. Little research exists on the relationships between adolescent parents, yet such relationships may prove to be key to the couples' and their children's adjustment (see Moore, Florsheim, & Butner, 2007).

THE MERITS OF A UNIFIED RELATIONAL PERSPECTIVE

In this chapter, we have argued for a unified relational perspective. Our thesis has several key points. First, friendships and romantic relationships need to be studied as relationships. They are dyadic phenomena with a history; they are influenced by each person's characteristics, the interaction of their characteristics, and the pattern of their interactions over time. Each person affects the other person's behavior within an occurrence of interaction, and each occurrence affects subsequent occurrences. To date, work has focused primarily on individual's characteristics and, to a lesser degree, partner's characteristics. We have learned much from this work yet without more work on the partner, the interfacing of the person and the partner's characteristics, and especially the temporal history of their interactions, we will have an incomplete picture of the relationship and its impact. Indeed, the fact that relationships develop over time underscores the importance of studying interpersonal processes in the dyad, a seriously understudied topic.

Second, our unified relational perspective emphasizes that close peer relationships share some common features. The specific nature of the similarities (and differences) needs to be delineated further as only few studies have compared interactions in friendships and romantic

relationships (Furman & Shomaker, 2008). Moreover, although we described links between friendships and romantic relationships, the literatures on the two relationships are not that connected. We reviewed the literature on the two types of relationships in parallel to encourage greater cross-fertilization. As seen in our review, the two fields often focused on different issues, yet many topics examined in relation to one type of relationship could be studied in regards to the other type of relationship. Certainly, some facets of friendships and romantic relationships are not the same, and differences in research topics are expected. However, we can profit from greater coordination in the theory, method, and research topics in the two fields.

Third, our unified relational perspective emphasizes the importance of multiple contextual factors. A key factor is that any relationship is embedded in a network of dyadic relationships. Different relationships affect one another, and we should consider the set of relationships simultaneously.

One reason for examining networks of relationships is that the characteristics of different relationships often covary. For example, levels of support in middle adolescents' relationships with friends, romantic partners, and mothers are moderately related (Laursen, Furman, & Mooney, 2006). In fact, the three common configurations of relationship networks in middle adolescence in a U.S. sample are those in which levels of support are high in relationships with friends, romantic partners, and mothers, low in all three, or low in relationships with friends and mothers, and no romantic relationship. These similarities in different relationships underscore the importance of a unified relational perspective.

Most studies have included one type of relationship as a predictor or one type as an outcome; few have included multiple relationships assessed at the same age (see Lonardo et al., 2009; Stocker & Richmond, 2007, for exceptions). Including multiple relationships as concurrent predictors in the same study, even the same analysis, can help identify what links are common across relationships and what links are specific to one type of relationship. Evidence of convergence and divergence may lead to a better understanding of the nature of the relationships. Moreover, one type of relationship often moderates the effect of another type of relationship (e.g., S. Miller, Gorman-Smith, et al., 2009). On a related point, the examination of behavior in multiple types of relationships can also provide a better understanding of both the behavior itself and its significance. For example, sexual intercourse

with special romantic partners is not related to delinquency, but intercourse with nonromantic partners or with both romantic partners and nonromantic partners is linked to increases in delinquency (McCarthy & Casey, 2008). An understanding of sexual activity will require that we take the relational context into account.

The fact that an adolescent often does not have a current romantic partner underscores the importance of a network perspective. When an adolescent is not in a relationship, the functions fulfilled by that relationship are either unfulfilled or fulfilled by another relationship. By examining when another relationship substitutes for a romantic relationship and when it does not, we can identify processes common to different relationships and those particular to romantic relationships. We also can learn about the impact of romantic relationships by comparing characteristics of social networks when a romantic relationship exists and when one does not.

Moreover, little research has examined associations in multiple types of relationships simultaneously; thus little is known about whether, *within an individual*, differences among different types of relationships are associated with other differences in relationship cognitions, behaviors, or outcomes. One study of middle adolescents examined associations between patterns of interactions and relationship representations with mothers, friends, and romantic partners (Furman, Stephenson, & Rhoades, 2013). The results revealed that the more positive interactions there are in one relationship relative to the individual's own average level of positive interactions across relationships, the less avoidant the representations are for that type of relationship. Associations between representations of one relationship and interactions in another relationship do occur but are attenuated when representations of the same type of relationship are controlled for. Attachment theory has emphasized cross-relationship links, but it is important to consider how cognitive representations and experiences within a particular type of relationship affect each other as well.

Finally, our unified perspective not only emphasizes the importance of the system of close relationships but also of contextual factors, such as the peer group, media, culture, and historical time. Dyadic peer relationships cannot be understood without incorporating the contexts in which they occur; conversely, these contexts need to take close dyadic relationships into account to understand how they influence individuals and development. In effect they are part of a multilevel system that is constantly evolving as the different parts influence one another.

In sum, dyadic relationships are both part of a system of relationships and are embedded in multiple levels of context, all of which influence one another. As a consequence, they are key to our development, well-being, and health. Indeed, a recent meta-analysis revealed that they have as big an impact on mortality as well-known risk factors, such as smoking, obesity, and substance use (Holt-Lunstad, Smith, & Layton, 2010). Stated simply, relationships are powerful and should be central in our work as social scientists.

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CHAPTER 23

Religious and Spiritual Development

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INTRODUCTION

Religion and spirituality have long been integral in the human experience. Fittingly, some of psychology's early giants wrestled with the religious and spiritual impulse, such as James' (1902/1982) deep exploration of religious and spiritual experience and Freud's (1927/1961) dismissal of religion as a universal neurosis. The field's early turn to objectivist, positivist science and the rise of behaviorism contributed to a neglect of religiosity and spirituality in empirical psychology. This neglect has occurred in

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developmental science as well. But times have changed, as reflected dramatically by the first-ever inclusion in 2006 of a chapter on religion and spirituality in the *Handbook of Child Psychology*. (In contrast, the 1998 edition had a mere handful of references to religious or spiritual topics.) The 2006 chapter, "Religious and Spiritual Development Throughout the Life Span," by Oser, Scarlett, and Bucher, emphasized a theoretical life-span approach, appropriate for its position in *Volume 1: Theoretical Models of Human Development*. In light of burgeoning research on these

topics, this chapter is situated in the more research-focused *Volume 3: Socioemotional Processes*.

Our chapter reviews current knowledge on child and adolescent religiousness and spirituality and presents a vision for the future. We examine theoretical frameworks but focus on the recent explosion of findings on religion and spirituality in childhood and adolescence. As such, we first describe religious and spiritual development as unique domains of human development and explore how young people develop in both. Second, we discuss how religion and spirituality may serve as developmental systems or contexts that contribute distinctively to child and adolescent development.

We first discuss the field's recent growth and describe the demographic landscape of religion and spirituality in the lives of children and adolescents, in the United States in particular. We present data indicating that religion and spirituality are important aspects of the everyday lives of millions of young people in our world. We then move to the challenge of defining our terms—religious and spiritual development. Next, we examine major theoretical perspectives that are particularly helpful for understanding religious and spiritual development. We then devote most of the chapter to religion and spirituality in childhood and adolescence. We attempt to elucidate what religious and spiritual development entails and how religion and spirituality may matter in the lives of youth. Finally, we offer suggestions for a more integrative science of religious and spiritual development as well as map future directions for the field.

For several reasons we discuss children and adolescents separately. First, there is an ever-growing number of scholars and practitioners particularly interested in adolescence. Thus, developmental scientists have become increasingly age segregated, if you will, with the strong establishment of the Society for Research in Adolescence and many adolescence journals. Second, the designs and samples of studies are almost always age-segregated themselves; in fact, a distinct shortcoming of the field is the dearth of longitudinal or even cross-sectional studies spanning childhood and adolescence. Third, the foci of religion and spirituality research are different for the two age periods. Research on children is dominated by a cognitive-developmental orientation that examines how children *think* about religious topics (e.g., God) and a socialization orientation that focuses on the family and parent-child dynamics. In contrast, little work on adolescents examines their religious cognition, and the socialization approach is considerably broader, incorporating peers, ethnic issues, and other factors. Finally, in

contrast to the growing but still small amount of work on children's well-being in relation to religion and spirituality, extensive research on adolescents is concerned with religion and spirituality in association with psychosocial issues such as identity, thriving, risk, and resilience. Thus, when developmental scientists talk about children's and adolescents' religion and spirituality, they are often talking about different things.

At the outset, we want to note a couple of limitations of our chapter. The study of religious and spiritual development in children and adolescents has not, until recently, been anywhere close to a mainstream concern of scholars. Thus, in many ways the field is in its nascent stages. Consequently, the existing literature is limited in its scope. For instance, existing research is dominated by U.S. samples as well as Western assumptions regarding the self and human development. Given the unusually high rates of religiousness in the United States (Lippman & McIntosh, 2010) and the history of the field of psychology of religion within the American Psychological Association, it may not be surprising that the extant research comes largely from the United States, on American samples; hence our literature reflects this. That said, we do review studies from outside the United States as well as examine literature that focuses on many particular ethnic groups in the United States. In addition, the vast majority of research has focused on how religion and spirituality are associated with variables that are standard psychological outcomes (e.g., mental health, academic performance, substance use). Consequently, our review here says relatively little about how religion and spirituality may be linked in children and adolescents to more extreme negative outcomes, such as intergroup hostility, violence, or terrorism. We hope that future research may illuminate whether childhood and adolescent socialization experiences influence the odds for youths' involvement in such violent and antisocial acts, but for now the psychological literature is rather quiet on these matters within the age range that is the scope of our chapter.

DEMOGRAPHICS OF ADOLESCENT RELIGIOUSNESS AND SPIRITUALITY

Across cultures and continents, many adolescents endorse strong religious beliefs (Lippman & McIntosh, 2010). One apparent trend is a de-emphasis on traditional religious values as countries became more developed, and another theme is the "clear imprint" of some countries' influential

religious traditions leading to higher rates of religiosity among youth.

Benson, Scales, Syvertsen, and Roehlkepartain (2012) conducted a “global portrait” of youth spirituality among 6,725 youth ages 12–25 spanning eight countries across five continents. Participants were invited through in-country research partner organizations to complete primarily web-based questionnaires. Although sampling was not random, efforts were made to represent a range of socioeconomic and educational backgrounds. The results suggested that spirituality and religion are relevant to many of the world’s youth. According to Benson, Scales, et al., 77% of youth indicated some type of religious affiliation, with Christianity the largest (49%), followed by Hinduism (15%), Islam (9%), Buddhism (2%), and “other religion” (2%). Approximately 18% of respondents indicated that they did not ascribe to any religious affiliation. Most participants indicated that the following aspects of spirituality were important life goals: following God or a higher power (61%), feeling close to God or a higher power (65%), and praying, meditating, and studying sacred texts (69%).

Major overviews of the literature demonstrate that religion and spirituality are prominent in children’s and adolescents’ psychological development (Pargament, Mahoney, Exline, Jones, & Shafranske, 2013; Roehlkepartain, King, Wagener, & Benson, 2006). The most representative study of religion in American youth documented that the vast majority of adolescents (84%) affiliate with one particular religious group (Smith & Denton, 2005). In terms of specific religious identifications, NSYR data show that most U.S. youth self-identify as Christian (75%) with 52% identifying as Protestant and 23% Catholic. In addition, 2.5% self-identify as Mormon, 1.5% as Jewish, 0.5% as Muslim, and another 1%–2% with other religions. Approximately 3% of adolescents self-identify with two different religions, likely due to the increase in interreligious marriages in U.S. society. The 16% minority of NSYR adolescents who did not report any religious identification were labeled *nonreligious*. Among these, most self-identified as “just not religious” (10%), “atheist” (1.5%), or “agnostic” (1.5%). The remaining 3% of “nonreligious youth” seemed uncertain, suggesting some adolescents may have “unexplored” religious identities. Some teenagers who did not identify with a religion were raised in a household where religion was present. Interview data suggested that intellectual skepticism and disbelief were the main reasons for lack of religious transmission in these homes.

Although “nonreligious” youth are a minority, this segment of youth is growing. According to ChildTrends

(2013) Monitoring the Future Data, during the 1990s the percentage of youth reporting that religion was very important in their lives fluctuated slightly, though in general it increased among all grades studied. But between 2000 and 2010, the share of youth who report such a role for religion decreased significantly, from 37% to 29% among 14-year-olds, 32% to 25% among 16-year-olds, and 32% to 27% among 18-year-olds. Thus, as in the adult population (Pew Forum, 2012), the numbers of religiously unaffiliated adolescents are increasing.

Perhaps the most studied variables indexing religiousness beyond religious self-identification is individuals’ self-rated importance of religion and frequency of attendance of religious services. These measures are often combined and globally referred to as religiosity or religiousness. (Combining these different kinds of variables may be problematic, as some index identity or beliefs and some index religious behavior, though the different measures are usually highly correlated.) Smith and Denton (2005) reported that about half of U.S. adolescents (Ages 13–17 years) indicate a strong and positive orientation to religion and faith in their lives and the other half have little or no regard for them. Recent analysis suggests that just more than a quarter of U.S. adolescents report that religion is “very important” to them (ChildTrends, 2013). ChildTrends noted that, despite a rise in youth who report attending a service once a week from 1991 to 2002, religious attendance decreased significantly between 2002 and 2010 for 14-, 16-, and 18-year-olds, dropping from 44% to 39%, 42% to 33%, and 35% to 30%, respectively.

Sex differences in adolescent religiousness and spirituality are consistently reported. ChildTrends (2013) reported a higher proportion of females responding that religion is very important in their lives. Specifically, in 2010, this gender gap increased slightly with age, from four percentage points among 14-year-olds, to five points among 16-year-olds, to seven among 18-year-olds. Similarly, Smith and Denton (2005) reported that, compared to adolescent boys, adolescent girls aged 13–17 years old were more religious on a broad spectrum of indices, as girls were more likely to: attend religious services, see religion as shaping their daily lives, have made a personal commitment to God, be involved in religious youth groups, pray alone, and feel closer to God. These differences remained after accounting for youths’ social backgrounds.

Consistent with national data on adults, African American adolescents were more likely than European American ones to report that religion played a very important role in their lives (ChildTrends, 2013). In 2010, 46% of

African American 18-year-olds reported that religion was very important whereas only 24% of European American adolescents did. Differences in lower grades were smaller but consistent. Latino 16-year-olds were slightly more likely than European American 10th graders to report that religion plays a very important role in their lives, but Latino students of other ages were not significantly different from European American students. Similarly, African American students reported higher rates of regular attendance than European American students, though the gap decreased with age. Compared to their European American peers, 14-year-old Latina/o American students reported lower rates of regular attendance but no significant attendance differences in 16- and 18-year-olds.

HISTORY OF THE STUDY OF CHILD AND ADOLESCENT RELIGION AND SPIRITUALITY

In light of the role of religion and spirituality among contemporary children and adolescents, it is disconcerting that religion and spirituality have been so neglected within developmental science as contexts and domains of development. As we will indicate, these contexts seem to have a strong impact on child and adolescent well-being, prosocial and antisocial behavior, coping, values, sense of purpose, and identity. Fortunately, we have witnessed a surge of interest during the past 15 years in religion and spirituality in child and youth development.

At one end of the scholarly pipeline, dissertations on children and spirituality have increased, with most appearing since 2000, and a four-fold increase in the number of dissertations from 2007 to 2012. At the other end of the pipeline, of the peer-reviewed articles published in six top-tier developmental journals¹ from 1990 to 2012, the percentage on religion and spirituality increased by more than 50% from 1990–2002 to 2003–2012, with 1.4% of all articles addressing this topic (Benson, Roehlkepartain, & Rude, 2003). In addition, many major volumes have recently appeared, including the *Handbook of Spiritual Development in Childhood and Adolescence* (Roehlkepartain et al., 2006), with 34 chapters on a broad spectrum of contexts and developmental domains within spiritual development. Other recent publications have included

an encyclopedia of religious and spiritual development (Dowling & Scarlett, 2006), and edited books focusing on cognitive-developmental issues (e.g., Rosengren, Johnson, & Harris, 2000) and spirituality and thriving (Lerner, Roeser, & Phelps, 2008; Warren, Lerner, & Phelps, 2012). The past decade has also seen a spate of special journal issues on religious and spiritual development (Boyatzis, 2003), religion and spirituality in the family (Boyatzis, 2006a), and religion and spirituality in adolescence (Benson, Roehlkepartain, & Hong, 2008; Boyatzis & Hambrick-Dixon, 2008; King & Boyatzis, 2004). As noted earlier, the 2006 edition of the *Handbook of Child Psychology* for the first time included a chapter on religious and spiritual development (Oser et al., 2006). Prior to 2000, there were no edited volumes, handbooks, handbook chapters, or special issues on child and adolescent religious and spiritual development in the developmental sciences.

It is clear that research in this field has not only grown in quantity but improved in quality. Recent studies have advanced beyond the typical earlier study that tested for correlations between a single religiousness variable (often parents' worship attendance) and a child outcome. While this correlational approach is still common in the field, recent studies feature more complex conceptualizations of variables, more sophisticated quantitative approaches, and more in-depth qualitative approaches.

DEFINITIONS OF RELIGIOUS AND SPIRITUAL DEVELOPMENT IN CHILDHOOD AND ADOLESCENCE

A recent proliferation of descriptive approaches to defining religiousness and spirituality has characterized the field of psychology of religion and spirituality (see Pargament et al., 2013). Initially, in psychology the terms *religion* and *spirituality* were used synonymously (see James, 1902/1982). Until recently this area of study has been plagued by conflation and confusion of terms, but we are now moving toward more clarity. As the field has evolved, the concepts of religion and spirituality have begun to diverge both in scholarship and popular culture (Koenig, McCullough, & Larson, 2001). For example, young people are increasingly identifying as "spiritual, but not religious" (Smith & Denton, 2005). In the literature, religion is increasingly conceptualized as an organized socio-cultural-historical system, and spirituality as an individual's personal quest for meaning, satisfaction,

¹Child Development, Developmental Psychology, International Journal of Behavioral Development, Journal of Adolescent Research, Journal of Early Adolescence, and Journal of Research on Adolescence.

and wisdom. For instance, a widely used definition of religion is:

... an organized system of beliefs, practices, rituals, and symbols that serve (a) to facilitate individuals' closeness to the sacred or transcendent other (i.e., God, higher power, ultimate truth) and (b) to bring about an understanding of an individual's relationship and responsibility to others living together in community. (Koenig et al., 2001, p. 18)

From this perspective, religiousness refers to the extent to which an individual has a relationship with a particular institutionalized religion's approach to ultimate reality. This relationship occurs through affiliation with an organized religion, participation in its prescribed rituals and practices, and reflection or embrace of its espoused beliefs. Religious development would then entail the qualitative change and growth in the engagement in and understanding of the religious community and its rituals, creeds, sacred texts, and beliefs.

In contrast, Koenig et al. (2001) defined spirituality as "a personal quest for understanding answers to ultimate questions about life, about meaning, and about relationship to the sacred or transcendent, which may (or may not) lead to or arise from the development of religious rituals and the formation of community" (p. 18). This conception aligns with the view of personal religiousness or spirituality as a "search for the sacred" in which the sacred is an individual's concept of God, the divine, and transcendent reality, as well as other aspects of life that take on divine character or are imbued with divine-like qualities, such as transcendence, immanence, boundlessness, and ultimacy (Pargament et al., 2013). It is also consistent with definitions from the field of youth development that emphasize a capacity for self-transcendence and goals of awareness, connectedness, meaning, purpose, and contribution (Benson et al., 2012; Good, Willoughby, & Busseri, 2011; King, Clardy, & Ramos, in press; Lerner et al., 2008).

From a youth development perspective spiritual development was initially understood as growth in "the intrinsic capacity for self-transcendence, in which the self is embedded in something greater than the self, including the sacred... shaped both within and outside of religious traditions, beliefs, and practices" (Benson et al., 2003, pp. 205–206). Recent research suggests that spiritual development involves "transactions that are characterized by transcendence leading to a clarity and commitment of beliefs and identity resulting in behaviors that contribute to the self and society" (King, et al., in press). This definition's latter thrust—that spiritual development results

in contributions to self or society—is typically absent in notions of children's spiritual development (e.g., Hay & Nye, 1998) but is more prevalent in the adolescent literature (e.g., Benson et al., 2012). Other scholars have asserted that spirituality is intrinsic to human beings and is "a self-transcending awareness that is biologically structured into the human species" (Hay, Reich, & Utsch, 2006, p. 50).

These definitions offer helpful starting points in this emerging field and characterize spirituality as (a) a human propensity; (b) socialized and shaped by multiple experiences, sometimes within organized religion but also outside it in multiple social and natural contexts; and (c) characterized by a sense of connectedness and *relationality* to what is beyond the self. We use the term *relationality* to emphasize the centrality of relating to another or others for human development (Kuczynski & De Mol, Chapter 9, this *Handbook*, Volume 1; Lerner, 2006; Overton, 2013) in general and in spiritual development in particular (King, Ramos, & Clardy, 2013; Mahoney, 2010, 2013). Spirituality, then, is not restricted to a particular religious doctrine or sacred entity; God or a theistic version thereof is not *a priori* the only transcendent entity with which children or teens could experience relationships. These definitions also suggest that children's spiritual and relational consciousness emerge prior to religious socialization (Hay & Nye, 1998). The positing of a spiritual propensity in very young children presupposes that children are spiritual beings first and then are acculturated (or not) within a religious tradition that channels inchoate spirituality into particular institutional expressions (rituals, creeds, etc.). These definitions also convey that children's spirituality is subject to many influences, including family and culture.

One proposal (C. N. Johnson & Boyatzis, 2006) is that spiritual development proceeds from intuitive understanding to increasingly reflective thought about what is beyond the self. Children possess powerful inference mechanisms for intuitively sorting out reality and the supernatural. Such intuition is integrated with increasing reflection and is supported and scaffolded by cultural practices that orient the child to cultural modes of spiritual knowing and being. Thus, spiritual development arises not from mere acquisition of knowledge about the transcendent but from increasingly meaningful and organized experiential connections of the self to, in James's (1902/1982) words, the "something more." These connections transform the self by shaping beliefs, values, identity, fidelity, and actions.

Although an emphasis on personal as opposed to institutional levels may clarify the distinctions between religion and spirituality, there is considerable overlap between

them. Religion ought not be viewed as purely institutional; important individual-level processes such as interpreting and constructing religious worldviews are central to child and adolescent religiousness. Conversely, when spirituality is treated too narrowly as an individual phenomenon, the varied ways that spirituality grows and expresses itself in intimate relationships, families, congregations, and cultures may be overlooked. Indeed, many personal spiritual expressions are embedded in larger religious or social contexts. Religion and spirituality are multidimensional constructs with diverse cognitions, feelings, behaviors, experiences, and relationships and must be considered multilevel from theoretical and methodological vantages. Given the increasing conceptual clarity in the field, we try to distinctly use “religion” and “spirituality” based on the constructs under discussion. However, these terms are still often conflated in the literature and when unable to draw distinctions we will refer to “religiousness and spirituality” or to “religious and spiritual development.”

As we turn to theory, in our view there is no satisfactory “grand theory” of religious and spiritual development. Although some extant theories elucidate specific areas of religious and spiritual development, it is unclear whether they can capture the breadth and complexity of religious and spiritual development. As stated by King and Roeser (2009, p. 439):

The study of religion and spirituality in developmental science hinges upon whether it is possible to formulate *good* theories from which scientists derive clear and scientifically tractable definitions of what religion and spirituality *are* substantively, what they *do* functionally...and how they *develop* systematically.

THEORIES OF RELIGIOUS AND SPIRITUAL DEVELOPMENT IN CHILDHOOD AND ADOLESCENCE

Although an exhaustive review of theories related to religious and spiritual development is beyond the scope of this empirically focused chapter (see King & Roeser, 2009; Oser et al., 2006), we review theories within development science that are helpful to understanding the nature and function of religion and spirituality in development.

Psychoanalytic and Attachment Approaches

Due to space limitations, we combine psychoanalytic and attachment accounts of religious development. According

to object relations theory, individuals internalize affectively charged representations of their relationships with significant others such as parents as “psychic objects.” These images of parents serve as “templates” for God images (Rizzuto, 1979). In this theory, God images are posited to serve as “transitional objects” that can reduce attachment insecurity as children develop independence from caregivers and in the face of significant change and stress. Rizzuto emphasized that one’s private, subjective, “living” God is often different from any “official” God of organized religion. Developmentally, this private, living God emerges prior to formal religious socialization, developing in early childhood as a transitional object based on emotion-laden images of both parents and of self. This focus on the vital link between the child’s early experiences with one’s parents and the child’s God image has much in common with attachment theory.

Attachment theory is an important framework in the study of religious development. Building on Bowlby’s theory (e.g., 1988), Kirkpatrick and Shaver (1990), and Granqvist (e.g., Granqvist & Dickie, 2006) have likened individuals’ relationships with God to their relational attachments to parents. The fundamental tenet is that the internal working model of the parent-child relationship is used as an internal working model for the individual’s image of and relationship with God. Throughout life, the activation of the attachment system leads the individual to seek comfort (or not) from God in times of stress, as the child would (or not) from a parent. The models most often tested are the correspondence model and the compensation model.

The *correspondence model* posits that individuals’ internal working models of their attachments to their parents serve as the basis for the God attachment: those securely attached to their parents would have secure attachments to God, and those insecurely attached to parents would have insecure attachments to God. In contrast, the *compensation model* posits that an early insecure attachment with an earthly parent does not seal one’s fate with a divine parent but that one can develop an attachment to God as a substitute attachment figure, due to God’s perceived responsive and consistent loving, forgiving, and protective functions. There is evidence for both processes in adults but in children there is only limited evidence for correspondence, as the compensation process may not emerge until adolescence or later (Richert & Granqvist, 2013).

Nevertheless, the correspondence hypothesis is supported by some work on children. When asked to place a symbolic God figure on a felt board near a child figure

in an attachment-activating scenario, children who were securely attached to their mothers placed the God figure closer to the child than did children who were insecurely attached; this pattern occurred in Swedish 5- to 7-year-olds (Granqvist, Ljungdahl, & Dickie, 2007) and Italian 6- to 8-year-old children (Cassiba, Granqvist, & Costantini, 2013). Adolescents with secure attachments to parents are likely to adopt the faith and God images (or lack thereof) of their parents (e.g., Hertel & Donahue, 1995). The compensation process has received support in other studies. Children were more likely to describe a loving, present God if their fathers were absent from the home (Dickie et al., 1997). Adolescents with insecure attachments were likely to seek security by joining religious organizations and others rejected their parents' religion due to their distant or difficult relationships with parents (Smith, 2003b).

Across childhood and adolescence, attachment theorists would suggest that children begin with a "living God" representation based on the relationship with their parents, and across childhood and adolescence increasingly view God in relational and interpersonal terms. Thus, explicitly conscious relational images of God may become more salient during adolescence. This trend is manifested in adolescents' prayer concepts that show a move from children's concrete instrumental view of prayer as "talking to" God toward the adolescent view that prayer is more conversational "talking with" God (Scarlett & Perriello, 1991). In sum, attachment theory may elucidate many aspects of religious and spiritual development though better measures are needed to capture children's more implicit content and functions of the God image and attachment at nonconscious, physical, and nonverbal levels (E. B. Davis, Moriarty, & Mauch, 2013).

Cognitive-Developmental Approaches

To a considerable extent the study of children's religious and spiritual development has been the study of children's thinking about religious concepts (e.g., God, prayer), and thus has reflected developmental psychology's broader Piagetian-cognitive hegemony. Cognitive-developmentalism posits several tenets of cognitive development applied to religious cognition: qualitatively distinct stages of thinking that are yoked to a specific age range, a progression from concrete to abstract understanding, and the march from immature thought to the *telos* of mature abstract and rational thought.

In the 1960s, David Elkind conducted a series of important studies in the Piagetian cognitive-developmental

tradition on children's religious cognition (e.g., Elkind, 1961). Elkind's work on children's prayer concepts (Long, Elkind, & Spilka, 1967) and his broader theoretical explication (Elkind, 1970) are exemplary accounts of that era's approach. His work confirmed theoretical expectations that children's religious thinking showed stage-like progress from concrete and egocentric to more abstract and socio-centric thought. Religious cognition was merely a specific case of a generic conceptual process.

A new wave of cognitive-developmentalism in the 1980s ushered in a rejection of global stages that characterized, at any one age, all of a child's thinking and replaced them with models of domain-specificity, viewing the child as a builder of naive folk theories of specific domains (e.g., Carey, 1985). By the 1990s, domain specificity and research on children's theory of mind had become so central in the field that scientists viewed children's religious concepts (e.g., God) as part of the general growth of understanding of the mind, agency, and mental-physical causality. Children's religious cognitions were understood to operate under the same tendencies of children's everyday cognition but within specific domains of thought (Boyer, 1994).

In the case of beliefs about God, the anthropomorphic God images common to children and adults arise from the natural extension and application of an intuitive folk psychology (used to understand people) to supernatural figures. These ontologies possess several key features. First, they include counterintuitive beliefs (i.e., they violate ordinary expectations, as in the case of spiritual entities who are immortal or omniscient). Second, counterintuitive religious beliefs operate within the implicit backdrop of theory of mind that equips children with a prepared set of qualities to extend to religious agents (e.g., "My supernatural God has wishes and thoughts and worries [just like all beings with minds do]"). Third, the combination of the agents' counterintuitiveness with the judgment that such agents are *real* make the beliefs more salient to those who hold them, and their salience enhances their likelihood that they will be transmitted to others.

Another revision is the claim that children's and adults' thinking may not be altogether different. Magical thinking and rational thinking, "ordinary" and "extraordinary" reality, and other thought processes that seemingly compete with each other may in fact all coexist in the minds of children and adults. As Woolley (2000) put it, "children's minds are not inherently one way or another—not inherently magical nor inherently rational" (pp. 126–127). Such claims shake the venerable views of the child as cognitively

immature and cognitive growth as an invariant, stage-like march from irrational fantasy toward the *telos* of rational logic. This new characterization has been supported by a review of children's and adults' thinking about origins of life, death, and illness. Legare, Evans, Rosengren, and Harris (2012) concluded that as children get older they do not "lose" early intuitive thought processes but instead develop a coexistence model that integrates their previous intuitive and often supernatural accounts with later-developing scientific explanations. Legare et al. found that supernatural explanations were used more often by adults than younger children. Thus, supernatural beliefs—in developing and industrialized countries—do not diminish with age and with exposure to scientific knowledge from education or culture. Cognitive-developmental theories of religion and spirituality will surely evolve in relation to our broader accounts of cognitive development.

Faith Development Theory

Perhaps the most comprehensive stage theory was James Fowler's (1981) Faith Development Theory, a synthesis of the stage theories of Erikson, Piaget, and Kohlberg to explain the ontogeny of faith development. Fowler asserted that faith is a relational construct, incorporating the self in relation to others and in relation to some shared center of transcendent value or significance that exerts an ordering significance on one's life. This center of value in major religions is God or some transcendent reality, though one's center of value and thus faith need not be religious; Fowler claims that one's center of value could be an ideology or cause (e.g., nationalism, environmentalism) or a personal priority (e.g., career, money). One's faith, then, reflects and shapes one's deepest values, beliefs, and meanings and reflects "the human quest for relation to transcendence" (p. 14) and to the universal.

Here we describe the two stages of faith that correspond to the age range of interest in this chapter. During middle childhood (corresponding to Erikson's stage of industry versus inferiority and Piaget's stage of concrete operations), children are in a "mythic-literal" stage. Religious principles are taken at face value with a moral realism to them, and symbols are one-dimensional, with little conceptual or symbolic analysis. Faith is built around concrete story-like narratives whose meanings come from culturally available meaning systems. A challenge late in this stage is reconciling narratives from different sociocultural sources that would lead to conflict or dissonance (e.g., reconciling Biblical and evolutionary accounts of human origins).

With the onset of early formal operational thinking, young adolescents enter a "synthetic-conventional" stage in which they adopt the shared centers of values of others (conventional) without much reflection or analysis (hence synthetic). At this time, young adolescents' ability to be aware of what other people think can make youth sensitive to others' judgments of them and be susceptible to the "tyranny of the they" and a herd mentality regarding the shared centers of value they may adopt. Thus, adolescents are prone to embrace shared centers of value that could be profoundly different, ranging from love and justice to hate or nihilism. The adolescent synthetic-conventional faith is an "absorbed" and tacit one that is conformist rather than critically scrutinized. These more introspective processes emerge in later adolescence, corresponding to the faith stage Fowler labeled "individuative-reflective," when youth move from an absorbed tacit faith to an examined explicit faith orientation that is more truly one's own.

Although some agree with the proposed general stage progression, Fowler's theory has been criticized for its structural and cognitive basis and for its suggestion that children are limited to less mature forms of faith (e.g., Balswick, King, & Reimer, 2005). At most chronological ages, even the subjects in Fowler's original study showed striking individual variation (see Boyatzis, 2005, 2013, on these problems). Thus, psychologists of religion have criticized stage theory for failing to capture the diversity of faith at any one age, especially the unevenness and nonlinear nature of faith progression (Hood, Hill, & Spilka, 2009), just as developmentalists have rejected traditional stage theories for failing to capture variation in development at any one particular age.

Relational Developmental Systems Perspectives

As empirical challenges have highlighted the limitations of stage theories, relational developmental systems perspectives are increasing in popularity. These theories emphasize that ontogeny occurs through mutually influential relations between individuals and the many levels of the bioecology in which they are embedded across time (Lerner, 2006; Overton, 2013). Development occurs at all levels of the system—biological, psychological, social, cultural, and so forth. As such, relational developmental systems theory provides a meta-framework consistent with bioecological theory (Bronfenbrenner, 1974), sociocultural theory (Vygotsky, 1978), and social transaction models (Kuczynski, 2003).

From a relational developmental systems perspective, religious and spiritual development occur through ongoing transactions between individuals and their multiple socio-cultural contexts (Lerner, Dowling, & Anderson, 2003). Religious development can be described as the systematic changes in how one understands and participates in the doctrines, practices, and rituals of religious institutions. Thus, from a relational developmental systems approach, as a young person interacts with friends, family, faith community, and so forth, he or she will change in beliefs, commitments, and engagement in religion. This process is well recognized. Less clarity exists regarding the nature of spiritual development. Scholars are now addressing what exactly develops in spiritual development (Benson et al., 2012; Good et al., 2011; King et al., in press; Warren et al., 2012).

Recent theoretical and empirical literature suggests that relationality is central to spirituality. These systemic approaches highlight bidirectional relations, or reciprocity, between young people and their world. From this perspective, it is not just the interactions that influence spiritual development, but the interactions themselves, the capacity for transcendence, and the young persons' responses are central to spiritual development.

Transcendence involves a shifting of a young person's cognitive and emotional orientation from one's self to another in such a way that it provides ultimate value and meaning beyond the mundane and material, shapes identity, and motivates an active response (Lerner et al., 2008). When a young person experiences a meaningful connection with something of significance beyond him or herself, he or she may become aware of and feel connected to peers, nature, God or a divine entity, a sense of all of humanity, or a specific religious community.

However, not all transactions are transcendent. Specifically, those transactions between an individual and another (e.g., God, nature, community) promote transcendence when the interaction informs beliefs, meaning, identity, purpose, and/or fidelity and serves to motivate contribution to the well-being of the world beyond themselves. This contribution does not necessitate a public interaction, but research on adolescents suggests that spirituality involves living and acting consistently with one's beliefs (Benson et al., 2012; Dowling et al., 2004; King et al., in press; Warren et al., 2012).

Consequently, spiritual development involves transcendence, transformation, and action. We must note that these latter processes would be more readily apparent in older youth than younger children. One implication is that

spiritual development at any age would share fundamental characteristics (e.g., a relational connectedness to what is beyond the self) but have different manifestations and effects at different ages.

Although an expression of the divine is not needed to instigate spiritual development, the forces that stimulate spiritual growth are imbued with divine-like qualities, such as immanence, boundlessness, and ultimacy (Pargament et al., 2013). This spiritual transcendence instigates, as James (1902/1982) described, systematic changes within the self and leads to increases in one's awareness (Benson et al., 2012), identity (Templeton & Eccles, 2006), fidelity (King et al., in press, 2013), purpose (Damon, Menon, & Bronk, 2003), and action (King & Benson, 2006).

To summarize, relational developmental systems theories are framed within a relational meta-model that provides a set of person-context processes useful for exploring the complexity of spiritual development. For instance, relational developmental systems theories point to the plasticity of human development (Overton, 2013) and the resulting capacity for change and growth in development generally, and in spirituality specifically. Such approaches also emphasize the reciprocity of interactions between young persons and their world, highlighting that spiritual development is an active process and involves relating and responding. Such personal transformation or growth and contribution or service to the greater good is reflected in many spiritual and religious traditions. The relational developmental systems theories' emphasis on diversity and the interactions *within* the individual and *between* individual and context acknowledges the complexity of spiritual development. As such, religious and spiritual development are linked to processes in other developmental domains, as highlighted by our discussion of attachment and cognitive-developmental approaches and, as we discuss later, identity and moral development.

Relational developmental systems may be the most current formulation of understanding adolescent spiritual development. Although the meta-model provides a promising lens through which to view and investigate religious and spiritual development, empirical research has only begun. The research presented in this volume points to other studies indicating that spiritual development is an active process and not only involves transcendence but personal transformation as evidenced by identity, fidelity, and actions consistent with one's beliefs. Relational developmental systems theory provides an integrative approach to human development and helps us see how spirituality interacts with all of the levels within the developmental system.

Accordingly, our discussions in this chapter explore many systems that shape religious and spiritual development as well as how religion and spirituality influence child and adolescent development. However, before reviewing existing literature on child and adolescent religious and spiritual development, we examine reciprocating spirituality in order to emphasize the importance of bidirectional relationships between young persons and their context that contribute to religious and spiritual development.

Reciprocating Spirituality

Collectively, these relational-systems frameworks articulate a view of spiritual development that involves the development of key psychological processes (e.g., attachment, cognition, and—as we shall argue—identity) that emerge and grow as young persons interact with their surrounding environment. Relationality is key to our understanding of spirituality, and signifies the importance of attachment, whether young people attach to a transcendent other out of prescriptive internal working models or a need to compensate because of deficient working models. Though recent conceptualizations have emphasized relational spirituality (King et al., 2013; Mahoney, 2010), we propose *reciprocating spirituality* as a more appropriate formulation that conveys the relational and active processes in spiritual development.

Spiritual development involves the growing capacity to transcend the self, requiring the increase of cognitive and emotional capacities to be aware of and grasp that which is beyond the self, while reciprocally growing in self knowledge and understanding. This process requires the development of identity, purpose, values, meaning-systems, and eventually results in fidelity to an ideology. Further reciprocity is evident as the young person then responds to transcendence out of a sense of fidelity with actions that are consistent with their beliefs, values, and self-concept. Such actions are characterized by contribution, compassion, and leadership and require prosocial, moral, and civic development (Lerner et al., 2003). Spirituality is more than a feeling of transcendence, but a growing sense of identity or awareness that motivates or propels young people to care for themselves and to contribute to the greater good (King et al., 2013).

No doubt this description paints a picture of mature spirituality that is characterized by connection, commitment, and coherence (King et al., in press). As in all domains of development, this process takes place in the ongoing bidirectional interactions between individuals and their

context. This process is not linear. Research has noted that children's imagination and lack of analytical skills enable them to engage in spiritual emotions of wonder and awe (Roehlkepartain et al., 2006), and be more open to spiritual experience, whether through nature or religion (Fowler, 1981). Furthermore, loss, challenge, and doubt may also deepen faith by making meaning out of difficult situations and by renewed devotion or commitment to spiritual ideals.

Consequently, we recognize that spiritual development varies across individuals depending on their development and integration of the various psychological processes involved. For example, younger children may not have the reflective skills necessary to consciously integrate their experiences of the sacred or their beliefs with their identity and actions. Mentally handicapped children's spiritual development may be more based on their relational capacities than cognitive capacities. We believe that the spiritual development trajectory is unique for all people based on their individual (e.g., biological, psychological) factors and their relations with their contexts (e.g., cultural, religious). Despite these diverse expressions, we argue that the developmental trajectory of reciprocating spirituality is toward coherence of transcendence, fidelity, and contribution. As such we propose the notion of reciprocating spirituality to capture the complexity and richness of this developmental process. We next discuss the development of religion and spirituality and their roles in childhood and adolescence.

CHILDHOOD AND RELIGION AND SPIRITUALITY

This section integrates theory and research on different topics in children's religious and spiritual development and focuses on the most current and rigorous research. We have chosen these specific topics because they have clearly dominated, for decades, the research on children. In addition, the research has described the emergence of the cognitive and relational capacities necessary for reciprocating spirituality. One area of research reflects cognitive-developmental approaches to children's thinking about religious concepts; this work posits that there are cognitive-maturational processes that shape such thinking. A different but related approach is a sociocultural and social ecology view that examines how children's thinking about religious and spiritual topics is associated with the beliefs of their parents or other socializing agents. This work often tests the degree to which children's religious

cognition corresponds to or is independent from their parents' religious cognition. Another focus is on socialization dynamics and parent-child relationships that may affect children's religiousness or spirituality. A relatively new area of work examines links between children's behaviors and specific constellations of their parents' religiousness and parenting; an important lesson from that body of work is that the interactions between these variables are particularly revealing about how religion "works" in the family. After that, we address religion and children's well-being to learn whether the available evidence supports the notion that religion and spirituality are "good" for children. In that section, we offer important caveats about avoiding simplistic interpretations and conclusions and instead urge researchers to recognize the complex and nuanced relationships between religiousness and child outcomes. Finally, we offer important new directions for research on children.

Cognitive-Developmental Approaches to Religious Cognition

The venerable emphasis in developmental psychology on children's thinking is abundantly evident in work on children, religion, and spirituality. This section provides an overview of the major specific domains of children's religious cognition.

Children's Concepts of God

The longest-studied religious-cognition topic is children's thinking about God. This focus is not surprising, given that God and the relationship with God is the central component of most organized religions and that most research has been done by Westerners in Western settings, where monotheism predominates. The most robust conclusion from this work is that children think about God in anthropomorphic terms. Studies on religiously diverse samples have found widespread anthropomorphism with some denominational variation. In his collection of school-children's drawings, Coles (1990) found that 87% depicted God's face. Pitts (1976) sampled 6- to 10-year-old children and found the most anthropomorphic God drawings by Mormon, Mennonite, and Lutheran children and the least by Jewish and Unitarian children, consistent with the God imagery in their religions. Heller (1986) also found that Hindu children, more than Jewish, Baptist, or Roman Catholic children, described a multifaceted God who feels close and like a person in some ways yet is also an abstract and intangible form of energy. Hindu children's beliefs

reflect their doctrine about different gods with different natures and functions. Taken together, these studies show that many children anthropomorphize God but also that children in different religions and cultures conceptualize God in diverse and often nonanthropomorphic ways that reflect the impact of sociocultural influences.

The anthropomorphizing tendency has been typically explained by cognitive-developmentalists as resulting from an extension of an intuitive folk psychology to supernatural figures (Boyer, 2001). However, research by J. L. Barrett et al. challenges this view of the child's God as a personified God. J. L. Barrett and Keil (1996) and J. L. Barrett and Richert (2003) have studied young children to test whether they equate God's qualities with human qualities (i.e., think about God anthropomorphically). They have offered an alternative, "preparedness" hypothesis, which posits that children are prepared conceptually at young ages to think about God's *unique qualities*—not only those shared with humans. In one study (J. L. Barrett, Newman, & Richert, 2003) 5-year-olds claimed that God, but not their mothers, would immediately understand ambiguous drawings. In another (J. L. Barrett, Richert, & Driesenga, 2001), 3- to 7-year-old children claimed that God but not their mothers would know the contents of a cracker box that actually contained rocks. A study (Wigger, Paxson, & Ryan, 2013) of 3- to 8-year-old children challenged the anthropomorphism hypothesis because, with age, children made increasingly appropriate attributions of knowledge to real friends, imaginary friends, and dogs, but their claims of God's knowledge did not change with age—God was omniscient at all ages. Provocatively, while imaginary companions were less knowing than God, they were more knowing than real friends or dogs. N. Knight (2008) found somewhat similar results with Yukatek Mayan children in Mexico, who viewed the "Catholic God" as more knowing than other figures including people, animals, the Sun God, and forest spirits. As in the Wigger et al. study, these latter invisible entities were endowed with more knowledge than humans or animals.

However, in an excellent study, Lane, Wellman, and Evans (2010) addressed the preparedness argument. They tested young children's beliefs about ordinary characters (mom, a girl) and extraordinary ones (God) using a false belief task. The young preschoolers (40- to 52-month-olds) failed to attribute false beliefs to any characters; all characters including God would know a crayon box had marbles, hence God was not special in this knowledge. Children in the middle age group (53- to 59-month-olds) said that ordinary characters and God would have false beliefs, hence

God was not omniscient. In the oldest group (59+ months) children said that ordinary characters would mistakenly think the box held crayons but God would know it held marbles. These data suggest that young children are prepared to first think about God in anthropomorphic terms and only later, around age 5, adapt and overcome those propensities to appreciate God's counterintuitive, special abilities. Lane et al. note that their interpretation is supported by other studies. For example, in one study of Greek Orthodox children, 3- and 4-year-olds claimed that both a young girl and God would be ignorant of the hidden contents of a box; only at the age of 5 did children believe that God would have unique knowledge of the box's contents (Makris & Pnevmatikos, 2007). Thus, both hypotheses—that God is an anthropomorphized figure and that children are prepared to recognize God's uniqueness—have received support, and future research must determine under what testing and sociocultural conditions children seem to endorse one over the other. For example, we need more evidence on children from families (from atheist to fundamentalist) and religions (monotheistic to polytheistic) that vary widely in their theistic views.

Children's Concepts of the Soul and Afterlife

Although children's thoughts about the soul have received less empirical attention than God concepts, more scientists are exploring how children think about death, the soul, and the afterlife. Contemporary cognitive-developmental work indicates that children's beliefs about the afterlife are related to children's early distinction between minds and bodies (Bering & Bjorklund, 2004; Richert & Harris, 2006). Children know that physical/biological functions cease at death; however, children do not clearly see that death terminates all mental and emotional processes.

Bering, Blasi, and Bjorklund (2005) used a clever task involving a mouse (puppet) eaten by a hungry alligator to study afterlife beliefs in 5- to 12-year-old secular and Catholic children in Spain. Results showed that children, especially younger ones and children who attended a religious school, understand that biological processes cease at death but that psychological processes continue in the afterlife. If children hold early intuitions about the afterlife, they are reified and scaffolded by surrounding familial and cultural practices that provide ample testimony and rituals. As Bering et al. (2005, p. 600) stated, in a socialization milieu that regularly espouses the continued spiritual life of the deceased, "biological reasoning about the psychological status of dead agents may be set aside

in favor of explicit religious ideas that defy naturalistic principles." Richert and Harris (2006) have claimed that, rather than thinking of people as dualists in the traditional body/mind or body/soul dichotomy, humans may think more along a tripartite model of fundamental essences—of the body, mind, and soul—and while body and mind die the "soul" persists after death. Such concepts would arise, Richert and Harris claim, from surrounding testimony that commonly draws such distinctions. For example, children would be unlikely to hear phrases such as "the mind lives on" but would commonly hear "the soul (or spirit) lives on." Future research must learn more precisely how testimony from parents and organized religion about the soul/afterlife affects how children understand death and afterlife.

Children's Understanding of Prayer

William James (1902/1982) claimed that prayer is the "very soul and essence of religion" (p. 464) and that prayer is a central ritual in many religions. Perhaps the earliest study of how children understand prayer was by Long et al. (1967). Younger children (5 to 7 years of age) described prayer as an emotionally neutral, perfunctory act at specific times and locations. Prayers were said by all children, prayers came from heaven and God, and God had to process prayers one at a time. In the early elementary school years (7 to 9 years of age), prayer was seen as a specific act motivated by a desire (often to ask God for material objects). Prayers were not said by all children because some were too sleepy to pray and some did not "want anything." In later school years (9 to 12), prayer became a mental, private activity to communicate with God. Prayer was no longer yoked to ritual events, and beliefs motivated prayer: Those who didn't believe in God didn't pray. Older children saw prayer as a means to ask God to respond to more abstract, humanitarian needs such as peace, and a coping function was evident because children said negative emotions could lead to prayer.

Scarlett and Perriello (1991) explored concepts of prayer in adolescents who were asked to write prayers they would make in response to hypothetical vignettes (e.g., a friend was ill with cancer). Age trends emerged in the content and functions of prayers, as 13-year-olds made petitions to God to help the friend get well, 15-year-olds asked God to give the friend strength for her struggles, and college students expressed a search for meaning amidst doubt. When describing the nature and function of prayer, subjects' responses progressed with age from objective concerns (asking God for things) to subjective issues

(coping with feelings) to becoming closer to God. Other analyses revealed that young people's beliefs progressed from thinking of prayer as "talking to" God to "talking with" God, reflecting increased maturity in both the breadth and depth of relationality with the transcendent.

Subsequent research corroborated and refined the developmental patterns. Bamford and Lagattuta (2010) tested 4-, 6-, and 8-year-olds and adults on a variety of measures. Interview questions included "Can prayer be done in the head or do you have to say words?" and "Is prayer the same thing as talking to God?" After being given a story and vignette, children were asked how the characters' diverse feelings might inspire the characters to pray and how praying might help their feelings. With increasing age, children better understood that prayer is a mental activity done in one's head (endorsed by 45% of 4-year-olds but 84% of older children) and that prayer and talking to God are the same thing (43% of 4-year-olds but 90% and 94% of 6- and 8-year-olds). Children also came to better appreciate the role of emotions in prayers. Four- and 6-year-olds believed that positive emotions more than negative ones would cause people to pray, whereas 8-year-olds believed that both kinds of emotions would similarly inspire prayer. From 6 to 8 years of age there were significant increases in beliefs that negative emotions would lead to prayer and declines in beliefs that positive emotions would. As for the emotional benefits of praying, children felt that people would feel better after praying.

Bamford and Lagattuta (2010) also tested two alternative hypotheses: a *religious socialization model* in which children's knowledge of prayer (tapped by the questions described above) would be associated with their level of religious experience and education, and a *cognitive maturation model* in which children's prayer concepts would reflect age-related cognitive constraints. Parents provided data on children's religious activities (e.g., prayer with others, discussion about religion with parents, etc.). Although children's understanding of prayer was positively correlated with religious activity in the two younger ages, on most measures there were no relationships between children's religious activity and their prayer knowledge. Only 4-year-olds showed a link between religious activity and prayer knowledge but this association emerged on a minority of measures. Thus, this study does not support the socialization hypothesis, and neither did another study on parents' religiosity and their young children's comprehension of prayer (Woolley & Phelps, 2001). Bamford and Lagattuta noted that there may be other ways, not addressed in their study, that socialization could influence children's

prayer sophistication, but overall the results supported the cognitive maturation model in early childhood.

Summary of Cognitive-Developmental Approaches

The above review shows that exciting work has investigated how children think about entities and processes that are central to world religions and children's sociocultural contexts. This work reflects a Piagetian-infused focus on structural change in children's thinking as well as a more contemporary understanding of how children recruit both endogenous cognitive processes and cultural inputs to shape their thoughts. A sociocultural account of children's religious cognition underscores the fact that children's (and adults') thinking takes place in a rich social milieu. In our view, a key goal for future work is to synthesize methods and interpretive frameworks from cognitive-developmental and sociocultural approaches into a more helpful multilevel analysis of children's religious and spiritual cognition and growth in order to understand how cognitive abilities contribute to more fully developed spirituality. Future research must also correct an imbalance in the literature: We know much about *how children think* about God, prayer, and the afterlife, but less about *how do children feel* about such issues, and whether it matters? More work (perhaps informed by attachment theory) is needed on children's affect and emotion-laden responses to God, prayer, and the afterlife. How are children's personal feelings about God related to their own self-esteem, anxiety, or depression? Do these outcomes differ for children who believe in God and those who do not? What kinds of feelings about God motivate young children's prosocial behavior? We touch on some pertinent work below, but we know little about these questions that might illuminate more fully how personal religion "matters" for children.

A Social-Ecology Approach to Children's Religious and Spiritual Development

Several frameworks organize our thinking about the myriad social influences on children's religious and spiritual development. A bioecological model (Bronfenbrenner & Morris, 2006) posits multiple interrelated contexts of influence on children's development. These contexts range from proximal *microsystems* (e.g., family, school, peer group, religious community) to more distal *macrosystems* (e.g., dominant cultural values and ideologies). Thus, it takes a village to raise a religious or spiritual child but the family is the "first village" (Boyatzis, 2005, 2013). In this section we focus on the family because this context has received

by far the most empirical attention. The adolescent section below addresses the family as well as additional contexts (for an extensive treatment of sociocultural contexts, see Roehlkepartain et al., 2006).

A sociocultural model emphasizes the influence of knowledgeable adults and peers who scaffold children in culturally meaningful practices to help young apprentices move to higher competence (Rogoff, 2003; Vygotsky, 1978). Hence, parents, relatives, clergy, educators, older siblings, and knowledgeable friends can act as mentors. Such mentors can guide children to more advanced levels of spiritual connectedness to the sacred and, in religious contexts, greater understanding and engagement in rituals, creeds, and worship. A sociocultural perspective suggests that parents' practices and beliefs give children "cognitive anchors" (Ozorak, 1989).

Another framework for family processes (Kuczynski, 2003) is a transactional model positing that children and parents influence each other in bidirectional, reciprocal exchanges. This conception, which is associated with relational developmental systems theories (see Kuczynski & De Mol, Chapter 9, this *Handbook*, Volume 1), departs from the traditional view that parents shape children in a unilateral Parent→Child fashion. That "transmission" model long dominated religious socialization research but, as we discuss below, and again reflecting relational developmental systems ideas, scholars now endorse a more dynamic conceptualization of multidirectional influences (see Boyatzis, 2005; Boyatzis, Dollahite, & Marks, 2006).

Children's religious and spiritual beliefs and attitudes may be shaped and influenced in various ways within the family through induction of beliefs (from subtle persuasion to dogmatic insistence), narrative, rewards and punishments, and behavioral modeling. Children may revise their implicit religious theories and beliefs when exposed to conflicting parental testimony or experiences that support alternate accounts (P. L. Harris & Koenig, 2006) or as "secondary adjustments" brought about through "third-party discussions" in the family (Kuczynski, 2003, p. 10) about religious and spiritual issues. In addition, the earlier section on religious cognitions makes clear that whatever input or testimony children receive from their families must be processed through the child's inherent cognitive structures. For example, in studies of adolescents, children's own religious beliefs are more strongly related to their perception of what their parents believe than what the parents themselves report believing (Bao, Whitbeck, Hoyt, & Conger, 1999; Okagaki & Bevis, 1999).

Communication and Beliefs About Religion and Spirituality in the Family

One challenge in studying the family context is to identify immediate, proximal processes within parent-child relationships that go beyond measures of relationship quality (Mahoney & Tarakeshwar, 2005). A good candidate for such a proximal process is parent-child conversation about religion, which may be an important mechanism through which parents socialize their children. In a study of Christian families (Boyatzis & Janicki, 2003) with children aged 3 to 12, parents completed a religious-conversation diary for 2 weeks as well as survey measures on the topics, frequency, setting, and processes involved in such conversations. Parents (overwhelmingly mothers) and children discussed religious and spiritual issues close to three times per week; the most common topics in this Christian sample were God, Jesus, and prayer. Analyses of diary conversations revealed that children were active participants in conversations—they initiated and terminated about half the conversations, spoke as much as parents did, and frequently asked questions and offered their own views.

These data suggest that, in family discourse about religion, children are active participants rather than passive recipients of ideas "transmitted" by parents, and that, in many families, a bidirectional style is more prominent than a uni-lateral parent-to-child dynamic. For instance, Flor and Knapp (2001) assessed Christian families with school-age children in the rural U.S. South. Regression analyses revealed that frequent bidirectional communication about religion predicted the importance of religion and belief in God for children. These patterns were especially apparent in same-sex dyads (mother-daughter, father-son). Thus, an open communication style between parents and children may influence children's religious development. (The later adolescent section describes additional work that confirms these bidirectional processes.) Future work should examine how different parenting styles and parental religiosity variables (e.g., fundamentalism) interact to shape parents' communication style and impact on children.

A study by Braswell, Rosengren, and Berenbaum (2011) studied Midwestern Protestant and Catholic parents' beliefs about religion (and magic and science) and whether they encouraged their children to hold such beliefs. Parents felt it was important for their children to learn about religion (M of 4.4 out of 5) though they felt it was more important for them to learn about science (M = 4.6). Interestingly, parents felt that it was important for their children to learn

about religion at a significantly younger age (4.9 years) than about science (5.4 years). When asked to choose different mechanisms through which their children should learn about religion, parents almost never chose "on their own" but 31% chose "with help" and 64% "on their own with help." The strength of parents' religious beliefs was highly related ($r = .76$, $p < .001$) to the belief that they should encourage such beliefs in their children.

Parents' endorsement of mythical, culturally salient characters such as Santa Claus, the Easter Bunny, and the Tooth Fairy is sometimes related to their children's belief in them (Prentice, Manosevitz, & Hubbs, 1978; Rosengren, Kalish, Hickling, & Gelman, 1994), but correspondence between parents and children is not so strong as to suggest children think what their parents want them to. When parents encouraged their children to believe in the Easter Bunny, 23% did *not* believe, and when parents discouraged belief, fully 47% of their children *did* believe in the Easter Bunny (Prentice et al., 1978). These findings attenuate the notion that parents somehow "transmit" their beliefs to children in some simple uni-directional fashion.

Taylor and Carlson (2000) reported parents' attitudes about children's fantasy play through ethnographies and interviews. Parents' religious views influenced their reactions to children's fantasy and engagement with imaginary companions. Mennonite parents had strongly negative reactions to imaginary companions whereas Hindu parents often reacted positively, perhaps believing that communication with invisible companions may be a way for children to interact with spirits from a past life. This interpretation reflects their religious tradition of belief in reincarnated and metaphysical entities.

Evans (2000) compared the beliefs about origins (Creationist or evolutionist accounts) of children in secular families and in fundamentalist Christian families, who also attended religious schools or were home-schooled. To some degree, family type did matter—fundamentalist Christian children overwhelmingly embraced Creationist views with virtually no endorsement of evolutionist ones. However, even young children (7 to 9 years of age) from *secular* homes embraced Creationist views, and not until early adolescence did youth in secular homes begin to consistently share their families' evolutionist cosmologies. Evans notes that in even a "saturated" belief environment, sociocultural messages are filtered through the child's intuitive belief system.

Overall, family research indicates that both cognitive-developmental and sociocultural theories are informative. The evidence is limited on just how similar or "anchored"

children's beliefs are relative to their parents', but the available data make clear that the independence and distinctiveness of children's thoughts refutes simplistic models portraying children as passive recipients of parental beliefs and instead highlights children's active roles in their religious and spiritual development (for more on children's agency, see Boyatzis, 2011).

While parent-child communication has long been a topic of mainstream family research, developmental scientists have given scant attention to parent-child communication about religion and spirituality. We believe that future work will prove this family dynamic to be a crucial locus of children's (and parents') religious and spiritual growth. However, further research is needed to more fully understand how parents' beliefs are conveyed in their *actual* behavior and communication; this is a crucial missing piece of the religion and family puzzle. More data are also needed on what "mix" or balance of parents' verbal communication about religion and their overt behaviors (e.g., praying with or attending worship with children) constitutes the most "saturated" or effective context for religious socialization. Such work will be most informative if it bridges the dominant cognitive-developmental and sociocultural models of religious and spiritual development.

RELIGION IN THE FAMILY: THE VALUE OF MULTIPLE VARIABLES AND INTERACTION EFFECTS

Although religiousness is recognized as highly multidimensional, more than three quarters of studies on religion and family from the past three decades measured religiosity with only one or two items (Mahoney, 2010). As Boyatzis (2006b) noted, family research would benefit from the study of diverse populations with measurement of multiple dimensions of religiousness, parenting, and child outcome, using multiple informants. Here we highlight several studies that capture some of these qualities and illustrate the value of measuring multiple variables and the interactions of both parent religiousness and parenting behavior.

One of the most important and challenging dimensions of parenting is discipline, which is related to parents' religiousness in complicated ways. For example, parents with conservative Protestant affiliations endorse and use spanking more than other parents (Gershoff, Miller, & Holden, 1999). However, a stronger predictor is a continuous psychological variable—parents' theological conservatism

and belief in Biblical literalism and inerrancy (Gershoff et al., 1999). Building on this finding, Murray-Swank, Mahoney, and Pargament (2006) tested mothers' use of spanking in relation to their theological conservatism in interaction with their sanctification of being a parent, that is, how much they imbued their parent role with sacred and divine qualities and saw parenting as "God's work." Conservatism and sanctification were not related independently to mothers' spanking, but the interaction between mothers' conservatism and sanctification predicted spanking. Specifically, theologically conservative mothers were more likely (than other conservative mothers) to spank their children if they also viewed their parental role as sanctified, sacred, and holy; in contrast, mothers who were theologically liberal were less likely (than other liberal mothers) to spank if they also viewed their role as sacred and holy.

Volling, Mahoney, and Rauer (2009) measured parents' disciplinary strategies and sanctification of parenting in relation to their preschool children's moral conduct. The more parents sanctified their role, the more they used induction (e.g., focusing on consequences of children's wrongdoing) and positive socialization techniques (e.g., approving good behavior). A key finding was that parents' positive techniques combined with sanctification of parenting to predict children's conscience development. A similar interaction obtained for children's affective discomfort: After misbehaving, children's apologizing and concern for others was highest when parents used positive socialization techniques *and* were high in sanctification of parenting.

In another study, Dumas and Nissley-Tsiopinis (2006) analyzed a diverse sample of families with preschoolers. Parents reported on sanctification of parenting and style of religious coping in response to children's defiant behavior. Sanctification did not predict children's behavior, but oppositional behavior increased when parents' religiousness was low and when mothers used negative religious coping (e.g., expressing anger at God, feeling abandoned by God). Thus, children's defiant behavior was most evident at the intersection of different facets of religiosity.

Summary of Research on the Social-Ecology of the Family

To understand the family's influence on child religious and spiritual development, new methods and designs are needed to elucidate the dynamics of parent-child relationships. Too many studies rely on parental self-reports. Future work could employ additional measures, such as direct observation of parents and children discussing

spiritual issues or engaging in shared religious rituals or practices. Another constraint in the literature is the correlational nature of designs. Future work could use longitudinal and cross-lagged designs to test whether parent-child spiritual discourse at Time 1 is causally related to youth religiousness or spirituality at Time 2. Many questions remain and it will help to use multiple measures of parenting and of proximal constructs (e.g., sanctification) rather than more global ones (e.g., religious affiliation, church attendance) (Mahoney, 2010). We now turn to work on other dimensions of well-being in children.

Children's Religiousness, Spirituality, and Well-Being

A core question in the psychological study of religion and spirituality is whether and how these constructs are related to well-being (Koenig et al., 2001; Pargament, 1997). These issues have been explored in samples of normal children on outcome variables ranging from attachment to internalizing/externalizing symptoms to psychosocial constructs. Other studies have explored religious and spiritual elements in coping and outcomes in children facing acute or chronic challenges ranging from family dysfunction to medical problems to surrounding violence.

Given the generally positive role of religion and spirituality in myriad adult outcomes (Koenig et al., 2001; Pargament, 1997), an underlying hypothesis motivating this work on children is to test whether religiosity would serve positive functions, buffering children from stress or conflict in problematic situations or simply promoting positive adjustment in more optimal conditions. The research demonstrates that religion and spirituality do not have simple or direct effects in any monolithic, positive manner. Nevertheless, it is extremely rare to find any negative or undesirable links with children's outcomes. However, many studies show that religion and spirituality are associated in complicated, nuanced ways with various outcomes in various populations of children. This corpus of work on children affirms the wisdom of Pargament's (1997) admonition that asking if religion is good for people is too simplistic and that the more fruitful and valid question is, what dimensions of religion and spirituality are related to which outcomes in which populations?

Religion and Coping by Children in Difficult Circumstances

K. A. Davis and Epkins (2009) examined whether 11- to 12-year-olds' private religious practices such as prayer, scripture reading, and listening to religious programs

would buffer them against the impact of family conflict. The children's religious practices showed no direct association with their depressive and anxiety symptoms, but they did moderate relations between family conflict and the children's anxiety and depression. Specifically, family conflict was more related to young people's depression and anxiety when youth were low (as opposed to high) in private religious practices. Similarly, school-age children who prayed frequently were significantly higher in protective resources such as social connectedness and a sense of humor (Rew, Wong, & Sternglanz, 2004).

Two studies have measured how sick children use religion to cope. A qualitative study of children with cystic fibrosis (Pendleton, Cavalli, Pargament, & Nasr, 2002) found that children described 11 different religious coping strategies, including petitioning God to intercede, working with God to cope with their struggles, and expressing discontent with God or their congregation. Children felt that most of these strategies helped them with their illness. In a study of children with asthma, Benore, Pargament, and Pendleton (2008) found that the quality of children's lives and asthma severity were largely unrelated to the importance of religion and religious activities reported by parents (e.g., children's prayer/attendance frequency, religious education). In regressions that controlled for secular coping and the importance of religion, positive religious coping (e.g., "I think God is watching over me") did not predict unique variance in most outcomes, although it did predict—paradoxically—more worrying by children when they were hospitalized (which may have triggered greater use of positive religious coping). However, negative religious coping (feeling abandoned by God or feeling angry at God) during hospitalization predicted lower quality of life related to asthma, higher depression, and higher anxiety. One month later, negative coping predicted higher anxiety whereas children who used more positive coping came to feel closer to God and their faith communities.

To learn if religion has a protective buffering effect for abused children, J. Kim, McCullough, and Cicchetti (2009) examined normal and maltreated children from low-income families. This study was the first, the authors claimed, to test whether parental religiousness would be related to adjustment outcomes in maltreated children. Results showed parents' religiousness was protective for nonmaltreated children but not for maltreated children. An important pattern to emerge from this study was that different dimensions of both parents' and nonmaltreated children's religiousness interacted to predict child

outcomes. Specifically, parents' higher worship attendance predicted fewer internalizing symptoms in children who did not attend worship frequently (but not in children who did attend frequently). Also, higher importance of faith to parents predicted lower internalizing and externalizing problems in children who were low in faith (but not in children high in faith).

Another study has found that mothers' religiousness is related to better child adjustment in regions of Northern Ireland that have suffered chronic conflict between Catholics and Protestants (Goeke-Morey et al., 2013). In this study, mothers' religiousness was an aggregate score based on church attendance, importance of religion, and endorsement of Christian beliefs. Children's (M age = 12 years) psychological adjustment was assessed using an aggregate score based on mothers' and children's reports of the children's emotional problems, conduct problems, peer difficulties, and impulsivity. Results showed that higher maternal religiousness predicted many positive outcomes: healthier psychological adjustment in the children, stronger (more secure) child-mother attachments, and higher rates of personal disclosure to the mothers. In other analyses, several significant interactions highlighted the protective benefits conferred by mothers' religiousness. First, mothers' behavioral control was related to stronger attachment security in children when mothers were more religious but not less; second, higher family cohesion was related to strong attachment in children when mothers were more religious but not less; and third, mothers' own mental health problems were related to children's lower attachment security when mothers were less religious but not more. This study suggests that religion serves as a family asset that enhances child and family well-being in numerous ways.

Another study assessed how church attendance and private religiousness (e.g., prayer, reading the Bible) was related to aggression in African American children between 7 and 12 years of age who had previously been identified as moderately to highly aggressive (Holmes & Lochman, 2012). In regressions testing the full model of parent and child organizational and private religiousness and SES, the only predictor of children's lower aggressiveness was the parents' church attendance. An interaction between children's private religious practices and SES emerged, as the children highest in aggression were low in SES and high in private religious practices whereas the children lowest in aggression were low in both SES and private religious practices. While causality is unclear, the authors suggested that highly aggressive poor children

may pray or read Scripture to help self-regulate or control their aggression. An alternative explanation would be that such youth may seek comfort in prayer or find justification in scripture for their aggression (e.g., the Old Testament adage of “an eye for an eye”).

In sum, the small but growing literature on religion, coping, and outcomes for children suggests that religion may often, but not always, function as a personal or family asset. However, the findings do not consistently point to this conclusion, as religion did not seem to buffer abused children (J. Kim et al., 2009) or aggressive children (Holmes & Lochman, 2012); some desirable outcomes emerged only from some informants’ but not others’ reports, and some only from the interaction of certain parent and child qualities but not others. While evidence points generally to a positive role of religion in children’s lives, the findings are nuanced and complicated and confirm the need to identify which dimensions of religiousness are associated with which parenting or child variables leading to particular outcomes in particular populations. For example, because several of the studies reviewed above (Goeke-Moray et al., 2013; Holmes & Lochman, 2012; J. Kim et al., 2009) had samples with mostly single-mother families, additional research is needed to learn how religion and spirituality may operate in various family structures.

Religion and Children’s Well-Being

Here we focus on two studies of children in normal circumstances. We elaborate on these two in particular because their designs are more complex than those in other studies, and these studies present data from multiple informants on multiple dimensions of religiousness or spirituality in relation to multiple child outcomes, making the studies especially informative. One study focuses on religious variables, the other study on spirituality dimensions.

Holder, Coleman, and Wallace (2010) assessed happiness in 320 eight- to twelve-year-old children from public and private religious schools. The authors posited that children’s happiness would be enhanced through religion and spirituality through the provision of social support, relationship with the divine, and a sense of meaning. Children’s happiness was assessed on four similar measures (e.g., a smiley-face task in which children chose the expression that matched how they felt), some reported by children themselves and some by their mothers. Children’s religiousness was indexed by a survey on religious practices (e.g., prayer frequency) and religious beliefs (e.g., desire to be closer to a higher power) and spirituality on a Spiritual Well-Being Questionnaire that indexed four

dimensions of self-reported spirituality: *personal*, or the value and meaning in one’s life; *communal*, or quality and depth of relationships with others; *environmental*, or a sense of awe for nature; and *transcendental*, or faith in and relationship with something or someone beyond the human level (Holder et al., 2010, p. 136).

Holder and colleagues (2010) found that children’s happiness was not related to religiosity (defined as involvement in organized religion). In contrast, happiness was correlated with some measures of spirituality, albeit with low r s (.12–.21). In subsequent regression analyses that controlled for children’s gender, school type, and temperament, personal and communal spirituality predicted significant variance in children’s happiness. That is, children were happier the more they had a positive sense of self and better relationships with others. One might argue that these dimensions do not reflect spirituality as much as constructs such as self-esteem and social acceptance. However, if spirituality is understood as connectedness to what is beyond the self, then relationships with peers may be an important early expression of a “horizontal” spirituality in childhood. In contrast, the more “vertical” forms of spirituality were not relevant: Children’s sense of awe for the environment did not predict any happiness outcomes and transcendental connection predicted only one of four outcomes (and only 1% of the variance at that). These last findings on the minor impact of transcendental connection are noteworthy in part because this sense of connectedness is integral to most definitions of spirituality. However, from the framework of reciprocating spirituality, perhaps what is especially crucial in childhood is the development of an interpersonal or horizontal spirituality, which may function as a foundation for the development of a relationship with more transcendent entities such as nature or the supernatural. This interpretation seems consistent with theories of faith development, attachment, and relational spirituality already described earlier, and we return to this idea later.

In a large national study, Bartkowski, Xu, and Levin (2008) used data from one wave (N = approximately 17,000 children) of a representative sample of kindergarten and first-grade children and their parents and teachers. This study measured several aspects of family religiosity—mothers’ and fathers’ worship attendance, frequency of discussion with the child about religion, and frequency of spousal arguing about religion. Outcomes included children’s psychological and psychosocial functioning, some rated by parents and teachers and others by only one group of informants. Regression analyses with

demographic controls showed that frequency of worship attendance by mothers and fathers (separately and together) was widely associated with children's positive outcomes (self-control, social skills) and lower levels of undesirable outcomes (internalizing and externalizing problems), as rated by parents and teachers. These findings suggest potential benefits of involvement in organized religion for different types of outcomes in children. How often parents discussed religion with the children was less influential. Of the 10 possible outcomes, this measure was significantly linked to only 3 (better self-control, approaches to learning, and interaction with peers). We want to highlight that these significant findings emerged only with parents' reports of children's outcomes; none of the teacher-reported child outcomes were significantly predicted.

Collectively, these two studies confirm that simple conclusions about the benefits of religion or spirituality are unwarranted; some dimensions of religion or spirituality are related to some outcomes in some populations. The findings reviewed thus far demonstrate that, in a research literature of modest size, religion and spirituality and children's well-being are linked in complex and nuanced ways. This conclusion contrasts with the pattern in adolescence, where religion and spirituality clearly act as positive assets.

In sum, researchers should employ more developmental designs, micro-genetic or longitudinal, to learn how religiousness and spirituality actually develop and change. Such designs will also inform us about how childhood religiousness predicts later religiousness, how earlier religiousness and spirituality relate to child outcomes at later ages, and whether certain childhood psychological profiles set the stage for particular religious or spiritual outcomes later in life. Some longitudinal work shows that infants who were high-reactive and easily stressed were more religious as adolescents (Kagan, Snidman, Kahn, & Towsley, 2007). What other childhood temperamental or psychological profiles are associated with religious outcomes? What childhood qualities and environments lead to adolescent spiritual curiosity as opposed to defensive and dogmatic closure? We have much to learn.

ADOLESCENCE AND RELIGIOUS AND SPIRITUAL DEVELOPMENT

Although adolescence has long been recognized as a critical phase of development for religiousness and spirituality (Erikson, 1968; Hall, 1904), empirical research on it has blossomed only recently. In this section, we discuss why

spiritual and religious development are especially prevalent during adolescence and review the recent growing body of research that attempts to identify, conceptualize, and measure religious and spiritual issues and processes in adolescence. Such inquiry has been undertaken to identify what constitutes spiritual development during adolescence, delineate distinctions between religious and spiritual development, and discern how religious and/or spiritual development are resources for positive development.

Adolescent Development and Religion and Spirituality

In the last decade, scholars have brought to light how the marked physical, psychological, and social changes during adolescence enable young people to be developmentally poised for qualitative changes in their religious and spiritual development (Good & Willoughby, 2008; King & Roeser, 2009; King et al., 2013; Warren et al., 2012). Recognizing that youth are malleable and have the potential for growth, the following section describes how the many changes happening at different levels of the developmental system (e.g., biological, psychological, social) are germane to religion and spirituality during adolescence.

Growing evidence points to a role for biological-level variables on religious and spiritual development. Some studies have begun to examine neural correlates of religious and spiritual beliefs (see S. Harris et al., 2009). The evidence suggests that adolescent brain maturation, particularly the pruning of neural connections and increases in white matter, facilitates increased abstract reasoning that may be associated with spirituality (S. B. Johnson, Blum, & Giedd, 2009). Future research also needs to test the notion that heightened emotionality in adolescence due to maturation of the limbic system might enable adolescents to be engaged by the emotional aspects of religiousness and spirituality (see DeHaan, Yonker, & Affholter, 2011) and to experience the conviction of conversion (Smith & Denton, 2005). Insights into brain maturation during adolescence call for a multilevel future agenda to test potential influences on adolescent religious and spiritual development, ranging from neurological to psychological to family and culture (see Warren et al., 2012).

In addition, recent epigenetic research underscores the need to explore how certain genotypes interact with particular personality tendencies or childhood experiences that may lead to different religious and spiritual outcomes (see Slavich & Cole, 2013). For example, in their review of human social genomics, Slavich and Cole (2013) present growing evidence for the influence of

social context on genetic expression, including evidence for effects of spiritual practices (e.g., meditation) on genome-regulating effects. In addition, positive states associated with spirituality and religion such as gratitude, peace, and connectedness may influence genetic transcription. All of these processes illuminate how environments and experiences affect genetic and biological processes. The work by Slavich and Cole highlights the notion that spiritual and religious experience or feelings may not only influence brain process and function but genetic expression in such a way that has significant implications for adolescent health and even genomic evolution.

These biological changes may parallel cognitive and emotional developments that facilitate one of the main developmental tasks of adolescence—identity formation, in which religiousness and spirituality can play a vital role as youth endeavor to establish self-definition and belonging (Erikson, 1968; King, 2003). In striving toward identity cohesion, young people actively search for a sense of self. In this process of seeking to form a meaningful identity, adolescents are exposed to a variety of beliefs, values and roles, and they begin to ask existential questions and search for purpose (Damon, Menon, & Bronk, 2003; King, 2003, 2008; Mariano & Damon, 2008; Markstrom, 1999). These processes may reflect a quest for a philosophy of life by youth that comprise much of the religious and spiritual life. Adolescents are maturationally ready to embark on this psychological endeavor to consolidate and understand their experience of self and the world, as well as to identify themselves in terms of familial, vocational, societal, existential, and spiritual roles. Religious and spiritual communities may also be helpful to adolescents as they explore ultimate beliefs and as their relationships begin to shift.

Given the psychological growth indicative of adolescence, teenagers are developmentally prepared for deeper and broader engagement with the world beyond themselves due to emerging cognitive and emotional capacities that allow for more abstract reasoning, self-reflection on their beliefs and their place in their expanding social worlds, and more astute awareness of others and their perspectives (Warren et al., 2012) that cause them to engage in spiritual endeavors as they attempt to make sense of their world, ask existential questions and wrestle with doubt (Hunsberger, Pratt, & Pancer, 2002), seek belonging, and construct a sense of self. Given the potential import of religion and spirituality for adolescents, we turn to more recent distinctions between definitions of religiousness and spirituality in adolescents.

Adolescent Religious Development

Religious development involves the changes in a young person's engagement in and understanding of a religion's beliefs, rituals, and community. However, until recently the vast majority of empirical studies have employed measures of more simplistic religiousness variables, such as single-item variables that measure frequency of religious attendance and level of importance of religion. In hopes of deepening an understanding of adolescent religiousness or religious development, scholars have recently moved beyond these measures to more refined constructs such as religious commitment and religious identity. The following section highlights some promising new directions.

A recent meta-analysis of empirical articles published from 1990 to 2010 demonstrates the beginning of this shift. DeHaan et al. (2011) examined theoretical underpinnings, methodologies, and operational definitions of religion, spirituality, and faith that were used in studies of adolescents and young adults. Their analysis of 119 studies revealed four categories of conceptualizations and measures of religiosity: religious attendance (i.e., how often one attends church), religious behaviors (e.g., prayer), salience of beliefs (e.g., importance of religion or God), and religious searching (e.g., the extent to which religious beliefs have changed, readiness to face existential questions). The meta-analysis revealed that, although many researchers mentioned the intention to study religion and spirituality, few actually distinguished between these concepts in their operational definitions and measures. Most used measures tied to traditional religious traditions. This finding is of special interest in light of the growing concerns with creating operational definitions and measures of spirituality independent of religious tradition. This issue seems all the more important given the “rise of the nones,” those who claim no religious affiliation, in adolescence (Pew Forum, 2012; Smith & Denton, 2005).

In their secondary analysis of the NYSR data, L. D. Pearce and Denton (2011) proposed a more nuanced understanding of adolescent religiousness. Using three dimensions of religiousness, *content* (specific beliefs), *conduct* (the nature and frequency of religious practices), and *centrality* (the degree to which religion is salient in one's life), they used latent class analysis to identify five different religious profiles that remained stable over-time. Two types are clearly identifiable and internally coherent—“atheists” and religious “abiders.” They comprise 3%–5% and 20%–22% of U.S. teenagers, respectively. In addition, they found “avoiders” (17%–24% of U.S. youth who

resist identification as atheist or religious), “assenters” (20%–28% who are extrinsically oriented), and “adapters” (30%–31% who are intrinsically oriented to faith but not consistently affiliated). The analysis of the three additional types demonstrated the benefit of a person-centered approach as well as the complexity of internal and external factors that contribute to adolescent religiousness.

A recent qualitative study of Christian, Jewish, and Muslim adolescents used grounded theory to explore religious commitment beyond the typical attitudinal and behavioral measures employed to index adolescent religiousness. Exploring how adolescents talk about their religious commitments, Layton, Dollahite, and Hardy (2011) found seven “anchors” with which youth grounded their religious commitments—religious traditions, rituals, and laws; God; faith traditions or denominations; faith community members; parents; scriptures or sacred texts; and religious leaders. Consistent with other scholarship (King et al., 2013; Mahoney, 2010), these findings emphasize that “relational pathways are at work in the domain of adolescent religious commitment” (Layton et al., 2011, p. 407). The concept of “religious anchor” is a multidimensional relational construct that points to the specific ways that young people connect to religion. Youth are related to their faith not only through living people but also through God, ideals, teachings, practices, and stories in sacred texts and traditions. Interestingly, youth spoke of changes in the relative importance of different faith anchors at different points in their lives. Further research is needed to understand whether different anchors are more pertinent at different ages and in differing circumstances, religious traditions, and cultures. As we suggested previously, perhaps more concrete anchors (e.g. youth leaders, rules) are more accessible to young children or adolescents, whereas more abstract anchors (e.g. God, solidarity with previous and future believers) may be more meaningful to older youth. Furthermore, examining interactions between different anchors would illuminate the nature and content of the contexts that buoy religious commitments. A study of Moroccan-Dutch Muslim youth in the Netherlands exemplifies the complex interplay between adolescents’ religious and national traditions and cultures (Verkuyten, Thijs, & Stevens, 2012). For early adolescents, their parents’ identification with their religious group predicted the young people’s religious and ethnic/national identification, but by middle adolescence these associations were no longer significant.

In turn, understanding self-concept or identity in relation to religion has gained attention (Templeton & Eccles,

2006) due to the notion that religion, like any salient domain of social experience, constitutes an important source of individual differences in the social-cognitive-affective self-schemas that are elaborated across development. Roeser, Issac, Abo-Zena, Brittain, and Peck (2008) suggested that religious identity is a personal identification with a social collective or group characterized by a particular religious tradition. Individuals who claim membership in a particular tradition share in common with other group members’ collective sacred worldviews and associated beliefs, practices, rituals, and symbols.

In a longitudinal study, Lopez, Huynh, and Fuligni (2011) demonstrated the stability and coherence of adolescent religious identity and its connection to family and ethnic identity. Other studies have shown that religious importance and participation interact to promote religious identity (Hardy, Pratt, Pancer, Olsen, & Lawford, 2011). Commitment and exploration continue to be the two major constructs used in the study of religious identity, and Layton and colleagues (2011) found that specific “anchors” of commitment served as distinct components of adolescents’ religious identity inasmuch as identity is understood in terms of religious commitments made and maintained.

These studies advance understanding and assessment of adolescent religiousness. They highlight that religiousness is a multidimensional construct that involves beliefs, participation, commitment, and relationships. Research is needed to learn whether adolescent religious identity is a construct distinct from religiousness and, if so, how it illuminates the nature and function of religion in the lives of adolescents. In the next section, we discuss conceptualizations and measurement of spiritual development as distinct from religious development.

Adolescent Spiritual Development

In addition to studying religiousness, scholars have pursued a nuanced conceptualization and measurement of adolescent spirituality. Since 2010, scholars have made a concerted effort to understand the multifaceted nature of adolescent spirituality. The following section reviews empirical work on spirituality and spiritual development in the adolescent literature.

In a rare longitudinal study, involving 756 predominantly Canadian-born adolescents, Good, Willoughby, and Busseri (2011) examined intraindividual stability and change in spirituality and religiousness between 17 and 18 years of age. They included measures that were either more personal or institutional and more affective

or behavioral. These measures included religious activity involvement, wondering about spiritual issues, perceptions of transcendence, frequency of prayers, and frequency of meditation. Results of a cluster-analysis revealed five clusters with varying degrees of personal and institutional involvement and of affect and behavior. With the exception of the high institutional and personal cluster, the clusters remained stable over two time points. There also was strong intraindividual stability in all clusters, though a significant proportion of individuals classified as high institutional and personal at Time 1 moved into the primarily personal cluster at Time 2. This study illustrates the complexity and interrelatedness of adolescent religious and spiritual development. Some youth are committed at the institutional and personal level, while others are committed at only one or neither level. In addition, although institutional engagement may decline in later adolescence, personal modes of religiousness and spirituality are prevalent and relatively stable among adolescents.

In addition to operationalizing spirituality and religiosity distinctly, scholars have investigated spiritual identity as distinct from religious identity. In contrast to religious identity, Roeser et al. (2008) posited that the core of adolescent *spiritual identity* is a personal identification with that which is *pan-human* and *transcultural*, a solidarity with others, and values, ethics, and wisdom concerning life's ultimate existential questions relevant to all human beings. Although scholars have suggested that spiritual identity is salient in adolescence (Templeton & Eccles, 2006), there has been no empirical research on such an identity construct. Such data are needed to illuminate the potentially unique role of spiritual identity in young people. Just as identity achievement is linked to positive outcomes for youth, spiritual identity may help youth thrive and may facilitate the transition into meaningful and productive adulthood (Trommsdorff & Chen, 2012).

In addition to identity, recent attempts to elucidate spiritual development have emphasized constructs such as transcendence, awareness, connection, and contribution. In an exploratory study, the Search Institute conducted a quantitative study of 6,725 youth aged 12 to 25 from eight countries² (Benson et al., 2012). Items for an online survey were generated to explore spiritual development, drawing core spirituality constructs from numerous sources: a literature review, an international focus group study, a qualitative spiritual exemplar study, and a Delphi study

of expert practitioners and scholars of adolescent spirituality. Exploratory factor analysis was conducted on two sets of items from the online survey. The first set was intended to measure aspects of spirituality that were hypothesized to be more universal. Four psychological processes potentially integral to spiritual development were identified: connecting with others through prosocial beliefs and actions, discovering meaning, mindfulness, and alignment of values with action. The other set of items was intended to measure religious and spiritual engagement and yielded the following factors that were valid across the religions and countries represented in the sample: apprehension of God/Force, spiritual practices, religious practices, and spiritual experiences. Benson et al. then used a person-centered analysis to explore profiles of the unique ways spirituality manifested itself in the sample of diverse youth. Latent class analysis yielded six types of spiritual development involving different combinations of religious variables (e.g., attending congregation, reading sacred texts), spiritual variables (e.g., praying, experiencing God or the supernatural), and the four psychological processes described above.

Although preliminary, these Benson et al. (2012) findings suggest that spirituality is relevant for many youth from different cultural and religious backgrounds. Although the study was not longitudinal, the findings highlight important directions for future study. For instance, the researchers found that even though they did not report regular engagement with religious activities, the majority of youth reported connecting with other people through prosocial activities, seeking a sense of meaning, being mindful, and intentionally living lives aligned with their personal values. The study suggests potentially important links between youth and the ideological narratives, people, institutions, and cultures that surround them. Studies like this point toward the complexity of spirituality and psychological and behavioral components.

Another cross-cultural study explored dimensions of spiritual development in a sample of 30 culturally and religiously diverse youth from six countries³ who had been nominated by an international board of scholars and practitioners of adolescent spirituality as "spiritual exemplars" for living with profound spirituality in their culture (King et al., 2013). Using consensual qualitative research methods, structured analyses of participants' narratives of their experiences of spirituality yielded a view of spirituality as

²Australia, Great Britain, Canada, Cameroon, India, Thailand, Ukraine, and the United States.

³Kenya, India, Jordan, Peru, United Kingdom, and the United States.

based on transcendence, fidelity, and action. The findings suggested that spiritual development occurs when a young person's interactions with others are linked to a deeper connection to something beyond the self (transcendence), which can lead to a growing clarity and commitment to beliefs, values, and purpose (fidelity) that motivates a way of living that benefits others (action). The adolescent participants all described meaningful connections with God, their faith community, nature, or absolute truth. Perhaps one of the most interesting findings was that awareness and experience of God, absolute truth, or humanity informed the way these youth understood the world and themselves. These young people articulated clear beliefs and a genuine commitment to ideology—to the extent that they attempted to intentionally live in a manner consistent with their beliefs and values. In other words, these young people reported profound experiences of transcendence, were able to articulate a clarity and devotion to their beliefs, and participated in spiritual leadership or service.

In regards to measuring spirituality, transcendence is the construct that has received the most empirical attention. For example, the Spiritual Transcendence Index (STI; Seidlitz et al., 2003) has eight items (e.g., "My spirituality gives me a feeling of fulfillment," "I experience a deep communion with God") that measure subjective experiences of the sacred and their effects on one's self-perception, feelings, goals, and ability to overcome difficulties. The scale examines how one's daily experiences are interpreted in terms of spirituality, and it has been utilized with Canadian adolescents (Good, Willoughby, & Busseri, 2011) and among U.S. evangelical youth (Schnitker, Felke, Barrett, & Emmons, in 2014). Although the STI has strong psychometrics when used in adolescent populations, it is limited to a theistic expression of transcendence and spirituality. Other empirical studies have operationalized transcendence through adolescent self-perception of awareness of God, desire for closeness with God, and connection with others (see Desrosiers, Kelly, & Miller, 2011; Dowling et al., 2004; Warren et al., 2012).

The studies reviewed above suggest that a simple conceptualization and assessment of adolescent religious and spiritual development is neither available nor appropriate. However, there is growing consensus regarding the complexity of these constructs, as researchers are moving beyond simple operational definitions of religiousness and spirituality (e.g., frequency of attendance, degree of importance). Furthermore, the exploration of spiritual development has brought attention to the significance of concepts such as religious commitment and

religious identity, as well as transcendence, awareness, meaning-making, purpose, fidelity, and actions. These findings are consistent with the growing body of research that suggests that spiritual development is a domain of human development that pertains to finding significance, meaning, and the sacred through connection to self and other. In this light, we reaffirm the concept of *reciprocal spirituality* as a vital construct for a deeper and more comprehensive grasp of the active developmental process of transcending the self; of transforming personal beliefs, commitments, and meaning; and of living consistently with those beliefs. In the next section, we investigate different features of the adolescent developmental ecosystem to more fully understand relational influences on adolescent religiousness and spirituality.

Social Ecology of Influences on Adolescent Religiousness and Spirituality

From a relational developmental systems perspective, religious and spiritual development, like other areas of development, are embedded within networks of social relationships in different settings across the life span. In the following section, we describe what is understood regarding the social ecologies in which religion and spiritual development occur. First we examine research on how relationships with parents and peers, and experiences in schools and with mentors, shape religious and spiritual development during adolescence. In addition, given that religious traditions are closely connected to ethnicity and cultures, we review relationships between these broader contexts and the religious and spiritual development of youth.

Family Influences

Like research on other aspects of socialization, parents are viewed as the key socializers of adolescents' religion and spirituality. As described earlier, parental beliefs and practices are assumed to provide the foundation for young people's own religious beliefs and practices (Ozorak, 1989), directly through explicit socialization practices and indirectly through the influence of religion on parenting behaviors (Hood et al., 2009).

The quality of the parent-adolescent relationship is central to religious socialization. Parent-child relationships characterized by frequent interaction and trust enhance religious socialization (King & Furrow, 2004), and warm, close relationships are linked to greater correspondence of offspring's religious beliefs with those of their parents

(Hoge, Petrillo, & Smith, 1982) and less religious rebellion by teens (Wilson & Sherkat, 1994). Bao et al. (1999) found that parental acceptance mediated the socialization of religious beliefs and practices, with greater acceptance leading to greater influence. Thus, warm and supportive relationships with religious parents seem to enhance the religious and spiritual development of adolescents in U.S. populations (Hardy, White, Zhang, & Ruchty, 2011) as well as Indonesian Muslim populations (French et al., 2013). In a multigenerational study, Spilman, Neppl, Donnellan, Schofield, and Conger (2013) found that parents' religiousness in one generation predicted more positive relationships between parents and adolescent children in that generation as well as higher religiousness in adolescence and adulthood.

Other research indicates that mothers and fathers have distinct roles in promoting their adolescents' spirituality. Desrosiers et al. (2011) measured a large ethnically and religiously diverse sample in the northeast United States to learn how adolescents' relational spirituality (operationalized by daily spiritual experiences, forgiveness, and positive religious coping) was related to mothers' and fathers' care and concern for their children as well as spiritual support of their children's spirituality; support was operationalized as parents' interest in and frequency of discussing spiritual and religious issues. Mothers and fathers appeared to play different roles: Adolescents' spirituality was predicted by mothers' spiritual support and dialogue (but not general care and concern), whereas adolescents' spirituality was predicted by fathers' general care and concern (but not spiritual support and dialogue). The authors suggested that mothers seem especially important because they "supply the scaffolding for the spiritual individuation process in adolescents" (p. 49), which may help their children explore spiritual dialogue with friends; having an emotionally close relationship with fathers may provide a broad, secure foundation that is more important than specific interactions around religious topics.

Family socialization of adolescents in the religious domain is comprised in large part of family rituals and conversations about religion. Results of the NSYR (Smith & Denton, 2005) showed that 54% of U.S. families engage in "giving thanks before or after meals" and 44% of youth said they talked with their families about God, scripture, prayer, or religious and spiritual matters one or more days a week. Dollahite and Marks (2005) found that families foster religious and spiritual development in children through processes such as formal teaching, parent-child discussion, role modeling, and coparticipation in prayer and other

rituals. Dollahite and Thatcher (2008) surveyed and interviewed parents and adolescents in highly religious Jewish, Christian, and Muslim families, who described various techniques to shape young people's religiousness including family devotions, worship attendance, and praying with children. In interviews, parents and adolescents both cited conversations more frequently (more than 75% of each group) than any other method. In particular, they found "youth-centered" conversations were especially effective and meaningful. In these discussions parents focused on adolescents' spiritual needs and issues in contrast to "parent-centered" conversations that emphasized parents talking rather than listening to children and not taking adolescents' concerns as priorities. The youth-centered model is akin to the bidirectional parent↔child dynamic (Boyatzis & Janicki, 2003; Flor & Knapp, 2001). In the Dollahite and Thatcher (2008) study, youth-centered conversations were described by both adolescents and parents as more positive experiences. This style may help youth adopt parents' religious values as well as strengthen parent-child relationships.

Family prayer is common in conservative Protestant, African-American Protestant, and Mormon families and likely is one major way that these American parents socialize religious practices in their offspring (e.g., Ozorak, 1989). In a national Seventh-Day Adventist population, family worship patterns that involved a high degree of adolescent participation were positively linked with stronger adolescent faith (Lee, Rice, & Gillespie, 1997). Erickson (1992) found that parental religious participation with adolescents was more efficacious than mere parental religiousness. Another study on Protestant youth found that talking with parents about religious issues and participating in religious activities together predicted adolescents' experience of God and their report of the importance of religion (King, Furrow, & Roth, 2002). In a study of African-American families, there was no main effect of parents' religiosity or parenting style on their young people's religiosity, but a significant interaction emerged as higher authoritative parenting combined with higher parental religiosity to predict modest but unique variance in young people's religiosity (Abar, Carter, & Winsler, 2009).

The dearth of longitudinal studies on this topic precludes any strong inferences about the long-term effects of parenting on the religion of offspring, especially given the considerable fluctuation of religious affiliations noted earlier (e.g., Pew Forum, 2012). In addition, other sources of influence in the family, including siblings, aunts and uncles, and grandparents are important to consider in the

religious development of youth. This larger group of family members may be especially salient for ethnic minority families that live in close proximity to their extended family and who have religious homogeneity across generations.

One study demonstrated a plethora of social influences. Regnerus, Smith, and Smith (2004) analyzed data from the National Longitudinal Study of Adolescent Health, a database focused on youth 12 to 18 years of age. The survey included two religiosity outcomes for youth: worship attendance and importance of religion. Relative influences were computed for the religiosity of parents, peers, the young people's schools, and local county norms (for worship attendance). Teens' worship attendance was related most strongly to their parents' attendance, but peers' religiosity and local county worship norms were also strong predictors of youth attendance. Interestingly, the overall importance of religion in the young people's schools was the strongest predictor of the importance that the adolescents themselves placed on religion. Together, these studies confirm the value of a social-ecology approach that analyzes multiple influences and links between them.

Peer Influences

According to NSYR results (Smith & Denton, 2005), American youth generally report having peers who share their religious beliefs. Of their five closest friends, between two to three of these friends are on average said to "hold similar religious beliefs" and about one of these friends is said to "be involved in the same religious group." Conservative African-American Protestant and Mormon teens were more likely to have friends in their same religious group (Smith & Denton, 2005). King and Furrow (2004) found that religious youth, compared to their less religious peers, reported higher levels of positive social interaction, shared values, and trust with their closest friends.

These findings illustrate two important facets of adolescent religious and spiritual development: selection effects, in that youth pick peers who are religiously similar to themselves; and socialization effects, in that peers seem to shape each other. For instance, a longitudinal study of children from 7 to 22 years of age showed that the best childhood and adolescent predictors of religiosity during early adulthood were ethnicity and peers' church attendance during high school (Gunnroe & Moore, 2002). Desmond, Morgan, and Kikuchi (2010) used growth curve modeling to examine the influence of parents and peers on adolescent religious attendance and religious importance using five waves (eight years) of the National Youth Survey (1979–1987). Compared to adolescents with low peer

attachment, adolescents with high peer attachment were more likely to attend religious services initially and to believe that religion is important, although their religious service attendance and belief in the importance of religion decreased more rapidly over time.

Additional research points to how friends may influence each other's religious and spiritual development. Not surprisingly, adolescents who have friends who talk about religion and spirituality have higher self-reported religious beliefs and commitment than adolescents whose friends did not talk about their faith (Schwartz, Bukowski, & Aoki, 2006). In a large sample of Christian adolescents, perceived faith support and spiritual modeling of Christian friends were among the most important predictors of the adolescents' own faith (Schwartz, 2006). A striking finding from this study was that these peer factors mediated the influence of parents on adolescents' religiousness. Similarly, King et al. (2002) found that talking with friends about religion and participating with friends in informal religious activities (e.g., studying religious texts, attending religious camp) explained significant variance in religious commitment over and above parental influences. Desrosiers et al. (2011) found that friends' spiritual support—measured by how comfortably and how frequently adolescents reported discussing spirituality with their friends—predicted significantly higher relational spirituality in adolescents. Together these studies confirm that the peer group is a key context for religious and spiritual development.

School and Mentor Influences

Studies of school effects are typically divided into those assessing direct effects of attending religious schools on student academic development and on how the student body's religious composition may exert indirect effects on adolescents' religious lives. Studying an African-American Muslim school, Nasir (2004) found that teachers viewed students as spiritual beings waiting to be developed. This social positioning based on a spiritual ideology afforded these young people a unique set of supports and identity position to promote their religious and spiritual development. Similarly, J. B. Barrett, Pearson, Muller, and Frank (2007) suggested that the private religiosity of popular schoolmates may foster a community in which religious matters are normative and valued and in turn promote personal religiosity.

A small body of literature examines the roles of adult mentors in adolescent religious and spiritual development and has documented that the relational quality of mentoring relationships is linked to their impact on spiritual

development. In a study of over 3,000 Christian adolescents, participants who described their relationship with their youth pastors as instructive, imitative, and intimate also reported that these relationships contributed significantly to their spiritual development (Schwartz, 2006). Another study found that relationships between youth pastors and their youth that are characterized by both relational intentionality and spiritual focus result in spiritual development, as indicated by outcomes such as a personal relationship with God, moral responsibility, hopeful and positive attitudes, and engaging in mission and service (Strommen & Hardel, 2000). King and Furrow (2004) also found that for religious youth, relationships with adults that were characterized by higher levels of social interaction, trust, and shared values had more influence on adolescent moral outcomes than adults who were less engaged.

Thus, intimate and interactive relationships with spiritual mentors may provide inspiration for spiritual development, showing how nonparental role models matter in adolescent religious and spiritual development. Not only are relationships important to religious and spiritual development, but institutions play an important part as well.

Immigration

Given the high levels of immigration around the world, and the fact that immigrants are often more traditional peoples with historical ties to their religions and religious communities (e.g., Latinos to the Catholic Church, Turks to Islam), religious institutions serve as primary “contexts of reception” for immigrant adolescents. Such institutions afford them refuge, resources, and means for bonding with their ethnic community and mainstream culture through service and other activities (Jensen, 2008). Research on immigrant youth has revealed that congregations create opportunities for maintaining and building religious and ethnic identification and preservation (Suárez-Orozco, Singh, Abo-Zena, Du, & Roeser, 2012). In a study on acculturation, Güngör, Bornstein, and Phalet (2012) found that, when comparing acculturating Turkish-Belgian adolescents in Belgium to those living in their heritage culture (e.g., Turkish youth in Turkey, Belgian youth in Belgium), religious reaffirmation was higher among acculturating youth and was related to the cultural values of interdependence, maintenance of one’s heritage culture, and ethnic identification.

Race and Ethnicity

Religions reflect myriad geographical, historical, national, and ethnic/racial influences and are thus deeply cultural

in nature, so studying religious and spiritual development apart from culture misses something fundamental about their origins and manifestations (Mattis, Ahluwalia, Cowie, & Kirkland-Harris, 2006). Initial research confirms that spiritual development in any cultural context entails a deepening and intensifying sense of connectedness to the transcendent, even if the nature of the transcendent varies dramatically across cultures (see Benson et al., 2012; King et al., *in press*). However, culturally and developmentally sensitive methods are needed to understand the complexity of religious and spiritual development in diverse populations. For example, in cultures where religious rites of passage align with transitions to adulthood (e.g., bar mitzvah, confirmation), communal rituals help consolidate identity more effectively than in cultures where movement into the adult working world no longer accompanies these rites (Trommsdorff & Chen, 2012). Qualitative work in London has examined young adolescents’ “bowing” to their parents (Thanissaro, 2010). This act of bowing that has some religious significance to the individual and family occurred in more than a fifth of youth across diverse religions and ethnic groups but mainly in Buddhist and Muslim families and very rarely in nonreligious families or Christian ones. Religion and ethnicity interact to either promote or impede bowing. For example, Pakistani Muslim youth in London would not bow due to religious reasons but other Muslim youth from the Indian subcontinent would bow frequently. Clearly, adolescent religious practice occurs at the intersection of complex racial, ethnic, and religious traditions. An overview of existing research on the major racial and ethnic minority populations in the United States further demonstrates the nuances of the practice and function of religiousness in different groups.

African-American Adolescents. As discussed previously, African-American youth are more religious than other ethnicities (ChildTrends, 2013; Smith & Denton, 2005). African-American adolescents participate in various religions including Catholicism, Islam, and other forms of Protestantism. As the mainstay of African-American culture, the church plays an important role in the identity formation process of its adolescents by serving as a refuge and support system, and outside the family the church is one of the strongest social influences within African-American communities (Mattis et al., 2006). Several studies have shown positive associations with religiosity among African-American youth. For example, African-American students who were more religious were less likely to appropriate derogatory societal messages

regarding the African-American community (Brega & Coleman, 1999). Brittian and Spencer (2012) found that religious and ethnic identity correlated with less risk behavior for African-American youth. Highly religious African-American students perform well academically, study better, and engage in fewer risky behaviors than youth less committed to religion (Abar et al., 2009; Regnerus & Elder, 2003).

Asian-American Adolescents. Asian-American youth, in general, tend to be less religious than youth from other racial and ethnic groups (Smith & Denton, 2005), although variation exists. Despite low levels of religion and spirituality among Asian-American youth, religion and spirituality play significant roles in some of their lives and is related to their life satisfaction (S. Kim, Miles-Mason, Kim, & Esquivel, 2013). Religious youth groups may also provide Asian-American adolescents with a sense of community and religious identity that often supersedes cultural identity. In a longitudinal study of religious identity, Lopez et al. (2011) found that Asian-American and Latino youth reported higher levels of religious identity than Caucasian youth and this identity was stable over three years of high school.

Latino/a-American Adolescents. Given the adherence to the Catholic Church, it is not surprising that, in the United States, Latino/a youth are more religious than Caucasian youth. In the Lopez et al. (2011) study, Latino/a youth reported higher levels of religious identity than Caucasians and also reported higher levels of religious participation than the students from Asian and European backgrounds.

Latino and Latina youth tend to identify the family and home as contexts in which they learn spiritual practices that affirm their identities and offer spiritual support (M. Knight, Author, Bentley, & Dixon, 2004). Specifically, spirituality is sustained and developed in family pedagogies by using *cuentos* (stories) and *consejos* (advice) (Norton, 2006). For example, Lopez et al. (2011) found that young Latino/a American's religious identity was linked to family identity. Research has also documented that young Latino/a American's religious involvement is linked to lower drug use and spirituality to less marijuana and hard drug use (Hodge, Cardenas, & Montoya, 2001).

Summary of the Social-Ecology of Adolescent Religiousness and Spirituality

We need to learn more about how adolescent religious and spiritual development are influenced by the features

of social and cultural contexts. In addition to the methods most often employed to identify cultural universals, cultural developmental approaches are also warranted to understand differences in spiritual and religious development within populations (Jensen, 2012). For example, it is important to note that children grow up in different nations and cultures that may promote, incorporate, or tolerate organized religion to varying degrees. For example, in the United Kingdom "spirituality" is a required curriculum topic although religion, *per se*, seems not to have such a prominent place in public and political discourse, whereas, in the United States religious issues are often raised in public discourse, but religion and spirituality are excluded from government-funded education. A social ecology approach needs to include these broader public and political macrosystem factors.

In addition, exploring potential moderating or mediating effects of different relationships would shed further light on the social ecology of spiritual development. For example, does the frequent "spiritual growth" of adolescents renew or challenge their parents' spirituality, and would such effects vary by ethnicity? Do clear and consistent norms and accountability across contexts (e.g., family, school, congregation) influence changes in religious and spiritual development? Furthermore, given the increasing prominence of social media and technology in the lives of adolescents and the lack of existing research on technology and youth spirituality, research that investigates the impact of these environments on religious and spiritual development is required. We do not know how adolescent immersion in social media and technology may impede or promote their experiences of spirituality. Social media undoubtedly can increase the breadth of social contacts, but do these kinds of connection "beyond the self" promote a sense of transcendence that results in personal transformation and contribution to the greater good? Are some kinds of social media more beneficial than others?

Just as in other domains of development, the social ecologies that shape adolescent religious and spiritual development are increasingly complex as youth explore and affiliate more intensely and frequently outside the family. Longitudinal designs are needed to model or clarify causal influences on adolescent religious and spiritual development. Such designs will inform the nature of bidirectional relations between young people and the environments in which they live. For example, longitudinal designs may reveal under what conditions and through what mechanisms parents or peers promote religious and

spiritual development, or how adolescent religiousness or spirituality may influence their relationships.

Potential Influences of Religion and Spirituality on Adolescent Development

Empirical studies have turned toward understanding mechanisms that explain how religion and spirituality are potentially “fertile grounds” or important “anchors” for adolescent development (King, 2003; 2008). We have categorized existing studies to discuss the prominent roles of the ideological, social, and transcendent resources within religious and spiritual contexts. It behooves us to note that the large majority of studies are correlational and thus preclude any causal certainty. In addition, while many researchers presume that directionality flows from religious involvement to some positive quality in youth, the reverse directionality may apply: There may be selection effects, with youth who are higher in certain values or beliefs or more inclined to civic action or healthy behavior seeking out religious contexts that are consistent with their values and behaviors. Thus, the direction of causality in this work remains uncertain and underscores the need for designs that model or directly test causal influences.

Ideological Context

Young people strive to make sense of the world and to assert their place in it. The beliefs, worldviews, and values of religious and spiritual traditions provide an ideological context in which young people can generate a sense of meaning, order, and place in the world that is crucial to adolescent development (King, 2003; 2008). Erikson (1965) pointed to religion as an important aspect of the socio-historical matrix in which identity takes shape. He argued that religion is the oldest and most lasting institution that promotes fidelity. Religion intentionally offers beliefs, moral codes, and values from which youth can build personal belief systems (Smith, 2003b). Adolescents’ spirituality entails the intentional identification and integration of beliefs, narrative, and values in the process of making meaning. Whether this process is one of personal construction or socialization, the intentional act of relying on personal, religious, or cultural ideology is central to spirituality and crucial to the development of identity, meaning, and purpose (Damon et al., 2003).

Religion may help youth to internalize a set of beliefs and morals. In a large sample of 10- to 18-year-olds, religious commitment and religious involvement interacted to promote moral identity (Hardy, Walker, Rackham, &

Olsen, 2012). Similarly, in studies of individuals nominated for moral excellence, participants frequently reported that religion served as a foundation for their moral identity and action (Colby & Damon, 1999; Hart & Fegley, 1995). Larson, Hansen, and Moneta (2006) found that youth involved in faith-based youth programs tended to have stronger senses of identity than youth not engaged in faith-based programs. Furthermore, they found that 75% of youth in faith-based programs reported discussing morals and values, in comparison with 24% of youth involved in other types of organized youth programs. King and Furrow (2004) found that adolescents higher in religiousness had more shared beliefs, values, and expectations with parents, friends, and adults. In addition to providing ideology, religious traditions and forms of spirituality involve communities. Below we describe processes that clarify how youth may be socially influenced by religion and spirituality.

Social Context

Religion and spirituality do more than provide a belief system and a moral code. At their best, community members embody religious and spiritual ideological norms and serve as role models for youth (Erikson, 1968). Although religion and spirituality do not exclusively provide these social resources, ample research documents that they may be particularly effective in offering social capital, social support, and mentors. Religious influence is complex and is more thoroughly understood by the network of relationships, opportunities, and shared values common to religious congregations. It is useful to illustrate here a few different conceptions of how religion and religious settings may influence youth.

Social Capital. Social capital models posit that the constructive influence of religion on young people is due to the quantity and nature of relationships it provides. For instance, religious involvement strengthens young people’s access to intergenerational relationships, which are rich sources of social capital (King & Furrow, 2004; Smith, 2003a). Few other social institutions afford the opportunity that religious ones do to build trustworthy cross-generational relationships and give youth direct interaction with sources of helpful information, resources, and opportunities. For example, Benson, Scales, & Syvertsen (2011) provided an account of the resources available through religious and spiritual involvement. Structural equation modeling demonstrated that positive benefits of adolescent religiousness were partially mediated through

developmental resources available to these youth (Wagener, Furrow, King, Leffert, & Benson, 2003). In short, religious involvement provided youth with access to resources such as supportive adults and positive peer relationships, demonstrating the rich social milieu of religious participation.

Social Channeling. Religious institutions offer opportunities for social channeling, the conscious process on the part of adults to steer their children toward particular individuals positioned to discourage negative behaviors and promote positive life practices (Smith, 2003b). Social channeling in congregations promotes spiritual development, academic achievement, and generally positive development (Martin, White, & Perlman, 2001; Regnerus & Elder, 2003). Religious institutions and the relationships they engender also provide forms of social support that are particularly important to adolescent coping, resilience, and well-being. For example, youths' perceptions of social support from religious communities strongly predicted fewer depressive symptoms (Miller & Gur, 2002), whereas youth who perceived that their congregations were critical of them had more depressive symptoms (M. J. Pearce, Little, & Perez, 2003). It appears, then, that religious communities can be sources of social support or stress based on how youth feel about how adults in those communities perceive and treat the youth.

Spiritual Modeling. Based on social learning theory, spiritual modeling refers to emulating another in order to grow spiritually (Oman, 2013). Spiritual modeling emphasizes how adults may socialize young people's religious and spiritual identities to align with the beliefs, norms, and expectations of particular religious groups. A foundation of this approach is the notion that the people with whom we regularly associate shape the behavioral patterns that will be repeatedly observed and learned most thoroughly. Spiritual modeling is often provided by parents or by intentional mentors. Religious and spiritual groups are often intentional about mentoring younger members. For example, the Hindu tradition has gurus and the Christian tradition disciples. Through these relationships, adults connect youth to a larger whole, enabling them to identify with greater religious communities.

Spiritual Scaffolding. We suggest the term "spiritual scaffolding" to emphasize the value of an optimal balance of monitoring, interest, and support for youth in their pursuit of religious and spiritual exploration. Such scaffolding fits well with the sociocultural models described earlier. Exploration requires freedom within reasonable

boundaries to facilitate discovery and scrutiny of spiritual beliefs, engagement, and commitments. Scaffolding conducive to exploration is warm and supportive and needs to provide appropriate distance and autonomy. For example, a study of highly religious parents revealed that parental efforts to control their adolescent sons' problem behavior sometimes backfired whereas such strategies were more effective with daughters (Mahoney & Tarakeshwar, 2005). As noted in the section on family influences, children's religious beliefs are more similar to their parents' when the parents are perceived by children to be warm and accepting. These findings suggest that controlling parenting practices, in conjunction with religious teachings, may be problematic, particularly with adolescent sons, whereas autonomy support and warmth may facilitate religious socialization in sons and daughters equally in adolescence.

In summary, research confirms the importance of the social milieu associated with religion and spirituality. Religious communities teach, reinforce, and support religious and spiritual development and seem to influence other developmental outcomes. As measurement and methods become more sophisticated, research could investigate factors that determine the effectiveness of religious social engagement (e.g., religious attendance, youth group participation, mentoring) and more personal religious and/or spiritual factors. What types of spiritual scaffolding most effectively support healthy development? What religious and spiritual modeling allows for optimal identity exploration and commitment? Longitudinal designs will clarify developmental processes and trends and elucidate person-centered profiles of spiritual development. Finally, we note that our discussion is rather Western in its assumptions of autonomy and exploration as normative processes; in cultures with different presuppositions about human development, such processes may show different trajectories with different outcomes and influences on them.

Transcendent Context

Religion and spirituality provide important ideological resources and social relationships that may nurture adolescent development and also foster valuable opportunities for transcendent experiences. Transcendence—connecting with something beyond the self in ways that bring about deeper awareness of one's self and others—is often intentionally nurtured in religious and spiritual communities (Roehlkepartain & Patel, 2006). Experiences of transcendence can affirm one's own sense of identity and

self-worth through a profound sense of connection to a divine or human other. In a qualitative study on spiritual youth, a Christian boy from Kenya described this sentiment: "Knowing that I'm actually a child of the Most High God, I find that I'm actually a bit special" (King et al., in press). In an affiliated quantitative study of youth, initial findings suggested that awareness of one's inherent value and strength is a common aspect of spirituality among youth from eight different countries (Benson, Scales, et al., 2012). In addition, youth may experience transcendence through connection to religious communities. An American adolescent explained, "Well, we're [the Jews] a people who suffer. That's who we are and what we do. I get my social consciousness, my beliefs, my view of humanity from my Jewish traditions" (King et al., in press).

Ritual, worship, spiritual practices, and rites of passage can promote transcendence. Ongoing rituals may promote awareness of the Divine or human other, as well as confirm youths' places in communities. In the exemplar study, a Hindu boy from India talked about rituals in this way: "It's because of the ceremonies, which are held, and it makes people come together . . . and then sometimes you get a connection with God, a special time with God" (King et al., in press). Rites of passage are unique events that intentionally celebrate and affirm a young person's sense of identity as a religious or spiritual person, in addition to recognizing his or her place within the faith community, which may contribute to the youth's sense of maturity and commitment to something larger than the self.

Spiritual practices may promote experiences of transcendence. Meditation and prayer are spiritual practices, and in a nationally representative study of American youth, Smith and Denton (2005) found that 10% reported doing religious or spiritual meditation in the prior year. Meditation is associated with prefrontal cortex activation and self-regulation of pleasant emotions during cognitive reappraisals (Urry, Roeser, Lazar, & Poey, 2012). Serving the poor may be a spiritual practice because it may allow youths to experience others in different circumstances (e.g., cultural or socioeconomic) from themselves, promote civic engagement (Beyerlein, Trinitapoli, & Adler, 2011; Youniss, McLellan, & Yates, 1999) and teach the value of self-sacrifice. Such experiences are spiritual insofar as they inspire positive action and deepen the sense of connection to what is beyond the self. Of course, many "service" experiences may involve merely "going through the motions" to meet requirements for youth groups or schools, and we would presume that such experiences would not have salutary spiritual effects.

Summary of Religious and Spiritual Influences

Religion and spirituality may spur adolescent development when they offer ideology, social resources, and transcendent spiritual experiences. These facets are not unique to religion and spirituality but are often characteristic of them. Perhaps the most unique aspect of religious and spiritual contexts is the potential for transcendence. Many youth programs and organizations offer ideology and rich social environments; however, not many intentionally promote experiences of transcendence where young people are encouraged and expected to acutely experience an entity beyond themselves in ways that transform their ideological commitments, inspire devotion, and shape generative behavior. Consistent with a relational developmental systems approach, it would be important to learn in future research what characteristics of the experience and context combine with characteristics of youth to result in the greatest spiritual growth. Future research that tests diverse resources within religion and spirituality could reveal how they may be beneficial—or deleterious—to youth. An important question is how the perception by youth of the supernatural is related to their development. In addition, operationalizing different experiences of transcendence would clarify the nature and role of transcendence in young people's lives, especially in relation to contribution to the common good. In the next section, we discuss how religion and spirituality may function in the lives of youth and examine existing research on religiousness and spirituality on positive youth development.

Positive Youth Development and Adolescent Religiousness and Spirituality

Given the role of plasticity and developmental regulation in RDST approaches, the field of positive youth development has emerged (see Lerner, Lerner, Bowers, & Geldhof, Chapter 16, this *Handbook*, Volume 1) and emphasizes what can go right with young people rather than what can go wrong. This emphasis on thriving, rather than the traditional mental health emphasis on pathology, reorients a discussion of youth outcomes to explore optimal development as well as risk factors. However, much of the research in this field is still concerned with risk factors and thus our review attempts to capture both approaches. Several comprehensive syntheses of the literature that examines the dual role of religion and spirituality as protective factors inhibiting risk-taking behavior while promoting well-being, resilience, and thriving have been published

(Bridges & Moore, 2002; King & Benson, 2006; King & Roeser, 2009). Consequently, the following discussion highlights studies that clarify how religion and spirituality function in the lives of adolescents.

A recent meta-analysis of 75 studies (Yonker, Schnabelrauch, & DeHaan, 2012) included measures of adolescent and young adult religiousness and/or spirituality, risk behaviors, well-being outcomes, and personality variables. Using a broad conceptualization of religiousness and spirituality, this analysis was able to assess the relationships between more conventional measures of religiousness (e.g. religious attendance, behaviors, salience) and also more personal measure of spirituality (e.g. searching). Looking across religious and spiritual variables, the authors reported the relatively modest main effect sizes. Specifically, religiousness and spirituality were moderately correlated with risk behaviors (−.17), depression, (−.11), well-being (.16), self-esteem (.11), and the personality traits of Conscientiousness (.19), Agreeableness (.18), and Openness (.14). The direction and magnitude of these findings indicate that religiousness and spirituality seem to have a positive but modest role in the well-being of youth.

Of particular interest was their finding that the conventional measures of religious service attendance and religious salience provided the greatest number of significant associations with beneficial outcomes, compared to measures assessing more personal forms of spirituality. This finding is important and calls into question the relevance of spirituality, at least as represented as a personal quest for the sacred or existential meaning, in predicting behavioral outcomes among adolescents and emerging adults. The NYSR Study similarly found that the minority of U.S. youths claimed to be spiritual and not religious (Smith & Denton, 2005).

The findings described above suggest that religion and spirituality may indeed have positive though modest roles in the positive development of youth. They also indicate that additional work is needed to clarify how religion and spirituality may offer distinct contributions to positive development in adolescence. For example, in line with the discussion in the previous section, these findings highlight the potential importance of the ideological and social context of religions. Attendance and salience do not reveal what particular resources are available to youth through religious participation or in religious commitment. In addition, these findings raise the question of whether transcendence that is experienced within the context of a religious congregation or community functions differently than more individual quests for meaning and transcendence.

Thriving and Positive Youth Development

Research on adolescent spiritual development has evolved alongside the study of positive youth development (i.e., King & Benson, 2006; Lerner et al., 2003, 2008). It is not surprising, then, that there is a burgeoning literature examining relationships between religion, spirituality, and thriving. A noteworthy work on this topic is Warren et al.'s (2012) edited volume, *Thriving and Spirituality Among Youth*, which presents a variety of studies (many reviewed in this chapter) from mixed-method approaches that consider biological, psychological, social, and cultural factors involved with spirituality and thriving. One of the earliest studies to distinguish the roles of religion and spirituality in relation to thriving was conducted by Dowling et al. (2004). In this secondary analysis of the Search Institute's "Youth and their Parents" data set, spirituality was operationalized by: experiencing transcendence, defining the self in relationship to others, having genuine concern for others; religiousness by affiliation and participation in a religious tradition and doctrine; and thriving was defined by prosocial contributions to others. Results indicated that spirituality and religion both had direct effects on thriving, and that religion mediated the effects of spirituality on thriving. This study demonstrated that spirituality has an influence on youth thriving beyond religion and also points to the potentially important and constructive role of religious institutions.

Health. Many studies suggest that religion and spirituality are linked to better adolescent physical health. Church attendance predicts health-enhancing behaviors such as exercise, diet, dental hygiene, and seatbelt use (Jessor, Turbin, & Costa, 1998). In a nationally representative sample of high school seniors, religious youth were more likely to use healthy nutrition, exercise, and rest, and less likely to engage in health-compromising behaviors (Wallace & Forman, 1998). In a sample of Jewish adolescents, Benjamins (2012) found, after controlling for age, gender, and weight, that religious beliefs about health behaviors predicted behaviors related to physical activity. In adjusted regression models, the adolescents who reported that their religious beliefs influenced decisions about being physically active were active more days per week than those who said their religious beliefs did not influence such decisions.

Mental Health and Coping. Religion provides adolescents with resources for well-being, mental health, and coping (Mahoney, Pendleton, & Ihrke, 2006). Those

adolescents who valued church attendance and religion in general experienced fewer feelings of depression, loneliness, and hopelessness (M. J. Pearce, Jones, Schwab-Stone & Ruchkin, 2003; Sinha, Cnaan, & Gelles, 2007). In a longitudinal study on relationships between Australian adolescents' religious sentiment and psychological adjustment (Ciarrochi & Heaven, 2012), religiousness and hope were inversely related to psychoticism and neuroticism at both time points studied. After controlling for personality, structural equation modeling revealed that religious values at Age 17 did not predict improvements in self-esteem at Age 18, but they did predict improvements in hope. In addition, a longitudinal study with adolescent, parent, and teacher ratings of spirituality and religiousness found generally positive associations between Indonesian Muslim adolescents' religion and spirituality and adjustment (Sallquist, Eisenberg, French, Purwono, & Suryanti, 2010). Findings from this study indicated that, in that setting, where culture and religion were closely aligned, spirituality and religious practices were best represented as one latent construct, rather than two distinct constructs. In addition, although findings indicated that religion and spirituality had the predicted positive associations with adjustment and negative associations with maladjustment across a year, there was also some evidence that maladjustment predicted religiousness and spirituality over time, demonstrating the complex nature of the relationship between spirituality and religion and socioemotional functioning.

Religion and spirituality can serve as a resource for better coping when conceptualized in a positive manner (e.g., viewing God as benevolent) (see Mahoney et al., 2006), whereas negative forms of religious or spiritual coping (e.g., feeling punished by God) are often associated with negative outcomes. For example, one study found that Jewish youth used three distinct religious coping strategies. They tended to reframe their difficulties from a spiritual perspective, draw on their Jewish cultural relationships, and pray to God (Dubow, Pargament, Boxer, & Tarakeshwar, 2000). Among youth with diabetes and cystic fibrosis, Reynolds, Mrug, and Guion (2013) found that positive spiritual coping was associated with fewer internalizing and externalizing problems; whereas negative spiritual coping was related to more externalizing problems for youths with diabetes and cystic fibrosis. Among youths with cystic fibrosis, negative spiritual coping was also associated with internalizing problems as well, suggesting that youths with progressive, life-threatening illnesses may be more vulnerable to negative spiritual coping. In study of

youths at religious schools, Carpenter, Laney, and Mezulis (2012) found that negative religious coping significantly moderated the effects of stress on depressive symptoms in a 12-week study, with depressive symptoms being highest among adolescents exposed to high stress who reported high negative religious coping.

Besides protective qualities, religiosity and spirituality may promote positive mental health, although this relation is suggested only tentatively because the literature has been dominated by correlational designs. A positive relation between religiosity and spirituality and psychological well-being has been found in communities with different religious and spiritual traditions. For example, Kelley and Miller (2007) found that, among a diverse sample of U.S. adolescents, life satisfaction was associated with several dimensions of spirituality (e.g., daily spiritual experiences, forgiveness, positive religious coping, congregational support). Spirituality was similarly associated with life satisfaction in Korean-American Catholic adolescents (S. Kim et al., 2013). The strongest predictors of their life satisfaction were daily spiritual experiences (e.g., feeling the closeness of God), followed by their ability to forgive (others and oneself), and their sense of support from their congregations; worship attendance was not related to life satisfaction. In Muslim Kuwaiti adolescents, higher religiosity was associated with greater happiness (Abdel-Khalek, 2007). In another international study, Sabatier, Mayer, Friedlmeier, Lubiewska, and Trommsdorff (2011) found that family and country were linked in complex ways to adolescents' life satisfaction. Specifically, family orientation mediated the relationship between religiosity and life satisfaction. Higher religiosity in youth predicted higher life satisfaction, but this effect was mediated by family orientation; this effect was more salient for youths in countries with higher levels of religiosity (United States, Poland) than in those lower in national importance of religion (France, Germany). This last study illustrates the importance of a social-ecology approach to understanding how religion and spirituality may function in youths' lives.

Academic Achievement. Religious attendance and salience are modestly associated with better academic performance in adolescence. Youth in urban, low-income neighborhoods who are involved with their churches are more likely to stay on track academically than are peers who are not involved in their churches (Regnerus & Elder, 2003), perhaps because church attendance channels youths into relationships with people who support academics,

academic competencies, and commitments. Along those lines, Milot and Ludden (2009) found that adolescents who reported that religion was important in their lives reported less school misbehavior and higher motivation; those with high religious attendance had higher grades. Interaction effects indicated that religious importance particularly enhanced school bonding and self-efficacy in males. McKune and Hoffman (2009) found that adolescents' highest achievement occurred when parents and adolescents reported similar levels of religiosity, whereas the lowest occurred when parents reported high religiosity and adolescents reported low religiosity.

Civic Engagement and Moral Development. Many studies show that religion and spirituality are linked to community service, prosocial involvement, and altruism. Several studies show that more religious youth are significantly more likely to be involved in forms of civic engagement than their less religious peers (see Roehlkepartain et al., 2006). One reason may be, as one study found, that involvement in a faith-based context with a moral and value-laden framework promotes youth dialogue and self-reflection on religious justifications for one's actions (Youniss et al., 1999). In a longitudinal study, Kerestes, Youniss, and Metz (2004) tracked students' religious development from 14 to 18 along four trajectories based on being low or high in religiosity at Ages 14 and 18. Thus, there were four groups: low religiosity at both times, high religiosity at both times, low religiosity at Age 14 and high at Age 18, and high religiosity at 14 and low at 18. Participation in civic activities, extracurricular activities, and willingness to perform volunteer service was highest in the students who were high in religiosity at both times; most interestingly, civic engagement increased dramatically in students who changed from low to high religiosity across the 2 years. In a secondary analysis of data from Wave 1 of the NYSR dataset, participating in a short-term mission trip still increased the likelihood of adolescents' later participation in many forms of civic activity but particularly religious-based volunteering after controlling for demographic background, religiousness, parent religiousness, and attitudes toward the poor (Beyerlein et al., 2011).

Youth educated in Protestant secondary schools were more likely than other youth to continue to volunteer even accounting for potential influences such as parent religiousness, whereas youth schooled at home or in private nonreligious settings were significantly less likely to continue volunteering (Hill & den Dulk, 2013). The

study emphasizes the importance of the religious context through which the service was conducted. A study in the Netherlands found that both Christian and Muslim religious adolescents had more developed democratic competencies than nonreligious adolescents (Grundel & Maliepaard, 2012), again demonstrating the potential positive socializing effects of religion.

In a study on diverse U.S. youth, King and Furrow (2004) found that religious salience and religious attendance were related to altruism and empathy, and that religious youth engaged in volunteer service more often than their less religious peers. Structural equation models revealed that social capital resources (operationalized as social interaction, trust, and shared values with parents, peers, and adults) mediated the effects of religion on these moral outcomes, demonstrating the significance of the religious social context for adolescent moral and civic development. Another study demonstrated through structural equation modeling that youths who reported having a religious identity (assessed by self-report on prototypical descriptors) had more ideological frameworks for life and prosocial concerns for others (Furrow, King, & White, 2004). Adolescent youth nominated for their consistent caring behaviors toward family or community members were found to have salient moral identities and also described religion as an important influence on their moral commitments (Hart & Fegley, 1995). In the adolescent spiritual exemplar study mentioned previously, highly spiritual youth from around the world described that being moral and engaging in acts of compassion, service, justice, and leadership were central to their experience of being spiritual (King et al., in press). In another study on U.S. youth, religiosity was a significant positive predictor of kindness as well as compliant, anonymous, and altruistic prosocial behavior (Hardy & Carlo, 2005); interestingly, associations between religiosity and both compliant and altruistic prosocial behaviors were mediated by kindness, indicating that religious youth may be helpful, caring, and kind for different religious motivations. A later study (Hardy et al., 2012) of 10- to 18-year-olds found that religious commitment was indirectly related to empathy as mediated by moral identity.

In sum, this review suggests that young people who identify as religious or who are involved with institutional religion show greater prosocial behavior on a variety of measures. (In some cases, of course, there can be a "dark side" to youth involvement in religion and we address this point below.) Additional work is needed to clarify what causal mechanisms are at work and whether selection

effects (i.e., prosocial youth seek out religious organizations) explain these links, but one mechanism may be that religious involvement and commitment enhance a sense of moral identity which then leads to more prosocial action.

Identity. Religion and spirituality can contribute to psychosocial identity development and the broader search for purpose, meaning, and fidelity characteristic of adolescence (Damon et al., 2003; King, 2003; Templeton & Eccles, 2006). As noted previously, Lopez et al. (2011) found that Latino/a American and Asian American youths reported higher levels of religious identity than European-American youths even after controlling for ethnic differences in religious affiliation, socioeconomic background, and generational status. Although adolescents' religious identity remained mostly stable across 3 years of high school, changes in ethnic and family identities were linked to changes in their religious identity, suggesting that family, ethnic, and religious identity were closely tied for these ethnic minority youth.

Research using Marcia's (1966) identity status paradigm has yielded less conclusive findings. Youths' church attendance has been positively related to higher identity achievement, yet also foreclosure and identity diffusion have been linked to lower levels of religious importance and more orthodox Christian beliefs (Markstrom-Adams, Hofstra, & Dougher, 1994). Other researchers have shown that intrinsically religiously motivated youth (those who try to internalize and live by their faith) were most likely to have attained identity achievement (Markstrom-Adams & Smith, 1996). However, Hunsberger et al. (2001) found weak associations between religious commitment and achieved identity status in a Canadian sample.

One study of highly religious adolescents (Puffer et al., 2008) found that religious doubt was higher in youths with identity moratorium and achievement, whereas youths lower in doubt were more likely to be in identity foreclosure and diffusion. These findings could mean that youths in moratorium may experience doubt as both cause and effect of their "holding pattern" in identity, whereas youths with achieved identity may be more comfortable questioning their beliefs because they have explored and committed to ideologies. Using latent growth curve modeling and collecting data over four occasions, Hardy et al. (2011) found that late adolescents' change in religious involvement correlated negatively with identity diffusion and moratorium and positively with foreclosure. The results of cross-lagged panel analyses demonstrated effects in the expected direction from involvement to identity as

well as some, but to a lesser extent, reciprocal effects. Overall, the findings provided longitudinal evidence demonstrating that adolescents involved in communities with more cohesive norms and social structure tended to experience greater identity maturity than those who were less involved.

It is not surprising that religion has been shown to have a positive impact on adolescents' development of a sense of personal meaning and purpose (Damon et al., 2003). For instance, in a national probability sample of U.S. adolescents, religious and spiritual commitments were positively associated with their overall sense of meaning and hope for the future (Smith & Denton, 2005). Youths reporting strong religious identity (versus weak religious identity) were more likely to have a meaning framework that added direction and purpose to their lives (Furrow et al., 2004). Adolescents had greater sense of purpose and commitment to personal philosophy when they participated in religious communities (Markstrom, 1999). In addition, a qualitative study found that spirituality and religiosity appeared to guide some adolescents toward character development, service, and life purposes (Mariano & Damon, 2008).

Risk-Taking Behaviors

Ample research shows that religion and spirituality may buffer against risk-taking behavior such as delinquency, substance abuse, sexual activity, substance use, and suicide (see King & Roeser, 2009). Studies have revealed important nuances in the relations between religiousness and spirituality and risk-taking behaviors. For example, Desrosiers and Miller (2008) tested a large mixed-ethnicity sample to tease apart the effects associated with congregational religious factors from more personal spiritual ones; these spiritual constructs were derived from the Brief Multidimensional Measure of Religiousness/Spirituality. Lower alcohol use was predicted by higher scores on subscales of "personal spirituality," which included forgiveness, daily spiritual experience, and positive religious coping and by higher scores on public religion variables, such as perceived support from one's congregation. However, when youths perceived their congregations to be critical of them, they scored higher in anxiety.

In a large study, Salas-Wright, Vaughn, Hodge, and Perron (2012) categorized 17,705 U.S. youths as religious regulars (40.85%), religiously devoted (18.25%), religiously infrequent (23.59%), privately religious (6.55%), or religiously disengaged (10.76%). The religiously devoted group members engaged in less substance use, less fighting, and less theft. To a lesser extent, the religious

regulars were less likely to use substances or fight, whereas the religiously infrequent and privately religious groups only used marijuana less.

Taken together these studies begin to map out different dimensions of religious and spiritual development related to positive and undesirable outcomes. Although causal certainty has not yet been attained, this approach helps us grasp the complex constellation of ideological, social, and transcendent factors involved in youth behavior. The following studies shed additional light on these issues.

Delinquency. The inverse relationship between religiosity and delinquent behavior among adolescents has been well established. For instance, a 2004 study on U.S. teens found that youths who perceived religion as important and who participated in religious activities reported fewer risk behaviors such as smoking, truancy, marijuana use, and depression (Sinha et al., 2007). Similarly, after controlling for sociodemographic backgrounds, higher adolescent religiosity was negatively correlated with attitudes toward delinquent behaviors, association with delinquent peers, and engagement in delinquent behaviors (B. R. Johnson, Jang, Larson, & De Li, 2001). In African American preadolescents who had been previously identified as being moderate to high in aggression, parent religious attendance and preadolescent intrinsic religiosity predicted lower aggression and the relation between preadolescent private religious activities and aggression was moderated by socioeconomic status (Holmes & Lochman, 2012). Frequent exposure to religious content (e.g. reading, watching, or hearing religious information) decreased the likelihood of antisocial practices, witnessing violence, or being the victim of violence (M. J. Pearce, Jones, et al., 2003). In a study of how spiritual beliefs and experiences moderated the effects of exposure to violence in urban African-American adolescents, Shannon, Oakes, Scheers, Richardson, and Stills (2013) found that more frequent daily spiritual experiences and positive religious coping predicted unique variance in life satisfaction and positive mood beyond effects of demographic factors and family support. In a nationally representative sample of youths aged 12 to 18 years, Regnerus and Elder (2003) found that religiosity was related to a slight decrease in delinquent behaviors in early adolescence, disappeared as a predictor of delinquent behaviors during middle adolescence, and emerged as a strong negative predictor in late adolescence.

Substance Use. Studies consistently show a protective role for religion in adolescent drug use. In a national U.S.

sample, religious adolescents were less likely than their nonreligious peers to drink in excess, smoke cigarettes, drink alcohol weekly, or smoke marijuana (Sinha et al., 2007). More recent studies shed light on this consistent relationship. Arguing that religious involvement provides more than social capital, Longest and Vaisey (2008) demonstrated through secondary analysis of the nationally representative longitudinal data from the NYSR that valuing religion predicted abstinence from marijuana use more than mere social control or involvement in religious institutions did. Their findings reveal the complexity of religion as a developmental context by demonstrating that a young person's commitment and value of religion catalyzes the impact of the social norms and relationships available through religious involvement.

Similarly, in another nationally representative sample of 12- to 18-year-olds, Nonnemaker, McNeely, and Blum (2006) found that adolescents' decisions to experiment with smoking tobacco were influenced by their individual practice of religion and by their participation in religious communities. Private religiousness was protective against initiation of regular smoking among nonsmokers. It also protected against initiation of experimental smoking but only when the young people frequently attended religious services or religious youth groups. However, public, not private religiousness predicted reduction and cessation of cigarette use among regular smokers. Taken together, these findings demonstrate the multifaceted influence of religion on young people's lives and make clear that religion must be examined as individual and communal as well as in terms of beliefs, attitudes, and behaviors.

Desmond, Soper, and Kraus (2011) found that three measures of peer influence—peer attitudes, behaviors, and pressure—had weaker effects on substance use in religious adolescents. Thus, even when religious youth are exposed to peers who encourage substance use, religiousness may serve as a protective factor that reduces the deleterious effect of peers. However, one study found that religiousness in heterosexual but not gay, lesbian, and transgendered youth was linked to lower substance use (Rostosky, Danner, & Riggle, 2007).

Sexual Activity. There is no clear link between religiosity and sexual activity. In some studies, adolescents who attended church regularly and valued religion were more likely to assent to the importance of sexual abstinence until marriage than nonreligious peers, even though their beliefs were not always congruent with their actions (Smith & Denton, 2005). Despite the higher prevalence of

beliefs in the importance of sexual abstinence, religious youths were still likely to be sexually active, though to a lesser degree than peers for whom religion was not salient (Lammers, Ireland, Resnick, & Blum, 2000). For example, adolescent identification with religion at the age of 15 predicted delayed sexual activity at ages 15 and 21 (Rostosky, Regnerus, & Wright, 2003). However, Leonard and Scott-Jones (2010) found that no measures of religiousness in 18-year-olds were correlated with age of first intercourse or frequency of sex. Furthermore, a composite score of religious variables did not predict sexual activity, and the students' sexual activity was not predicted by their beliefs regarding premarital sexual activity.

Summary of Outcomes and Adolescent Religiousness and Spirituality

For many outcomes in adolescent behavior (e.g., civic engagement, delinquency), the research paints a clear picture of a positive relationship with adolescent religiosity and spirituality. These links would appear to benefit the adolescent and society. For other outcomes (e.g., sexual activity), the picture is murkier. We believe that the data support the admonition (Pargament, 1997) that, instead of assuming that religion and spirituality have some monolithic relations with outcomes, different dimensions of religiosity or spirituality should be related in different ways to different outcomes in different populations. As we have stated at various points, caution is needed in assuming any simple causal links between religion and outcomes. Finally, we see a clear need for more research closely examining person-environment matches and clarifying how religious and spiritual resources may work together to promote well-being and prevent risk and other challenges common in adolescence.

NEGATIVE ASPECTS OF RELIGION AND SPIRITUALITY

As we have shown, religion and spirituality seem to function as positive resources in child and adolescent development. Many of the previous sections build the argument that connections to the transcendent are beneficial. However, religion and spirituality are multivalent constructs that do not necessarily promote well-being and thriving. Holding negative worldviews and negative perceptions of God can cause significant personal distress (Mahoney et al., 2006; Wagener & Maloney, 2006). For

example, adolescents who attributed their illnesses or stresses to God's punitive nature reported more externalizing problems than those youths who held more positive God images (Carpenter et al., 2012; Reynolds et al., 2013). In terms of social context, some religious connections or spiritual experiences can inhibit personal growth or inculcate a negative sense of identity. For example, cults may elevate the identity and needs of the group while devaluing the individual. Religious environments that impede adolescent exploration, questioning, and expression of religious doubt may thwart optimal development. History tells us that organized religion and some manifestations of transcendence and connectedness have inspired hatred and violence, hate groups, and terrorism. We see how religion can be a negative force when it causes detriment to individual or societal well-being. At this time, there is little psychological evidence available on these processes in children and adolescents.

Thriving is also dependent on a prosocial ideology that nurtures a sense of moral and civic identity (Lerner et al., 2003). If the sources of transcendence do not engender a commitment to contribution to the greater good, they might be negative spiritual influences. For example, environments that use religion to encourage violence through ideology and example do not promote thriving (King, 2008). Religious expressions that encourage an "in-group" and promote suspicion of or hostilities toward others may also undermine positive youth development (Templeton & Eccles, 2006). In addition, experiences of religion and spirituality that promote personal quests for meaning and satisfaction but not contributions beyond the self may not promote thriving and social well-being. The relational developmental systems perspective proposed in this chapter provides a lens through which to understand when religion and spirituality may be deleterious.

Specifically, we advocate for a conceptualization of spirituality that emphasizes beneficial reciprocating relationships between individuals and the many contexts in which they live. Religion or spirituality are not always conducive to thriving and can cause harm to individuals (e.g., religiously inspired child abuse, suicide bombing, oppression) or can cause individuals to do harm to the greater good (e.g., discrimination, terrorism). Just as existing research demonstrates the potential benefits of religion and spirituality, history demonstrates the potential dangers (Oser et al., 2006). Both the good and bad point to the potency of religion and spirituality for children, adolescents, and society.

INTEGRATIVE COMMENTS AND FUTURE DIRECTIONS

The inclusion of this chapter in a research volume of the *Handbook* marks a historical moment for the field of child and adolescent religious and spiritual development. The depth and breadth of empirical work discussed in this chapter demonstrates that the study of the nature and function of religion and spirituality in development is moving from its earlier periphery and neglect to the mainstream of developmental psychology. We hope that this chapter is the most comprehensive and current review of these topics to date. To close, we offer some conceptual perspectives that will, we hope, promote richer understanding of the foci of this chapter.

Relational and Reciprocating Spirituality

A major theme we have emphasized is that religious and spiritual development occurs in relationships—to individuals, communities, nature, all humanity, or the supernatural. This sense of relationality is at the heart of transcendence—moving beyond the self to the discovery of meaning and transformation. Spiritual development stems from the transactions one has with transcendence. A combination of maturational constraints and sociocultural influences will shape this experience. For some the transcendent entity may be a parent, peers, a religious community, a political party, solidarity with all of humanity, or God. It is probable that the more one views the object of transcendence as sacred or meaningful, the greater the influence on the self (King et al., 2013).

This idea is supported by a study of adolescent spiritual exemplars who described various experiences of transcendence—some with God, Allah, nature, and absolute truth, for example. Because these forms of “another beyond the self” were perceived as ultimate and boundless, they had great impact on shaping the beliefs, world-view, identity, commitments, devotion, and actions of these young people. Spiritual development does not stem from *any* positive relationality but those transactions that are marked by transcendence that bring about meaning and beliefs that motivate and sustain a commitment to contributing to self and others.

From this vantage we have proposed revising the term *relational spirituality* (Mahoney, 2010; King et al., 2013) to *reciprocating spirituality*. This nuance emphasizes that spiritual development entails not only relationships but responding and contributing to the greater good. This

bidirectional movement is evident in studies that examine broad conceptualizations of spirituality (Benson et al., 2012; King et al., in press). The studies reviewed in this chapter confirm this sense of reciprocating spirituality. It has been noted that religiousness and spirituality are linked to bidirectional effects between young people and their worlds—whether parents, schools, or God. Religion and spirituality are clearly linked to identity, fidelity, and contribution—especially during adolescence. From this perspective, the heart of spiritual development lies in the interaction between the self and another that informs one’s beliefs and commitments, and motivates the young person to live in a manner mindful of others. Further research is warranted to understand the mechanisms through which transcendence may promote transformation, action, and well-being.

Are Religion and Spirituality Good for Children and Adolescents?

Based on the research we have reviewed, one of the most important conclusions we can offer is this: Simple conclusions about whether religion or spirituality are good or bad for children and adolescents are inappropriate. In contrast, it seems prudent to ask: What dimensions of religion or spirituality are related to which outcomes in which populations, and based on data from which informants? Such a cautious and more meticulous approach is needed in research on religion or spirituality and *children’s* well-being, where the findings are nuanced. However, the literature on religion/spirituality and adolescents provides a more consistent and robust pattern of evidence suggesting that religion and spirituality promote adolescent well-being. At this time, research points to the added benefits of both personal variables such as salience, experiences of transcendence, clearly defined morals and values, as well as more social or institutional variables such as religious participation and social capital. That said, further research is needed to clarify causal directions and under what circumstances the resources available through religion and spirituality are most helpful to young people.

Children’s “Horizontal” Spirituality and Growth Toward Reciprocal Relationality

Some transcendent relationships may be more pertinent or meaningful at different ages. Clearly, children are often *raised* as if they have relationships with the supernatural, and the social contexts they are raised in—family,

church or temple, community, and culture—can certainly strengthen those relationships. Perhaps, though, it is most important that young children develop relations with earthly others—developing “horizontal” spirituality in these social contexts. These experiences may well provide a foundation for the development of reciprocal relationality with that which is “further beyond” the self. This more “vertical” spirituality may become more salient in later childhood and adolescence. We emphasize here that young children’s spirituality is merely different from—not “less than” or “deficient” from—older children’s and adolescents’. The notion that young children’s spirituality would be particularly horizontal and grounded in human relationships seems plausible in light of many theories of development, from object relations and attachment theory to cognitive-developmental theory to faith development theory to psychosocial perspectives, that emphasize early trust as integral to the later development of spirituality and faith.

We believe that this conclusion is preliminary, because relatively little empirical data on children’s relationality with the transcendent is available. With very few exceptions, far more studies of children have measured their parents’ religiousness than have attempted to examine any deep facets of children’s spirituality. In addition, developmental scientists do not typically treat children as experts or authorities on their own experience, a tradition that must change if we are to obtain a deeper understanding of children’s spiritual relationality of all kinds, especially vertical (see Boyatzis, 2011). These constructs call for the development and use of new tools.

Building a Better Mousetrap: Improving Our Methodologies

Throughout the chapter we have offered many suggestions for future research. But a more fundamental issue is methodology. The measures and methods typically used by developmentalists may simply be inadequate for the task of assessing young children’s spirituality. Our methods may offer too crude an approach, too blunt an instrument, to capture the complexity of children’s transcendent relationality; we need better mousetraps. Even if we have faith in our measures, it behooves us to realize that “the map is not the territory.” William James (1902/1982) asserted that one of spirituality’s defining qualities was its “ineffability”—its resistance to being described. This would be all the more true for young children whose

communication abilities may be inadequate for describing transcendent connectedness.

Our understanding of religious and spiritual development would benefit from the use of multimethod approaches (see Tolan & Deutsch, Chapter 19, this *Handbook*, Volume 1). While quantitative approaches have been invaluable for measuring and charting links between constructs, qualitative approaches would help us understand more of the “how and why” of religious and spiritual development. Robert Coles’ (1990) work, *The Spiritual Life of Children*, was a stellar example of a qualitative approach. Coles talked with school-age children from Christian, Muslim, Jewish, and other backgrounds within the United States and outside it—at length, on many occasions, in various locations comfortable to the children. In his attempts to create authenticity and rapport, Coles made clear to them that, in their conversations (not “interviews”), he viewed the children as his teachers. This time-consuming personal approach may not work for all researchers or to answer all questions, nor would it be appropriate for children who are too young or too developmentally challenged for this heavily verbal approach. But it seems likely that the depths of children’s spiritual struggle and search for transcendent meaning would be revealed best using qualitative methods. Gersch’s work on “listening to children” in London is a rich example (Gersch, Dowling, Panagiotaki, & Potton, 2008). In the United States, Jennifer Beste (2012) studied Roman Catholic children’s experience with the sacrament of reconciliation or penance. She spent ample time in the children’s religious settings and acknowledged children as authorities on their own experience. As Beste asserted, “Interviewing children about what they think about their religious experiences, participation in religious rituals, religious communities, and relationship with God may very well alter or even shatter our dominant assumptions about children’s intellectual, religious, moral, and spiritual capacities, allowing us greater understanding of the actual children in our midst” (p. 170).

In their study of adolescent spiritual exemplars, King et al. (in press) traveled around the world to listen to the stories of youths who had been recognized in their communities for having “highly developed” spirituality. As nominated exemplars, these youths were viewed as expert informants who shared their experiences, opinions, and meanings about spirituality and their experiences of the transcendent. Hearing their stories and the meaning of them through in-depth interviews allowed more complex constructs like fidelity and coherence among their beliefs, identity, and actions to emerge. Without their

life narratives, these more recently recognized aspects of spiritual development would not have been evident.

In addition to qualitative methods, more advanced quantitative approaches are needed. Perhaps one of the most valuable new directions would involve using person-centered approaches rather than, or to complement, variable-centered approaches. Longitudinal designs are needed to track these personal intraindividual changes from childhood to adolescence and from adolescence to adulthood; such designs would help us identify the individual, psychological, social, and cultural factors that promote or impede religious and spiritual development and to learn how religious and spiritual development may contribute to development in other domains. Many of the developmental issues raised in this chapter could be elucidated by such longitudinal work. For example, how does the development of metacognition affect the capacity for transcendence? In addition, further research is warranted to understand how and under what circumstances experiences of transcendence bring about personal transformation and fidelity. Does fidelity based on a religious or spiritual identity sustain more generative contributions than other forms of fidelity? Which childhood antecedents of these tendencies are apparent during adolescence? Furthermore, existing research is based on assumptions of normative development. Research is needed to investigate the ontogeny of religious and spirituality development in children and adolescents who experience cognitive or emotional impairments.

Much research is needed to understand the relations between religion, spirituality, culture, and development. For example, do religious or spiritual identities function differently for youth who do not subscribe to the same beliefs and values dominant in their cultural context? Although initial research suggests consistencies across diverse religious groups (see Benson et al., 2012; King et al., in press; Trommsdorff & Chen, 2012), cultural-developmental or indigenous explorations are required to gain a more nuanced understanding of potentially different developmental trajectories among diverse expressions of spirituality or religious traditions.

It is important to note here that, consistent with a relational developmental systems perspective, spiritual development is linked to processes in other developmental domains. This interdependence creates a synergy in which spiritual development contributes to and is influenced by other changes in other developmental domains. Thus, longitudinal designs and methods to measure biological, psychological, social, cultural, and perhaps even

supervenient level variables may clarify the relations between spiritual development and other domains such as cognition, emotion, identity, moral, and civic development. Such research will give further insight into both the nature and function of spirituality in lives of children and adolescents.

It will be helpful if developmental scientists recognize that hundreds of millions of children and adolescents worldwide are raised in faith traditions, engaged and embedded in religious and spiritual communities, rituals, sacraments, scripture, practices, creeds, music, art, and proscribed and prescribed behaviors. In addition we need to learn about children growing up in atheist families or those with no ties to organized religion. An interesting qualitative study of atheist and agnostic scientists at elite U.S. universities (Ecklund & Lee, 2011) explored their plans and goals for involving religion in raising their children. The scientists revealed a striking disinterest in spirituality of any form but these same adults emphasized that exposing their children to religion was important and consistent with their value of free thinking: Involving their children in religion "was a way to expose them to diverse religious ideas so that they (the parents) do *not* inadvertently indoctrinate them with atheism" (p. 736). These groups are intriguing ones to study, and it will be interesting to learn how trajectories differ for children from atheist and religious homes (see Evans, 2000).

Why Not Organized Religion?

Developmental science has plumbed the depths of many microsystems of development, from the family to peer group to school to others. Why not organized religion? Given that so many children worldwide are raised within organized religious traditions, it is curious, if not a serious omission, that religious institutions remain "unexamined crucibles" for children's growth (Roehlkepartain & Patel, 2006). Developmental science would benefit from learning how children and adolescents understand and experience many aspects of the organized religions in which they grow up. These include forgiveness, sin and salvation, distinction between faith and good works, reincarnation, charity, grace and redemption, the Eucharist, karma, confirmation ceremonies, the Trinity, the power of divine figures to heal and punish, and so on. Other questions abound: How do Jewish children make sense of the Passover seder or the broader call for *tikkun olam*, to put together a broken world? What do Roman Catholic children feel and think when they are praying to a saint or statue of the Virgin Mary? How do

Hindu youth make sense of their polytheistic tradition (especially if they live in a monotheistic culture)? How are Muslim children transformed by the *hajj* to Mecca? How do children make sense of their religion's call to help the poor, or the mandates of dietary restrictions? How are children affected by the gendered nature of their gods or gender divisions in religions? What role does youths' cognitive level and family context, for example, play in these matters?

These questions and topics touch on many essential components of world religions. Many of these components are used as mechanisms to socialize children into religious conceptions of the good and moral life, appropriate notions of the self and of others, and to help children cultivate connectedness to the tradition's sacred transcendent entities and the human faith community around the children. We believe these are matters of profound importance, and think that, if more developmental scientists could take the bold step of studying these topics and questions, our field would take enormous leaps in understanding how religion plays a role in children's and adolescents' lives.

CONCLUSIONS

Over a century ago, William James noted that the function of personal religion (which, today, he would probably label spirituality) was to motivate individuals to realize a more satisfying existence: "Not God, but life, more life, a larger, richer, more satisfying life, is, in the last analysis, the end of religion. The love of life, at any and every level of development, is the religious impulse" (1902/1982, p. 453). For James, the core of spirituality at the personal level was "fundamentally about being whole, being wholly human, and being part of the whole that is existence" (King & Roeser, 2009, p. 449). We posit that spiritual development is the domain of development through which individuals experience their wholeness and their uniqueness most fully as they transcend themselves in relation to what is greater than the self and to the extent that they are contributing to the world beyond themselves. Religious development is a more specific domain in which young people undergo qualitative change of increasing differentiation and integration in their understanding and experience of the practices, beliefs, doctrines, and communal practices of their faith community.

To ignore this area of study within human development, which has been the case until recently, is to ignore a central aspect of child and adolescent psychological development and the global challenges of our day and age. Religion

and spirituality are increasingly viewed as basic human capacities, and religious and spiritual development are increasingly visible domains of developmental science. The concept of reciprocating spirituality emphasizes how religious and spiritual development take place through the interactions between young people and the many contexts in which they live. At its best, religious and spiritual development may be able to facilitate both individual and societal well-being. Religion and spirituality potentially offer youth a host of developmental resources from the intrapersonal to social to ideological to transcendent. Let us continue to learn how these dimensions of young people's lives develop and how they may contribute in good ways (and bad) to young people's growth, thriving, and flourishing.

As developmental scientists who have studied religious and spiritual development and the roles of religion and spirituality in children's and adolescents' lives for many years, we understand that some developmentalists may find these constructs too new, unfamiliar, or broad to confidently move toward studying them. However, developmental scientists have always faced the challenge of operationally defining and measuring dimensions of development that we have come to view as central (e.g., infant emotion, attachment, adolescent identity), yet long ago may have seemed amorphous or elusive. It is axiomatic that the more we study developmental phenomena the clearer they become and the more we come to understand them—while at the same time deeper questions and mysteries are revealed. We are confident this will be the way of this field as well, that the more developmentalists examine religious and spiritual development phenomena, the clearer they will become and the more important in development they will seem.

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