

Studying Lives Through Time: Secondary Data Analyses in Developmental Psychology

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To study lives in context through time, many approaches are available to the developmental psychologist. Two such ways are the analyses of longitudinal national data and secondary data analysis of long-term developmental studies conducted to answer questions not originally posed. This article, the first in a series of four, considers the current opportunities for, and possible limitations of, these two types of analyses, the policy relevance of these analyses, and their application to interdisciplinary research.

Multiple methods and approaches are available to the developmental psychologist studying lives in context over time. This article and the following three articles address the analysis of longitudinal national data and secondary data analysis of long-term developmental studies to answer questions not originally posed. The focus is on long-term studies that span a decade or more. This article sets the stage by considering a range of current opportunities for and possible limitations of these two types of analyses, as well as the policy relevance of such analyses. The second article considers how to conduct analyses of both longitudinal national data and secondary data analysis of long-term developmental studies (McCall & Applebaum, 1991). The third article describes a data set on a national panel in terms of its usefulness for answering developmental questions. We chose the Children of the National Longitudinal Survey of Youth (NLSY) as an exemplar, because unlike most data sets of this kind that focus on children and adolescents, developmental psychologists have contributed to its design and measure selection. This contribution includes a fair representation of psychologically oriented mediating and outcome variables, a set of behavioral observations of the children in their homes, and repeated measures of children's behavior (Chase-Lansdale, Mott, Brooks-Gunn, & Phillips, 1991). The fourth article in this

issue offers illustrations of the usefulness of the Children of the NLSY to address questions of interest to family policy analysts as well as to the research community. Several issues are highlighted: effects of various aspects of maternal employment on preschoolers' cognitive and behavioral functioning, effects of the types of child care used, and the relative effects of each (Baydar & Brooks-Gunn, 1991). Looking at the intersection of maternal employment and type of child care is generally impractical in smaller, more homogeneous samples. Two colleagues from sister disciplines comment on these articles (i.e., Greg Duncan, an economist, and Andrew Cherlin, a sociologist). They speak to the usefulness of interdisciplinary collaboration in such analyses as are represented by the four articles.

The plurality of methods available to the developmentalist allows for diversity in research design. At least two distinctions are relevant when considering the use of an existing data set: (a) the length of time an individual or family is studied and (b) whether a study is designed to test specific hypotheses or is designed to be a data resource for the social science community.

The first distinction is the length of time that an individual or family is studied. Relatively short-term repeated-measures studies are most common in developmental research on children and adolescents; typically, the focus is on growth during one life phase or across adjacent life phases (i.e., infancy to preschool or childhood to the young adolescent years). Developmental studies in adulthood generally open a longer time frame, in part because developmental change is probably not as rapid as it is earlier in life. The difference in time frames is illustrated by looking at the two compendia of longitudinal studies prepared by the Social Science Research Council on childhood-adolescence and on adulthood (Migdal, Abeles, & Sherrod, 1981; Verdonic & Sherrod, 1984).

The second distinction involves whether the study was designed to test specific hypotheses. Most developmentally oriented studies are of the hypothesis-generation type. Hypothesis-generating studies may be limited for secondary analysis

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purposes when the original measures were narrowly defined; such data may not allow for other hypotheses to be tested. Examples of developmentally oriented data sets in which the measures collected were both broad in terms of constructs and deep in terms of individual characteristics are considered in the next section. In contrast, longitudinal national studies are typically designed with the explicit purpose of being a data resource for the social science community. Typically, the scope is broad. In such nationwide, large sample studies, measurement is limited to self-reports on life experiences and attitudes. Actual behavior is usually not observed, and scales focusing on individual characteristics are often not included. These studies are able to document effects, for example, of family composition on children's high school graduation rates, on achievement in school, and on children's own family formation, but usually are unable to provide the type of information necessary to understand how changes in family composition alter children's outcomes (Furstenberg, Brooks-Gunn, & Morgan, 1987; Garfinkel & McLanahan, 1986; Zill, 1988). Examples of longitudinal national data sets that include more microlevel measures are given in the next section, and the Children of the NLSY is described in the next article (Chase-Lansdale et al., 1991).¹

Here, we take a look at (a) why long-term longitudinal secondary analyses are necessary; (b) what past and recent events have facilitated such analyses, including the emergence of long-term longitudinal studies and archive centers; (c) limitations in the analyses of such data, which often have been corrected by someone other than the scholars actually formulating the research questions and conducting the analyses; and (d) the future prospects of such analyses. More detail on opportunities and limitations is available in several other publications (e.g., Colby & Phelps, 1990; Elder, 1985; Featherman, 1983; Hyman, 1972; Kiecolt & Nathan, 1985; Mednick, Baert, & Bachman, 1981; Mednick, Harway, & Finello, 1984; Migdal et al., 1981; Nesselrode & Baltes, 1979; Sorenson, Weinert, & Sherrod, 1985; Tuma & Hannan, 1984). For the sake of brevity, analysis of long-term longitudinal studies are used in this article to refer to both reanalysis of data from developmental studies as well as analysis of longitudinal national studies. Both have been subsumed under the heading of secondary analyses to emphasize the points that the scholars using the data sets were not the ones who originally designed the study (so that secondary questions are being asked of the study) and that in the case of the longitudinal data sets (and even some of the long-term longitudinal studies such as the Fels, Berkeley, and Oakley Growth Studies), data were not collected to address specific hypotheses but were more broad based (i.e., employment of youth in the National Longitudinal Survey (NLS) studies and development of children in the growth studies).

Why Are Secondary Analyses Necessary?

Longitudinal data are necessary to study lives through time. Documenting the sequences of events occurring to individuals or families and the inherent patterns of changes in these events entails time-ordered waves of data collection.² Cross-sectional information only provides a brief, static snapshot of a slice of an individual's or a family's life.

Collecting longitudinal data in more than a short-term study

presents the researcher with that inevitable constraint—time. To look at continuity and change in behavior across life phases, to study early precursors of adult or even adolescent behavior, to chart the progression of adults through old age, or to examine two generations at the same point in the life span—all of these interests require a research duration beyond that of individual researchers, who are confronted with the real-life demands of academe and their own aging. Some of these research issues are reviewed here.

Age, Period, and Cohort Perspectives

Perhaps the most distinctive feature of life-course studies is the explicit link among the life course, developmental phase, and historical or social events, or among age, period, and cohort. Conceptual models have been developed to guide analyses of associations between social or historical events and the life course; secondary analyses are essential for such research. This is illustrated by G. H. Elder, Jr.'s, well-known study of the effects of the Great Depression of the 1930s on individuals and familial relationships. Elder (1974, 1975) took advantage of a particular characteristic of two well-known longitudinal studies—the Berkeley Guidance Study and the Oakland Growth Study.

At the time of the Great Depression, most of the Oakland Study children were making the transition to adolescence, whereas the Berkeley Study children were much younger. Tracing the effects of individual family's economic loss and the differences in such deprivations across families, the study showed that children who were younger at the time of the Depression, and in particular the boys, were more affected by familial economic loss than the children who were in the midst of becoming adolescents. These effects occurred in part through the negativity of fathers in their marriages and the parent-child relationship, and they tended to persist into adulthood. Thus, the timing of the social event—the Great Depression—at a specific period in the life course formed the crux of the investigation.

Interconnections Between Lives

A question central to many developmental scholars has to do with the effect of parents (parental life decisions and events, personality, and child rearing practices) on children and adolescents as they grow up. Often studied under the rubric of socialization, a tremendous amount is known about parental interac-

¹ Although distinctions are being made between the more in-depth individual level analyses in smaller studies and the more macrolevel approaches of larger, often nationally representative studies, the two may be combined. An example is the ongoing study by Reiss, Plomin, and Hetherington in which national sampling strategies are being combined with collection of in-depth data, including family observational data. Thus, although sample size and data collection techniques tend to covary, they represent independent choices.

² All attempts to construct an individual's life course of events involve some retrospective accounts, in that individuals are asked about events occurring in the past year, or 5 years, or even more. Life-history records are quite accurate for events such as births, marriages, and divorces, participation in the work force, and residential histories (see, e.g., Furstenberg et al., 1987).

tions and their influence on children, as well as something about parental beliefs and their direct and indirect effects on children (Maccoby & Martin, 1983; Sigel, 1985). Likewise, maternal characteristics—such as depression, temperamental characteristics, and anxiety—have been associated with child functioning (Billings & Moos, 1986; Forehand, Lautenschlager, Faust, & Graziano, 1986; Rutter & Garmezy, 1983; Weissman et al., 1987). In addition, maternal life circumstances—such as education, employment, and marital status—are associated with child outcomes (Duncan, Hill, & Hoffman, 1988; Featherman, Spenner, & Tsunematsu, 1988; Furstenberg et al., 1987; Garfinkel & McLanahan, 1986; Hofferth, 1985).

Most of this research focuses on parental characteristics at one point in time. But almost nothing is known about how a change in parental circumstances is influenced by social changes and as a result, influences the life-course trajectory of children and adolescents. Parental characteristics are not always static. For example, studies of depressed mothers typically do not analyze the effects of changes in depressive status on the child or the effects of chronic versus periodic bouts of depression on the child at different points in the life course.

Not only do parental characteristics change but family circumstances also change, and these changes influence how, where, and with whom children live (Duncan et al., 1988; Featherman et al., 1988; Hofferth, 1985). Even when children's outcomes are assessed longitudinally and family circumstances are entered as predictors, changes in the latter are almost never studied by developmental psychologists (with the notable exception of the divorce literature).³ That is, the interweaving of parents' and children's lives is not studied; their life courses are not taken into account simultaneously, even though that is how they occur.

How do the processes underlying individuals' interconnections between several life courses influence subsequent life-course events? In addition to the work by Elder (1974), changes in maternal circumstances and child outcomes have been documented simultaneously in the Baltimore Study, a 17-year follow-up of about 300 teenage mothers and their first-born children (Furstenberg et al., 1987). The teenage mothers were interviewed periodically between the ages of 17–19 and 34–36, and their children were seen between the ages of 4–6 and 16–18. As would be expected from previous cross-sectional studies, concurrent maternal life situations (such as welfare status and maternal education) were highly associated with their children's school performance and problem behavior during the preschool and high school years. Moreover, the study was able to examine what happened when mothers' life circumstances changed between their children's preschool and high school years. For example, mothers who exited the welfare system during this time period reduced the chances that their children would fail a grade in school by midadolescence, even given their verbal and school-readiness abilities as measured in the preschool years. Such analyses are dependent on the long-term life records and multiple assessments of both children and their parents.

Perhaps the interconnection of children's and parents' lives has not been a focus because developmental theory until the middle 1960s tended to be characterized by beliefs that development was relatively inflexible, primarily controlled by maturation,

and malleable only at very young ages (Bloom, 1961; Hunt, 1961). Great strides have been made in demonstrating that change occurs across the life span, that life courses are not entirely determined by early childhood experiences, and that contextual features both enhance and constrain the potential for change (Baltes & Brim, 1978–1984; Baltes & Nesselrode, 1973; Brim & Kagan, 1980; Gollin, 1981; Lerner, 1984). The field of developmental psychology is poised for more work on interconnections between parent and child life courses (Brooks-Gunn & Furstenberg, 1987).

Critical Life Phases

A related developmental issue focuses on the impact of life-course events as a function of the life phase of the child, parent, or family. Do environmental events occurring at one life phase have more of an effect on individuals or families than similar events occurring at another life phase? Do prior events have persistent effects in subsequent life phases, and under what conditions and in what life phases do such effects persist? These questions require longitudinal data.

Several different conceptual frameworks are used to address the issue of differential effects and persistence of effects of familial life course events as a function of an individual's own life phase. Transitions between life phases are being studied to see if phases in which many social, cognitive, and biological changes are taking place are perceived of as more difficult or result in more negative outcomes or rapid changes (Connell & Furman, 1984; Deutsch, Ruble, Fleming, Brooks-Gunn, & Stangor, 1988). The literature on the transition from childhood to adolescence is a case in point (Gunnar & Collins, 1988; Lerner & Foch, 1987; Montemayor, Adams, & Gullotta, 1990).

Another model involves the timing of life events, long used by sociologists and demographers to study timing of such events as parenthood, marriage, and work entrances and exits. Being out of phase with respect to events such as the ones just mentioned results in different subsequent life courses for multiple family members, as is illustrated in the teenage parenthood literature (Brooks-Gunn & Furstenberg, 1986; Hofferth & Hayes, 1987; Lancaster & Hamburg, 1986). These models are being applied to life events of children and adolescents (e.g., pubertal timing, timing of school transitions, and timing of entrance into non-maternal child care; Baydar & Brooks-Gunn, 1991; Brooks-Gunn, Petersen, & Eichorn, 1985; Simmons & Blyth, 1987). Others are studying possible social, biological, or cognitive vulnerabilities specific to a particular life phase (Keating, 1990; Rutter & Garmezy, 1983).

Although across-age comparisons of the effects of life events are just beginning, the literature on the effects of divorce and

³ Changes in family circumstances are studied extensively by demographers and family sociologists. However, until quite recently, their focus has not been on changes in child outcomes as a function of change in family circumstances (see Baydar's, 1988, analysis of the National Survey of Children as an exception). When children are the focus, their developmental outcomes are likely to have been examined at a single point in time, just as developmental psychologists have been likely to focus on family circumstances at a single point in time (cf. Featherman, 1983; Garfinkel & McLanahan, 1986; Zill, 1988).

remarriage on children is perhaps the best developed (Chase-Lansdale & Hetherington, 1990; Hetherington & Arastek, 1988). However, much of this research is cross-sectional or only uses a short-term longitudinal framework, does not examine predivorce characteristics of children or parents, does not control for effects of economic change that often accompany divorce, or does not take into account various custody arrangements (Hetherington & Arastek, 1988; Maccoby, Depner, & Mnookin, 1990).

The limited evidence, however, suggests that divorce has pronounced short-term effects, that divorce may leave more negative effects on boys and younger children, that remarriage may have more of an effect than divorce on children over a 5-year period, and that variability in outcomes is large (Baydar, 1988; Furstenberg, Nord, Peterson, & Zill, 1983). Long-term effects may be seen for girls as they become adolescents, although the database for this finding is limited (Hetherington, 1972, 1987). Analyses of extent data sets would allow for period and cohort replication across ethnically and economically diverse groups, more precise exploration of effects by age of child, and identification of protective and risk factors (Rutter, 1988).

Intergenerational Processes

The possibility of intergenerational effects on children and families is attracting increased attention for many reasons. As single parenting has become more common, it is believed that multigenerational parenting is more prevalent. As longevity has increased and change across the life span has been acknowledged, aging has become a developmental topic (Baltes, Reese, & Lipsitt, 1980; Lerner, 1984; Watkins, Menken, & Bongaarts, 1987). With the maturity of the longitudinal studies, it is now possible to examine parent-child interactions across two generations of the same families. Topics suitable for secondary analyses include the consequences of multigenerational parenting for grandmothers and grandchildren, the costs and benefits of assuming parental roles the second time around, continuity of behavior and parenting style across two generations, and satisfaction with assumed roles and changes over time and generation in satisfaction.

Additionally, concern about the transmission of poverty across generations makes secondary data analyses very attractive, because some data sets allow for an examination of intergenerational processes that may contribute to persistent poverty across generations (Furstenberg, Levine, & Brooks-Gunn, 1990). These processes include attitudes, aspirations, actual parental practices, and residential, family, and work patterns.

Precursors of Relatively Infrequent Events

Secondary data analyses lend themselves to an examination of the precursors of relatively infrequent outcomes (Colby & Phelps, 1990). Vaillant's (1983) study of the life history of alcoholism points to the usefulness of secondary analyses for this purpose. Reanalyzing information gathered on more than 600 men from adolescence through middle age, Vaillant was able to identify precursors of alcoholism before its onset as well as the course of alcoholism over the adult years. Given the incidence of alcoholism in the general population of men, the identifica-

tion of precursors could not have been undertaken without a large sample. Access to a sample of men not initially selected because of characteristics or behaviors believed to be associated with later problem drinking allowed Vaillant to distinguish life-course events that were predictive of the subsequent event. Robins (1966) and others have examined the childhood precursors of adult criminal behavior using a similar approach.

What Events Have Facilitated Secondary Analyses?

Developments that have facilitated long-term longitudinal secondary analyses in behavioral science include (a) the existence of many excellent longitudinal and national panel studies in Europe and the United States, (b) reconstitution of valuable long-term longitudinal data sets, (c) application of new statistical techniques for longitudinal analyses, (d) interest in comparative studies of different generations, and (e) the founding of archival centers.

Longitudinal and Panel Studies in the United States

In the 1920s, several studies were initiated for fairly specific purposes. However, they turned into long-term longitudinal studies covering a broad array of issues and marked the beginning of a tradition of research into truly lifelong development. Were it not for these pioneers, a wealth of longitudinal data would not be available today.

In the waning days of the eugenics movement and its hereditarian concerns, Terman launched a longitudinal study in 1921 to investigate the maintenance of early intellectual superiority over a 10-year period. This objective was soon extended to the adult years. By identifying the most gifted at a young age, Terman believed that society could ensure the flow of talent to leadership positions. With the aid of his assistants, he selected 857 boys and 671 girls from 3 to 19 years old from large and medium-size urban areas of California who had IQs above 135 (Terman & Oden, 1959). Twelve waves of data collection have been carried out, with the first wave occurring from 1921-1922. Five-year follow-ups were carried out through 1986. By the 1980s, the sample still included approximately 800 men and women. All coded data from the 12 waves of data collection are available at the Inter-University Consortium for Political and Social Research (ICPSR). A long-time associate of Terman, Oden (1968), observed wide variation in adult achievement and asked why this was so. Twenty years later, a research team using recodes found that historical times (such as entering the job market in the early 1930s) accounted in part for such outcomes (Elder, Pavalko, & Hastings, 1991). As late as 1987, Vaillant (1983) interviewed about 50 of these women who were all over 70 years of age.

The Institute of Human Development at the University of California, Berkeley, houses and continues data collection efforts on the intergenerational studies of development and aging. These studies are a combination of three longitudinal studies begun between 1928 and 1933. The Guidance Study was initiated by Jean MacFarlane as a 6-year prospective study of a sample of 248 infants (MacFarlane, 1938). Nancy Bayley began the Berkeley Growth Study in 1928 with 61 infants to trace normal intellectual, motor, and physical development during

the first year of life (Bayley, 1949). The third study, the Oakland Growth Study, was started in 1931 by Jones, Jones, and Stolz to study normal adolescence, especially physical and physiological maturation and peer relationships, in 212 fifth and sixth graders (Jones, Bayley, MacFarlane, & Honzik, 1971). All three samples have been followed repeatedly from their inception. Between 1969 and 1972, data were collected on subjects who were in their 40s, along with their spouses, parents, and children (Eichorn, Clausen, Haan, Honzik, & Mussen, 1981). The last major follow-up was carried out in 1982.

Another major study was begun in 1929 by Sontag at the Fels Research Institute in Yellow Springs, Ohio (Sontag, Baker, & Nelson, 1958). Each year between 1929 and 1973, an average of 16.7 subjects from 63 families were enrolled in this study of psychological development from birth to adulthood. From the beginning, the emphasis was on direct behavioral observation and repeated administration of standard mental and personality test procedures. Between 1982 and the present, 46 additional subjects were enrolled, and beginning with the 1982 data collection, the focus has been on physical growth measures. Overall, 768 children participated in this research. Further follow up is possible, with additional funding. Crandall and Roche are the current directors of the Fels Study (cf. Crandall & Battle, 1970).

Since these first longitudinal research programs were launched in the 1920s, others have been initiated. A few of these studies that remain active will be mentioned (see two compendia of developmentally oriented longitudinal studies for a complete listing of relevant studies: Migdal et al., 1981; Verdonik & Sherrod, 1984). In 1935, Kelly began a 7-year study of 300 engaged couples into aspects of marital compatibility and other aspects of married life. The sample was followed up in 1954 by Kelly, and again in 1979 by Conley (cf. Conley, 1984; Kelly, Westoff, & Sagi, 1958). In 1938, Bock began the Harvard Medical School Study of Adult Development (the "Grant Study") of healthy college sophomores. These men have been followed up repeatedly by several investigators. The current director is Vaillant (cf. Vaillant, 1977; Vaillant & Vaillant, 1990). Glueck and Glueck (1950) began a study of delinquency in 1940. They compared samples of about 500 delinquent and 500 control boys ages 11 to 16. These samples have been followed up at ages 25 and 31. The control sample has been followed up since then by Vaillant. Perhaps the final study in this tradition is *Patterns of Child Rearing*, started in 1951 by Sears, Maccoby, and Levin (1957). This was a study of the child rearing practices and personality development of 379 mothers of kindergartners. In 1958, 160 of the children, then in the sixth grade, were recontacted, along with an additional sample of 377 new sixth graders. This sample has been followed up many times, most notably by McClelland (McClelland, Constantian, Pilon, & Stone, 1980). In 1987, he and his colleagues recontacted this sample of children, then aged 41.

Developments in other disciplines also fueled the current interest in long-term follow-ups. Economists and sociologists pioneered a series of longitudinal national studies. These new studies differ from the earlier intensively studied samples as they are very large, nationally representative samples. In 1965, the Office of Manpower, Policy, Evaluation, and Research of the U.S. Department of Labor contracted with the Center for Human

Resource Research at Ohio State University to study labor market experience (Parnes, 1983; Wolpin, 1987). In this project (the NLSs), 5,000 individuals were sampled from each of four groups: men 45 to 59 years of age, women 30 to 44 years of age, men 14 to 24 years of age, and women 14 to 24 years of age. These groups have been surveyed frequently since 1965. A fifth sample of young men and women was added in 1979; these youth have been seen yearly, and data were collected on the children of the original female respondents in 1986 and 1988. More information is available in Chase-Lansdale et al. (1991) and in Baker and Mott (1989).

The Panel Study of Income Dynamics was launched in 1968 to investigate the course of poverty and its effects on families in a sample of approximately 5,000 American families (Duncan & Morgan, 1985). Over 20 years later the panel study is still active but with a much broader range of problem foci over the life course, such as the residential histories of Black and White children and the work and parenting experiences of women (Hofferth, 1985). A new wave of data collection is carried out each year. Studies based on longitudinal records from the panel study have reshaped the appreciation for the dynamic nature of family life, households, and the experience of poverty. By following individuals over time, transient and more permanent exposures to poverty have been distinguished and the notable changes in economic and social circumstances that children experience have been highlighted (Duncan et al., 1988). Now recognized as a data archive of national significance, the Panel Study of Income Dynamics is serving as a model for similar projects in European countries (Smeeding & Toorey, 1988).

In 1972, the National Center for Education Statistics (NCES, 1972) initiated its National Longitudinal Study of the Class of 1972, an extensive study of 19,000 students. A second study, *High School and Beyond*, was begun in 1980, and data collection continues biennially (NCES, 1980). Together, these studies follow the progress of youth during high school and the period of transition to postsecondary education, work, and family formation.

This is only a cursory overview of some major American long-term studies and longitudinal national data sets. There are, of course, many other studies that might be of interest to researchers. Fortunately, two directories of longitudinal data describe these and many other longitudinal studies. Several years ago the Social Science Research Council published these inventories that together provide descriptions of over 200 longitudinal studies, one for studies focusing on aging and one on childhood and adolescence (Migdal et al., 1981; Verdonik & Sherrod, 1984). The Henry A. Murray Research Center of Radcliffe College is in the process of combining, expanding, and computerizing these listings for a single inventory (Young, Savola, & Phelps, 1991).

Longitudinal and Panel Studies in England

In England, the Economic and Social Research Council was established in 1967 to collect and make available machine-readable data relating to social and economic affairs from academic, commercial, and government sources. This greatly facilitates use by researchers from around the world. Two studies of particular interest for developmental researchers are the National

Survey of Health and Development, initiated in 1946 under the direction of Douglas (1964), and the National Child Development Study, begun in 1958 by the National Birthday Trust Fund. Because of the similarities in samples and measures, the cohorts in these studies may be compared with each other. These and many other European longitudinal studies are described in Mednick et al. (1981).

For the National Survey of Health and Development, community nurses visited 90% of families in England, Scotland, and Wales who had a child born between March 3 and 9, 1946. The nurses interviewed the mothers and completed health questionnaires between May and September 1946. Subsequently, a sample of 5,362 families was selected for a 5-year follow-up, which was eventually extended, with the last contact being made in 1977. In the early years, information was collected about the development and health of the children, family circumstances, and maternal employment. As the children grew older, educational progress was also measured, along with eventual employment histories. In 1969, a second-generation study was started and included collecting information from survey families when their own oldest child reached the ages of 4 and 8. This permits researchers to ask whether one's early experiences affect the way in which one brings up children and conducts family life.

The National Child Development Study included 17,000 children born in 1958 in England, Scotland, and Wales. It was designed to examine social and obstetric factors associated with early death or abnormality. The sample was recontacted in 1965, 1969, 1974, and 1981, at age 23. Efforts are currently underway to interview the respondents at age 32 as well as their children. Data were collected from parents, birth records, health visits, teachers, medical examinations, and tests of ability and questionnaires completed by the subjects. For more information, see Davie, Butler, and Goldstein (1972) and Fogelman (1983).

In 1985, the European Science Foundation established the Network on Longitudinal Research on Individual Development with David Magnusson, University of Stockholm, as chairperson. The foundation currently is sponsoring preparation of an inventory of European longitudinal research that will serve as a companion volume to the Social Science Research Council inventories. Wolfgang Schneider (Max-Planck Institute, Munich) and Wolfgang Edelstein (Max-Planck Institute, Berlin) are in the process of compiling this information.

New Statistical Techniques and Models

Older models derived from the life-course perspective did not always focus on temporal, process-oriented, or contextual features of life-course patterns. The family cycle typology ignored the timing of different events. The single career analysis did not look at multiple career paths or trajectories, and life-change measures did not take into account the context in which lives unfolded (see Elder, 1975, Featherman, 1983, Riley, Johnson, & Foner, 1972, and Sorenson et al., 1985, for seminal arguments for more inclusive models).

At the same time, statistical techniques promoted more dynamic modeling (Nesselroade & Baltes, 1979; Tuma & Hannan, 1984). More frequent publications, presentations at meetings, and workshops explaining and using such methods have made

them more accessible to researchers. Measurement and statistical equation models encouraged the examination of multiple indicators simultaneously and of direct and indirect effects on multiple indicators (see Hartup, 1987). Event, history, or life-table analyses facilitated work on timing as well as comparisons among multiple career trajectories (Allison, 1984). Survival analyses made it easier to describe life events and to calculate transitional probabilities; and more precise specification of rate of change and the effects of various social events on such change is made possible by growth-curve analyses and differential equation models (Baydar, 1988; Rogosa & Willett, 1985; Singer & Willett, 1991). Other methodological advances include single case designs, time series analysis, and sequential data analyses (Nesselroade & Baltes, 1979). For more information, see Annotated Bibliographies for Longitudinal Research Methodologies, prepared by the Network on Methodological Issues in Longitudinal and Cohort Research and sponsored by the National Institute on Aging (NIA) and the National Institute of Mental Health (NIMH), 1986.

Three of these methods—structural equation modeling, event-history analysis, and growth-curve analysis—are receiving particular attention because of their promise of broad applicability. Structural equation modeling permits analysis of the interrelations among theoretically important variables and therefore provides tools for understanding the patterns of relations in nonexperimental data. Techniques that are useful for making causal inferences from experimental data are not as useful for the analysis of patterns in naturalistic studies. The lack of experimental control forces a heavier reliance on statistical controls in the assessment of possible causal effects. Advances in understanding and computing structural models have permitted the study of multivariate longitudinal associations that previously could only be hypothesized but not tested. Biddle and Martin (1987) and Rogosa (1979) provide discussions of the advantages as well as some of the disadvantages of this class of methods.

Event-history analysis originated in the fields of demography and engineering but has been made more accessible to social scientists through sociology and biostatistics. An event history is a longitudinal record of when events happened to individuals. This type of analysis can be used to study the causes of events or qualitative changes in the lives of individuals. For example, marital sequences (marriage, divorce, remarriage, and so on) can be studied with respect to other changes and characteristics in an individual's life. Allison (1984) provided a particularly clear exposition on these methods.

A third class of longitudinal methods, the growth-curve analysis, addresses a very basic research issue—the measurement of change. This area has been an important one for understanding growth but has been plagued by different statistical problems. Recent work by Rogosa and Willett (1985), Bryk and Raudenbush (1987), and McArdle and Epstein (1987) has described methods for understanding individual growth curves and the correlates of differences in individual growth.

Archive Centers

Data archive centers are a most fruitful source of data for secondary analyses. Such centers serve as repositories for data

collected by others rather than generating data themselves. Many archive centers in the United States and around the world collect a wide variety of social science data (Kiecolt & Nathan, 1985). Four that have especially good collections of longitudinal data of interest to developmental researchers are briefly described below.

In 1962, the ICPSR was founded by the Survey Research Center at the University of Michigan and 21 other universities in the United States to serve as a central repository for machine-readable social science data. For many years, the consortium served primarily political scientists. More recently, their holdings have expanded greatly in areas of interest to researchers in most social science fields, including developmental psychology, gerontology, and education. Data are made available at no cost to researchers at over 320 member institutions. Examples of computer-accessible data of particular interest for longitudinal researchers are Terman's Life-Cycle Study of Children with High Ability, 1922-1982 (Terman & Oden, 1959), High School and Beyond conducted by the NCES (1980), and the ongoing National Longitudinal Surveys of Labor Market Experience (Wolpin, 1987). Within ICPSR is an additional archive, the National Archive of Aging, that focuses explicitly on data related to the process of aging, health-related subjects, and the attitudes and behavior of the aged population.

The Henry A. Murray Research Center of Radcliffe College was established in 1976 as a multidisciplinary research center focusing on the study of individual and family life courses. It is a national repository for social and behavioral science data on human development and social change and includes data from the fields of psychology, psychiatry, sociology, anthropology, economics, political science, and education. Unlike most other data banks, the Murray Research Center collects and makes available qualitative material as well as computer-accessible data. The center emphasizes the use of longitudinal designs in recognition of the special archival value of longitudinal studies. Included among the archive's data sets are such classics as Murray's *Multiform Assessments of Personality Development* (see Davids, 1955), White's (1952) *Lives in Progress*, Block's (1971) *Lives Through Time*, and Sears et al.'s (1957) *Patterns of Childrearing*. The Murray Center is unique in that samples from many of the studies it holds are available for further follow-up by new investigators.

A third archive that may be of interest to developmental researchers is the Data Archive on Adolescent Pregnancy and Pregnancy Prevention sponsored by the Office of Population Affairs. Card of Sociometrics Corporation (Los Altos, CA) has developed this archive, which includes both small-scale studies with extensive measurement (typically conducted by psychologists) and large-scale, often nationally representative studies (typically conducted by sociologists and demographers). This archive provides data on mainframe computer tapes, micro-computer floppy diskettes, and CD-ROM. An example of developmental data they can provide is the National Survey of Children. The nationally representative sample initially included 2,279 children born between 1964 and 1969, their parents, and their teachers. In 1981, a subsample of 1,377 children were reinterviewed, and in 1987, 1,147 children were interviewed again. Thus, the survey period focuses on children at

ages 7 to 11, ages 12 to 16, and ages 17 to 21 (see Furstenberg et al., 1983; Peterson & Zill, 1986).

A final archive is the American Family Data Archive, which is funded by the National Institute of Child Health and Human Development (NICHD). This archive was also developed by Card. The family data archive is similar to the one focusing on adolescent pregnancy; that is, both large and small studies are included.

Limitations of Conducting Secondary Analyses

Limitations to conducting secondary analyses of long-term longitudinal studies include training, measurement issues, and cohort composition.

Training

Most developmental programs do not provide enough training to allow a graduate student to engage in secondary analyses of existing longitudinal data sets. Such analyses are ill-advised without training or prior participation in a project with scientists skilled in secondary analyses. Without knowledge of how to move from conceptualization of a problem to choosing measures in a large data set, researchers can founder for months (as experienced firsthand by Jeanne Brooks-Gunn, who had no such training when beginning to work with the Educational Testing Service [ETS] Head Start Longitudinal Study; Shipman, 1972).

Measurement

Recoding. In developmentally oriented data sets, reconstruction of life histories is necessary to answer certain questions. Elder (1974) had to construct individual life courses on the Berkeley Guidance and Oakland Growth Studies as the information had not been coded as life records that depicted social trajectories and transitions. Recoding of open-ended interview data also may yield valuable and unique information. Block (1971), in his ground-breaking study from which the title of this article is borrowed, also went to the original records of the Oakland Growth and Berkeley Guidance Studies to derive different dimensions of personality and to do so across the life span. He had vast amounts of quantitative and qualitative information on each individual over a 30-year period: open-ended responses; ratings by interviewers, peers, teachers, and parents; Rorschach and Thematic Apperception Test responses; interview material from multiple respondents; and in some cases, even news stories. Over 25 clinicians assessed this rich but untidy amalgam of information. The California Q-Sort allowed Block to construct a personality typology from such data and to use it to explore change in personality from early adolescence to middle adulthood.

Defining variables. In national data sets, recoding often seems more mundane, just being the definitions of the variables of interest. Even in a meticulously constructed and documented data set, the coding decisions are myriad and the construction of life courses difficult, as is illustrated with five examples from the Children of the NLSY. First, the coding of ethnicity is not always standard across surveys, and the identifi-

cation of Hispanics has even changed in the census data over time. The NLSY includes Asians and others in their White classification. Does a particular researcher wish to parse this category into finer detail, and what is the loss of power (i.e., individuals) when certain decisions are made? What is the missing data pattern for these finer distinctions? What seems at a cursory glance to yield enough individuals for a particular analysis is sometimes surprising. For example, in the analysis by Baydar and Brooks-Gunn (1991), so few Hispanic 3- and 4-year-olds were assessed on the measures of interest that the effects of employment and child-care patterns over their first 3 years of life could not be explored.

Second, in the first release of the Children of the NLSY tape, Peabody Picture Vocabulary Test scores of zero were included and not flagged; if a researcher did not spend time with the documentation book and the frequency distributions, these scores could mistakenly be used.

As a third example, internal reliability must be estimated for any measures derived or used in secondary analysis; the alpha coefficients provided in the Children of the NLSY handbook (Baker & Mott, 1989) provide a guide but were calculated for the total sample, not for the subgroups on which a particular investigator is focusing (see Chase-Lansdale et al., 1991).

Fourth, constructing variables from the merged data set will not always result in data that correspond to the years of the child's life as determined by questions from the child supplement collected in 1986. Questions in previous waves were keyed to the mother's age, not the child's age, and as a result the employment data needed to be recalculated by year of child's life or, in the case of the first year of life, by quarter year (because maternal return to the work force increases dramatically over the first 4 quarters of the child's life; see Baydar & Brooks-Gunn, 1991).

Our final examples focus on less static variables, specifically on changes in the family. For example, to examine how different household residential patterns, and changes in them, influence children, it is necessary to go to earlier waves of the NLSY to obtain the mother's residential history data and to match the records to the particular age of each child at that particular wave (because the NLSY interviewed the mothers yearly, and the children were born throughout the last 10 years). Another difficult coding problem involves determining whether and when the biological father is present in the household and the pattern of father presence across the child's life (see Mott, 1989, for a discussion of these issues and the time necessary to construct a life history of father presence).

Reliability. In most longitudinal national sets, measures were selected to be broad based; they are not observational and they are not always based on psychometrically sound scales. Problems exist in attempting to assess specific constructs of interest from single items or cannibalization of existing scales. Caution needs to be taken in cases in which internal consistency cannot be ascertained or does not exist. Another problem common to both types of data sets considered here is a change over time in how a particular construct is measured. Different measures are often used at different time points, not because a change in the construct was postulated to occur over time, but because measurement standards and customs changed over

time. Care needs to be taken in documenting such changes and determining within- and across-age consistency.

Documentation

Documentation becomes a problem in studies in which the investigator did not intend to conduct a long-term longitudinal study or did not plan on giving the data set to an archive center for secondary analyses. Archive centers are particularly helpful in such cases because they do the initial work first in determining whether the documentation is adequate and second in preparing the documentation. Even in cases in which the original investigators are involved, reconstructing the documentation years later is laborious.

Cohort Selectivity

Generally, the developmentally oriented longitudinal studies tend to be smaller and less representative than the longitudinal national studies, because in practice, investigators have traded off representativeness and depth of data collected (although in theory, national studies may include more process-oriented data).

When using a relatively small data set, it is imperative to place the sample in context. One strategy is to compare the sample's makeup cross-sectionally at different time points to larger, more representative samples. This procedure was used in the Baltimore Study to see whether this sample of over 300 Black urban teenage mothers resembled teenage mothers more generally and metropolitan young mothers more specifically. Comparisons of marital, work, welfare, education, and fertility status were made with three national samples of same-age women who had at least one child by the middle 1980s, comparing teenage childbearers with older childbearers (Furstenberg et al., 1987). Additionally, the first-born children were compared with the National Survey of Children, a nationally representative sample of children and adolescents, with regard to school performance, sexual behavior, substance use, and adjustment. Finally, fertility comparisons were made with the NLSY (Furstenberg, Levine, & Brooks-Gunn, 1990). The hospital-based sample of 300 Black urban teenage mothers and their children were similar to the relevant subsets of the larger national samples, adding greater weight to the generalizability of the Baltimore Study findings.

Samples also are period specific; this is true for longitudinal studies and national panel studies. If a return to a data set from an earlier time period is desirable, results need to be placed in context. One example is the ETS Head Start Longitudinal Study (Lee, Brooks-Gunn, Schnur, & Liaw, 1990), which, although collected in the 1970s, is one of the few to use a neighborhood canvas strategy (desirable in cases in which randomization is not possible; Cook & Campbell, 1979). Differences between children attending Head Start in the 1980s and in the 1970s had to be documented when considering the relevance of the findings for today's Head Start graduates (i.e., changes in the last 20 years include the rise in number of working mothers necessitating full-time child care, which Head Start typically does not offer; the inclusion of more special-needs children in

Head Start programs; a change in the ethnic mix of Head Start attendees; and possible changes in the quality of the programs; see Lee, Brooks-Gunn, & Schnur, 1988; Lee et al., 1990).

Even national panel data are subject to cohort selectivity issues, as is illustrated in the accompanying article on the Children of the NLSY; this sample is not yet a representative sample of children born to U.S. mothers. In brief, the investigator must place a study in time and place and explain its importance in terms of methodology and theory, not prove a study's generalizability to all children or all times.

What Are the Future Prospects for Secondary Analyses?

More developmentally oriented secondary analyses are possible because of the existence of several excellent archival centers (one with a specific developmental focus); the burgeoning interest in more life-span questions requiring longitudinal data sets; the possible upswing in interdisciplinary collaborations (particularly with sociologists, demographers, and economists who are adept at secondary analyses); the requirement of many federal agencies and foundations that large-scale, long-term studies be placed in archives or at least be available to other researchers; and the generosity of many colleagues who have already donated their data sets to archive centers. Several developments in life-course studies generally have resulted in a favorable climate for secondary analyses—a shift to collection of life record data (both prospective information and retrospective life histories); an emphasis on the temporal, process-oriented, and contextual features of life patterns; and the increased use of appropriate statistical models.

Developmental psychologists today have a unique opportunity to take advantage of these trends. Some specific recommendations follow.

1. Acceptance of more developmentally oriented secondary analyses proposals by NICHD, NSF, NIMH, NIA, and other federal agencies is desirable. Study sections that focus on developmentally oriented issues must include members who are conversant with methodological and budgetary requirements of secondary data analyses (Friedman & Baldwin, 1990). In addition, because we anticipate that interdisciplinary collaborations will be required more frequently, study section committees should become more inclusive across social and behavioral science disciplines rather than relying on separate discipline-oriented study sections. Finally, to encourage such work, specific Research Funding Announcements can be targeted toward important research questions that require secondary analyses and interdisciplinary collaboration.

2. Encourage foundations to fund secondary analyses. Such analyses often provide answers to policy questions of interest to foundations (Fineberg, 1990). They also have the advantage of informing policy relatively rapidly. Additionally, several foundations have encouraged interdisciplinary collaboration on secondary data analyses. The Foundation for Child Development sponsored a summer institute in 1987 on the Children of the NLSY; over 50 developmental researchers (psychologists, sociologists, economists, and demographers) participated, and as a result, interdisciplinary groups around the country are using the Children of NLSY data set.

3. The formation of working groups and policy committees around a specific topic also encourages such analyses, as questions are posed that require secondary analyses and as such groups usually include individuals familiar with secondary analyses. The W. T. Grant Foundation has several such groups on topics such as the emergence of depression in late childhood and adolescence and the effects of divorce on children. In some cases, the Society for Research in Child Development (SRCD) Study Groups (originally funded by the Foundation for Child Development) have been such a vehicle as well. The MacArthur Foundation is contributing to interdisciplinary secondary data analyses in research programs on Successful Adolescence Among Youth from High Risk Settings and the Research Program on Risk and Protective Mechanisms in the Development of Psychopathology. The National Academy of Sciences Committee on Child Care has not only summarized the literature on child care effects but has recommended directions for research, some of which will require secondary analyses (Hayes, Palmer, & Zaslow, 1990). The National Academy of Sciences Committee report on preventing acquired immunodeficiency syndrome is another example (Turner, Miller, & Moses, 1989). In their search for information on the homosexual practices of adolescents and adults, the National Academy of Sciences Committee commissioned secondary analyses of perhaps the only relevant national data set from the 1970s (Fay, Turner, Klassen, & Gagnon, 1989).

4. Of particular policy concern is the fact that few national longitudinal studies have included psychologists in their design or measure selection. The effect is to render individual-level process analyses quite difficult, as has been discussed in this article. Additionally, given that the national social science agenda focuses on use of longitudinal studies for policy recommendations, developmental psychology will not be well represented in these debates nor will the issues that may only be addressed by individual-level analyses. If developmental psychology does not participate in this type of research, microlevel processes will not be included in these national studies, making it impossible to examine more micro- and macrolevel processes simultaneously. Interdisciplinary research demands such data.

Conclusion

The study of development from both life-course and context-dependent perspectives is virtually impossible if analyses of extant data sets are ruled out as a viable option. Long-term, carefully preserved longitudinal studies form the backbone of developmental psychology; they represent our national heritage. However, only a handful of scholars have actually treated them as such by putting the care and time into studying lives through time (Block, 1971; Elder, 1975; Kagan & Moss, 1962; Terman & Olden, 1959). We have made a case for secondary data analysis, both for enlarging the number of valuable data sets archived and for using them more frequently. Indeed, a rich and varied array of archived longitudinal data sets now exists, over and above the well-known early studies. This state of affairs in and of itself attests to the commitment of developmental scholars to studying lives in context through time.

References

- Allison, P. D. (1984). *Event history analysis: Regression for longitudinal event data*. Sage University paper series on quantitative applications in the social sciences (Report No. 07-046). Newburg Park, CA: Sage.
- Baker, P. C., & Mott, F. L. (1989). *The NLSY child handbook 1989*. Columbus, OH: Ohio State University, Center for Human Resource Research.
- Baltes, P. B., & Brim, O. G., Jr. (Eds.). (1978–1984). *Life-span development and behavior, Vols. 1–6*. San Diego, CA: Academic Press.
- Baltes, P. B., & Nesselroade, J. R. (1973). The developmental analysis of individual differences on multiple measures. In J. R. Nesselroade & H. W. Reese (Eds.), *Life-span developmental psychology: Methodological issues*. San Diego, CA: Academic Press.
- Baltes, P. B., Reese, H. W., & Lipsitt, L. P. (1980). Life-span developmental psychology. *Annual Review of Psychology*, 31, 65–110.
- Baydar, N. (1988). Effects of parental separation and reentry into union on the emotional well-being of children. *Journal of Marriage and the Family*, 50, 1–15.
- Baydar, N., & Brooks-Gunn, J. (1991). Effects of maternal employment and child-care arrangements in infancy on preschoolers' cognitive and behavioral outcomes: Evidence from the Children of the NLSY. *Developmental Psychology*, 27, 932–945.
- Bayley, N. (1949). Consistency and variability in the growth of intelligence from birth to 18 years. *Journal of Genetic Psychology*, 75, 165–196.
- Biddle, B. J., & Martin, M. M. (1987). Causality, confirmation, credibility, and structural equation modeling. *Child Development*, 58, 4–17.
- Billings, A. G., & Moos, R. H. (1986). Children of parents with unipolar depression: A controlled 1-year follow-up. *Journal of Abnormal Child Psychology*, 14, 149–166.
- Block, J. (1971). *Lives through time*. Berkeley, CA: Bancroft Books.
- Bloom, B. S. (1961). *Stability and change in human characteristics*. New York: Wiley.
- Brim, O. G., Jr., & Kagan, J. (1980). *Constancy and change in human development*. Cambridge, MA: Harvard University Press.
- Brooks-Gunn, J., & Furstenberg, F. F., Jr. (1986). The children of adolescent mothers: Physical, academic and psychological outcomes. *Developmental Review*, 6, 224–251.
- Brooks-Gunn, J., & Furstenberg, F. F., Jr. (1987). Continuity and change in the context of poverty: Adolescent mothers and their children. In J. J. Gallagher & C. T. Ramey (Eds.), *The malleability of children* (pp. 171–188). Baltimore: Brookes.
- Brooks-Gunn, J., Petersen, A. C., & Eichorn, D. (Eds.). (1985). The study of maturational timing effects in adolescence [Special issue]. *Journal of Youth and Adolescence*, 14(3–4).
- Bryk, A. S., & Raudenbush, S. W. (1987). Applications of hierarchical linear models to assessing change. *Psychological Bulletin*, 101, 147–158.
- Chase-Lansdale, P. L., & Hetherington, E. M. (1990). The impact of divorce on life-span development: Short and longterm effects. In P. B. Baltes, D. L. Featherman, & R. M. Lerner (Eds.), *Life-span development and behavior* (Vol. 10, pp. 107–151). Hillsdale, NJ: Erlbaum.
- Chase-Lansdale, P. L., Mott, F. L., Brooks-Gunn, J., & Phillips, D. A. (1991). Children of the National Longitudinal Survey of Youth: A unique research opportunity. *Developmental Psychology*, 27, 918–931.
- Colby, A., & Phelps, E. (1990). Archiving longitudinal data. In D. Magnusson & L. R. Bergman (Eds.), *Data quality in longitudinal research* (pp. 249–262). Cambridge, England: Cambridge University Press.
- Conley, J. J. (1984). Longitudinal consistency of adult personality: Self-reported psychological characteristics across forty-five years. *Journal of Personality and Social Psychology*, 47, 1325–1333.
- Connell, J. P., & Furman, W. (1984). The study of transitions: Conceptual and methodological considerations. In R. Emde & R. Harmon (Eds.), *Continuity and discontinuity in development* (pp. 183–193). New York: Plenum Press.
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design & analysis issues from field settings*. Chicago: Rand McNally.
- Crandall, V. C., & Battle, E. S. (1970). The antecedents and adult correlates of academic and intellectual achievement effort. In J. P. Hill (Ed.), *Minnesota Symposia on Child Psychology* (Vol. 4, pp. 36–93). Minneapolis: University of Minnesota Press.
- Davids, A. (1955). A comparison of three methods of personality assessment: Direct, indirect, and projective. *Journal of Personality*, 23, 423–430.
- Davie, R., Butler, N., & Goldstein, H. (1972). *From birth to seven: The 2nd report of the National Child Development Study*. London: Longman.
- Deutsch, F. M., Ruble, D. N., Fleming, A., Brooks-Gunn, J., & Stangor, C. (1988). Information-seeking and maternal self-definition during the transition to motherhood. *Journal of Personality and Social Psychology*, 55, 420–431.
- Douglas, J. W. B. (1964). *The home and the school*. London: MacGibbon and Kee.
- Duncan, G. J., Hill, M. S., & Hoffman, S. D. (1988). Welfare dependence within and across generations. *Science*, 1, 467–471.
- Duncan, G. J., & Morgan, N. J. (1985). The Panel Study of Income Dynamics. In G. H. Elder, Jr. (Ed.), *Life course dynamics: Trajectories and transitions, 1968–1980* (pp. 50–71). Ithaca, NY: Cornell University Press.
- Eichorn, D. H., Clausen, J. A., Haan, N., Honzik, M. P., & Mussen, P. H. (Eds.). (1981). *Present and past in middle life*. San Diego, CA: Academic Press.
- Elder, G. H., Jr. (1974). *Children of the Great Depression*. Chicago: University of Chicago Press.
- Elder, G. H., Jr. (1975). Age differentiation and the life course. *Annual Review of Sociology*, 1, 165–190.
- Elder, G. H., Jr. (1985). Perspectives on the life course. In G. H. Elder, Jr. (Eds.), *Life course dynamics: Trajectories and transitions, 1968–1980* (pp. 23–49). Ithaca, NY: Cornell University Press.
- Elder, G. H., & Caspi, A. (1988). Economic stress in lives: Developmental perspectives. *Journal of Social Issues*, 44, 25–45.
- Elder, G. H., Jr., Pavalko, E., & Hastings, T. (1991). Talent, history, and the fulfillment of promise. *Psychiatry*, 54, 251–267.
- Fay, R. E., Turner, C. F., Klassen, A. D., & Gagnon, J. H. (1989). Prevalence and patterns of same-gender sexual contact among men. *Science*, 243, 338–348.
- Featherman, D. L. (1983). Life-span perspectives in social science research. In P. B. Baltes & O. G. Brim, Jr. (Eds.), *Life-span development and behavior, Vol. 5* (pp. 1–57). Hillsdale, NJ: Erlbaum.
- Featherman, D. L., Spenner, K. T., & Tsunematsu, N. (1988). Class and the socialization of children: Constancy, change, or irrelevance? In E. M. Hetherington, R. M. Lerner, & M. Perlmutter (Eds.), *Child development in life-span perspective* (pp. 67–90). Hillsdale, NJ: Erlbaum.
- Fineberg, B. D. (1990). Support for science from a foundation perspective. *American Psychologist*, 45, 58–60.
- Fogelman, K. (1983). *Growing up in Great Britain: Collected papers from the National Child Development Study*. London: Macmillan.
- Forehand, R., Lautenschlager, G. J., Faust, J., & Graziano, W. G. (1986). Parent perceptions and parent-child interactions in clinic-referred children: A preliminary investigation of the effects of maternal depressive moods. *Behaviour Research and Therapy*, 24, 73–75.
- Friedman, S. L., & Baldwin, W. (1990). Scientist-administrators at the National Institute of Child Health and Human Development as contributors to the scientific enterprise. *American Psychologist*, 4, 54–57.

- Furstenberg, F. F., Jr., Brooks-Gunn, J., & Morgan, S. P. (1987). *Adolescent mothers in later life*. Cambridge, England: Cambridge University Press.
- Furstenberg, F. F., Jr., Levine, J. A., & Brooks-Gunn, J. (1990). The daughters of teenage mothers: Patterns of early childbearing in two generations. *Family Planning Perspectives*, 22, 54-61.
- Furstenberg, F. F., Jr., Nord, C. W., Peterson, J. L., & Zill, N. (1983). The life course of children of divorce: Marital disruption and parental contact. *American Sociological Review*, 48, 656-668.
- Garfinkel, I., & McLanahan, S. S. (1986). *Single mothers and their children: The new American dilemma*. Washington, DC: Urban Institute Press.
- Glueck, S., & Glueck, E. (1950). *Unraveling juvenile delinquency*. New York: The Commonwealth Fund.
- Gollin, E. S. (Ed.). (1981). *Developmental plasticity: Behavioral and biological aspects of variations in development*. San Diego, CA: Academic Press.
- Gunnar, M. R., & Collins, W. A. (Eds.). (1988). *Transitions in adolescence: Minnesota Symposia on Child Psychology, Vol. 21*. Hillsdale, NJ: Erlbaum.
- Hartup, W. (Ed.). (1987). Special section on structural equation modeling [Special issue]. *Child Development*, 58(1).
- Hayes, C., Palmer, J., & Zaslow, M. (1990). *Who cares for America's children? Child care for the 1990s*. Washington, DC: National Academy of Sciences Press.
- Hetherington, E. M. (1972). Effects of father absence on personality development in adolescent daughters. *Developmental Psychology*, 7, 313-326.
- Hetherington, E. M. (1987). Family relations six years after divorce. In K. Pasley & M. Thinger-Tollman (Eds.), *Remarriage and stepparenting: Current research and theory* (pp. 185-205). New York: Guilford Press.
- Hetherington, E. M., & Arastek, J. (1988). *The impact of divorce, single parenting, and step-parenting on children*. Hillsdale, NJ: Erlbaum.
- Hofferth, S. L. (1985). Children's life course: Family structure and living arrangements in cohort perspective. In G. H. Elders (Ed.), *Life course dynamics: Trajectories and transitions, 1968-1980* (pp. 75-112). Ithaca, NY: Cornell University Press.
- Hofferth, S. L., & Hayes, C. D. (Eds.). (1987). *Risking the future: Adolescent sexuality, pregnancy, and childbearing, Vol. 2*. Washington, DC: National Academy of Sciences Press.
- Hunt, J. M. (1961). *Intelligence and experience*. New York: Ronald Press.
- Hyman, H. H. (1972). *Secondary analysis of sample surveys: Principles, procedure, and potentialities*. New York: Wiley.
- Jones, M. C., Bayley, N., MacFarlane, J. W., & Honzik, M. P. (Eds.). (1971). *The course of human development*. New York: Wiley.
- Kagan, J., & Moss, H. A. (1962). *Birth to maturity*. New York: Wiley.
- Keating, D. P. (1990). Adolescent thinking. In S. Feldman & G. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 54-90). Cambridge, MA: Harvard University Press.
- Kelly, E. L., Westoff, C. F., & Sagi, P. C. (1958). Fertility through twenty years of marriage: A study of predictive possibilities. *American Sociological Review*, 23, 549-556.
- Kiecolt, K. J., & Nathan, L. E. (1985). *Secondary analysis of survey data*. Newbury Park, CA: Sage.
- Lancaster, J. B., & Hamburg, B. A. (Eds.). (1986). *School-age pregnancy and parenthood: Biosocial dimensions*. New York: Aldine de Gruyter.
- Lee, V. E., Brooks-Gunn, J., & Schnur, E. (1988). Does Head Start Work? A one-year follow-up comparison of disadvantaged children attending Head Start, no preschool, and other preschool programs. *Developmental Psychology*, 24, 210-222.
- Lee, V. E., Brooks-Gunn, J., Schnur, E., & Liaw, T. (1990). Are Head Start effects sustained? A longitudinal comparison of disadvantaged children attending Head Start, no preschool, and other preschool programs. *Child Development*, 61, 495-507.
- Lerner, R. M. (1984). *On the nature of human plasticity*. Cambridge, England: Cambridge University Press.
- Lerner, R. M., & Foch, T. T. (Eds.). (1987). *Biological-psychosocial interactions in early adolescence: A life-span perspective*. Hillsdale, NJ: Erlbaum.
- Maccoby, E. E., Depner, C. E., & Mnookin, R. H. (1990). Coparenting in the second year after divorce. *Journal of Marriage and the Family*, 52, 141-155.
- Maccoby, E. E., & Martin, J. A. (1983). Socialization in the context of the family: Parent-child interaction. In P. H. Mussen (Series Ed.) & E. M. Hetherington (Vol. Ed.), *Handbook of child psychology: Vol. 4. Socialization, personality, and social development* (4th ed., pp. 775-911). New York: Wiley.
- MacFarlane, J. W. (1938). Studies in child guidance: I. Methodology of data collection and organization. *Monographs of the Society for Research in Child Development*, 3(6, Serial No. 19).
- McArdle, J. J., & Epstein, D. (1987). Latent growth curves within developmental structural equation models. *Child Development*, 58, 110-133.
- McCall, R. B., & Appelbaum, M. I. (1991). Some issues of conducting secondary analyses. *Developmental Psychology*, 27, 911-917.
- McClelland, D. C., Constantian, C. A., Pilon, D. A., & Stone, C. (1980). Effects of child-rearing practices on adult maturity. In D. C. McClelland (Ed.), *The development of social maturity* (pp. 209-248). New York: Irvington Press.
- Mednick, S. A., Baert, A. E., & Bachman, B. P. (Eds.). (1981). *Prospective longitudinal research: An empirical basis for the primary prevention of psychological disorders*. New York: Oxford University Press.
- Mednick, S., Harway, M., & Finello, K. (Eds.). (1984). *Handbook of longitudinal research, birth and childhood cohorts: Vols. 1-2*. New York: Praeger.
- Migdal, S., Abeles, R. P., & Sherrod, L. R. (1981). *An inventory of longitudinal studies of middle and old age*. New York: Social Science Research Council.
- Montemayor, R., Adams, G., & Gullotta, T. (Eds.). (1990). *Advances in adolescent development: Vol. 2. The transition from childhood to adolescence*. Newbury Park, CA: Sage.
- Mott, F. L. (1989). *When is a father gone: Patterns of father-child interactions in father-absent homes of young children born to adolescent and young adult mothers*. Unpublished manuscript, Ohio State University, Center for Human Resource Research, Columbus.
- National Center for Education Statistics. (1972). *National longitudinal study of the class of 1972* [Machine-readable data file]. Washington, DC: National Center for Education Statistics (Producer and distributor).
- National Center for Education Statistics. (1980). *High school and beyond* [Machine-readable data file]. Washington, DC: National Center for Education Statistics (Producer and distributor).
- Nesselroade, J., & Baltes, P. (Eds.). (1979). *Longitudinal research in the study of behavior and development*. San Diego, CA: Academic Press.
- Network on Methodological Issues in Longitudinal and Cohort Research. (1986). *Annotated bibliographies for longitudinal research methodologies*. Bethesda, MD: National Institute of Aging and National Institute of Mental Health.
- Oden, M. H. (1968). The fulfillment of promise: 40-year follow-up of the Terman gifted group. *Genetic Psychology Monographs*, 77, 3-93.
- Parnes, H. S. (1983). *The national longitudinal surveys 1966-1982* [Machine-readable data file]. Washington, DC: U.S. Department of Labor, Office of Manpower Policy, Evaluation, and Research (Producer). Columbus: Ohio State University, Center for Human Resource Research (Distributor).

- Peterson, J., & Zill, N. (1986). Marital disruption, parent-child relationships, and behavior problems in children. *Journal of Marriage and the Family*, 48, 295-307.
- Riley, M. W., Johnson, M., & Foner, A. (1972). *Aging and society*. New York: Russell Sage Foundation.
- Robins, L. N. (1966). *Deviant children grown up: A sociological and psychiatric study of sociopathic personality*. Baltimore: Williams & Wilkins. (Reprinted and published by Krieger, Huntington, NY, 1974).
- Rogosa, D. (1979). Causal models in longitudinal research: Rationale, formulation, and interpretation. In J. R. Nesselroade & P. B. Baltes (Eds.), *Longitudinal research in the study of behavior and development* (pp. 263-302). San Diego, CA: Academic Press.
- Rogosa, D., & Willett, J. B. (1985). Understanding correlates of change by modeling individual differences in growth. *Psychometrika*, 50, 203-228.
- Rutter, M. (1988). *Studies of psychosocial risks: The power of longitudinal data*. Cambridge, England: Cambridge University Press.
- Rutter, M., & Garmezy, N. (1983). Developmental psychopathology. In P. H. Muggen (Series Ed.) & E. M. Hetherington (Vol. Ed.), *Handbook of child psychology: Vol. 4. Socialization, personality, and social development*. (4th ed., pp. 775-911). New York: Wiley.
- Sears, R. R., Maccoby, E. E., & Levin, H. (1957). *Patterns of child rearing*. Stanford, CA: Stanford University Press.
- Shipman, V. C. (Ed.). (1972, December). *Disadvantaged children and their first school experiences: Head Start longitudinal study* (ETS Technical Report Series No. PR-72-27). Princeton, NJ: Educational Testing Service. (ERIC Document Reproduction Service No. ED081813).
- Sigel, I. E. (Ed.). (1985). *Parental belief systems: The psychological consequences for children*. Hillsdale, NJ: Erlbaum.
- Simmons, R. G., & Blyth, D. A. (1987). *Moving into adolescence: The impact of pubertal change and school context*. New York: Aldine De Gruyter.
- Singer, J. D., & Willett, J. B. (1991). Modeling the days of our lives: Using survival analysis when designing and analyzing longitudinal studies of duration and the timing of events. *Psychological Bulletin*, 110, 268-290.
- Smeeding, T. M., & Toorey, B. (1988). Poor children in rich countries. *Science*, 242, 873-877.
- Sontag, L. W., Baker, C. T., & Nelson, V. L. (1958). Mental growth and personality development: A longitudinal study. *Monographs of the Society for Research in Child Development*, 23(68, Serial No. 68).
- Sorenson, A. E., Weinert, F., & Sherrod, L. (Eds.). (1985). *Life-course research on human development: Multi-disciplinary perspectives*. Hillsdale, NJ: Erlbaum.
- Terman, L. M., & Oden, M. H. (1959). *Genetic studies of genius: 5. The gifted group at mid-life*. Stanford, CA: Stanford University Press.
- Tuma, N. B., & Hannan, M. T. (1984). *Social dynamics: Models and methods*. San Diego, CA: Academic Press.
- Turner, C. F., Miller, H. G., & Moses, L. E. (1989). *AIDS: Sexual behavior and intravenous drug use*. Washington, DC: National Academy of Sciences.
- Vaillant, G. E. (1977). *Adaptation to life*. Boston, MA: Little, Brown.
- Vaillant, G. E. (1983). *The natural history of alcoholism*. Cambridge, MA: Harvard University Press.
- Vaillant, G. E., & Vaillant, C. O. (1990). Natural history of male psychological health: 12. A 45-year study of predictors of successful aging at age 65. *American Journal of Psychiatry*, 147, 31-37.
- Verdonik, F., & Sherrod, L. R. (1984). *An inventory of longitudinal research on childhood and adolescence*. New York: Social Science Research Council.
- Watkins, S. C., Menken, J. A., & Bongaarts, J. (1987). Demographic foundations of family change. *American Sociological Review*, 52, 346-358.
- Weissman, M. M., Gammon, G. D., John, K., Merikangas, K. R., Warner, V., Prusoff, B. A., & Sholomskas, D. (1987). Children of depressed parents: Increased psychopathology and early onset of depression. *Archives of General Psychiatry*, 44, 847-853.
- White, R. (1952). *Lives in progress: A study of the natural growth of personality*. New York: Holt, Rinehart & Winston.
- Wolpin, K. I. (1987). *Handbook of the national longitudinal surveys of labor market experience*. Columbus: Ohio State University, Center for Human Resource Research.
- Young, C. H., Savola, K., & Phelps, E. (1991). *Inventory of longitudinal studies in the social sciences*. Newbury Park, CA: Sage.
- Zill, N. (1988). Behavior, achievement, and health problems among children in stepfamilies: Findings from a national survey of child health. In E. M. Hetherington & J. Arastek (Eds.), *The impact of divorce, single parenting, and step-parenting on children* (pp. 325-368). Hillsdale, NJ: Erlbaum.

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