FUNDAMENTALS OF Psychology

Michael W. Eysenck

FUNDAMENTALS OF
Psychology

This page intentionally left blank

FUNDAMENTALS OF Psychology

Michael W. Eysenck

Psychology Press
Taylor & Francis Group
an informa business

First published 2009 by Psychology Press,
an imprint of Taylor & Francis
27 Church Road, Hove, East Sussex, BN3 2FA

Simultaneously published in the USA and Canada
by Psychology Press
270 Madison Ave, New York, NY 10016

Psychology Press is an imprint of the Taylor & Francis Group,
an informa business

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data
Eysenck, Michael W.
Fundamentals of psychology / Michael W. Eysenck.
p. cm.
Includes bibliographical references and index.
ISBN 978–1–84169–371–2 (hbk)—ISBN 978–1–84169–372–9 (pbk.)
1. Psychology. I. Title.

BF121.E945 2009
150—dc22 2008000676

ISBN: 978–1–84169–371–2 (hbk)
ISBN: 978–1–84169–372–9 (pbk)

Cartoons by Sean Longcroft
Consultant for case studies and boxes: Evie Bentley

Cover design by Sandra Heath
Typeset in Sabon by Newgen Imaging Systems (P) Ltd
Printed and bound in Slovenia

It is the mark of an instructed mind to rest satisfied with the degree of precision which the nature of the subject permits and not to seek exactness when only an approximation of the truth is possible.
(Aristotle)

To Maria with love

This page intentionally left blank

Contents

About the author

Michael W. Eysenck is one of the best-known psychologists in Europe. He is Professor of Psychology in the psychology department at Royal Holloway University of London, where he was Head of Department between 1987 and 2005. He is especially interested in cognitive psychology (about which he has written several books) and most of his research focuses on the role of cognitive factors in anxiety within normal and clinical populations. He has published 36 books. His previous textbooks published by Psychology Press include *Psychology for AS Level (4th ed.)* (2008), *Psychology for A2 Level* (2001), *A2 Psychology: Key Topics (2nd ed.)* (2006), *Psychology: An International Perspective* (2004), *Psychology: A Student's Handbook (5th ed.)* (with Mark Keane) (2005), *Simply Psychology (3rd ed.)* (2007), *Fundamentals of Cognition* (2006), *Psychology: A Student's Handbook* (2000), *Perspectives on Psychology* (1994), and *Individual Differences: Normal and Abnormal* (1994). He has also written two research books for Psychology Press based on his research on anxiety: *Anxiety: The Cognitive Perspective* (1992) and *Anxiety and Cognition: A Unified Theory* (1997), as well as the popular title *Happiness: Facts and Myths* (1990). He is also a keen supporter of Crystal Palace football club and lives in hope that one day they will return to the Premiership.

Chapter 1

Contents

Introduction

1

WHAT IS PSYCHOLOGY?

What is psychology? As is clear from media coverage, psychology is amazingly wide-ranging. Here are just a few examples. Some psychologists are involved in treating mental disorders and use many techniques not dreamt of by Sigmund Freud. There are also forensic psychologists such as Cracker (Eddie Fitzgerald) of UK television fame who engage in offender profiling and tracking down criminals. Other psychologists study the human brain using scanners, with their research producing the brightly colored pictures of patterns of activation in the brain found in magazines. Still other psychologists (known as health psychologists) are hard at work trying to persuade us to adopt healthier lifestyles with less smoking and drinking and more physical exercise.

What is the common element to the varied activities of psychologists? Probably the most frequent definition of psychology is that it is the scientific study of behavior. However, this definition is too limited, because most psychologists are trying to understand *why* people behave in certain ways. To achieve that understanding, we must consider internal processes and motives. Thus, we arrive at the following definition:

> *Psychology is a science in which behavioral and other evidence (including individuals' reports of their thoughts and feelings) is used to understand the internal processes leading people (and members of other species) to behave as they do.*

As you read this book, you may be bewildered (hopefully not too bewildered!) by the numerous approaches psychologists have adopted in their attempts to understand human behavior. These approaches exist because our behavior is jointly determined by several factors including the following:

- The specific stimuli presented to us
- Our recent experiences (e.g., being stuck in a traffic jam)
- Our genetic endowment
- Our physiological system
- Our cognitive system (our perceptions, thoughts, and memories)
- The social environment
- The cultural environment
- Our previous life experiences (including those of childhood)
- Our personal characteristics (including intelligence, personality, and mental health)

The notion that there are various levels of explanation can be illustrated by taking a concrete example. Suppose one man attacks another man very aggressively by punching him repeatedly on the head and body. How can we understand this behavior? It may depend in part on the genes the man has inherited from his parents. It may also depend on the attacker's childhood experiences, for example, the presence of violence within the family. It may also depend on a recent stressful experience such as being caught in heavy traffic. The attacker's clinical history may also be relevant—he may have a history of psychopathic or antisocial behavior. His behavior may depend on his thoughts and feelings (e.g., he may have misinterpreted the other person's behavior as threatening). His behavior may depend on social factors. For example, the man behaving aggressively may believe the other man has insulted members of his family. His behavior may depend on

the physiological state of the man behaving aggressively—his internal bodily state may be highly aroused and agitated. Finally, the attacker's behavior may depend on cultural factors, in that expressing aggression by punching is regarded as more acceptable (or less unacceptable) in some cultures than in others.

The crucial point of the above example is that there is no *single* "correct" interpretation of the aggressive man's behavior. Indeed, it is probable that several of the factors discussed above contributed to his behavior, and the same is true of the great majority of the behavior we observe in everyday life. Thus, the scope of psychology needs to be very broad if we are to understand human behavior.

Some of the main approaches within psychology are as follows: biological psychology; cognitive psychology; individual differences; developmental psychology; and social psychology. Below we consider *how* each approach developed, and *why* that approach is important. Note that these approaches are all related to each other. For example, personality is discussed within the individual differences approach. However, individual differences in personality depend in part on genetic factors (biological approach), on cognitive processes (cognitive approach), on childhood experiences (developmental approach), and on interactional processes (social psychology). Thus, the various approaches are not as separate as might be assumed.

BIOLOGICAL PSYCHOLOGY

It is difficult to imagine the enormous impact that *The Origin of Species* by Charles Darwin (1809–1882) had on the way people think about themselves. Before its publication in 1859, most people assumed that human beings were radically different from (and far superior to) all other species. The notion that human beings had evolved from other species indicated that this view of the importance of the human species needed reassessment. However, not surprisingly, many people found it very difficult to accept that human beings should be regarded simply as members of the animal kingdom. Indeed, the millions of people who believe in intelligent design (i.e., humans were created by an intelligent designer) still do not accept Darwin's approach.

A cartoon about evolution, circa 1871. Charles Darwin is rebuked for slighting a gorilla by claiming man may be descended from apes.

Darwin was a biologist rather than a psychologist. However, his views on evolution had several major implications for psychology. First, psychologists began to realize that it was worth considering human behavior from the biological perspective. Second, Darwin emphasized the importance of heredity, and the notion that offspring tend to resemble their parents. This suggested to psychologists that the role of heredity in influencing human behavior should be explored. Third, Darwin focused on variations among the members of a species with evolution favoring some members rather than others (i.e., survival of the fittest). This led to an interest in the role of heredity in explaining individual differences in intelligence and personality.

Why is this approach to psychology of importance? First, everyone (apart from identical or monozygotic twins) has their own unique set of genes, and genes influence our intelligence, personality, and behavior. Second, our motivational systems (e.g., hunger; sex) developed originally as a result of the biological imperative to survive and to pass on our genes to successive generations. Third, the processes studied by biological psychologists are involved in nearly all human behavior.

COGNITIVE PSYCHOLOGY

The study of human cognition with its focus on thinking and other mental processes originated with Plato and Aristotle. It remained the dominant area within psychology

for 2000 years. However, it was relatively ignored during the first half of the twentieth century. The reason was that psychology (especially in the United States) was dominated by **behaviorism**, an approach with an emphasis on observable behavior rather than internal processes. According to the behaviorists, it is more scientific and "objective" to measure human behavior than it is to rely on people's possibly entirely mistaken reports of their internal thoughts and feelings, and so these reports should be ignored. The absurdity of carrying this approach to its logical conclusion is captured in the following joke. Two behaviorists are talking to each other after having had sex. One says to the other, "Your behavior tells me that you enjoyed that. Did I enjoy it?"

Plato and Aristotle, shown here in a painting by Raphael, were the originators of study concerning human cognitive processes.

In the mid-1950s, the cognitive revolution began. Several major cognitive psychologists (e.g., Donald Broadbent, Jerome Bruner, George Miller, Herb Simon) started to explore human cognition in detail. They focused on the internal processes and structures involved in cognition, including perception, attention, learning, memory, language, thinking, and reasoning. They (and other cognitive psychologists) were interested in observable responses mainly to the extent that they provide information about these underlying processes and structures.

For many years, cognitive psychologists focused mainly on the cognitive processes exhibited by volunteer participants taking part in artificial experiments under laboratory conditions. In recent years, cognitive psychologists have become interested in the role played by cognitive processes in accounting for people's behavior in the real world. However, we must be careful not to exaggerate the changes within cognitive psychology. After all, people use the same cognitive system whether performing a task in the laboratory or coping with everyday life.

Let's consider an example of the approach taken by cognitive psychologists. Patients with social phobia (excessive fear of social situations) interpret their own social behavior as much more inadequate than it appears to other people (Rapee & Lim, 1992). Cognitive psychologists regard social phobics' misinterpretation of their own behavior as shedding important light on the internal processes maintaining their disorder. More specifically, this misinterpretation helps to explain why social phobics shun most social occasions and experience considerable distress in demanding social situations.

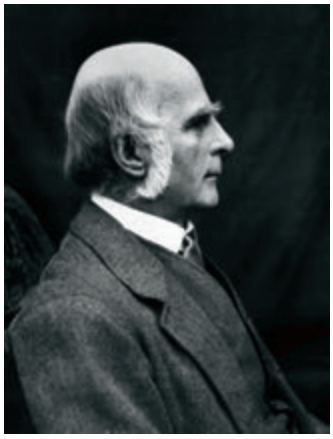
Why is the cognitive approach to psychology so important? First, the understanding of human cognition developed by cognitive psychologists has had a great impact on social, developmental, and abnormal psychology. For example, we can only understand the behavior of children or of patients with mental disorders by taking account of the ways in which they perceive and interpret themselves and the world around them. Second, the insights obtained by cognitive psychologists have had real-life application in the design of computer and other systems in order to make them relatively easy to use. Third, cognitive psychology has had very beneficial effects on the treatment of depression and the anxiety disorders. More specifically, cognitive therapy uses insights from cognitive psychologists to change the maladaptive cognitive processes and structures of depressed and anxious patients.

Key Term

Behaviorism: an American school of psychology with an emphasis on measuring and predicting observable behavior.

INDIVIDUAL DIFFERENCES

The systematic study of individual differences started with the work of Sir Francis Galton (1822–1911), a cousin of Charles Darwin. The publication of Galton's book *Hereditary Genius* in 1869 was a landmark in the study of individual differences. Researchers on individual differences have focused mainly on intelligence and personality, although obviously people differ from each other in almost limitless ways. One of the key issues is to try to understand the factors responsible for individual differences in intelligence and



Sir Francis Galton, 1822–1911.

The experiences we have during childhood have a great impact on our adult lives.

personality. As mentioned earlier, both are influenced by genetic factors, by developmental factors, by cognitive factors, and by social factors.

Why is this approach to psychology important? First, individual differences in intelligence and personality influence most forms of behavior. Second, if our educational system is to be effective, we need to take account of the particular skills and abilities possessed by individual children. Third, it is desirable in many real-life situations to use information about individuals' intelligence and personality (e.g., in personnel selection).

DEVELOPMENTAL PSYCHOLOGY

It was only when Sigmund Freud's psychoanalytic theories became widely known in the early part of the twentieth century that serious attention was paid to developmental psychology. Thereafter, the greatest impetus to developmental psychology came from the Swiss psychologist, Jean Piaget (1896–1980). He spent several decades studying the childhood development of thinking and intelligence and produced a more comprehensive theory of cognitive development than anyone else.

Developmental psychology is concerned mainly with changes occurring during the course of childhood, and with the impact of childhood experiences on adult behavior. There are two main areas within developmental psychology. First, there is cognitive development, involving the child developing increasingly complex skills (e.g., reading; writing; numerical skills). Second, there is social development. Children acquire social skills and interact more effectively with other people as they grow up.

Why is this approach to psychology of importance? First, we can obtain some understanding of the behavior of adults by considering their childhood experiences. Second, if we could understand factors facilitating cognitive development, this would help to improve the educational system. Third, if we understood more clearly the factors underlying social development, this knowledge could be used to ensure that nearly all children develop good social skills. This would in turn lead to a reduction in juvenile delinquency and crime.

SOCIAL PSYCHOLOGY

Surprisingly, social psychology was one of the last areas of psychology to be fully accepted. Indeed, it was only after the Second World War that serious research in social psychology began. Social psychology covers a very wide range of topics. Some social psychologists are interested in processes within individuals (e.g., their attitudes and beliefs). Other social psychologists focus on networks of friendships and relationships characterizing the social interactions of everyday life. Still other social psychologists consider broader issues concerned with intergroup relations including issues such as prejudice and discrimination.

There is an important difference between social psychology in the United States and social psychology in Europe. Many (or even most) American social psychologists are mainly interested in the ways in which individuals make sense of their social environment and behave with respect to it. European social psychologists share those interests, but also focus on the functioning of groups (e.g., social; work). European social psychologists are more inclined than American ones to believe that an individual's sense of self depends importantly on the kinds of involvement he/she has with groups that are perceived as important.

Research in social psychology takes many forms. Experiments are often carried out either in the laboratory or in the field. In addition, there are surveys, in which questionnaires and/or interviews are used to obtain detailed information about social issues. There are also field studies, in which the researchers observe the social behavior of groups (e.g., adolescent gangs; members of an organization in a meeting). Finally, there are case studies, in which an individual or a group is studied in great detail. Case studies are

especially valuable in the investigation of rare phenomena (e.g., coping with natural disasters; weird cults).

Why is this approach to psychology of importance? First, it takes full account of the fact that we are social animals who spend much of our time with other people. Even when we are on our own, we use social knowledge to make sense of our lives, and we reflect on social events we have experienced. Second, social psychologists have discovered that our perceptions of ourselves and of other people are often inaccurate or distorted. It is desirable that we develop an understanding of the limitations of our social perceptions. Third, our behavior is often influenced by other people to a much greater extent than we realize. Once again, it is desirable that we become more fully aware of the powerful impact of social influence on our everyday behavior.

Social psychology looks at our relationships with other people and society.

IS PSYCHOLOGY A SCIENCE?

Interesting questions often don't have a single, simple answer, and that is certainly true of the question, "Is psychology a science?" Most psychologists would answer that question, "Yes." However, some psychologists (including the author) are skeptical that *all* of the enormously diverse research in psychology can reasonably be regarded as scientific. We can make some progress by seeing the extent to which psychology possesses the main criteria of science (considered shortly).

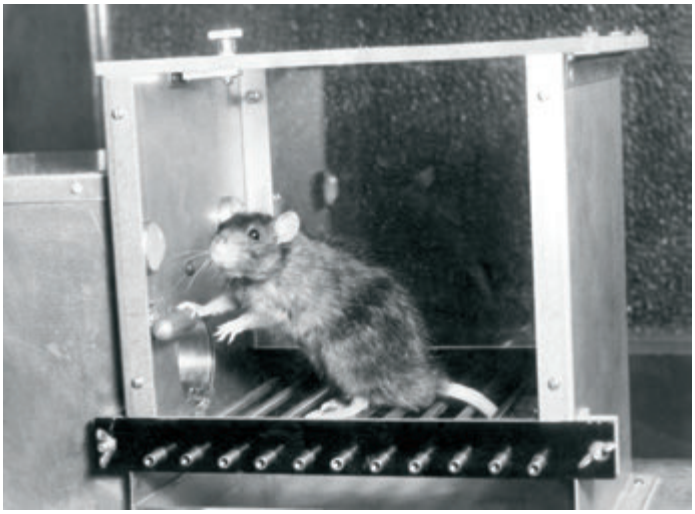
Note that there is no necessary relationship between being scientific and being useful—psychological approaches and research that are not scientific can nevertheless be extremely useful. Here are two examples. First, there is the important phenomenon of groupthink, in which groups often make irrational decisions because of considerable pressures on the members of the group to reach a unanimous decision (see Chapter 19). Most of the research on groupthink has involved the careful study of documentation concerning famous (or notorious) political decisions rather than the carrying out of experiments, and so can be regarded as unscientific. Second, Sigmund Freud developed a form of therapy for mental disorders known as psychoanalysis on the basis of individual case studies, and his approach is generally thought to be unscientific (see Chapter 22). However, psychoanalysis and the general psychodynamic approach that developed out of psychoanalysis have been found to be moderately effective (see Jarvis, 2004, for a review) and are thus very useful.

1. *Controlled experiments* In most sciences (except astronomy and a few others), it is typical for experiments to involve observing the effects of some specific manipulation (e.g., mixing two chemicals together). As applied to psychology, the use of controlled experiments is based on the **experimental method**. This involves observing the effects of some manipulation of the environment on participants' behavior. For example, we can see whether reward enhances learning by comparing speed of learning in one group receiving reward (environmental manipulation) with that in another group not receiving reward.

   The fact that hundreds of thousands of experiments in psychology have been carried out using the experimental method may suggest that psychology comfortably satisfies the criterion of controlled experiments. Sadly, that is not really the case. The experimental method often works extremely well when we are interested in studying the effects of the *immediate situation* on behavior. However, our behavior is also determined by numerous factors in addition to the immediate situation, most of which can't be manipulated. These factors include recent events (e.g., row with partner), our physical health, our personality, childhood events (e.g., parents divorcing), genetic factors, cultural expectations, and so on.
2. *Objectivity* It is sometimes argued that science requires the collection of data in an objective way. However, some philosophers of science doubt whether that is possible.

Key Term

Experimental method: an approach to research involving manipulation of some aspect of the environment (independent variable) to observe its effects on the participants' behavior (dependent variable).



A Skinner box (or operant conditioning chamber) is an enclosed environment in which the behavior of an animal can be studied. The animal is given a stimulus and its response is noted. This rat is in a box with a lever. Such levers can perform numerous functions, both positive ones, such as releasing food, or negative ones, such as giving an electric shock.

Thus, it may be more realistic to claim that scientists should be as objective as possible in their research. Popper (1969, 1972) pointed out that scientific observations are theory-driven rather than objective. The famous demonstration he used in his lectures involved telling his audience, "Observe!" Their obvious and immediate retort was, "Observe what?" This demonstration makes the point that no one observes without some idea of what they are looking for. Thus, what you observe depends in part on what you expect to see.

Let's consider a concrete example of how difficult it is to be totally objective. Some of the most famous experiments in psychology were carried out by Skinner. He put rats into a box containing a lever. They received a food pellet when they pressed the lever, and there was a mechanism that recorded every time the lever was pressed. That sounds completely objective. However, there are grounds for arguing that it isn't. Weak lever presses didn't activate the mechanism and so weren't recorded. In addition, the mechanism was activated by a strong lever press regardless of whether it was produced by the rat's left paw, its right paw, its nose, or its tail. Skinner claimed that it didn't matter how the animal pressed the lever, but that is an assumption rather than an objective fact.

3. *Replicability* It is important in science that we can repeat or replicate the findings from any given experiment. This is the criterion of **replicability**. If we obtained different findings every time we carried out an experiment, the situation would be chaotic and we couldn't make any real progress.

   Experiments in psychology vary considerably in terms of replicability. At one extreme, everyone (or virtually everyone) experiences the phenomenon of **apparent motion**. This is an illusion in which we perceive motion when a series of still images is presented very rapidly. We experience apparent motion every time we go to the movies—films are presented at a rate of 24 frames per second but we perceive smooth and coherent motion. At the other extreme, there are findings in social psychology. Our social behavior is heavily influenced by cultural factors, and this greatly reduces replicability. Smith and Bond (1998) reviewed the literature, and concluded that only one research finding in social psychology has been convincingly replicated around the world (discussed in more detail shortly).

   Psychologists have generally focused on the findings from individual experiments. However, there is an alternative approach. In essence, what we can do is combine the findings from numerous similar studies into one very large analysis; this is known as **meta-analysis**. It is claimed that meta-analyses have the great advantage of providing a coherent overall picture of the research findings in any given area. For that reason, there has been a huge increase in the number of meta-analyses carried out.

   As we will see at many points in this book, meta-analyses have proved valuable in making sense of complex research findings. However, there are various potential problems with meta-analyses. Sharpe (1997) identified three such problems:

   (i) The "Apples and Oranges" problem: Studies that are not very similar to each other may nevertheless be included within a single meta-analysis.

   (ii) The "File Drawer" problem: It is generally more difficult for researchers to publish studies with nonsignificant findings. Since meta-analyses often ignore unpublished findings that remain in file drawers, the studies included may not be representative of all the studies on a given topic.

   (iii) The "Garbage in—Garbage out" problem: Many psychologists carrying out meta-analyses include all the relevant studies they can find. However, this means that very poor and inadequate studies are often included along with good quality ones.

Key Terms

Replicability: the ability to repeat or replicate findings obtained from an experiment.

Apparent motion: the illusion of movement created by the rapid presentation of still images.

Meta-analysis: an analysis in which all of the findings from many studies relating to a given hypothesis are combined for statistical testing to obtain an overall picture.

Note that the above three problems are identified as *potential* problems. Psychologists have become increasingly sophisticated in the ways they carry out meta-analyses, as a result of which there are now fewer problems than in the past. The "Apples and Oranges" and "Garbage in—Garbage out" problems can be greatly reduced by establishing clear criteria that have to be met by any studies included in the meta-analysis. There are techniques for estimating the magnitude of any "File Drawer" problem, and it can be reduced by asking leading researchers in the area of the meta-analysis to supply their unpublished data.

What conclusions can we draw? Our behavior is typically influenced by numerous factors, most of which can't be controlled and some of which can't even be identified. In view of this complexity, it can be claimed that psychology has made reasonable progress in meeting the criterion of replicability. Meta-analyses have facilitated the task of deciding what general trends exist in research in any given area.

4. *Testing theoretical predictions* Scientific experiments are typically carried out to test the predictions of some theory. That makes very good sense. There is essentially an infinite number of experiments that could be carried out, and scientific theories assist in the task of identifying which experiments are worthwhile.

   How does psychology match up to this criterion? There are thousands of theories in psychology, and most experiments are designed to test one or more of these theories. However, numerous experiments lack any real theoretical purpose. For example, hundreds (or even thousands) of brain-imaging experiments were motivated by curiosity rather than by theory. The researchers concerned wondered which parts of the brain would be activated when people performed a given task, but had no theoretical predictions.

5. *Falsifiability* According to Popper (1969), the hallmark of science is **falsifiability**. This is the notion that scientific theories can potentially be disproved by negative evidence. Why did Popper focus on being able to prove a theory false rather than on proving it to be correct? The reason is that it is impossible to prove conclusively that a theory is correct! Suppose that a theory has been supported by the findings from hundreds of experiments, and there are no findings inconsistent with it. It is still possible that it may be disproved in the future, perhaps in some culture in which the theory has not been tested so far.

   We can see the power of Popper's views by considering the fate of turkeys. As the philosopher Bertrand Russell pointed out, a scientist turkey might form the hypothesis, "Every day I am fed," because for all of his life that has been the case. However, this hypothesis provides no certainty that the turkey will be fed tomorrow, and if tomorrow is Christmas Eve it is likely to prove false.

   How well does psychology meet the criterion of falsifiability? The picture is very mixed. At one extreme, many of Freud's theoretical ideas are unfalsifiable. For example, he argued that the mind is divided up into the ego (conscious mind), the id (basic motivational forces), and the superego (the conscience). It is difficult (or even impossible!) to think of any findings that could disprove this position. At the other extreme, there are numerous theories that are not only falsifiable but have actually been falsified. For example, several theorists have claimed that we possess the fundamental attribution error. This involves exaggerating the extent to which other people's behavior is determined by their personality and minimizing the role of situational factors. Several studies (especially those in non-Western cultures) have failed to obtained any evidence for the fundamental attribution error (see Chapter 17).

   In sum, many theories in psychology are falsifiable and many are not. Bear in mind that falsifying a theory *doesn't* necessarily mean that researchers immediately abandon it. Even in physics, Newton's theory of gravity was falsified well over a hundred years before it was replaced by Einstein's theories! What is typically the case is that a theory is only abandoned when someone puts forward a better and more comprehensive theory. Even then, the advocates of the discredited theory may be too proud to accept that they were wrong.

6. *Use of a paradigm* According to Kuhn (1962, 1977), the most essential ingredient in science is a paradigm. A **paradigm** is a general theoretical orientation accepted by the

Key Terms

Falsifiability: the notion that all scientific theories can in principle be disproved by certain findings.

Paradigm: according to Popper, a general theoretical orientation commanding wide support.

Before Copernicus showed that the planets, including the earth, revolved around the sun, all astronomical theories had been based on the paradigm that the earth was the center of the universe. The complete change in science post-Copernicus is an example of a paradigm shift.

great majority of researchers in a given field of study. Kuhn argued that there are three distinct stages in the development of a science:

(i) There is pre-science, in which there is no paradigm and a wide range of opinion about the best theoretical approach to adopt.
(ii) There is normal science, in which there is a generally accepted paradigm. Most scientists are very attached to the paradigm they are using, and so the current paradigm is likely to be adhered to well after its "sell by" date.
(iii) There is revolutionary science, in which problems with the current paradigm become so great that it is eventually overthrown and replaced by a different paradigm. This is known as paradigm shift.

According to Kuhn (1962), psychology has failed to develop a paradigm and so remains at the pre-science stage. In support of this argument is the fact that psychology is an unusually fragmented discipline. It has connections with several other disciplines including biology, physiology, biochemistry, neurology, and sociology. This fragmentation and diversity make it unlikely that agreement can be reached on a common paradigm or general theoretical orientation.

CONCLUSIONS

We have seen that some research in psychology (but by no means all) meets most of the six criteria discussed above. Where does that leave us? In my opinion, it leaves us in a position resembling that of the psychologist in the old story. A psychologist is walking along a deserted path late at night with a friend when a thief snatches his wallet and throws it into a bush 15 yards (14 meters) off the path. The psychologist goes to the nearest light and starts looking for his wallet there. When his friend points out that he is looking in the wrong place, the psychologist replies, "But I can see what I'm doing here!"

In similar fashion, many psychologists carry out very respectable scientific research in the laboratory using the experimental method. However, this research focuses on aspects of the immediate situation that influence behavior and tends to ignore all the other important factors involved. As a result, researchers adopting this approach are in danger of being like the psychologist looking under the light. What they are doing is easy but unfortunately of limited value. In contrast, researchers who focus on all the other factors influencing behavior other than the immediate situation are looking in the right place (i.e., in the bush). However, they are in danger of not being very scientific because they are studying factors that don't lend themselves to the scientific method.

The ideas expressed above are somewhat oversimplified. However, it is certainly true that the challenge for psychology is to study important issues while remaining scientific. As we will see throughout this book, the good news is that psychologists are increasingly meeting that challenge. They are making use of more-and-more sophisticated experimental approaches, they have access to new technology (e.g., brain scanners), and they are increasingly prepared to address some of the most complex and important issues in psychology.

PSYCHOLOGY AROUND THE WORLD

Most research in psychology is carried out in the Western world, especially the United States. According to Rosenzweig (1992), 64% of the world's 56,000 researchers in psychology at the start of the 1990s were Americans. Smith and Bond (1998) considered several textbooks in social and organizational psychology. They concluded as follows: "The universe of social and organizational behaviors that is being sampled is almost

entirely restricted to studies done within less than a dozen of the more than 200 countries in the world, constituting little more than 10 per cent of the world's population."

In spite of what has just been said, American psychologists don't carry all before them. Haggbloom et al. (2002) identified the 100 most eminent psychologists of the twentieth century. Just under 20% of them were non-American, nearly all European. For interest's sake, the 50 most eminent psychologists in order are shown in the box below.

Rank	Name	Rank	Name	Rank	Name
1.	B.F. Skinner	18.	Kurt Lewin	35.	R.B. Zajonc
2.	Jean Piaget	19.	Donald Hebb	36.	Endel Tulving
3.	Sigmund Freud	20.	George Miller	37.	Herbert Simon
4.	Albert Bandura	21.	Clark Hull	38.	Noam Chomsky
5.	Leon Festinger	22.	Jerome Kagan	39.	Edward Jones
6.	Carl Rogers	23.	Carl Jung	40.	Charles Osgood
7.	Stanley Schachter	24.	Ivan Pavlov	41.	Solomon Asch
8.	Neal Miller	25.	Walter Mischel	42.	Gordon Bower
9.	Edward Thorndike	26.	Harry Harlow	43.	Harold Kelley
10.	A.H. Maslow	27.	J.P. Guilford	44.	Roger Sperry
11.	Gordon Allport	28.	Jerome Bruner	45.	Edward Tolman
12.	Erik Erikson	29.	Ernest Hilgard	46.	Stanley Milgram
13.	H.J. Eysenck	30.	Lawrence Kohlberg	47.	Arthur Jensen
14.	William James	31.	Martin Seligman	48.	Lee Cronbach
15.	David McClelland	32.	Ulric Neiser	49.	John Bowlby
16.	Raymond Cattell	33.	Donald Campbell	50.	Wolfgang Kohler
17.	John Watson	34.	Roger Brown		

CROSS-CULTURAL PSYCHOLOGY

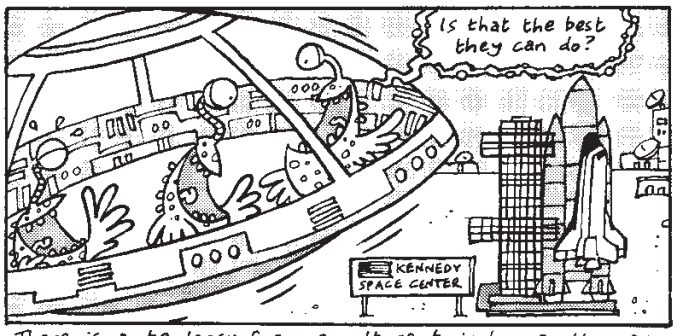
Similarities and differences across cultures are studied within **cross-cultural psychology**. What exactly is a culture? According to Fiske (2002, p. 85), "A culture is a socially transmitted or socially constructed constellation consisting of such things as practices, competencies, ideas, schemas, symbols, values, norms, institutions, goals, constitutive rules, artefacts [man-made objects], and modifications of the physical environment."

How important is cross-cultural psychology? If human behavior is similar across all cultures, the findings obtained from American and European research may suffice to develop adequate psychological theories. In fact, there are major differences across cultures, and so many theories based only on Western research have limited applicability. Note, however, that we would expect basic psychological processes (e.g., apparent motion; limited capacity of attention) to be very similar in every culture. In contrast, most social behavior is likely to be influenced by the cultural context. Smith and Bond (1998) considered cross-cultural attempts to replicate several phenomena in social psychology found in American research. They concluded as follows: "The only topic on which there is much evidence for consistently successful replication are the studies on obedience" (Smith & Bond, 1998, p. 31). As you will see in Chapter 19, Milgram (1974) found that most people are remarkably willing to administer potentially lethal electric shocks to another person.

Most studies in cross-cultural psychology have involved comparisons between different countries. However, a country is generally *not* the same as a culture. For example, it is generally assumed that the American culture is one based on individual independence and responsibility. Vandello and Cohen (1999) found that was the case in the Mountain West and the Great Plains. In the Deep South, however, the culture was based more on interdependence and sharing of responsibility within the family or other group.

Key Term

Cross-cultural psychology: an approach to psychology focusing on the similarities and differences across cultures.



There is a tendency for one culture to judge another as being "undeveloped" or "primitive".

Are you still doubtful whether cultural differences are sufficiently great to be worth bothering about? Perhaps you will be convinced by this quotation from Westen (1996, p. 679) even though it is somewhat over the top:

> *By twentieth century Western standards, nearly every human who has ever lived outside the contemporary West is lazy, passive, and lacking in industriousness. In contrast, by the standards of most cultures in human history, most Westerners are self-centered and frenetic.*

Individualism vs. collectivism

One starting point for cross-cultural psychology is to assign cultures to various categories that capture important differences among them. Many psychologists argue there is a crucial difference between cultures emphasizing **individualism** and those emphasizing **collectivism**. Oyserman, Coon, and Kemmelmeier (2002, p. 5) defined these terms as follows: "[We may] conceptualize individualism as a worldview that centralizes the personal—personal goals, personal uniqueness, and personal control—and peripheralizes the social . . . the core element of collectivism is the assumption that groups bind and mutually obligate individuals."

Oyserman et al. (2002) considered the components of individualism and collectivism as assessed by 27 questionnaires. They identified six components of individualism and eight components of collectivism:

Individualism	Collectivism
1. Independent (free; control over one's life).	1. Related (considering close others as part of the self).
2. Goals (striving for one's own goals and achievements).	2. Belong (enjoying belonging to groups).
3. Compete (personal competition and success).	3. Duty (being willing to make sacrifices as a group member).
4. Unique (focus on one's unique characteristics).	4. Harmony (concern for group harmony).
5. Private self-know (keeping one's thoughts private from others).	5. Advice (turning to close others for help with decisions).
6. Direct communicate (stating clearly what one wants and needs).	6. Context (self alters across situations).
	7. Hierarchy (emphasis on status issues).
	8. Group (preference for working in groups).

Key Terms

Individualism: characteristic of cultures emphasizing independence, personal responsibility, and personal uniqueness.

Collectivism: characteristic of cultures emphasizing interdependence, sharing of responsibility, and group membership.

The first theoretical account of individualism and collectivism was proposed by Hofstede (1980, 1983). He argued that individualism and collectivism are opposites. Individualistic cultures are those with an emphasis on *independence* and individual responsibility whereas collectivistic ones emphasize *interdependence* and group membership.

Findings

Hofstede (1980, 1983) surveyed work-related values among IBM employees from 53 countries. The countries scoring highest on individualism were the United States (rank 1), Australia (rank 2), Great Britain (rank 3), and Canada and The Netherlands (joint rank 4). Hofstede assumed (mistakenly as it happens) that countries scoring lowest on individualism were the highest on collectivism. Those scoring lowest on individualism were Guatemala (rank 53), Ecuador (rank 52), Panama (rank 51), and Venezuela (rank 50).

Several countries in the Far East (e.g., Indonesia, South Korea, Taiwan, and Thailand) also scored low on individualism.

One of Hofstede's key findings was that individualism correlated +.82 with modernity as measured by national wealth. This suggests that wealthier countries are generally individualistic. The most likely explanation is that affluent individuals have less need to be reliant on other people.

There is increasing evidence that individualism and collectivism are *not* opposites of each other as was assumed by Hofstede. Triandis et al. (1993) obtained several measures of individualism and collectivism across several cultures. Their key finding was that individualism and collectivism were essentially independent or uncorrelated with each other.

Gelfand, Triandis, and Chan (1996) presented American students with concepts relating to individualism (e.g., choosing own goals; broad-minded), to collectivism (e.g., family security; reciprocate favors), and to authoritarianism (e.g., submissiveness; punish deviates). There were two key findings. First, individualism and collectivism were unrelated to each other. Second, authoritarianism was the opposite of individualism. In general terms, individualists want to control their own lives, whereas authoritarians want to control other people's lives.

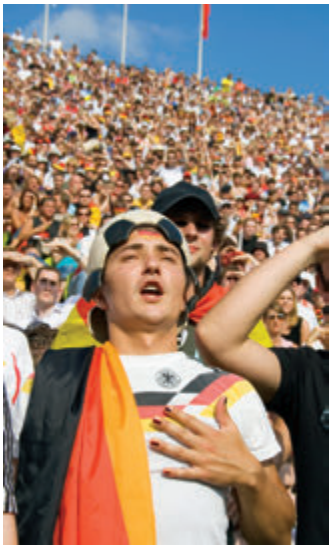
It has often been assumed that what is true at the level of a culture is also true at the level of individuals within that culture. However, that is not strictly correct. Triandis et al. (2001) studied several cultures. Only about 60% of those living in individualistic cultures have individualistic beliefs, and only about 60% of those in collectivistic cultures have collectivistic beliefs. Thus, there is only a moderate tendency for matching between individuals and the culture in which they live.

Evaluation

- (+) There is an important distinction between individualism and collectivism.
- (+) The distinction between individualism and collectivism has been more influential than any other distinction in cross-cultural research.
- (−) Hofstede's research was limited in that his sample consisted mainly of male workers from IBM's marketing and serving division.
- (−) Individualism and collectivism are essentially unrelated to each other rather than being opposites as was originally assumed.
- (−) The concepts of individualism and collectivism are both very broad and involve several components. As Fiske (2002, p. 83) pointed out, "IND [individualism] amalgamates Thomas Paine, Vincent van Gogh, Mahatma Gandhi, Michael Jordan, Hugh Hefner, and Adolf Hitler into one category!"
- (−) The heavy reliance on questionnaires to assess individualism and collectivism is adequate only if people have access to *all* relevant information about themselves and their culture. This is most unlikely to be the case.

Cultural influences: Fixed or flexible?

It is generally assumed that the culture to which we belong has a fixed and constant impact on us. As Hong, Morris, Chiu, and Benet-Martinez (2000, p. 709) pointed out, "Cultural knowledge is [typically] conceptualized to be like a contact lens that affects the individual's perceptions of visual stimuli all of the time." Is it really true that cultural influences are constant across different situations? According to Hong et al., the answer is, "No." Cultural influences have more influence on us when we are in situations that make culture-relevant information readily accessible than in situations that do not. For



Feelings of patriotism are likely to be more intense when we watch our country play football than at other times. This demonstrates that cultural influences are flexible in nature, and the extent to which they impact on our emotions and behavior is often contextually determined.

example, you may identify more with your own culture when you hear the national anthem being played than at other times.

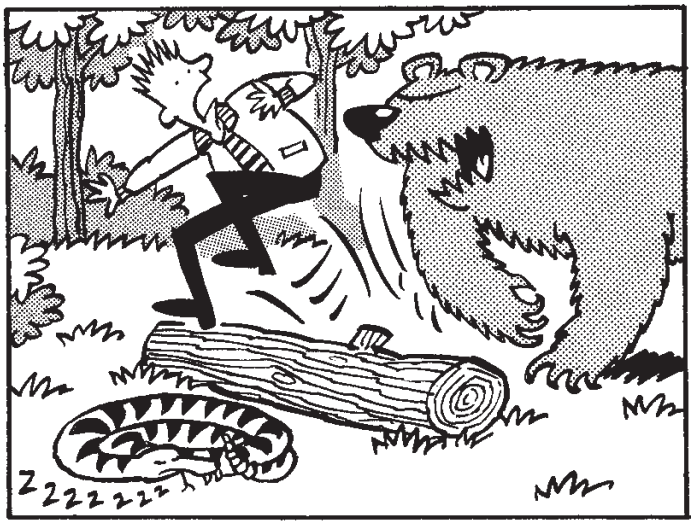
The clearest evidence that cultural influences are flexible and changeable has been obtained in studies on bicultural individuals who have internalized two different cultures. Such individuals often report frame switching, in which they switch from one cultural outlook to the other. For example, Padilla (1994, p. 30) quotes the following experience of a Mexican-American individual: "At home with my parents and grandparents the only acceptable language was Spanish . . . Everything was really Mexican . . . But at school, I felt really different because everyone was American, including me. Then I would go home in the afternoon and be Mexican again."

Hong, Chiu, and Kung (1997) studied Westernized Chinese students in Hong Kong. Participants were shown pictures strongly related to either the American culture (e.g., the American flag; Marilyn Monroe; the Capitol Building) or to the Chinese culture (e.g., a Chinese dragon; a Chinese opera singer; the Great Wall). After that, they were shown a realistic picture of a fish swimming in front of a group of other fish. Participants exposed to symbols of American culture favored an internal or individualistic interpretation of the fish's behavior (the one fish is leading the other fish). In contrast, those exposed to symbols of Chinese culture favored an external or collectivistic interpretation (the one fish is being chased by the other fish).

In sum, the extent to which we are affected by cultural influences depends very much on the situation in which we find ourselves (see Lehman, Chiu, & Schaller, 2004, for a review). That is an important insight, and one that is likely to become the focus of much future research.

HOW USEFUL IS PSYCHOLOGY?

Most people think psychology is an interesting subject (which it is!). We are all interested in trying to understand ourselves and other people, and that is the central goal of psychology. However, there is more controversy concerning the usefulness of psychology. Skeptics argue that psychology tells us what we already know (the science of the bleeding obvious), that findings obtained in the laboratory don't generalize to everyday life, and that most psychological research is trivial (e.g., rats running through mazes). There are many ways of refuting such arguments. However, I will concentrate on two issues. First, the argument that psychology is no better than (or even the same as) common sense will be discussed. Second, the major contributions that have been made in the areas of clinical psychology and health psychology will be considered.



"Look before you leap" vs. "He who hesitates is lost."

"PSYCHOLOGY IS JUST COMMON SENSE"

An unusual feature of psychology is that everyone is to some extent a psychologist. We all observe the behavior of other people and of ourselves, and everyone has access to their own thoughts and feelings. One of the main tasks of psychologists is to predict behavior, and the prediction of behavior is important in everyday life. The better we can anticipate how people will react in any given situation, the more contented and rewarding our social interactions and relationships are likely to be.

The fact that everyone is a psychologist has led many people to underestimate the achievements of scientific psychology. If the findings of scientific psychology are in line with common sense, it can be argued that they tell us nothing we didn't already know. On the other hand, if the findings don't accord with common sense, then people often respond, "I don't believe it!"

There are various problems with the view that psychology is no better than common sense. It is misleading to assume that common sense forms a coherent set of assumptions about behavior. This can be seen if we regard proverbs as providers of commonsensical views. A girl parted from her lover may be saddened if she thinks of the proverb, "Out of sight, out of mind." However, she may cheer herself up if she tells herself that, "Absence makes the heart grow fonder." Another pair of proverbs expressing opposite meanings is the following: "Look before you leap" versus "He who hesitates is lost." As common sense involves such an inconsistent view of human behavior, it can't be used as the basis for explaining that behavior.

There is another reason for not trusting commonsensical views. People's views about issues in psychology often reflect their own experience rather than any objective reality. For example, Furnham (1982) carried out a study in the UK on people's beliefs about the factors causing poverty. Conservative party voters (who tend to be wealthier than those voting for other parties) argued that poverty is a result of problems within poor individuals (e.g., lack of effort; lack of thrift). In contrast, Labour party voters (who tend to be less well-off) argued that poverty is a result of problems within society (e.g., prejudice and discrimination; low wages in some industries).

The notion that psychology is just common sense can also be disproved by considering psychological studies in which the findings were very unexpected. A famous example is the work of Stanley Milgram (1974; discussed in Chapter 19). The experimenter divided his participants into pairs to play the roles of teacher and learner in a simple learning task. The "teacher" was told to give electric shocks to the "learner" every time the wrong answer was given, and to increase the shock intensity each time. The situation was rigged so that the learner was always a confederate of the experimenter. This confederate was a middle-aged man who allegedly had a heart condition. At 180 volts, the learner yelled, "I can't stand the pain!," and by 270 volts his response had become an agonized scream. If the teacher showed reluctance to give the shocks, the experimenter (a professor of psychology) urged him/her to continue.

Do you think you would be willing to give the maximum (and potentially fatal) 450-volt shock in such an experiment? What percentage of people do you think would be willing to do it? Milgram (1974) found that everyone denied they personally would do any such thing. Psychiatrists at a leading medical school predicted that only one person in a thousand would go to the 450-volt stage. In fact, about 60% of Milgram's participants gave the maximum shock, which is 600 times as many as the expert psychiatrists had predicted! Thus, people are much more conformist and obedient to authority than they realize. There is a strong tendency to go along with the decisions of someone (e.g., a professor of psychology) who seems to be a competent authority figure.

The fact that Milgram's findings are very different from those predicted by common sense doesn't say anything about all the other hundreds of thousands of findings in psychology. Accordingly, let's extend this discussion to include a quiz covering a wide range of topics in psychology (many taken from Furnham, 1988). For each item, decide whether you think it is true or false.

Psychology quiz

1. In making decisions, committees tend to be more conservative than individuals. TRUE/FALSE
2. In small amounts, alcohol is a stimulant. TRUE/FALSE
3. Flashbulb memories (i.e., vivid memories of dramatic world events like 9/11) are exceptionally accurate and long-lived. TRUE/FALSE
4. There is some truth in many national and ethnic stereotypes. TRUE/FALSE
5. A schizophrenic is someone with a split personality. TRUE/FALSE
6. To change people's behavior towards members of ethnic minority groups, we must first change their attitudes. TRUE/FALSE

7. A person who is fatigued invariably does poorer work than someone who is fully rested. TRUE/FALSE
8. Intelligence plays a smaller role in human happiness than does emotion. TRUE/FALSE
9. Very intelligent children tend to be less strong physically than children of average intelligence. TRUE/FALSE
10. Physically attractive adults have better social skills and physical health than unattractive ones. TRUE/FALSE
11. Human progress is a result of increased native intelligence from age to age. TRUE/FALSE
12. Most people feel sympathy for the victims of serious accidents or natural disasters and don't hold them responsible for the harm they have suffered. TRUE/FALSE
13. Patients with amnesia have very poor long-term memory but can still acquire many skills such as learning to play the piano. TRUE/FALSE
14. People's behavior in most situations depends much more on their personality than on the situation itself. TRUE/FALSE
15. Eyewitness testimony about an event often reflects not only what he/she actually saw but information they obtained later. TRUE/FALSE

The correct answer to most of the questions is "False". The exceptions (where the correct answer is "True") are questions 4, 8, 10, 13, and 15. How did you get on? I tried to select questions so that the correct answer differs from common sense, but I may or may not have been successful. If you scored 12 or more, then I suspect you have already spent some time studying psychology. If not, you must be a very keen student of human behavior! If you scored fewer than 12, then perhaps you will agree that there may be more to psychology than meets the eye.

Some of the topics forming the items in the quiz are discussed in various chapters of this book. For example, Chapter 8 deals with items 3, 13, and 15, Chapter 11 deals with item 11, Chapter 12 deals with item 14, Chapter 18 with item 10, Chapter 19 with item 1, Chapter 20 with items 4 and 6, and Chapter 21 with item 5.

CLINICAL PSYCHOLOGY

Mental disorders cause untold human misery to millions of people around the world. The most common mental disorders are depression or mood disorders and anxiety, and so we will focus on them. Between 5% and 8% of the European population suffers from depression during any given year (Andlin-Sobocki, Olesen, Wittchen, & Jönsson, 2005), and the figure is 12% for anxiety disorders (Andlin-Sobocki & Wittchen, 2005). Apart from the costs in human misery, there are very large financial costs as well. It has been estimated that the total annual cost of mental disorders is 240 billion euros (about £200 billion, or $370) when account is taken of lost workdays and productivity loss (Andlin-Sobocki, Jönsson, Wittchen, & Olesen, 2005). All of the figures given are only estimates, but they show clearly the extremely damaging effects of mental disorders.

What has psychology contributed to the treatment of mental disorders? Many different forms of psychological therapy have emerged since Sigmund Freud developed psychoanalysis approximately 100 years ago. However, the evidence indicates that overall there are only small differences in the effectiveness of different forms of therapy (e.g., Wampold et al., 1997). Matt and Navarro (1997) combined data from 28 meta-analyses on the effects of therapy. They found that 75% of patients receiving therapy improved more than the average untreated control patient, which indicates that all forms of therapy are at least moderately effective. Approximately 85 million people in Europe suffer from anxiety and/or depression in any given year, and the great majority receive little in the way of effective therapy. Nevertheless clinical psychology has contributed substantially to improving mental health. There is enormous scope for

it to contribute much more if the resources were available to train more clinical psychologists.

HEALTH PSYCHOLOGY

Ünal, Critchley, Fidan, and Capewell (2005) estimated that the number of people in England and Wales dying from heart disease was 68,230 fewer in 2000 than in 1981. This reduction produced a gain of about 925,415 life years. There are two main ways in which we might explain this reduction in mortality from heart disease. First, and most obviously, there have been substantial advances in medicine. These advances include the development of more precise and effective surgical interventions, increased use of aspirin to prevent heart attacks, treatment for hypertension, and the use of statins (drugs that reduce cholesterol). Second, there are changes in lifestyle. Some of these changes are clearly beneficial (e.g., reduction in smoking), but others have adverse effects (e.g., increased obesity; decreased physical activity).

Here is a question based on the above information. What percentage of the reduced mortality from heart disease is attributable to medical advances and what percentage to lifestyle changes? The answer may surprise you—Ünal et al. (2005) concluded that 79% of the gain in life years (731,270 in total) was a result of lifestyle changes and only 21% (194,145 life years) was a result of medical interventions! Lifestyle changes had a massively positive effect overall even though some changes (e.g., reduced physical activity; increased obesity) had a negative effect on mortality from heart disease.

What is the relevance of all this to psychology? Lifestyle changes involve changing behavior, and the experts in devising ways of changing behavior are . . . psychologists. More specifically, many health psychologists focus on interventions designed to produce beneficial lifestyle changes. The lifestyle change having by far the greatest impact on reduced mortality from heart disease was a reduction in the number of people smoking. Indeed, almost 45% of the total gain in life years from lifestyle changes and medical interventions was attributable to a reduction in smoking.

Health psychology, such as basic counseling and social skills training, can be used as part of multi-component packages to help change behavior, and thus make the lifestyle changes necessary for successful smoking cessation, for example.

Viswesvaran and Schmidt (1992) carried out a meta-analysis of 633 smoking cessation studies. The annual success rate achieved by health psychologists was 30% with multi-component packages (e.g., basic counseling; information on the health effects of smoking; social skills training; nicotine patches) compared to 6% for smokers receiving no treatment. Since there are still about 10 million smokers in the UK, there is scope for health psychologists to reduce mortality from heart disease considerably in the future.

We have only focused on mortality from heart disease. However, smoking increases mortality from a very wide range of diseases. On average, smokers lose about 10 years of their lives as a direct consequence of smoking. Imagine if all 10 million smokers in the UK received multi-component smoking cessation packages from health psychologists. In principle, this could produce a gain of 24 *million* life years!!!

Chapter Summary

What is psychology?

- Psychology is the science devoted to understanding human (and social) behavior.
- Biological psychology is an approach that emphasizes the importance of internal processes and structures such as attention, perception, learning, memory, language, thinking, and reasoning.
- Cognitive psychology is an approach that focuses on understanding the internal processes and structures that influence behavior in nearly every situation.
- The individual differences approach emphasizes the ways in which any individual's behavior is influenced by his/her intelligence and personality.
- Developmental psychology is an approach concerned with the changes occurring during childhood and with the impact of childhood experiences on adult behavior.
- Social psychology is an approach that emphasizes the fact that we are social animals who spend much of our time with other people and being influenced by them.

Is psychology a science?

- Most science involves carrying out controlled experiments, collecting objective data, replicating findings, testing theoretical predictions, falsifiability of predictions, and use of a paradigm.
- Much research in psychology fulfills most of the criteria for a science. However, the most scientific research in psychology sometimes addresses relatively minor issues.

Psychology around the world

- There is an important distinction between individualistic and collectivistic cultures.
- Individualism and collectivism are very broad concepts, and are *not* opposites as has often been assumed.

How useful is psychology?

- Psychology is *not* just common sense. Common sense doesn't provide a coherent account of human behavior and nonpsychologists' predictions about human behavior are frequently disconfirmed.
- Mental disorders are extremely expensive in human and financial terms. Clinical psychologists have been increasingly successful in alleviating human misery (and saving very large sums of money) in recent years.
- A substantial proportion of recent increases in longevity in Western countries is a result of lifestyle changes rather than improvements in medical interventions. Health psychologists have an increasingly important role to play in persuading people to adopt healthier lifestyles that will extend their lives.

Further Reading

- Furnham, A. (1988). *Lay theories: Everyday understanding of problems in the social sciences*. Oxford, UK: Pergamon. Adrian Furnham has asssembled a formidable amount of evidence on the limitations of commonsensical views of psychology.
- Oyserman, D., Coon, H.M., & Kemmelmeier, M. (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin*, *128*, 3–72. This reference is very useful if you want to gain more understanding of cross-cultural differences.
- Smith, P.B., & Bond, M.H. (1998). *Social psychology across cultures* (2nd ed.). London: Prentice Hall. The major findings from cross-cultural research are discussed in a well-informed and critical way.

Chapter 2

Contents

2 Historical and conceptual issues

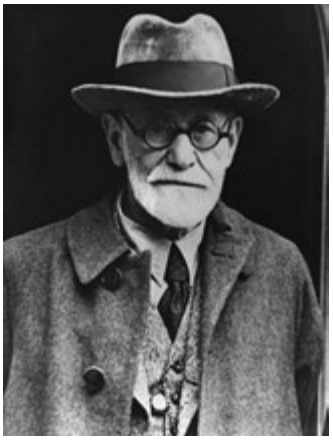
This chapter is divided into two major sections. The first such section is concerned with the history of psychology. It focuses on the major approaches to psychology that have been developed over the past century or so. The second section is devoted to major conceptual issues and debates in psychology. We will reserve discussion of those issues and debates until later in the chapter.

In Chapter 1, we saw how psychology is related to several other disciplines. For example, psychology has been influenced by physiology, genetics, biology, medicine, and anthropology. These influences help to explain the complexity and the richness of contemporary psychology, and shed light on the ways in which psychology has developed over the past century or so. However, the development of psychology has also been powerfully influenced by a relatively small number of theoretical approaches or "schools" of psychology.

The following five approaches are considered in this chapter: psychodynamic approach; behaviorism; humanism; cognitive psychology; and evolutionary psychology. They are considered in that order because it corresponds to the historical order in which the approaches were developed. The psychodynamic approach was developed by Sigmund Freud in Vienna at the start of the twentieth century. It was based mainly on a form of clinical therapy known as psychoanalysis. However, Freud extended the psychodynamic approach to account for childhood development and the development of personality. The behaviorist approach was developed by John Watson and other American psychologists from about 1912 onwards. This approach had its origins in animal research, and was mainly concerned with understanding the processes of learning under highly controlled conditions.

Humanism is sometimes known as the "third force" in psychology, with the psychodynamic and behaviorist approaches being the other two forces. It was developed by psychologists such as Carl Rogers and Abraham Maslow in the United States in the 1950s, and had its origins in philosophy. The humanist approach shared with the psychodynamic approach a major focus on therapy. The cognitive approach was developed mainly in the United States and the United Kingdom. This approach became increasingly influential from about the middle of the 1950s onwards. Cognitive psychology had some of its origins in the behaviorist approach, with its emphasis on controlled observation of behavior. However, the cognitive approach is much broader, since it considers a wide range of cognitive processes (e.g., attention; perception; reasoning; memory) as well as learning.

Finally, there is evolutionary psychology, which has been popularized by Steven Pinker (e.g., 1997). According to this approach, the process of evolution has served to shape our minds and behavior. As a result, much of human behavior is adaptive. That means it is well suited to the environment in which we find ourselves. This approach has proved controversial. In the eyes of many psychologists, it exaggerates the importance of



Sigmund Freud, 1856–1939.

genetic factors in influencing our behavior and de-emphasizes the role played by social and cultural factors.

PSYCHODYNAMIC APPROACH

Sigmund Freud (1856–1939) is the most influential figure in the entire history of psychology. He was Austrian, and trained in medicine before going on to specialize in neurology. His fame rests largely on his position as the founder of psychoanalysis. Note that psychoanalysis consists of two somewhat separate strands: (1) a complex set of theories about human emotional development; and (2) a form of treatment based in part on those theoretical ideas. Over the years, psychoanalysis was developed and extended by many others including his daughter Anna Freud, Karen Horney, and Erik Erikson. This entire approach is often described as "psychodynamic," and is discussed very well by Jarvis (2004).

Some of Freud's main contributions are discussed elsewhere in the book. His theory of psychosexual development (an approach to personality) is dealt with in Chapter 12, and his therapeutic approach is considered in Chapter 22. At a very general level, Freud assumed that the mind is divided into three parts. First, there is the id. This contains the sexual and aggressive instincts, and is located in the unconscious mind. Second, there is the ego. This is the conscious, rational mind, and it develops during the first 2 years of life. It works on the reality principle, taking account of what is going on in the environment. Third, there is the superego. This develops at about the age of 5 when the child adopts many of the values of the same-sexed parent (a process of identification). It is partly conscious and partly unconscious. It consists of the conscience and the ego-ideal. The conscience is formed as a result of the child being punished, and it makes the child feel guilty after behaving badly. The ego-ideal is formed through the use of reward. It makes the child feel proud after behaving well.

According to Freud, there are frequent conflicts among the id, ego, and superego. Most commonly, conflicts involve the id and the superego. The id wants to satisfy its basic motivational urges but the superego or conscience is opposed to that, and the ego tries to resolve the conflict. The ego protects itself by using various defense mechanisms (strategies designed to reduce anxiety). The main defense mechanism is repression, which involves forcing threatening thoughts and feelings into the unconscious. Other defense mechanisms are denial (refusing to accept the reality of a threatening event) and displacement (moving impulses away from a highly threatening object towards a less threatening one). Someone who has been made angry by their boss might show displacement by going home and kicking their cat.

Freud assumed that the mind exists at three levels: the conscious; the preconscious; and the unconscious. The conscious consists of those thoughts that are currently the focus of attention. The preconscious consists of information and ideas that could be retrieved easily from memory and brought into consciousness. The unconscious consists of information that is either very difficult or almost impossible to bring into conscious awareness.

Psychoanalysis as a form of therapy can be regarded as the first "talking cure." Freud argued that individuals experiencing traumatic events in childhood (e.g., sexual abuse) tend to repress their memories for those events by forcing them into the unconscious. Crucial to the success of therapy is allowing patients to gain access to their repressed feelings and thoughts, with the goal being to provide them with insight into the true nature of their problems. The retrieval of repressed memories can be facilitated by free association or by dream analysis. In free association, patients are asked to respond rapidly to various words presented to them with the first ideas that come into their minds. Freud regarded dream analysis as important because he argued that people's deep-seated feelings and concerns influence their dreams. People's reports of their dreams are typically fairly innocuous, but psychoanalysis can reveal the hidden meanings contained in them.

After Freud's death, neo-Freudians such as Anna Freud and Karen Horney developed ego analysis, which is based on the notion that therapy should focus on strengthening the ego so that it can achieve more gratification. Ego analysis makes use of free association and other techniques associated with psychoanalysis. However, it differs from psychoanalysis in that it focuses much more on the patient's *current* social and interpersonal problems than on their childhood experiences. It also differs in that ego analysts regard society as being a positive force in most people's lives, whereas Freud emphasized the ways in which society inhibits individuals.

Another neo-Freudian approach to therapy is based on Melanie Klein's object relations theory (discussed by Segal, 1964). The main focus is on early relationships and the effects that these relations have on later life. In essence, the therapist seeks to identify consistent relationship problems experienced by the client, and to find ways to improve matters.

Psychoanalyst Sigmund Freud and his daughter and fellow psychoanalyst Anna Freud arrive in Paris in 1938, after fleeing the Nazi occupation of their home country, Austria. They went on to London, where Sigmund died the next year. Anna did major work in the field of child psychology until her death in 1982.

Evaluation

- (+) Freud hugely expanded the scope of psychology. Before Freud, psychology was rather narrow, focusing on topics such as simple learning and associations of ideas. In contrast, Freud argued that psychology is relevant to virtually all human behavior, and history has proved him right.
- (+) Some of Freud's very general ideas have survived extremely well and are still generally accepted. For example, Freud argued that childhood experiences influence adult behavior and personality, that unconscious processes and motives influence our behavior, and that many of the behavioral symptoms of patients with anxiety disorders can be understood as attempts to reduce their anxiety level.
- (+) Freud developed the first systematic form of therapy for mental disorders based on psychological principles. Remarkably, psychoanalysis was as good as (or better than) most competing forms of therapy for more than 50 years after it was put forward.
- (+) Freud's theory of psychosexual development was the first systematic theory of personality.
- (+) As Williams (1987) pointed out, "Psychoanalysis has been society's most influential theory of human behavior . . . it profoundly altered Western ideas about human nature and changed the way we viewed ourselves and our experience."
- (−) Many of Freud's theoretical ideas are unscientific in that they lack falsifiability, i.e., the possibility of disproof. For example, we can't devise an experiment to prove (or disprove) the notion that the mind is divided into the id, ego, and superego.
- (−) Most of Freud's evidence for his ideas was obtained from clients during therapy. This evidence was probably contaminated—what patients said was influenced by what Freud had said previously and his known views. In addition, Freud may well have used his theoretical preconceptions to produce distorted interpretations of what patients said.
- (−) When Freud's specific ideas can be tested, they have generally been found to be wrong. For example, there is very little evidence supporting the existence of an Oedipus complex (young boys' sexual desire for their mother and consequent fear of their father). Another example is that Freud exaggerated the differences between males and females ("anatomy is destiny"), and has often been criticized for being sexist.

Freud's work was largely with middle-class women in Vienna in the 1890s and 1900s. How relevant do you think his ideas are to other cultures, particularly given the social changes during the twentieth century?

John Watson, 1878–1958.

BEHAVIORISM

The behaviorist approach to psychology started in the United States in the early years of the twentieth century. The central figure in this approach was John Watson (1878–1958). According to Watson (1913):

> *Psychology as the behaviorist views it is a purely objective, experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. Introspection forms no essential part of its method.*

Note that Watson believed that a major goal of psychology is to control behavior. This helps to explain the emphasis the behaviorists placed on the study of learning rather than on other aspects of psychological functioning. If you want to change someone's behavior, you need to provide the relevant learning experience.

Watson and the other early behaviorists were greatly influenced by the work of Ivan Pavlov (1849–1936) on classical conditioning in dogs (see Chapter 7). Dogs salivate when food is put in their mouths, and Pavlov found they could be trained to salivate to a neutral stimulus such as a tone. This tone was presented just before food on several occasions, so that the tone signaled the imminent arrival of food to the dog. Finally, Pavlov presented the tone on its own without any food, and found that this led to the dog salivating. This form of learning is known as classical conditioning.

Russian psychologist Ivan Pavlov, a dog, and his staff, photographed circa 1925–1936.

Why was Watson so impressed by Pavlov's work? First, Pavlov focused on observable stimuli and responses, and so his research seemed to be scientific. For example, the amount of learning could be assessed by the quantity of salivation produced by the tone. Second, Pavlov's work suggested that learning involves the formation of an association between a stimulus (e.g., a tone) and a response (e.g., salivation). Watson assumed that most (or all) learning was of this type.

Burrhus Fred Skinner (1904–1990) was the most influential behaviorist. His main assumption was that nearly all behavior is under the control of reward or reinforcement. Responses followed by reward will increase in frequency, whereas those not followed by reward will decrease in frequency. This is known as operant conditioning (see Chapter 7). The responses studied by Skinner were very simple (e.g., lever pressing; pecking), and it is unlikely that operant conditioning explains more complex forms of learning.

B.F. Skinner, 1904–1990.

Skinner seems to have favored the notion of equipotentiality, according to which virtually any response can be conditioned in any stimulus situation. This notion is simply incorrect. For example, Breland and Breland (1961) tried to train a pig to perform the (apparently) simple task of inserting a wooden token into a piggy bank for reward. However, the pig turned the token up with its snout, tossed it in the air, and so on. Thus, the pig behaved in ways that came "naturally" to it rather than those required to receive reward.

The behaviorists believed strongly (but wrongly!) that behavior is determined almost entirely by environmental factors and by learning. They argued that genetic factors are relatively unimportant: "There is no such thing as an inheritance of capacity, talent, temperament, mental constitution and characteristics. These things depend on training that goes on mainly in the cradle" (Watson, 1924).

The behaviorists' emphasis on *external* stimuli and responses was accompanied by a virtual ignoring of *internal* physiological (and other) processes. For example, Skinner (1980) argued that, "A science of behavior has its own facts . . . No physiological fact has told us anything about behavior that we did not know already." Even more dubiously, the behaviorists did not regard the brain as being of central importance. According to Murphy and Kovach (1972), "Though the brain remains a connecting station, it is for the

behaviorist no more intelligible to say that we think with the brain than to say that we walk with the spinal cord."

Behaviorism has influenced the development of psychology in two important ways. First, the behaviorists spelled out more systematically than had been done before exactly how psychology could achieve scientific status. In particular, they claimed that the careful observation of behavior in controlled settings is of fundamental importance to psychology, a claim that still seems valid one century later.

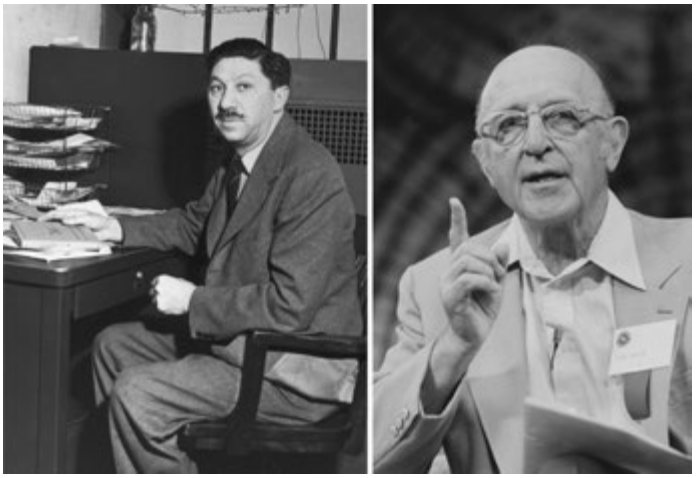
Second, behaviorism has had a powerful influence on the treatment of mental disorders through the development of behavior therapy (see Chapter 21). This form of therapy is based on the assumptions that abnormal behavior develops through conditioning, and that conditioning principles can be used to achieve recovery. How effective is behavior therapy compared to other psychological forms of treatment? Matt and Navarro (1997) considered 63 meta-analyses in which different types of therapy had been compared in what we might call a meta-meta-analysis. Behavior therapy and cognitive therapy seemed to be slightly more effective than psychodynamic or client-centered therapy. However, this probably exaggerated the value of behavior and cognitive therapy. Clients treated by behavior or cognitive therapy often had less serious symptoms, and behavior and cognitive therapists tended to use less stringent measures of recovery than did psychodynamic and client-centered therapists.

Evaluation

- (+) The behaviorists' general approach to psychology based on controlled experiments and observations of behavior has proved of lasting value.
- (+) Behavior therapy is an effective form of treatment for several mental disorders.
- (−) Skinner argued that we learn mainly by performing responses that are rewarded. In fact, however, much of our learning occurs through observing the behavior of other people (Bandura, 1977; see Chapter 7).
- (−) The most general problem with behaviorism is that it understated the impact of internal factors (e.g., past knowledge; goals) on behavior. According to Skinner, our behavior is controlled by *current* rewards and punishments. If that were true, then we would be like weather vanes, being blown about by changes in the rewards and/or punishments in the environment (Bandura, 1977). In fact, of course, much of our behavior is relatively consistent because we are controlled in part by various long-term goals (e.g., obtaining a psychology degree).
- (−) The behaviorists assumed that reward or reinforcement has a major impact on learning. However, they often blurred the distinction between learning and performance. If someone offered you a money reward every time you said, "The earth is flat," you might be persuaded to say it hundreds of times. Although the reward would have influenced your performance or behavior, it is most unlikely that it would have influenced your learning to the extent that you started to believe that the earth is actually flat. However, you would have learned a simple way of accumulating a lot of money!

HUMANISTIC APPROACH

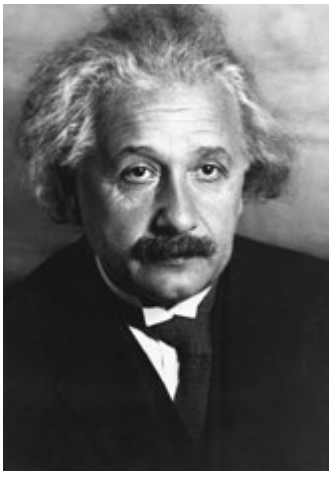
The humanistic approach to psychology was developed mainly by Carl Rogers and Abraham Maslow in the United States during the 1950s. Humanistic psychology "is concerned with topics that are meaningful to human beings, focusing especially upon subjective experience and the unique, unpredictable events in individual human lives" (Cartwright, 1979, pp. 5–6). Humanistic psychologists focus on issues such as personal responsibility, free will, and the



Abraham Maslow (left) and Carl Rogers (right), two of the main developers of the humanistic approach to psychology.

individual's striving towards personal growth and fulfillment. Of particular importance, humanistic psychologists favor a reliance on **phenomenology**, which involves reporting pure experience with no attempt at interpretation by the person doing the reporting. According to Rogers (1951, p. 133), "This kind of personal, phenomenological type of study . . . is far more valuable than the traditional 'hard-head' empirical approach. This kind of study, often scorned by psychologists as being 'merely self-reports,' actually gives the deepest insight into what the experience has meant."

As the above quotation suggests, humanistic psychologists did not subscribe to the scientific approach to psychology. Their anti-scientific approach was expressed forcefully by Maslow (1968, p. 13): "The uniqueness of the individual does not fit into what we know of science. Then so much the worse for that conception of science."



Maslow characterized Einstein as a famous individual who demonstrated "self-actualization"— including characteristics such as self-acceptance, resistance to cultural influences, empathy, and creativeness.

One of the main achievements of the humanistic approach is Maslow's hierarchical theory of motivation (discussed fully in Chapter 3). Maslow argued that previous theories of motivation were limited, because they focused only on basic motives such as sex, hunger, and thirst. He argued that most humans are also motivated by several other needs. Of particular importance is the need for self-actualization, which involves fulfilling one's potential in the broadest sense. Maslow (1954) identified Abraham Lincoln and Albert Einstein as two famous people who were self-actualized.

Another major achievement of the humanistic approach was Rogers' client-centered therapy, which was later called person-centered therapy. This form of therapy was based on the notion that the concept of "self" is of fundamental importance to an understanding of human behavior. Rogers (1967, p. 108) had this to say when discussing what mattered to his clients:

> *Below the level of the problem situation about which the individual is complaining—behind the trouble with studies or wife or employer . . .—lies one central search. It seems to me that at the bottom each person is asking "Who am I, really? How can I get in touch with this real self, underlying all my surface behavior? How can I become myself?"*

Rogers (1975) developed these ideas. He argued that the main goals of therapy should be to allow clients to develop a sense of personal agency and to become self-actualized by thinking about themselves in an honest and accepting way. These goals can be achieved provided the therapist consistently displays three qualities:

1. *Unconditional positive regard*: The therapist is always supportive.
2. *Genuineness*: The therapist is spontaneous and open.
3. *Empathy*: The therapist has a good understanding of the client's feelings and concerns.

There are two other important features of Rogers' approach to therapy. First, he was one of the first therapists to make available detailed information about what happened in treatment sessions (e.g., use of tape recordings). That made it easy for other therapists to identify key aspects of client-centered therapy. Second, most therapists modify the therapy they provide to take account of the specific disorder from which the client is suffering. In contrast, Rogers did not believe in the value of categorizing mental disorders. He believed that a single approach based on unconditional positive regard, genuineness, and empathy was nearly always appropriate.

Key Term

Phenomenology: an approach in which the focus is on the individual's direct reports of experience.

Evaluation

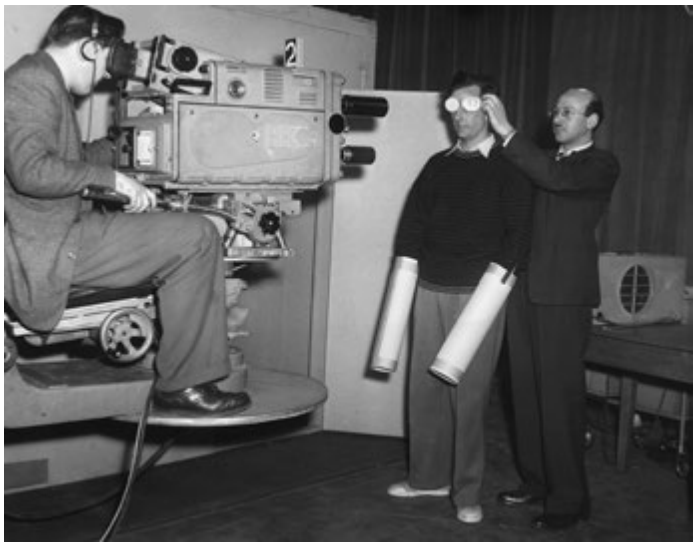
- (+) Humanistic psychology focused on issues of major concern to people (e.g., development of the self).
- (+) Major ingredients of client-centered (or person-centered) therapy such as therapist empathy, genuineness, and warmth or acceptance (related to unconditional positive regard) are predictive of therapeutic success (Orlinsky, Grave, & Parks, 1994).
- (+) A meta-analysis of studies on client-centered therapy indicated that the average client showed more improvement than 80% of individuals not receiving treatment (Greenberg, Elliott, & Lietaer, 1994). This suggests that client-centered therapy is moderately effective.
- (−) The emphasis on phenomenology means that humanistic psychologists haven't systematically explored unconscious processes and structures.
- (−) Client-centered therapy is reasonably effective when treating less severe disorders, but is of little value in treating severe mental disorders (Rudolph, Langer, & Tausch, 1980).
- (−) The refusal by humanistic psychologists to adopt a scientific approach to psychology has limited the value of humanistic psychology, and has meant that its current impact is modest.

COGNITIVE APPROACH

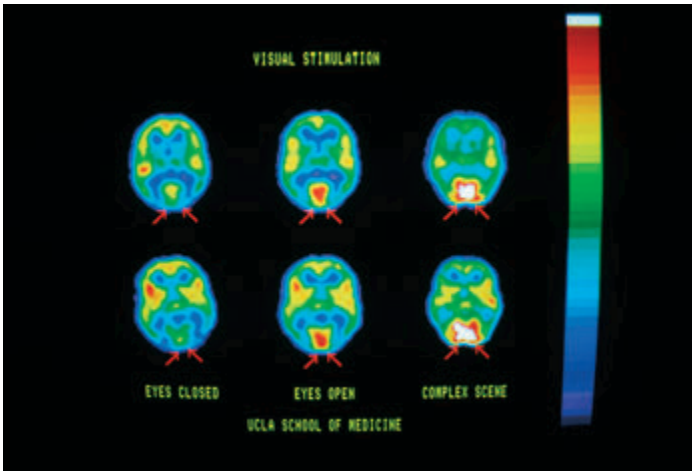
As we saw in Chapter 1, cognitive psychology developed in the 1950s under the influence of key figures such as Donald Broadbent, Herb Simon, and George Miller. One of the main reasons why the cognitive approach started to become influential at that time was a growing dissatisfaction with the behaviorist approach. Suppose that we want to understand cognitive abilities such as our mastery of language or the processes involved in problem solving. It is difficult to do that from the behaviorist perspective with its emphasis on observable behavior. What is needed is a focus on internal processes, which is what cognitive psychologists do. They study the main *internal* psychological processes involved in making sense of the environment and deciding what actions might be appropriate. These processes include attention, perception, learning, memory, language, problem solving, reasoning, and thinking. These processes are discussed in detail in Chapters 6–10 of this book and also by Eysenck (2006).

Research in cognitive psychology during the 1950s, 1960s, and much of the 1970s consisted almost entirely of laboratory experiments in which healthy participants (typically undergraduate students) performed various tasks under well-controlled or "scientific" conditions. Such research remains important to this day. It has contributed enormously to our understanding of human cognition and has had a massive influence on the cognitive neuropsychological and cognitive neuroscience approaches that followed (discussed below).

The cognitive approach expanded in the 1970s with the development of cognitive neuropsychology. There is an apparent paradox with cognitive neuropsychology because it involves studying brain-damaged patients in order to shed light on cognitive processes in intact individuals. It is based on the assumption that, "Complex systems often reveal their inner workings more clearly when they are malfunctioning than when they are running smoothly" (McCloskey, 2001, p. 594). As an example, McCloskey described how he only began to understand



Cognitive psychology developed in the 1950s, largely taking the form of laboratory-based experiments performed under well-controlled conditions.



An example of a PET scan. Cognitive neuroscience makes use of brain imaging such as this to study activation levels in different parts of the brain, and so increase our understanding of cognitive processes.

how his laser printer worked when it started misprinting things. Thus, we may develop an understanding of cognitive processing in intact individuals by focusing on the particular problems in cognition experienced by brain-damaged patients. For example, it has been found that some brain-damaged patients have very poor long-term memory but intact short-term memory, whereas others have poor short-term memory but intact long-term memory (Eysenck, 2006). This strongly suggests that there are separate short-term and long-term memory systems located in separate parts of the brain.

Since the early 1990s, there has been a phenomenal increase in **cognitive neuroscience**. This is a branch of cognitive psychology in which brain imaging is used in conjunction with behavioral measures in order to increase our understanding of the cognitive processes involved in performing a given task. You have almost certainly seen brightly colored pictures of the brain in action—such pictures are produced by using brain imaging to identify the activation levels in different parts of the brain when a task is performed.

The cognitive neuroscience approach can be very effective. For example, there has been controversy concerning the processes involved in visual imagery (imagining an object or scene with your eyes closed). The major possibilities are that visual imagery involves the same processes as visual perception or that it involves more abstract thinking based on our knowledge of objects and situations. Brain-imaging studies have shown that the same brain areas are generally activated during visual imagery and visual perception, including those brain areas involved in the early stages of visual perception (see Kosslyn & Thompson, 2003, for a meta-analysis).

As mentioned in Chapter 1, cognitive psychology has been very influential in the development of cognitive therapy (see Chapter 22). Cognitive therapy is based on the assumption that anxious and depressed patients have dysfunctional thoughts and beliefs about themselves and about the world. For example, Newmark, Frerking, Cook, and Newmark (1973) found that the statement, "One must be perfectly competent, adequate, and achieving to consider oneself worthwhile," was agreed to by 80% of anxious patients compared with 25% of nonpatients.

There are various forms of cognitive therapy, and it is often combined with behavior therapy to produce cognitive-behavior therapy. In essence, however, cognitive therapy is designed to replace dysfunctional thoughts and beliefs with more accurate and positive ones. This can be done by having patients challenge their dysfunctional thoughts. For example, snake phobics who greatly exaggerate the threateningness of snakes generally have more realistic beliefs about snakes after they have been persuaded to spend time in close proximity to them.

Evaluation

- Cognitive psychology has proved extremely effective in enhancing our understanding of human cognition. The development of cognitive neuropsychology and cognitive neuroscience has contributed greatly to this effectiveness.
- Cognitive psychology has benefited from extensive use of the experimental method. This has led to well-controlled experiments producing numerous replicable findings.
- As mentioned in Chapter 1, cognitive psychology has become increasingly influential in several other areas of psychology, including social psychology, developmental psychology, and abnormal psychology. Some of the fruits of that influence will be discussed in various chapters of this book.

Key Term

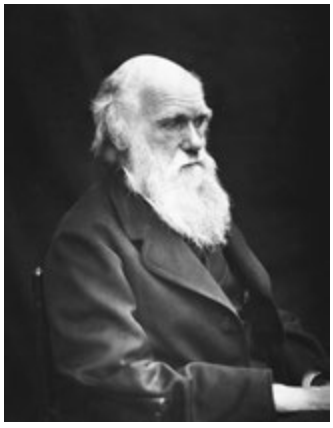
Cognitive neuroscience: an approach within cognitive psychology that involves combining brain-imaging data with behavioral measures to understand human cognition.

- (+) Cognitive therapy is generally effective and compares well against other forms of therapy (e.g., Matt & Navarro's, 1997, meta-analysis; see Chapter 22).
- (−) Laboratory research on cognitive processes may lack **ecological validity**, which is the extent to which the findings of laboratory studies apply to everyday life. In the real world, people typically try to have an impact on the environment. In contrast, the stimuli presented to participants in most cognitive experiments are determined by the experimenter's plan and are uninfluenced by the participants' behavior.
- (−) Measures of the speed and accuracy of task performance provide only *indirect* evidence about the internal processes.
- (−) Discovering that brain areas x and y are activated when people perform a given task does not directly tell us what cognitive processes occurred in those areas.
- (−) Many cognitive psychologists fail to take account of individual differences, and thus seem to assume that everyone's cognitive system is similar and is used in similar ways. However, there is increasing recognition that individual differences are important and need to be considered.

EVOLUTIONARY PSYCHOLOGY

As we saw in Chapter 1, Darwin's theory of natural selection assumes that evolution selectively favors some members of any given species over others. This is known as survival of the fittest, meaning that those individuals whose characteristics equip them best to cope with the environment will be most likely to reproduce. In recent decades, Darwin's influence has manifested itself in evolutionary psychology, an approach that focuses on the effects of natural selection on the development of the human mind. In the words of one of the leading evolutionary psychologists, Steven Pinker (1997, p. 42):

> *Natural selection . . . acts by designing the generator of behavior: the package of information processing and goal-pursuing mechanisms called the mind. Our minds are designed to generate behavior that would have been adaptive, on average, in our ancestral environment.*



Charles Darwin, 1809–1882.

Many of the key assumptions made by evolutionary psychologists are contained in the figure on the following page. **Inclusive fitness** is the notion that natural selection favors organisms that maximize replication of their genes directly by reproduction or indirectly by helping those with whom they share genes (e.g., immediate family). **Kin selection** is the notion that organisms are selected to favor their own offspring and other genetically related family members. **Differential parental investment** is the notion that females typically have a greater parental investment than males. Why is that the case? When a child is born, the mother typically devotes years of her life to looking after it. In contrast, the "costs" incurred by the father are often much less.

The other theoretical assumptions shown in the figure on the following page follow more or less directly from the assumptions just discussed. For example, it is assumed that cuckoldry (discovering their partner has had sex with someone else) causes more jealousy in males than in females. The explanation is as follows. Men can only justify their parental investment in a child provided it was actually fathered by them. If their partner is unfaithful, they cannot be sure that any child is actually theirs. In contrast, women always know for certain whether any given child is theirs regardless of whether their partner is faithful or not.

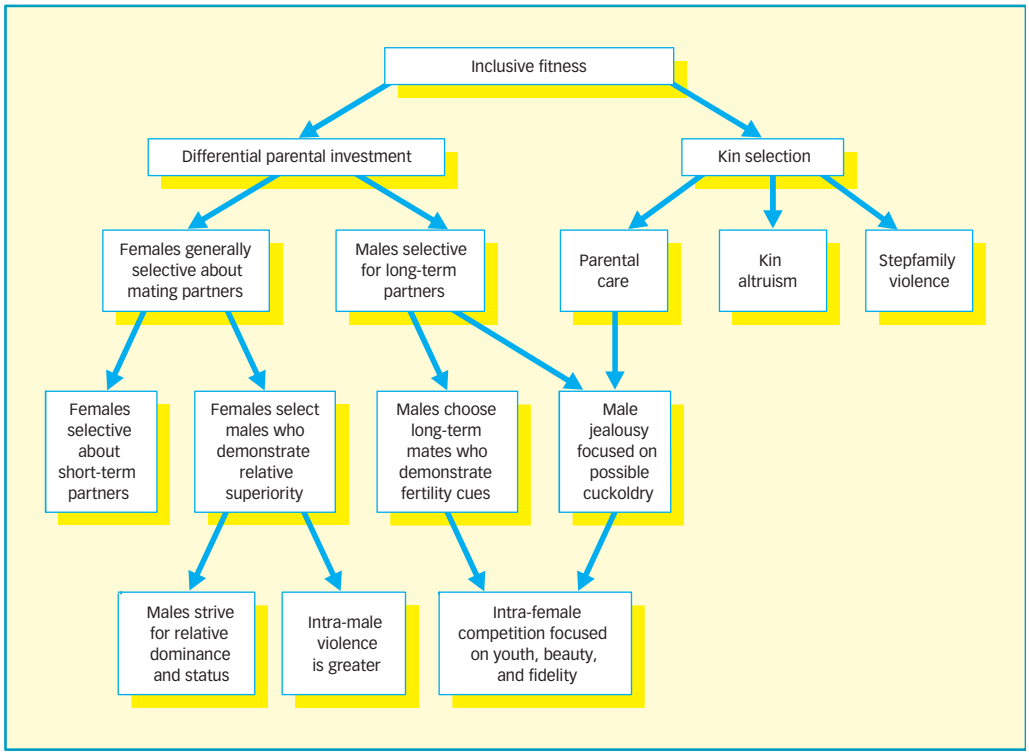
Key Terms

Ecological validity:
the extent to which the findings of laboratory studies are applicable to everyday settings and generalize to other locations, times, and measures.

Inclusive fitness:
the notion that natural selection favors individuals who maximize replication of their genes either directly via reproduction or indirectly by helping others who are genetically related to them.

Kin selection:
the notion that natural selection favors individuals assisting those genetically related to them.

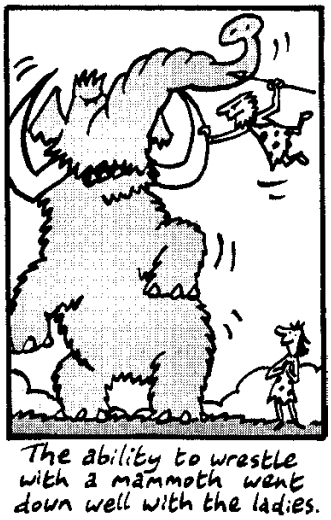
Differential parental investment:
the notion that females have greater parental investment than males, as a result of which they are more selective in their choice of mates.



The theoretical approach adopted by evolutionary psychologists, with the most general assumptions at the top and the most specific assumptions at the bottom. From Kenrick (2001). Copyright © American Psychological Association. Reproduced with permission.

It would be easy to assume that evolutionary psychologists believe that humans are *always* well-adapted to their environment. In fact, that assumption is false, because it can take thousands of generations for natural selection to produce substantial genetic changes. As Buss (1999, p. 29) pointed out, "We carry around a Stone-Aged brain in a modern environment. A strong desire for fat, adaptive in a past environment of scarce food resources, now leads to clogged arteries and heart attacks."

According to evolutionary psychologists, a central goal of our lives is to ensure the survival of our genes. However, this is by no means necessarily a *conscious* goal. What evolutionary psychologists actually believe was expressed by Pinker (1997, p. 44): "Our goals are subgoals of the ultimate goal of the genes, replicating themselves . . . As far as *we* are concerned, our goals . . . are not about genes at all, but about health and lovers and children and friends." Thus, the success most of us have in spreading our genes often occurs as a by-product of our goals in life rather than in a direct way.



Evidence that the sexual attitudes and behavior of men and women differ approximately as predicted by evolutionary psychology is discussed in Chapter 3. The prediction that we should be more willing to behave altruistically (unselfishly) towards close relatives than towards distant relatives or strangers was tested by Burnstein, Crandall, and Kitayama (1994; see also Chapter 18). They presented participants with scenarios in which individuals had problems, and asked whether they would be willing to help. As predicted, participants were much more willing to help close relatives than other people. This was especially the case with a serious emergency (a house was burning rapidly, and only one of the three people in the house could be saved).

Since Burnstein et al. (1994) used hypothetical situations, it is possible that the participants responded in socially desirable ways rather than in the way they would in real life. However, Essock-Vitale and McGuire (1985) obtained similar findings based on real-life data. Female participants described occasions on which they had received or given help. They were five or six times more likely to have helped their close kin (e.g., children) than less close kin (e.g., nephews or nieces).

According to evolutionary psychology, men should be more distressed than women if their partner enjoyed passionate sex with another person, whereas women should be more distressed by the thought of their partner forming a close emotional bond with another person. Buunk, Angleitner, Oubaid, and Buss (1996) obtained support for these predictions among men and women in the United States, Germany, and The Netherlands. However, this study focused on *hypothetical* rather than *actual* infidelity. Harris (2002) examined people's reactions to actual infidelity in their partners, and found no differences between men and women. Members of both sexes focused more on emotional than on sexual infidelity. These findings are totally inconsistent with the notion that evolutionary pressures have led men and women to respond very differently to sexual and emotional infidelity.

Parental care and altruism

"Bringing up baby" involves heavy costs to many animal parents: in mammals this includes biological investment in egg production, growth and development of the fetus in the womb, milk production after birth, time and effort spent in care and defense, etc. In birds there is a similar amount of investment in nest building, egg production, incubation, feeding, etc. These behaviors could be argued to be of no benefit to the parents directly, and so could come under the heading of altruism. This altruism is even more marked if the parents are assisted by other family members, i.e., others who share the same genes. Mumme (1992) observed a type of Florida jay whose older broods acted as helpers with younger offspring, with the result that the younger brood had a greatly increased survival rate.

Evaluation

- (+) Evolutionary psychology focuses on determinants of behavior (e.g., natural selection) that have been ignored by other approaches to psychology.
- (+) Evolutionary psychology has produced several original insights on topics such as altruism and mate selection.
- (−) Any type of behavior can be explained by claiming it is adaptive in an evolutionary sense if it is desirable (e.g., parenting) or maladaptive because of evolutionary time lag if undesirable (e.g., male violence). There is a danger of evolutionary psychologists providing unconvincing explanations of human behavior, many of which cannot be tested empirically.
- (−) Evolutionary psychology often seems to focus too much on evolutionary processes and not enough on the relevance of such processes for human behavior.
- (−) Numerous social and cultural factors are not considered fully by evolutionary psychologists. As a consequence, evolutionary psychologists tend to minimize the importance of cross-cultural differences.

ETHICAL ISSUES IN PSYCHOLOGY

Scientists often confront important and difficult ethical issues in the course of their work. For example, was it morally defensible for physicists to develop the atomic bomb during the 1940s? Should scientists participate in the development of chemical weapons that could potentially kill millions of people? All of these ethical questions are difficult to answer because there are good arguments for and against each program of research.

There are probably more ethical issues associated with research in psychology than in any other scientific discipline. There are various reasons why this is the case. First, all psychological experiments involve the study of living creatures (whether human or the members of some other species), and the rights of these participants to be treated in a caring and respectful way can be infringed by an unprincipled or careless experimenter.

Second, the findings of psychological research may reveal unpleasant or unacceptable facts about human nature, or about certain groups within society. No matter how morally upright the experimenter may be, there is always the danger that extreme political organizations will use research findings to further their political aims.

Third, these political aims may include social control. There is a danger that the techniques discovered in psychological research might be exploited by dictators or others seeking to exert unjustifiable influence on society or to inflame people's prejudices.

MILGRAM

We will start by considering two famous (or perhaps infamous) studies in psychology. First, there is Milgram's (1963, 1974) research on obedience to authority (see Chapter 19). He asked his participants to adopt the role of a teacher and to administer very strong (and potentially lethal) electric shocks to the learner, who was said to suffer from a heart condition. Approximately two-thirds of people agreed to administer these very strong shocks. In fact, the learner did not receive any shocks, but the teacher was unaware of that. At one point, the learner yelled, "I can't stand the pain," and later his response was an agonized scream.

The effects of this experiment on the teachers were dramatic, as Milgram (1974) pointed out. For example, as one observer reported, "I observed a mature and initially poised businessman enter the laboratory smiling and confident. Within 20 minutes he was reduced to a twitching, stuttering wreck, who was rapidly approaching a point of nervous collapse. He constantly pulled on his earlobe, and twisted his hands. At one point, he pushed his fist into his forehead and muttered: 'Oh God, let's stop it.' And yet he . . . obeyed to the end." Another participant was a housewife called Mrs. Elinor Rosenblum: "Every time I pressed the button, I died. Did you see me shaking? I was just dying here to think that I was administering shocks to the poor man."

You are probably thinking that Milgram's research was completely unethical, and such research certainly wouldn't be permitted in most countries today. However, Milgram had some arguments on his side. All of the participants were fully debriefed at the end of the experiment—the true purpose of the experiment was explained and they were told that the learner had not received any shocks. As many as 84% of the participants said they were pleased to have taken part, with only 1% expressing negative feelings. Approximately 80% of participants said that more experiments of this kind should be carried out, and 74% said that they felt they had learned something of personal importance.

ZIMBARDO

Zimbardo's (1973) Stanford Prison Experiment is another well-known study raising major ethical issues. In this study, a mock prison was set up with mock guards and mock prisoners. Some of the "guards" behaved very aggressively, and the overall level of violence in the prison increased over the days. After only 1 day in the prison, one of the prisoners became emotionally disturbed and starting screaming and crying uncontrollably. He had to be released. On the fourth day, two more prisoners showed symptoms of severe emotional disturbance and had to be released. Another prisoner developed a stress-induced rash all over his body, and also had to be released.

Zimbardo tried to minimize the after-effects of participation in his Stanford prison experiment by asking the participants to sign an informed consent form before the experiment began. Even so, some of the mock guards became very aggressive during the experiment, and four of the mock prisoners had to be released early.

Savin (1973) referred to the mock prison as a "hell." He argued that, "Professors who, in pursuit of their own academic interests and professional advancement, deceive, humiliate, and otherwise mistreat their students, are subverting the atmosphere of mutual trust and intellectual honesty without which . . . neither education nor free inquiry can flourish."

Zimbardo (1973) answered his critics. He pointed out that day-long debriefing sessions were held to discuss the moral conflicts involved in the study and to reassure participants. All the participants had signed an "informed consent" form that made it clear there would be an invasion of privacy, loss of some civil rights, and harassment. Questionnaires were sent to participants of the Stanford Prison Experiment at regular intervals after the study. The replies indicated that there was a large reduction in negative feelings about the experiment as time went by.

RESOLVING ETHICAL ISSUES

What can be done to resolve the ethical issues that arise from the fact that participants in experiments often have a power deficiency relative to the experimenter? Kimmel (1996) compared the ethical codes or guidelines produced by 11 different countries. Most of them focus on three basic principles:

1. Protection of individuals from physical harm
2. Protection of individuals from psychological harm
3. Confidentiality of the data obtained from individual participants.

There is general agreement that full informed consent (i.e., participants are told in detail what will happen in the experiment and agree to it) and avoidance of deception are important in ensuring that the first two principles are achieved. However, it is sometimes difficult to do this. Small children and patients with certain mental disorders may be unable to provide informed consent, in which case it is usual for a close relative to do so. The notion that deception should always be avoided in psychological research is too stringent, because it ignores the fact that many forms of deception are entirely harmless. For example, some memory researchers are interested in incidental learning, which involves people's ability to remember information they weren't asked to remember. This can only be done by deceiving participants as to the true purpose of the experiment until the memory test has been presented. Deception is justifiable if it is essential, not potentially damaging, and the research is important scientifically.

Another important factor in ethical research is that participants are explicitly told that they can withdraw from the experiment at any time without providing a reason. Finally, there should be a debriefing at the end of the experiment, with participants being given fairly detailed information about the nature of the research.

SOCIALLY SENSITIVE RESEARCH

So far we have focused mainly on the wellbeing of those who participate in experiments. However, much research raises issues of relevance to society as a whole. This is especially so with socially sensitive research, which was defined by Sieber and Stanley (1988, p. 49) as, "studies in which there are potential social consequences or implications either directly for the participants in research or the class of individuals represented by the research." Socially sensitive research can produce risks for many people other than those directly involved as participants. For example, McCosker et al. (2001) carried out a study in which women who had been abused were interviewed. Transcribers who had the task of typing up what had been said in the interviews often became distressed. As a result, arrangements were made for them to have immediate access to crisis counseling if required.

Application of findings

The research carried out by psychologists such as John Bowlby and Sir Cyril Burt, among others, had a profound effect on social policy. These studies examined the role of the mother in childcare, and the development of IQ, and resulted in policies such as encouraging mothers to stay at home rather than going out to work, and the introduction of the 11-plus examination. The studies posed ethical dilemmas for the researchers because their findings could be used to manipulate human behavior and life choices, as well as adding to the knowledge-base of science.

Sieber and Stanley (1988) argued that important ethical concerns can arise with respect to four major aspects of socially sensitive research:

1. *Deciding on the research question or hypothesis to be tested* Problems may arise if the issues studied are private or stressful (e.g., sexuality), are associated with stigmatization or fear (e.g., focusing on illegal behavior), or are regarded as relevant by extreme political groups (Lee, 1993). An example is research on homosexuality. Morin (1977) found in a review of studies on gays and lesbians published between 1967 and 1974 that 70% of these studies addressed issues such as whether homosexuals are mentally ill, ways in which homosexuality can be identified, and the causes of homosexuality. Focusing on such issues suggests that being homosexual was regarded almost like a disease that need to be "cured."

2. *The conduct of research and the treatment of participants* This has been covered already.
3. *The institutional context* If the institutional context is perceived to be prestigious, it may make participants feel powerless and thus affect their behavior. Milgram (1974) found there was much more obedience to authority when his research took place at Yale University rather than in a run-down office building.
4. *Interpretation and application of research findings* An infamous example is the research of Goddard (1913). He gave intelligence tests to immigrants arriving in New York, claiming that 87% of Russians were "feeble-minded," as were 79% of Italians. He reached this ludicrous conclusion by ignoring the obvious fact that most of these immigrants had a very limited command of the English language. In spite of the woeful inadequacy of this research, it influenced the American government to reduce the level of immigration from southern and eastern Europe.

Striking a balance

We have seen the potential dangers of socially sensitive research. However, such research (while it may generate uncomfortable evidence) can produce valuable knowledge that can be used for the benefit of society as a whole. It is important to strike a balance. The American Psychological Association did this in its *Ethical Principles in the Conduct of Research with Human Participants* (1982, p. 74):

> *On one side is an obligation to research participants who may not wish to see derogatory information . . . published about their valued groups. On the other side is an obligation to publish findings one believes relevant to scientific progress, an objective that in the investigator's views will contribute to the eventual understanding and amelioration of social and personal problems.*

BIASES IN PSYCHOLOGY

Psychologists have frequently been accused of bias in their theoretical ideas and in their research. Thankfully, there is probably substantially less bias in psychology than used to be the case. However, it is worth considering in some detail three types of bias still to be found within psychology: gender bias; cultural bias; racial bias.

GENDER BIAS

The greatest difficulty in considering gender bias is to distinguish genuine gender differences from culturally created ones. For example, there is a common view that women are more emotional than men. This is not simply bias, because women *on average* are more emotional than men. For example, females score significantly higher than males on measures of negative affectivity (a personality dimension relating to negative emotions such as anxiety and depression) (e.g., Denollet, 2005).

Hare-Mustin and Marcek (1988) argued that there are two kinds of gender bias: **alpha bias** and **beta bias**. According to them (p. 457), "Alpha bias is the tendency to exaggerate differences; beta bias is the tendency to minimize or ignore differences." We can see these biases in the work/family literature (Febbraro, 2003). The argument that women experience much greater work/family stress than men, and so male-dominated structures need to be transformed as a result, is an example of alpha bias. Beta bias is involved when it is claimed that multiple roles (e.g., parent, spouse, worker) increase the wellbeing of women in the same way as men.

Within Western cultures, alpha bias is more common than beta bias. For example, Freud argued that girls suffer from "penis envy" when they discover that they lack a penis. He also claimed that children's superego or conscience develops when they identify with the same-sexed parent. Girls don't identify with their mother as strongly as boys identify with their father, and so allegedly girls develop weaker superegos than boys. The evidence doesn't support Freud. Hoffman (1975) found that (if anything) girls were better than boys at resisting the temptation to do what they had been told not to do.

Key Terms

Alpha bias: the tendency to exaggerate differences between the sexes.

Beta bias: the tendency to minimize differences between the sexes.

Evolutionary psychology has often been criticized for its alpha bias. According to evolutionary psychologists, evolutionary processes explain why women typically have much more parental involvement than men in their offspring, and why men are more likely to commit adultery. There is some validity in these views, but it is also important to take account of major cultural changes. For example, Schmitt (2005) found that men scored higher than women on a questionnaire concerned with a preference for promiscuity and avoidance of emotional investment in all 48 countries studied. However, the gender difference was much smaller in those countries in which women had access to money and power.

There is some evidence for alpha bias in the diagnosis of mental disorders. Ford and Widiger (1989; see Chapter 21) argued that histrionic personality disorder (involving excessive emotionality) is regarded as a distortion of stereotypical feminine traits, whereas antisocial personality disorder (involving hostility and aggression) is a distortion of stereotypical masculine traits. Therapists were given case studies of patients with these personality disorders. Therapists were much more likely to diagnose histrionic personality disorder when the patient was allegedly female rather than male, and to diagnose antisocial personality disorder when the patient was male rather than female.

There is evidence of beta bias in experimental research, that is, a tendency to reduce or minimize gender differences. Male and female participants are used in most studies. However, there is typically no attempt to analyze the data to see whether there are significant sex differences, presumably because it is assumed that none would be found. Some sex differences probably occur simply because male experimenters treat their female participants differently from their male ones. Rosenthal (1966) reported that male experimenters were more pleasant, friendly, honest, and encouraging with female than with male participants. This led him to conclude: "Male and female subjects may, psychologically, simply not be in the same experiment at all."

Finally, we consider methodological gender bias: the design of a study biases the chances of the researcher obtaining some particular finding. Methodological gender bias is most likely to be found when the direction of gender differences depends on the precise measures of behavior that are taken. For example, Bjorkqvist, Lagerspetz, and Kaukianen (1992) found boys displayed much more physical aggression than girls, but girls showed more indirect aggression (e.g., gossiping). Armed with that knowledge, you could design a study apparently showing that boys are more aggressive than girls or vice versa!

What can be done? Bem (1993) used the concept of an "enculturated lens" to suggest that the view of gender we receive from our culture distorts how we see men and women. Bem (1993, p. 2) suggested that we should make those lenses:

> *visible rather than invisible, to enable us to look at the culture's gender lenses rather than through them, for it is only when Americans apprehend the more subtle and systemic ways in which the culture reproduces male power that they will finally comprehend the unfinished business of the feminists' agenda.*

In sum, researchers' growing awareness of alpha bias, beta bias, and methodological gender is contributing to a reduction in these biases. It is worth remembering that, even when there are gender differences in behavior, there is still nearly always a substantial overlap in the behavior shown by males and females.

CULTURAL BIAS

We discussed cross-cultural differences in Chapter 1. In that chapter, we focused on the major distinction between collectivistic cultures in which one's key responsibility is to the group, and individualistic cultures in which people have a strong sense of personal responsibility for their own lives. Here we focus on the various approaches taken by psychologists who are interested in cultural differences.

Berry (1969) distinguished between emic constructs and etic constructs. **Emic constructs** are specific to a given culture, and so vary across cultures. In contrast, **etic constructs**

Key Terms

Emic constructs: these are constructs that are meaningful within any given culture but vary considerably across cultures.

Etic constructs: these are constructs that are meaningful within most or all cultures.

refer to universal factors common to all cultures. For example, the notion of the "family" is an etic construct, whereas the "nuclear family" (just parents and children) is an emic construct. According to Berry, it is common in the history of psychology for what are actually emic constructs to be mistaken for etic constructs.

The study of intelligence can be used to illustrate the above point. In the past, many psychologists argued that the same abilities of problem solving, reasoning, memory, and so on define intelligence in every culture. However, much of the evidence refutes that argument. For example, Cole, Gay, Glick, and Sharp (1971) asked adult members of the Kpelle tribe in Africa to sort familiar objects into groups. In most Western societies, people would sort the objects into categories (e.g., foods, tools). What the Kpelle tribespeople did was to sort them into functional groups (e.g., a knife with an orange, because an orange can be cut with a knife). Thus, what is regarded as intelligent behavior can differ from one culture to another. By the way, the Kpelle tribespeople showed that they could sort the objects into categories when asked to do so—they didn't do this spontaneously because they thought it was a stupid way of sorting.

An **imposed etic** is a technique or theory rooted in a researcher's own culture that is used to study other cultures. Much cross-cultural research on intelligence and personality has been based on the use of imposed etics. We have already seen an example in the field of intelligence (study by Cole et al., 1971) and here is one from the field of personality. Western research led to the identification of the Big Five personality factors (conscientiousness; agreeableness; extraversion; neuroticism; and openness; see Chapter 12). Kuo-shu, Yang, and Bond (1990) asked Taiwanese students to describe several people they knew using adjectives relating to the Big Five personality factors and adjectives taken from Chinese newspapers. Five factors emerged from an analysis of data using the adjectives from Chinese newspapers: social orientation, expressiveness, competence, self-control, and optimism. There was some agreement between the two sets of factors (e.g., agreeableness correlated +.66 with social orientation), but the overall similarity was fairly low. This suggests that personality structure in Taiwanese culture differs from that in Western cultures.

There may be profound cultural differences in ways of regarding personality. The entire Western notion of semi-permanent personality characteristics determining behavior seems to be less applicable in collectivistic cultures in which it is assumed that individuals will change to fit in with group expectations. For example, it has been found that East Asians regard personality traits as much more flexible and changeable than do people from Western cultures (Norenzayan, Choi, & Nisbett, 1999).

Berry (1969) proposed an appropriate method for cross-cultural research based on a **derived etic**. Emic studies in each of several cultures are conducted by local researchers using local techniques, and the findings are then compared. We can see this approach in action in the area of diagnosing mental disorders. DSM-IV (APA, 1994), which is American-based, focuses mainly on mental disorders common in the Western world (see Chapter 21). However, there is a short appendix in DSM-IV on culture-bound syndromes that have been found in other parts of the world. This appendix is very incomplete, because it leaves out many disorders totally ignored by DSM-IV. Here are a few examples:

- *pa-fend* (fear of wind) found in China
- *amafufunyana* (violent behavior caused by spirit possession) found in South Africa
- *brain fag* (problems in concentrating and thinking produced by excessive study—one to avoid!) found in West Africa.

In sum, there are grounds for optimism concerning cultural bias. There has been a dramatic rise in the amount of cross-cultural research, and such research is increasingly sensitive to the substantial differences from one culture to another. For example, this increased sensitivity can be seen in research on intelligence, personality, and categories of mental disorder. However, as was pointed out in Chapter 1, a full understanding of cultural differences will involve moving beyond simple categorizations of cultures (e.g., into individualistic and collectivistic).

Key Terms

Imposed etic: this involves applying techniques and/or theories based on one culture to other cultures without considering differences among cultures; see **derived etic**.

Derived etic: this involves researchers in various cultures developing techniques that are appropriate within their culture and then comparing the findings; see **imposed etic**.

RACIAL BIAS

Racial bias is a particularly unpleasant form of cultural bias. Howitt and Owusu-Bempah (1990) studied racial bias by considering every issue of the *British Journal of Social and Clinical Psychology* between 1962 and 1980. They were dismayed at the way in which Western personality tests such as the 16PF were used inappropriately in non-Western cultures. They pointed out that, "There were no studies which attempted to explore, for example, the Ghanaian or Chinese personality structures in their own terms rather than through Western eyes" (Howitt & Owusu-Bempah, 1990, p. 399). Since 1990, however, several researchers have systematically tried to do precisely that (see Chapter 12 and a review by Triandis & Suh, 2002).

Owusu-Bempah and Howitt (1994) claimed to have found evidence of racism in the American textbook by Atkinson, Atkinson, Smith, and Bem (1993). They pointed out that Atkinson et al. tended to categorize Western cultures together, and to do the same for non-Western ones. Owusu-Bempah and Howitt's (1994, p. 163) central point was that Atkinson et al. (1993) evaluated other cultures in relation to the technological and cultural achievements of the United States and Europe: "Cultures that fall short of this arbitrary Euro-centric standard are frequently described as 'primitive,' 'undeveloped,' or, at best, 'developing.' Religion, morality, community spirit, etc., are ignored in this racist ideological league table."

Controversy concerning racial differences has been especially heated with respect to intelligence. The starting point for controversy is that the mean difference in IQ between white and black people in the United States (and other countries) is about 15 points (favoring white people). This is only an average figure, and about 20% of black people have a higher IQ than that of the average white person. Most psychologists have assumed that the difference between white and black people is due entirely to the environmental deprivation suffered by black people, an assumption supported by much evidence (e.g., Brooks-Gunn, Klebanov, & Duncan, 1996; Mackintosh, 1986). However, some psychologists (e.g., H.J. Eysenck, 1981; Jensen, 1969) have argued that genetic factors might be involved.

This controversial issue is of very little scientific interest in that it is unlikely to tell us anything about the processes involved in human intelligence. It is based on the incorrect assumption that white and black people form separate biological groups; indeed, the concept of "race" itself has no precise scientific definition. Furthermore, it is impossible to carry out definitive research. Even H.J. Eysenck (1981, p. 79) admitted, "Can we . . . argue that genetic studies . . . give direct support to the hereditarian position? The answer must, I think, be in the negative . . . none of the studies carried out on white people alone, such as twin studies, are feasible." Finally, research on racial differences in intelligence poses major ethical issues. Extreme groups such as the British National Party have used the findings to promote racial disharmony, which is totally unacceptable.

What many psychologists (including the author) regard as a particularly offensive example of racial bias is the research of Rushton (e.g., 1990) on racial differences. He compared three racial groups he described as mongoloids (Asians), caucasoids (white people), and negroids (black people). His central argument was that mongoloids are more

Racial bias has unfortunately long been evident in some areas of psychological research. To apply a standard Western personality test to a Ghanaian community, for example, is inappropriate, given its cultural specificity. To glean meaningful results would require exploring the Ghanaian personality structures on their own terms, not from a Western perspective.

advanced than caucasoids in evolutionary terms, and caucasoids are more advanced than negroids. He claimed that evolutionary development has led to **neoteny**, which is an increase in the duration of childhood. One aspect of neoteny is an extended period of brain development, which is useful because it allows the brain to shape itself to some extent to fit the environment. The "evidence" he provided is shown in the table in the box below.

Rushton's controversial relative ranking of the mongoloid, caucasoid, and negroid races on several measures. Based on Rushton (1990).

	Mongoloids	Caucasoids	Negroids
Brain weight and intelligence			
Cranial capacity	1448 cc	1408 cc	1334 cc
Brain weight at autopsy	1351 g	1336 g	1286 g
IQ test scores	107	100	85
Maturation rate			
Age of walking	Late	Medium	Early
Age of first intercourse	Late	Medium	Early
Lifespan	Long	Medium	Short
Personality and temperament			
Aggressiveness	Low	Medium	High
Cautiousness	High	Medium	Low
Dominance	Low	Medium	High
Impulsivity	Low	Medium	High
Sociability	Low	Medium	High
Reproductive effort			
Size of genitalia	Small	Medium	Large
Permissive attitudes	Low	Medium	High
Sexually transmitted diseases	Low	Medium	High
Social organization			
Law abidingness	High	Medium	Low
Marital stability	High	Medium	Low
Mental health	High	Medium	Low

Many of the "facts" contained in the table (e.g., alleged race differences in age of walking and in mental health) are open to dispute. However, the greatest criticism is that the so-called evidence can be explained in simple, uncontroversial ways. Many of the differences (even if genuine) can be explained on the basis of the greater affluence of mongoloids and caucasoids than negroids. For example, it would not be surprising if poverty and deprivation led to a short lifespan, aggressiveness, low levels of law abidance, and impaired mental health. Banyard (1999, p. 85) attacked Rushton's (1990) article as being "academically shallow but openly racist," which is fair comment.

Some recent research has focused on reducing racial bias in people taking part in experiments. Plant, Peruche, and Butz (2005) used a computerized situation in which white participants pretended they were police officers deciding rapidly whether to shoot at suspects who were black or white. There was a greater tendency to shoot at black suspects. However, extensive practice in which race was unrelated to the presence or absence of a gun eliminated that racial bias. Thus, at least some aspects of racial bias can be altered fairly easily.

In sum, there is much less racial bias in psychological research now than was the case in years gone by. That is wholly desirable. Racial bias poses very serious ethical issues, and can be exceptionally dangerous when racially biased research is used by political extremists for their own ends.

Key Term

Neoteny: an extended period or duration of childhood resulting from evolution.

FREE WILL VS. DETERMINISM

The issue of free will versus determinism has occupied philosophers and psychologists for centuries. According to those who believe in determinism, people's actions are totally

determined by the external and internal forces operating on them. An example of an *external* force would be the influence of parents when rewarding certain behaviors. An example of an *internal* force could be hormones influencing the way in which someone behaves.

Those who believe in free will argue that matters are more complicated. Most of them accept that external and internal forces exist. However, they argue that people have free will because each individual nevertheless has some ability to choose his/her own behavior. Note that the typical positions adopted by advocates of determinism and of free will are not that far apart—determinists argue that behavior is totally controlled by external and internal forces, whereas those favoring free will argue that behavior is mostly controlled by external and internal forces but with the addition of free will.

The distinction between free will and determinism can be seen if we consider the following question: "Could an individual's behavior in a given situation have been different if he/she had willed it?" Believers in free will answer that question "Yes." In contrast, advocates of determinism respond "No." Some of the main arguments for and against these positions are discussed next.

DETERMINISM

Determinists argue that a proper science of human behavior is only possible if psychologists adopt a deterministic account, according to which everything that happens has a definite cause. Free will, by definition, doesn't have a definite cause. If free will is taken into account, it becomes impossible to predict human behavior with any precision. In Chapter 1, we saw that an important aspect of the scientific approach to psychology is that it involves carrying out controlled experiments in which we manipulate certain variables (e.g., difficulty of the learning material) to observe their effects on behavior (e.g., speed of learning). It is simply not possible to manipulate free will in that way.

According to some determinists, it is often possible with other sciences to make very accurate predictions from a deterministic position (e.g., forecasting planetary motion). If determinism is regarded as not applicable to psychology, then psychology is either a very different science from physics, chemistry, and so on, or it is not really a science at all.

Chemistry can be said to be an example of a deterministic science, in that certain results can be accurately predicted. Mixing chemical "a" and chemical "b" will produce chemical "c," for example.

Hard vs. soft determinism

We can distinguish between hard determinism and soft determinism. **Hard determinism** as it applies to psychology is based on two key assumptions. First, no action or behavior is free if it must occur. Second, every human action has antecedent causes that ensure that that *particular* action is performed rather than any other. The conclusion from these assumptions is that all human actions are determined and none of them is free. Those who believe in hard determinism include B.F. Skinner and Sigmund Freud.

Hard determinism has been applied extensively in other sciences (especially physics). It seemed appropriate in the eighteenth and nineteenth centuries when most physicists believed they would eventually be able to make very precise and accurate predictions about everything relevant to physics. However, what happened in the twentieth century suggested that they were unduly optimistic. According to chaos theory (Hilborn, 1999), very small changes in initial conditions can produce major changes later on. For example, theoretically the flap of a butterfly wing in one part of the world could ultimately change the whole weather system in a different part of the world. Such a chain of events doesn't lend itself to prediction, and so we can't show that an approach based on hard determinism is appropriate.

Many (probably most) psychologists favor an alternative position labeled **soft determinism** by William James. According to this position, it is accepted that all human

Key Terms

Hard determinism: the notion that all of our actions are totally determined by a combination of causes; see **soft determinism**.

Soft determinism: the notion that all behavior has a cause, but some forms of behavior are more constrained by the current situation than are others.

actions have a cause. However, it is assumed that there is a valid distinction between behavior highly constrained by the situation (that appears involuntary) and behavior only modestly constrained by the situation (that appears voluntary). For example, a child may apologize for swearing because he/she will be punished if an apology isn't forthcoming (highly constrained behavior) or because he/she is genuinely upset at causing offence (modestly constrained behavior). The underlying causes are more obvious when behavior is highly constrained by situational forces.

Evidence consistent with the views of William James was reported by Westcott (1988). Canadian students indicated how free they felt in various situations. They experienced the greatest feeling of freedom in situations involving an absence of responsibility or release from unpleasant stimulation (e.g., a nagging headache). In contrast, they felt least free in situations in which they recognized that there were limits on their behavior (e.g., when they had to curtail their desires to fit their abilities).

There are various limitations with soft determinism. First, there is excessive reliance on our subjective beliefs—the fact that some actions feel voluntary whereas others feel involuntary doesn't necessarily mean they are really different. Second, it can be argued that soft determinists want to have their cake and eat it—actions are free if they are voluntary, but those actions are still caused. This could be regarded as a confusing blend of free will and determinism.

Behaviorist and Freudian approaches

Determinism is espoused by more approaches in psychology than is free will. The behaviorists believed strongly in determinism. Skinner argued that virtually all of our behavior is determined by environmental factors. He claimed that we repeat behavior that is rewarded, and we don't repeat behavior that isn't rewarded. Other behaviorists argued that we can predict how someone will respond given knowledge of the current stimulus situation and that individual's previous conditioning history.

Skinner (1971) developed his ideas about hard determinism most fully in his book, *Beyond Freedom and Dignity*. He argued that common beliefs about free will and personal moral responsibility (which he called "dignity") were wrong and should be abandoned. According to Skinner, the way to change human behavior is by structuring the environment so that people are rewarded for behaving in desirable ways (i.e., operant conditioning) rather than by focusing on meaningless notions like freedom and dignity.

Bandura (1977, p. 27) pointed out a serious limitation with Skinner's approach: "If actions were determined solely by external rewards and punishments, people would behave like weather vanes, constantly shifting in radically different directions to conform to the whims of others." In fact, we often behave in line with long-term goals.

What is missing from Skinner's approach? Skinner focused excessively on the notion that the external environment determines behavior. However, our behavior also determines the external environment—if you don't like a television program you are watching, you switch to another channel or turn the television off. In addition, our personality helps to determine the environment in which we find ourselves and it also influences our behavior. Thus, there are multiple determinants of behavior, but Skinner largely ignored most of them.

Freud was a strong believer in hard determinism, claiming that none of our behavior "just happens" or is a result of free will. He even argued that trivial phenomena, such as missing an appointment or calling someone by the wrong name, had definite causes within the individual's motivational system. Of particular importance is what is known as the **Freudian slip**—a motivated but involuntary error in which someone says or does something revealing their true desires. Motley et al. (1983) obtained evidence of Freudian slips. Male participants had to say out loud pairs of words such as *tool–kits*, some of which could be turned into sexually explicit words. When the experimenter was an attractive female, participants tended to make Freudian slips—for example, saying *cool–tits* instead of *tool–kits*.

Key Term

Freudian slip:
an error in speech or action that is motivated by unconscious desires.

Freud's emphasis on determinism and rejection of free will may well owe something to the fact that he focused on individuals suffering from mental disorders (especially anxiety disorders). Such individuals are presumably highly motivated to change their

behavior and eliminate the disorders but are often unable to do so—this seems somewhat difficult to explain if they possess free will.

Determinism vs. Free will

Determinism	**Free will**
Behaviorism	Humanistic approach
Freudian psychodynamics	

Do you think the cognitive psychologists fit into one or other of these lists? Can you explain your answer?

Testability

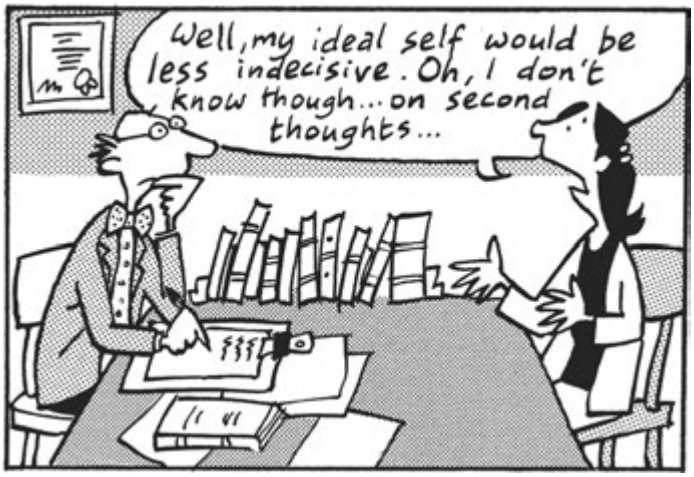
Determinism (whether soft or not) cannot really be submitted to a proper test. If it could be, then the issue of free will versus determinism would have been settled, and so would no longer exist as an issue! If all behavior is determined by internal and external forces, then in principle it should be possible to predict behavior accurately from a knowledge of these causal factors. In fact, we usually only have very limited knowledge of the internal and external forces influencing an individual's behavior. Thus, it remains only an article of faith that human behavior can eventually be predicted accurately.

Free will

Most people feel that they possess free will, in the sense that they can freely choose what to do from various options. Most people also have feelings of personal responsibility, because they feel in at least partial control of their behavior. Free will fits with society's view that people should accept responsibility for their actions and should expect to be punished (e.g., sent to prison) if they break the law.

Humanistic approach

Humanistic psychologists such as Carl Rogers and Abraham Maslow believed in free will. They argued that people exercise choice in their behavior, and they denied that people's behavior is at the mercy of outside forces. Rogers' client-centered therapy is based on the assumption that the client has free will. The therapist is called a "facilitator" precisely because his/her role is to make it easier for the client to exercise free will so as to maximize the rewardingness of the client's life. Humanistic psychologists argue that regarding human behavior as being determined by external forces is "de-humanizing" and incorrect.



Rogers claimed that we are motivated to minimize the discrepancy between our self-concept and our ideal self (the self-concept we would most like to possess). If we have free will and our behavior isn't determined by external forces, it might be expected that we would have little difficulty in doing this. The fact that there are millions of people with mental disorders who have a substantial discrepancy between the two suggests that free will either doesn't exist or is often very ineffective in producing highly desired changes.

Causality

Believers in free will have to confront various problems. First, it is hard to define precisely what is meant by free will. Second, determinism is based on the assumption that all behavior has one or more causes, and it could be argued that free will implies that behavior is random and has no cause. However, very few people would want to argue for such an extreme position. Anyone whose behavior seemed to be random would probably be classified as mentally ill or very stupid. If free will doesn't imply that behavior has no cause, then we need to know how free will helps to cause behavior. Third, most sciences are based on the assumption of determinism. It is possible that determinism applies to the natural world but doesn't apply to humans. If so, then there are enormous implications for psychology that have hardly been addressed.

Evaluation and summary

- It is not clear that it makes much sense to talk about "free will," because this assumes there is an agent (i.e., the will) that may or may not operate in an unrestrained way. As

the philosopher John Locke (1632–1704) pointed out, "We may as properly say that the singing faculty sings and the dancing faculty dances as that the will chooses."

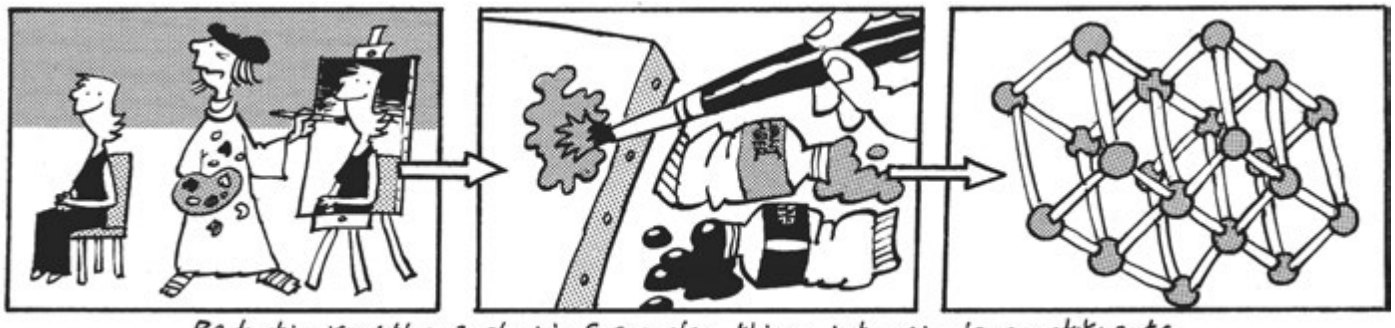
- The issue is philosophical rather than scientific, as it is impossible to design an experiment to decide whether or not free will influences human behavior. As William James (1890, p. 323) put it, "The fact is that the question of free will is insoluble on strictly psychological grounds." Thus, we can never know whether an individual's behavior in a given situation could have been different if he/she had so willed it.
- There is more common ground between advocates of determinism and free will than is generally realized. Most psychologists accept that heredity, past experience, and the present environment all influence our behavior. Although some of these factors (e.g., the environment) are external to the individual, others are internal. Most of these internal factors (such as character or personality) are the results of causal sequences stretching back into the past. The dispute then narrows to the issue of whether a solitary internal factor (variously called free will or self) is somehow immune from the influence of the past.
- There is little real incompatibility between determinism and free will at all. According to deterministic, it is possible in principle to show that an individual's actions are caused by a sequence of physical activities in the brain. If free will (e.g., conscious thinking and decision making) forms part of that sequence, it is possible to believe in free will and human responsibility at the same time as holding to a deterministic position. This would not be the case if free will is regarded as an intruder forcing its way into the sequence of physical activities in the brain. However, there are no good grounds for adopting this position. Thus, the entire controversy between determinism and free will may be somewhat artificial.

REDUCTIONISM

According to Reber (1993), **reductionism** "is the philosophical point of view that complex phenomena are best understood by a componential analysis which breaks the phenomena down into their fundamental, elementary aspects." Within the context of psychology, the term "reductionism" refers to several somewhat different theoretical approaches. First (and most importantly), there is the belief that the phenomena of psychology can potentially be explained within the framework of more basic sciences or disciplines (e.g., physiology; biochemistry) (physiological reductionism). Second, there is the assumption that complex forms of behavior can be explained with reference to relatively simple forms of behavior such as stimulus–response associations (experimental reductionism). Third, there is the notion that the complexities of human cognition can be compared to computer functioning (machine reductionism). Fourth, there is the assumption that human behavior can be understood with reference to other, less complex, species (animal reductionism). We will consider each of these types of reductionism in turn.

Key Term

Reductionism: the notion that psychology can ultimately be reduced to more basic sciences such as physiology or biochemistry.



PHYSIOLOGICAL REDUCTIONISM

According to physiological reductionism, we need to consider psychology in the light of other scientific disciplines. Scientific disciplines can be regarded as being organized in a hierarchical way, with the more general sciences at the top and the more specific and precise ones at the bottom. Some reductionists argue that sciences towards the top of the hierarchy will eventually be replaced by those towards the bottom. Here is an example of such a hierarchy:

- Sociology: The science of groups and societies.
- Psychology: The science designed to understand human and animal behavior.
- Physiology: The science of the functional working of the healthy body.
- Biochemistry: The science of the chemistry of the living organism.

Physiological and psychological explanations

Neurology and biochemistry underlie all behavior. What happens when a person sees a sunset? The physiological explanation would be that light reflected from the landscape forms an image on the retina, which is converted into a neural signal and transmitted to the brain, and so on. No one disputes that this is true, and the process is absolutely essential, but does it give a full and adequate explanation of what is going on? A psychological explanation would probably include the personal and social relevance of the experience, which many would argue are of equal value.

Of particular importance, all psychological processes are accompanied by physiological processes. Understanding those physiological processes (especially those associated with brain activity) might assist us in understanding human behavior. At the very least, psychological theories need to be consistent or compatible with relevant findings from physiology (and biochemistry).

There are various problems with physiological reductionism. First, much human behavior does not seem to lend itself to an explanation in terms of basic physiological processes. For example, if you wanted to predict how various people were going to vote in a forthcoming election, you wouldn't engage in a detailed physiological examination of their brains! Second, psychology typically describes the *processes* involved in performing some activity, whereas physiology focuses more on the *structures* involved (Valentine, 1992). Thus, psychologists are interested in *what* and *how* questions, whereas physiologists are interested in *where* questions. Third, there are no cases in which psychological phenomena have been fully understood on the basis of findings from disciplines such as physiology or biochemistry. What has happened is that findings from disciplines such as physiology have often added to our understanding. Examples include research on sexual motivation and hunger (see Chapter 3).

EXPERIMENTAL REDUCTIONISM

According to experimental reductionism, complex psychological phenomena can be reduced to simple constituent parts. The behaviorists were reductionists in this sense. They argued that many complex forms of behavior (e.g., use of language; problem solving) can be explained by assuming that they involve the use of numerous stimulus–response units and by assigning key importance to rewards or reinforcements. It is generally accepted that our behavior is influenced by rewards, but few now believe that that influence is as great as was believed by the behaviorists.

Experimental reductionism has often not fared well. It has been found consistently that simple explanations of behavior in virtually all areas of psychology have proved inadequate, and have had to be replaced by more complex ones. For example, Skinner (1957) tried to explain the complexities of language acquisition by arguing that children produce words and sentences that are rewarded or reinforced. As we will see in Chapter 10, the processes involved in language are so complex that Skinner's reductionist approach falls well short of providing a satisfactory explanation.

Experimental reductionism has proved most successful when it comes to designing experiments. As we saw in Chapter 1, use of the experimental method consists of designing well-controlled experiments. This typically involves ignoring much of the complexity of everyday life in order to expose participants to very limited situations under laboratory conditions. The advantages and disadvantages of experimental reductionism can be seen clearly if we consider two forms of validity. First, there is **internal validity**, which refers to the validity of an experiment within the context in which

Key Term

Internal validity: the validity of an experiment in terms of the context in which it is carried out, including the extent to which its findings can be replicated; also the extent to which research findings are genuine and can be regarded as being caused by the **independent variable**; see **external validity**.

it is carried out. Well-controlled experiments that produce findings that other researchers can replicate or repeat possess high internal validity. Second, there is **external validity**, which refers to the applicability of the findings from an experiment to other, everyday situations. In essence, well-controlled experiments based on experimental reductionism generally have high internal validity, but this is often achieved at the expense of external validity.

MACHINE REDUCTIONISM

Humans often try to understand the unknown in terms of the known. One way of doing that is by trying analogies or comparisons between what is known and what is not known. For example, numerous theorists have tried to understand the functioning of the brain or mind (especially its memory system) by comparing it to a wide variety of objects (this is machine reductionism). As Roediger (1980) noted, the brain has been conceptualized as a switchboard, a gramophone, a tape recorder, a library, a conveyor belt, and an underground or subway map. In recent decades, however, cognitive psychologists have most often drawn an analogy between the human brain and computers. This has two large and obvious advantages over previous analogies. First, computers are very flexible and versatile, and can be programmed in progressively more sophisticated ways to approximate more closely human information processing. Second, computers are capable of very complex functioning. For example, a chess program called Deep Blue managed to beat the then world chess champion Garry Kasparov in May 1997.

The ever more sophisticated and human-like cognitive capabilities of computers are exemplified by the computer program Deep Junior that in 2003 played a 6-game match against Garry Kasparov that resulted in a 3–3 tie with the ex-world chess champion.

Cognitive science

The precision of detail needed to mimic human thought processes using computers is demonstrated by a story that may or may not be an account of a real experiment. A group of cognitive scientists wanted to see if a computer-controlled robot could be programmed to mimic a human being building a pile of wooden bricks. However, the first few attempts failed because someone forgot to include the effects of gravity in the computer program, and the robot tried to begin the pile at the top! No human being would make such a mistake; we all understand about gravity from a very early age, but remembering to include every single item of such knowledge in a computer program is a huge task.

Newell and Simon (1972) provided a successful example of machine reductionism with their approach to understanding problem solving (see Chapter 9). They started by asking people to think aloud while they solved various problems. Newell and Simon used the information so acquired to devise a computer program called General Problem Solver that solves problems in ways resembling those used by humans. However, there are some differences. General Problem Solver is better than humans at remembering past moves on a problem, but it is worse than humans at forward planning.

In spite of the successes of the computer analogy to human thinking, there are some serious limitations of this approach. First, computer programs often function in ways very different from those of people. The chess program Deep Blue plays chess outstandingly well. However, it does so by considering several million moves every second, which is radically different from the thought processes of human grandmasters.

Second, the claim that the functioning of some computer programs closely resembles that of neurons in the brain is hotly disputed (see Eysenck & Keane, 2005). More specifically, the brain contains huge numbers of interconnected neurons, and it is argued that the basic processing units within connectionist networks (a type of computer program) resemble biological neurons. However, the number of such processing units is typically a tiny fraction of the number of neurons in the human brain. In addition, each neuron in the human brain is connected to only about 3% of neurons in the surrounding square millimeter of cortex (Churchland & Sejnowski, 1991), which is substantially less than the massive interconnectivity often found within connectionist networks.

Third, human cognitive functioning involves an interplay between a cognitive system (the Pure Cognitive System) and a biological system (the Regulatory System)

Key Term

External validity: the validity of an experiment outside the research situation itself; the extent to which its findings are applicable to everyday life and generalize across populations, locations, measures, and times; see **internal validity**.

(Norman, 1980). Much of the activity of the Pure Cognitive System is determined by the various needs of the Regulatory System, including the need for survival, for food and water, and for protection of oneself and one's family. Computer programs focus on the Pure Cognitive System and virtually ignore the key role played by the Regulatory System.

Fourth, it is difficult to imagine computers having consciousness or experiencing emotion, and I am not aware of any computer programs showing either of these characteristics. This pessimistic conclusion has been challenged by some experts. Sloman (1997) argued that it should be possible to design a machine that could fall in love. According to him, what we would need to do is the following: "Read what poets and novelists and playwrights say about love, and ask yourself: what kinds of information processing mechanisms are presupposed." For example, if X is in love with Y, we would expect X to find it hard to think of anything except Y. Personally, I will be amazed if anyone ever succeeds in devising a machine that can fall in love.

CONCLUSIONS

There are many forms of reductionism, including physiological reductionism, experimental reductionism, and machine reductionism. All of these forms of reductionism have proved useful, but they all suffer from important limitations. Physiological findings can enhance our understanding of psychological phenomena, but cannot replace the need for psychological explanations. Experimental reductionism permits the designing and carrying out of well-controlled experiments, but often fails to ensure that the findings obtained generalize to everyday life. Machine reductionism based on the computer analogy has provided useful insights into human thinking, but it is limited in part because motivational and emotional factors are generally ignored.

Chapter Summary

Psychodynamic approach

- Psychoanalysis consists of various theories about human emotional development but is also a form of therapy.
- According to Freud, the mind is divided into three parts (id, ego, and superego) that are often in conflict with each other.
- Psychoanalysis as a form of therapy is designed to allow patients to achieve insight into the true nature of their problems. Many of these problems stem from traumatic events in childhood.
- Many of Freud's general ideas are still generally accepted. However, most of his more specific ideas are either untestable or have been disproved.

Behaviorism

- The behaviorists claimed that most behavior could be explained in terms of environmental rather than genetic factors.
- According to Skinner, learning and behavior are under the control of reward or reinforcement.
- The behaviorists had a lasting influence on psychology through their emphasis on careful observation of behavior in controlled settings and the development of behavior therapy.
- The behaviorists greatly underestimated the impact of internal factors (e.g., past knowledge; goals; heredity) on behavior.

Humanistic approach

- Humanistic psychologists favored the use of phenomenology (reporting of pure experience) and were skeptical of the scientific approach.
- Maslow argued that the need for self-actualization (fulfilling one's entire potential) is of central importance to many people.

- Rogers developed client-centered therapy, which required the therapist to display unconditional positive regard, genuineness, and empathy.
- Humanistic psychologists focused on issues of major concern to people, and client-centered therapy is moderately effective in treating less severe disorders.
- Client-centered therapy is ineffective in treating severe disorders, and the unscientific nature of humanistic psychology has seen its influence wane considerably.

Cognitive approach

- Cognitive psychologists carry out well-controlled laboratory experiments to understand processes such as attention, perception, learning, language, and problem solving.
- Two major determinants of cognitive psychology are cognitive neuropsychology (studying cognition in brain-damaged patients) and cognitive neuroscience (using brain imaging to identify the brain areas associated with specific cognitive processes).
- Cognitive psychology (in conjunction with cognitive neuropsychology and cognitive neuroscience) has proved very effective at enhancing our understanding of human cognition. It led to the development of cognitive therapy, which is an effective form of treatment for anxiety disorders and depression.
- The behavioral and brain-imaging data collected by cognitive researchers provide only indirect measures of underlying cognitive processes. The use of laboratory experiments raises issues concerning ecological validity.

Evolutionary psychology

- According to evolutionary psychologists, natural selection favors individuals who maximize replication of their genes. This is achieved in part by helping those with whom we share our genes.
- Evolutionary psychologists also assume that the greater parental investment of females than of males has led to various gender differences (e.g., in sexual attitudes and behavior).
- As predicted by the theory, most people are more willing to help close relatives than other people. Predicted differences in sexual attitudes and behavior between males and females have also been reported (see Chapter 3).
- It is difficult to test most of the hypotheses of evolutionary psychologists, and they underestimate the importance of social and cultural factors.

Ethical issues in psychology

- Milgram's research on obedience to authority and Zimbardo's Stanford prison experiment are now regarded as unethical, in part because of the stress and discomfort experienced by the participants.
- Full informed consent, avoidance of deception, and the participant's right to withdraw at any point are all very important features of ethical research.
- Ethical issues are posed by socially sensitive research that can have damaging consequences for people not directly involved in the experiment.
- What is ethically acceptable depends in part on the likely scientific value of the proposed research.

Biases in psychology

- Gender bias can involve exaggerating gender differences (alpha bias) or minimizing them (beta bias). Alpha bias is found in the work of Freud and evolutionary psychologists.
- There is also methodological gender bias—the design of an experiment can bias the nature of the gender differences likely to be found.
- Much cultural bias occurs because researchers mistakenly believe that emic constructs (culture-specific) are actually etic ones (universal).
- Cross-cultural research on intelligence and personality has often involved the use of imposed etics (use of culture-specific tests).

- The claim that black people are genetically less intelligent than white ones is an example of racial bias. The issue is of little or no scientific interest, and raises serious ethical issues.
- Rushton claims that mongoloids are more evolutionarily developed than caucasoids, who in turn are more developed than negroids. This claim is unsupported by evidence and is racist.

Free will vs. determinism

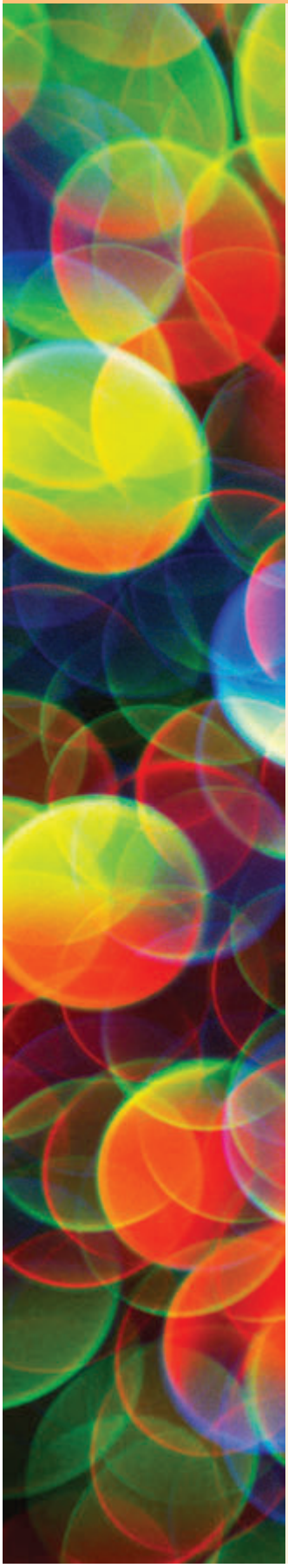
- Determinists (e.g., Freud; Skinner) argue that behavior is totally controlled by external and internal factors, whereas advocates of free will claim that behavior is also controlled by free will.
- Soft determinists claim that there is a valid distinction between behavior highly constrained by the situation and behavior only modestly constrained by the situation.
- Determinism seems more consistent than free will with the scientific approach, but it cannot be submitted to a proper test.
- It is difficult to define "free will" precisely. If free will means that we can freely choose our own behavior, it is hard to see why millions of people (e.g., those with mental disorders) feel unable to control their behavior.
- If free will forms part of the sequence of physical activities in the brain causing an individual's actions, then it would be possible to believe in free will and in determinism at the same time.

Reductionism

- According to physiological reductionism, more general sciences such as sociology and psychology will eventually be replaced by more specific sciences such as physiology and biochemistry.
- Physiological findings have often enhanced our understanding of psychological phenomena, but that does not eliminate the need for psychological explanations.
- According to experimental reductionism, complex psychological phenomena can be reduced to simple constituent parts by producing simple explanations or by carrying out simple experiments.
- Simple explanations of complex phenomena (e.g., by the behaviorists) are generally oversimplified. Simple, well-controlled experiments often have good internal validity but poor external validity.
- According to machine reductionism, human functioning can be understood with reference to machines (especially computers).
- Computers can function in flexible, complex ways. However, their functioning is often very different to that of humans, they lack consciousness, and they are generally uninfluenced by motivational and emotional factors.

Further Reading

- Glassman, W.E. (1995). *Approaches to psychology* (2nd ed.). Buckingham, UK: Open University Press. This book provides a good overview of historically important theoretical approaches in psychology.
- Jarvis, M. (2000). *Theoretical approaches in psychology*. London: Routledge. This is a very readable introduction to theoretical approaches that have been influential in the history of psychology.
- Valentine, E.R. (1992). *Conceptual issues in psychology* (2nd ed.). London: Routledge. Liz Valentine provides a balanced approach to some of the key conceptual and philosophical issues within psychology.



- **Human motivation** *pp.55–75*
  Maslow's hierarchical theory
  Hunger motivation
  Sex and sexual behavior
  Work motivation and performance
- **Emotion, stress, and coping** *pp.77–101*
  Psychology of emotion
  Theories of emotion
  Stress
  Coping with stress
- **States of awareness** *pp.103–125*
  Consciousness
  Sleep
  Dreaming

PART I

INTRODUCTION TO Biological Psychology

Biological psychology (often shortened to biopsychology) has been defined as "the study of behavior and experience in terms of genetics, evolution, and physiology, especially the physiology of the nervous system" (Kalat, 1998, p. 1). More generally, biological psychology involves using a biological approach to study psychology and to obtain an understanding of human (and animal) behavior.

Within the field of biological psychology, Pinel (1997) identified five main approaches. First, there is physiological psychology. The key aspect of this approach is that there is direct manipulation of the nervous system of nonhuman animals to observe the effects of such manipulation on the neural mechanisms of behavior. This direct manipulation can take various forms, including surgery, electrical stimulation, or the use of chemicals. For obvious ethical reasons, most of the interventions discussed above simply can't be used with human participants. There is some controversy concerning the relevance of research on nonhuman species for an understanding of human functioning. We can generally only be confident that findings from nonhuman animals are applicable to humans when there is clear supporting evidence from human research.

Second, there is psychopharmacology, which is concerned with the effects of various drugs on neural activity and on behavior. The emphasis in much psychopharmacological research is on the development of drugs having beneficial effects and minimal adverse side effects. However, some pharmacologists study the effects of drugs in order to shed light on the detailed chemical processes occurring in the brain.

Third, there is psychophysiology, which involves studying the relationship between physiological activity on the one hand and psychological processes on the other hand. Most psychophysiological research is carried out on humans. Psychophysiologists make use of a wide range of measures, including heart rate, electrical conductance of the skin, pupil dilation, and the electroencephalogram (EEG; based on recordings of electrical brain activity measured at the surface of the scalp). In recent years, several brain-imaging techniques have been developed (see the "Introduction to cognitive psychology," Part II).

Fourth, there is neuropsychology, which is mainly concerned with assessing the effects of brain damage in humans on their psychological functioning and behavior. Neuropsychologists often try to determine which part or parts of the brain have been damaged, using a variety of techniques including magnetic resonance imaging (MRI; see the Introduction to cognitive psychology). There are various similarities between neuropsychology and cognitive neuropsychology (see the Introduction to cognitive psychology). Other neuropsychologists study neurologically intact individuals with a view to understanding brain mechanisms of behavior. For example, Annett (e.g., 1999) has carried out much research on differences in cognition between people who are left-handed and those who are right-handed.

Fifth, there is comparative psychology, in which similarities and differences in behavior across various species are considered. Comparative psychologists also compare

Austrian botanist Gregor J. Mendel (1822–1884) photographed circa 1880.

different species with respect to their evolutionary history and the current adaptiveness of their behavior, although their underlying interest is often in trying to use information about other species to try to explain human behavior.

GENETICS AND BEHAVIOR

One of the most influential of current approaches is evolutionary psychology (see Chapter 2), which stems from Darwin's theory of natural selection. Evolutionary psychologists argue that evolutionary pressures have influenced the human mind and behavior. Darwin (1859) argued that offspring tend to resemble their parents more than other members of the same species through inheritance. However, he couldn't answer the question, "How are characteristics passed on from one generation to the next?" By one of those quirks of history, Darwin actually had in his possession a manuscript (unread or unappreciated) containing the answer to that question (namely, through genetic inheritance)! The manuscript had been sent to him by an obscure monk called Gregor Mendel (1822–1884), whose work is discussed below.

Mendel studied inheritance in pea plants. He started by cross-breeding the offspring of pea plants that produced only green seeds with the offspring of pea plants producing only yellow seeds. All of the first-generation offspring had green seeds. However, when the first-generation offspring were bred with each other, about three-quarters of the second-generation offspring had green seeds and one-quarter had yellow seeds. The characteristic or trait found in all the first-generation offspring and three-quarters of the second-generation offspring is called a dominant trait, and depends on a dominant gene. The trait found in one-quarter of the second-generation offspring is called a recessive trait, and depends on a recessive gene. In humans, for example, brown eyes are dominant and blue eyes are recessive.

How did Mendel explain his findings? He argued that there are two kinds of factors (e.g., green-seed factor and yellow-seed factor) for simple traits that can occur only in one of two forms. Such inherited factors are now called genes. Each organism possesses two inherited factors or genes for each simple trait. In the case of pea plants, they can have two yellow-seed genes, two green-seed genes, or one gene of each type.

Mendel then assumed that offspring receive one gene at random from each of their "parents." When the two genes are identical (e.g., both yellow-seed genes), then the offspring will have the trait associated with those genes. When the two seeds differ (e.g., one yellow-seed gene and one green-seed gene), then the offspring will have the trait associated with the dominant gene. Mendel's findings suggest that there is an important distinction between the **genotype** (underlying genetic potential) and the **phenotype** (observable traits or characteristics). As we have seen, Mendel found that one-quarter of the offspring resulting from breeding with green seeds had yellow seeds. This represents an important difference between the phenotype (observed yellow seeds) and the genotype (one green-seed gene and one yellow-seed gene).

Genetic transmission in humans is often far more complicated than what happens with pea plants. Most human traits (e.g., intelligence) are controlled by a large number of different genes rather than being controlled by a single gene. In addition, many genes don't function in a dominant or recessive way. Some genes are additive (with all genes contributing towards the offspring's phenotype), whereas others have interactive effects on each other. Other genes have **partial penetrance**, meaning that they influence an individual's life only in certain circumstances. For example, genes increasing the risk of alcoholism will not influence someone living in a culture in which alcohol is not available.

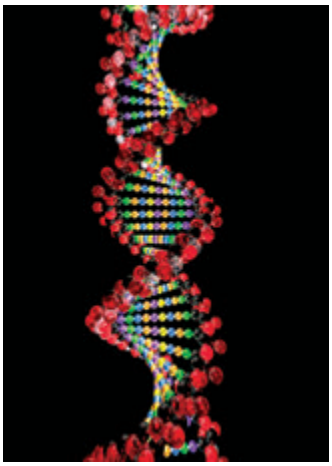
What is the nature of genes? In essence, chromosomes are strands of deoxyribonucleic acid (DNA) bearing the genes. Chromosomes appear in matched pairs, with humans having 23 pairs of chromosomes in each of their body cells. Each strand of DNA consists of a sequence of four nucleotide bases (adenine, thymine, guanine, and cytosine) arranged in a particular order, and these strands essentially form the genetic code. The two strands of DNA forming each chromosome are coiled around each other in a double helix (spiral) pattern. These strands are bonded together, with guanine on one strand binding with cytosine on the other strand, and adenine binding with thymine.

Key Terms

Genotype: an individual's potential in the form of genes.

Phenotype: an individual's observable characteristics based on his/her genotype plus life experiences.

Partial penetrance: a characteristic of certain genes, in which they influence behavior only under certain conditions.



Computer artwork of part of a strand of DNA. The DNA molecule carries genetic information in all cellular organisms. It consists of two strands wound around each other in a double helix.

BEHAVIORAL GENETICS

Our knowledge of genetic transmission allows us to understand the extent of genetic similarity (or degree of relatedness) between the members of a family. We know that children share 50% of their genes with each of their parents, that siblings also share 50% of their genetic material with each of their parents, that the figure is 25% for grandparents and grandchildren, and that it is 12.5% for first cousins. Monozygotic (identical) twins have the same genetic make-up, whereas dizygotic (fraternal) twins share only 50% of their genetic make-up. This is because identical twins come from the same zygote (fertilized egg cell) which splits post-fertilization, whereas fraternal twins come from two different eggs.

NERVOUS SYSTEM

The nervous system contains all the nerve cells in the body. As we will see, the various parts of the nervous system are specialized for different functions. The nervous system itself is made up of between 15 and 20 billion neurons (cells specialized to conduct electrical impulses). The nervous system itself is divided into two main sub-systems:

- *Central nervous system*. This consists of the brain and the spinal cord; it is protected by bone and by fluid circulating around it.
- *Peripheral nervous system*. This consists of all the other nerve cells in the body. It is divided into the somatic nervous system, which is concerned with voluntary movements of skeletal muscles (those attached to our bones), and the autonomic nervous system, which is concerned with involuntary movements of nonskeletal muscles (e.g., those of the heart).

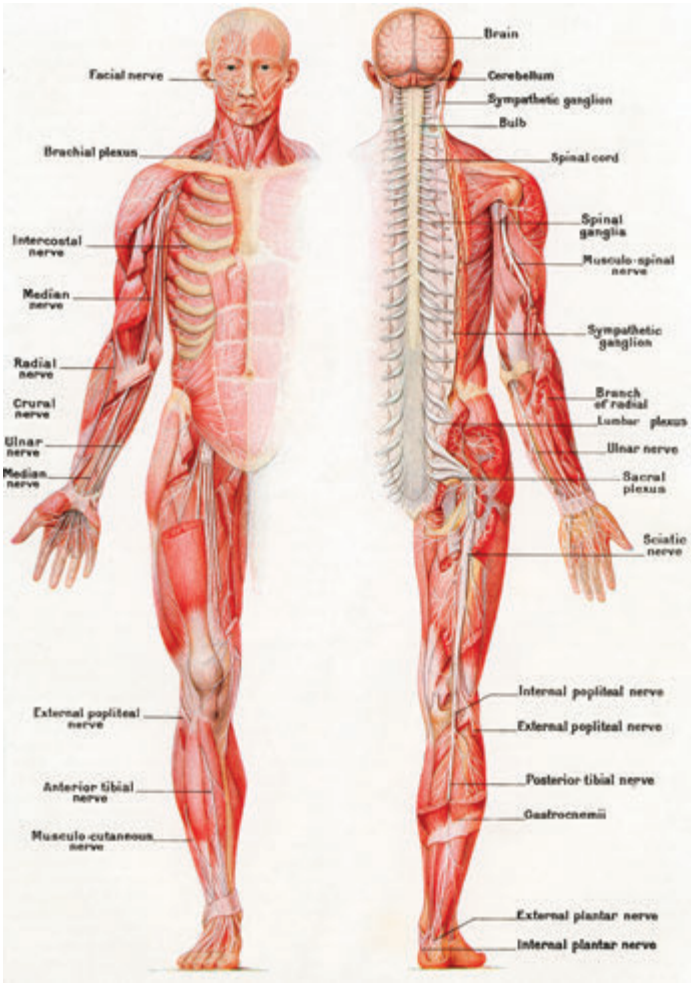
CENTRAL NERVOUS SYSTEM

We will focus our coverage of the central nervous system on the brain. In order to understand the brain, we must learn about its structure and about the functions of the various parts. It has proved easier to study structure than function. Only fairly recently have technological advances allowed us to identify the functions of different brain areas by observing the brain in action (see the Introduction to cognitive psychology).

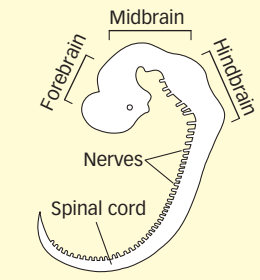
In view of the importance of the brain, it is not surprising that it is the most protected part of the body. Both the brain and the spinal cord are encased in bone and covered by protective membranes. In addition, there is the blood–brain barrier. This is a protective mechanism permitting blood to flow freely to the brain, but ensuring that most substances in the bloodstream do not reach the brain tissue.

The brain is divided into three main regions (see the figure on the following page): hindbrain, midbrain, and forebrain. These terms refer to their location in the embryo's nervous system, and do not indicate clearly the relative position of the different brain regions in adults. The hindbrain is at the back of the brain, and consists of the medulla, the pons, and the cerebellum. The medulla is involved in the control of various crucial functions such as breathing, vomiting, salivation, and the regulation of the cardiovascular system. The pons and medulla together contain the reticular formation, which is involved in controlling levels of arousal and is also of relevance to consciousness. The cerebellum is involved in the control of balance and of movement.

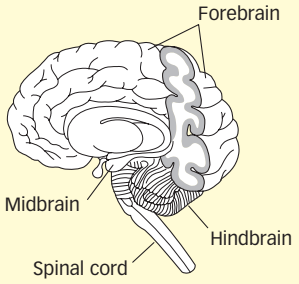
The midbrain is relatively smaller in mammals (including humans) than it is in reptiles, birds, and fish. It is



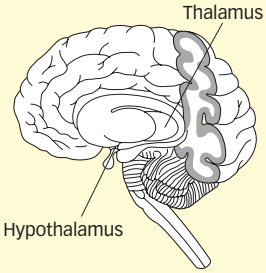
The nervous system within a human male figure. The brain and spinal cord constitute the central nervous system. The CNS integrates all nervous activities. There are 31 pairs of nerves that branch off the spinal cord into a network; they carry nerve impulses from the CNS to various structures of the body and back from these structures to the CNS. Nerves outside the CNS are part of the peripheral nervous system.



Embryo brain



Mature brain



divided into the tectum or roof and the tegmentum, which is the middle part of the midbrain. The tectum consists of the superior colliculus and the inferior colliculus, both of which are used as routes for sensory information.

The forebrain is easily the largest and most important division of the human brain. About 90% of the human cerebral cortex is neocortex (literally new cortex), which consists of six layers. The cerebral cortex plays a crucial role in thinking, the use of language, perception, and numerous other cognitive abilities (see the cognitive section in this book). It is a continuous sheet resembling a crunched-up blanket stuffed into a box (David Carey, personal communication). Parts of the forebrain lie underneath the cerebral cortex. Two series of interconnected structures in this part of the brain are the limbic system and the basal ganglia motor system. The limbic system consists of various structures including the amygdala, the septum, the hippocampus, the hypothalamus, the cingulate cortex, the fornix, and the mammillary body. The main functions of the limbic system are to regulate several kinds of motivated behavior, including eating, aggression, avoidance behavior, and sexual behavior, and emotions such as anger and anxiety (see Chapter 4). The basal ganglia consist of the striatum, globus pallidus, and the amygdala (which is often regarded as part of this system as well as of the limbic system). The basal ganglia assist in the production of voluntary motor responses.

The thalamus and the hypothalamus are both important structures. The hypothalamus is much smaller than the thalamus. It is situated below the thalamus (see the figure on the left). The hypothalamus is involved in the control of several functions such as body temperature, hunger, and thirst. It is also involved in the control of sexual behavior. Finally, the hypothalamus plays an important role in the control of the endocrine (hormonal) system. For example, the hypothalamus is directly connected to the anterior pituitary gland, which has been described as the body's "master gland."

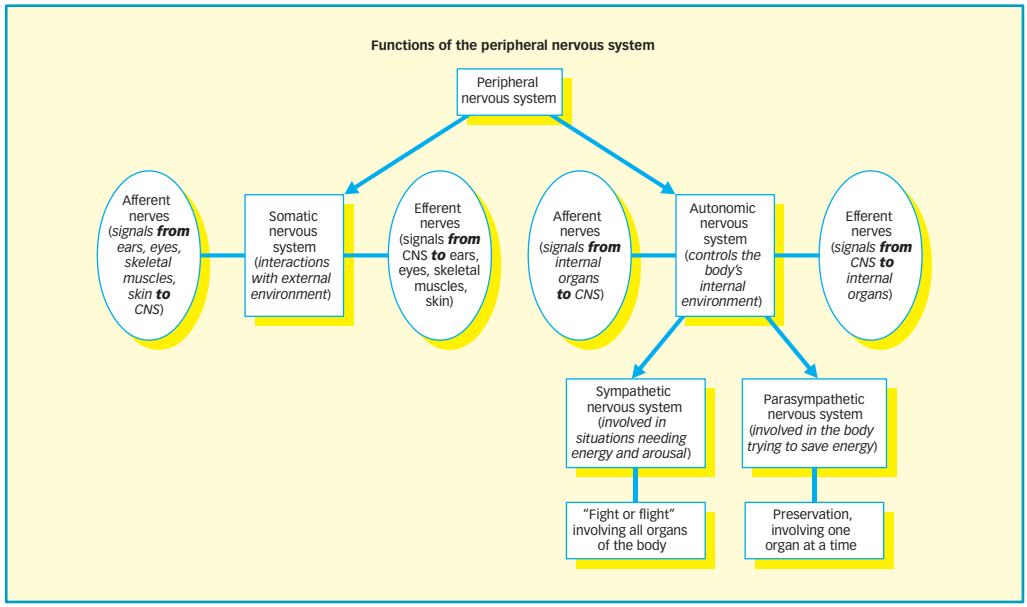
What about the thalamus? It acts as a relay station passing signals on to higher brain centers. For example, the medial geniculate nucleus receives signals from the inner ear and sends them to the primary auditory cortex. In similar fashion, the lateral geniculate nucleus receives information from the eye and sends it to the primary visual cortex, and the ventral posterior nucleus receives somatosensory (bodily sensation) information and sends it to the primary somatosensory cortex. In addition, there are projections in the opposite direction, proceeding for example from the primary visual cortex down to the thalamus.

PERIPHERAL NERVOUS SYSTEM

The peripheral nervous system consists of all the nerve cells in the body not contained within the central nervous system. It consists of two parts: the somatic nervous system and the autonomic nervous system (see the figure on the following page for a summary of their functions). The somatic nervous system is concerned with interactions with the external environment, whereas the autonomic nervous system is concerned with the body's internal environment. Most of the nerves of the peripheral nervous system project from the spinal cord. Some spinal nerves are involved in receiving signals from (and sending them to) skeletal muscles within the somatic nervous system, whereas others receive signals from (and send them to) the internal organs within the autonomic nervous system. In addition, there are connections between the central nervous system and the peripheral nervous system via 12 pairs of cranial nerves.

The somatic nervous system consists of afferent nerves that carry signals from the eyes, ears, skeletal muscles, and the skin to the central nervous system, and efferent nerves that carry signals from the central nervous system to the skeletal muscles, skin, and so on.

The autonomic nervous system is concerned with regulating the functioning of the internal environment, including the heart, stomach, lungs, intestines, and various glands (e.g., pancreas, salivary glands, and adrenal medulla). It is called the autonomic nervous system because many of the activities it controls are autonomous or self-regulating (e.g., digestion). These activities do not require conscious effort on our part, and continue even when we are asleep. As is the case with the somatic nervous system, the autonomic nervous system consists of afferent nerves and efferent nerves. The afferent nerves carry sensory signals from the internal organs to the central nervous system, whereas the efferent nerves carry motor signals from the central nervous system to the internal organs.



The autonomic nervous system is divided into the sympathetic nervous system and the parasympathetic nervous system. Nearly all the internal organs of the body receive signals from both sympathetic and parasympathetic nerves. In general terms, the effects of activation of the sympathetic and parasympathetic nervous systems are opposite. The sympathetic nervous system is called into play in situations needing energy and arousal (e.g., fight or flight). For example, the body's initial response to a stressor involves the sympathetic adrenal medullary system (see Chapter 4). What happens is that epinephrine and norepinephrine (adrenaline and noradrenaline) are secreted, which causes increased arousal of the sympathetic nervous system. The sympathetic nervous system produces increased heart rate, reduced activity within the stomach, pupil dilation (expansion), and relaxation of the bronchi of the lungs. In contrast, the parasympathetic nervous system is involved when the body is trying to save energy. The parasympathetic nervous system produces decreased heart rate, increased activity within the stomach, pupil contraction, and constriction of the bronchi of the lungs. In general terms, the sympathetic nervous system tends to act as a whole, whereas the parasympathetic nervous system often affects only one organ at a time.

The sympathetic and parasympathetic nervous systems often operate in opposition to each other. However, there are some exceptions (Atkinson et al., 1993). For example, the sympathetic nervous system is very active in states of fear or excitement, and yet parasympathetic activity can cause people who are fearful or excited to have an involuntary discharge of their bladder or bowels. Another example is sex in the male. Parasympathetic activity is required to obtain an erection, whereas sympathetic activity is needed for ejaculation.

ORGANIZATION OF THE BIOLOGICAL PSYCHOLOGY SECTION

There are three chapters in this section of the book. In Chapter 3, we discuss various approaches to motivation. Human motivation is complex, and depends on cognitive factors as well as on biological ones. However, biological factors are clearly of considerable importance in hunger and sexual motivation, and these factors are considered in detail. In Chapter 4, we discuss emotion, stress, and coping. There is substantial evidence that cognitive factors are important in determining the emotions we experience, how stressed we feel, and how we cope with stress. However, it is impossible to understand emotion or stress thoroughly without considering the biological (especially physiological) processes involved. In Chapter 5, states of awareness are analyzed, focusing on consciousness, sleep, and dreaming. Different physiological processes are associated with these various states of awareness, and are discussed in detail in this chapter.

Chapter 3

Contents

3 Human motivation

The study of motivation is of major importance to developing a full understanding of human behavior. Motivation helps to determine how well we do academically, the kind of job we have, how successfully we perform that job, and how we choose to spend our leisure time. Motivation is very relevant to the following:

- *Direction of behavior*: The goal or goals being pursued.
- *Intensity of behavior*: The amount of effort, concentration, and so on invested in behavior.
- *Persistence of behavior*: The extent to which a goal is pursued until it is reached.

All of the above ingredients are to be found in Colman's (2001, p. 464) definition of "motivation": "A driving force or forces responsible for the initiation, persistence, direction, and vigor of goal-directed behavior." For example, if someone is very hungry, we would expect their behavior to be directed towards the goals of finding and eating food. In addition, we would expect them to put in much effort to find food, and we would expect them to keep looking for food until they found some.

It is difficult to achieve a good understanding of human motivation. There are two main reasons for this. First, human beings are motivated by a bewildering range of goals, and these goals vary between the very short-term (e.g., have an Indian meal) and the life-long (e.g., become the most successful psychologist in the world). Most of us are motivated to eat and drink, to find an attractive sexual partner, to have a high level of self-esteem, to be liked by other people, to earn money, and to enjoy life. Some of us are motivated to become a great athlete, to write books, to sail around the world, or to become a celebrity.

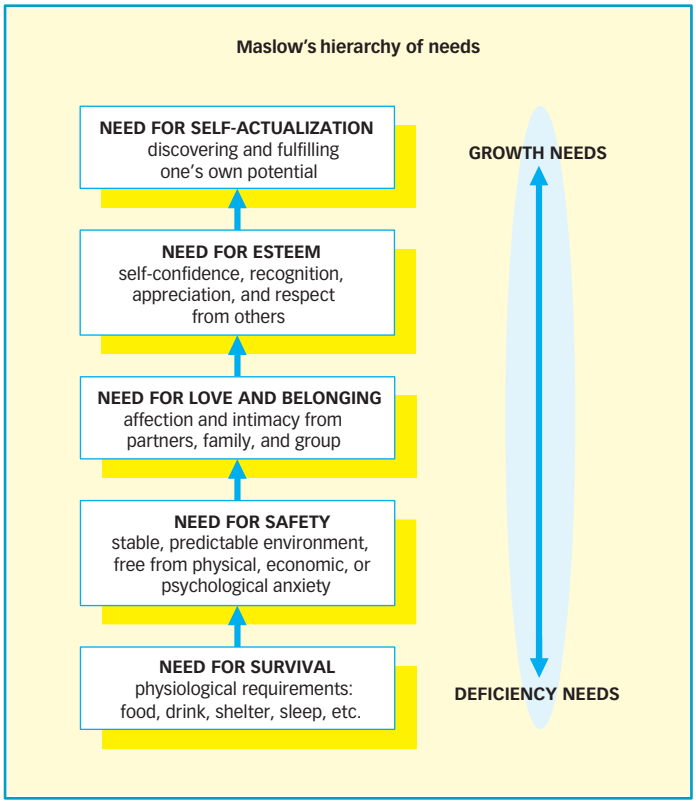
Second, motivation typically involves processes operating at several different levels. For example, consider hunger drive and eating behavior. Eating behavior depends in part on basic physiological processes. However, it also depends on various psychological factors, such as the habit of eating at certain times (e.g., around mid-day) and the desire to lose weight.

In this chapter, we start by considering a very general approach to motivation, namely, Maslow's (1954) hierarchical theory. After that, we focus on a few of the main forms of motivation. First, we discuss the factors underlying hunger and eating behavior. Second, we consider processes associated with sex motivation and sexual behavior. Third, we turn the spotlight on work motivation, identifying some of the factors influencing success at work.

MASLOW'S HIERARCHICAL THEORY

Need theories provide a comprehensive approach to motivation. Most need theories make two key assumptions:

1. Humans have a wide range of needs that motivate them.
2. The particular needs of greatest importance to a given individual vary over time.

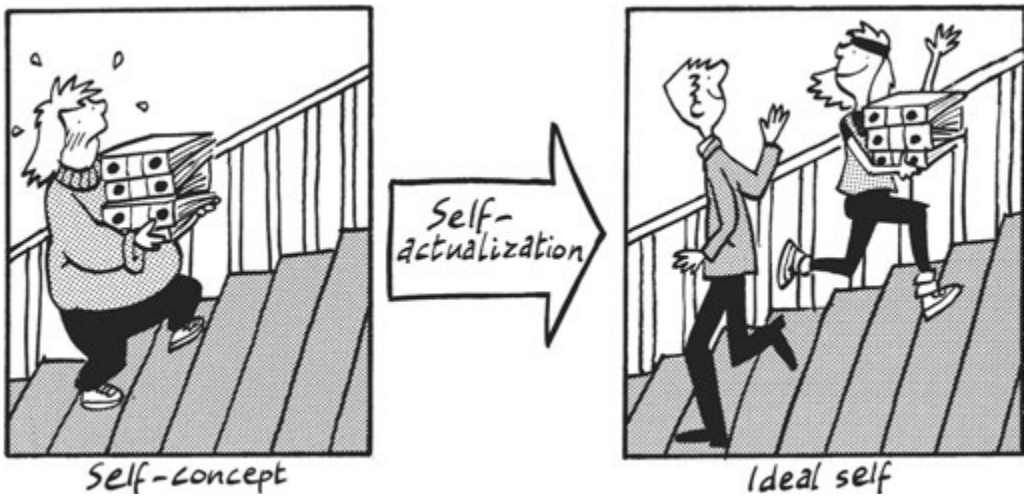


The best-known need theory is Maslow's (1954, 1970) hierarchical theory. According to this theory, we have a hierarchy of needs (see the figure on the left). Physiological needs or requirements (e.g., those for food, drink, air, and sleep) are at the bottom level of the hierarchy. Safety needs are at the next level; they include the need for security, freedom from fear, for protection, and for structure and order. In the middle of the hierarchy are needs for affection and intimacy. Maslow argued that there are two types of love: D-love and B-love. D-love is based on deficiency. It is selfish in that it involves taking rather than giving. However, we need to experience D-love before moving on to B-love, which is a "love for the being of another person." B-love is unselfish, and is based on a growth need rather than on deficiency.

The next level moving up the hierarchy is the need for esteem. There are two aspects to this: (1) the need for admiration and respect; and (2) the need to regard oneself as competent and successful. Finally, the need for **self-actualization** (fulfilling one's potential) is at the top of the hierarchy.

Maslow regarded all the needs towards the bottom of the hierarchy as deficiency needs, because they are designed to reduce inadequacies or deficiencies. Needs towards the top of the hierarchy (e.g., self-actualization) represent growth needs and are designed to promote personal growth. The key notion of self-actualization was described as follows by Maslow (1954): "A musician must make music, an artist must paint, a poet must write, if he [sic] is to be ultimately at peace with himself. What a man can be, he must be. This need we may call self-actualization." Self-actualized individuals (examples are Abraham Lincoln and Albert Einstein) typically possess various characteristics. These include: an acceptance of themselves; spontaneity; the need for privacy; resistance to cultural influences; empathy; profound interpersonal relationships; a democratic character structure; creativeness; and a philosophical sense of humour.

How can we assess self-actualization? Maslow (1962) focused on peak experiences. **Peak experiences** involve experiencing the world totally for what it is with accompanying feelings of euphoria, wonder, and awe. According to Maslow (1968, p. 111), "All peak experiences may be fruitfully understood as completions-of-the-act . . . or complete



Key Terms

Self-actualization: the need to discover and fulfill one's own potential.

Peak experiences: heightened experiences associated with feelings of joy and wonder.

orgasm, or as total discharge, culmination, climax, consummation, emptying or finishing." Peak experiences occur most often during sexual intercourse or when listening to music, and sometimes when doing both at the same time. Maslow found that self-actualized individuals had more peak experiences than other people. Self-actualization can also be assessed by self-report questionnaires (e.g., the Index of Self-Actualization).

Maslow believed that most people work upwards through the hierarchy. However, he accepted that some individuals have to satisfy their need for self-esteem before they can satisfy their needs for love. Maslow also accepted that we are often motivated by various needs at the same time. For example, sex is often motivated by the need for sexual release, but can also "be motivated by a need to win or express affection, a sense of conquest or mastery, or a desire to feel masculine or feminine" (Burger, 1993, p. 337).

FINDINGS

Maslow assumed that human growth is associated with maturity. It follows from that assumption that younger adults should focus more than older ones on needs low in the hierarchy and less on the "higher" needs. Support for this prediction was reported by Reiss and Havercamp (2005). "Lower" motives (e.g., eating; exercise) were stronger in younger than in older adults, whereas the higher motives (e.g., honor; idealism) were stronger in older than younger adults.

Aronoff (1967) tested the prediction that higher needs will only emerge when lower ones are satisfied. He compared fishermen and cane cutters in the British West Indies. Fishermen worked on their own, generally earning more than cane cutters working in groups. Cane cutting was a more secure job, because the rewards fluctuated much less than for fishermen, and because cane cutters were paid even when unwell. According to Maslow's theory, those choosing the more challenging and responsible job of fisherman should be mainly those whose security and esteem needs were met. This prediction was confirmed by Aronoff.

In apparent contrast to the findings of Aronoff (1967) are those of Sumerlin and Norman (1992). They compared self-actualization scores in homeless men and college students. Since homeless men were much less likely than college students to be satisfying their basic needs, it was predicted that college students would have much higher self-actualization scores. In fact, however, the two groups didn't differ in self-actualization.

Sumerlin and Bundrick (2000) explored self-actualization among homeless men. As predicted by Maslow's theory, they found that those men who had the highest self-actualization scores also tended to be the happiest.

According to Maslow, individuals high up the hierarchy of needs should have more peak experiences than those lower down the hierarchy. Supporting evidence was reported by Mathes, Zevon, Roter, and Joerger (1982), who devised a Peak Scale to assess individual differences in the tendency to have peak experiences. As predicted, high scorers on the Peak Scale were more likely than low scorers to emphasize higher-level values (e.g., beauty; truth; justice) in their everyday lives. They were also less likely to focus on lower-level deficiency values (e.g., taking from others rather than giving).

There may be important cultural differences in peak experiences. Privette, Hwang, and Bundrick (1997) found that Americans reported more peak experiences than Taiwanese. This may be because collectivistic cultures (such as the Taiwanese) emphasize group processes, whereas peak experiences typically have a very personal feel about them.

Maslow was wrong to suggest that all peak experiences are positive. There is much evidence (e.g., Wilson & Spencer, 1990) that some peak experiences are negative and occur in threatening situations.

Aronoff (1967) found that most West Indian fishermen had their security and esteem needs met, and this enabled them to handle an income and lifestyle that was less predictable than cane cutting.

Motivation and tourism

Cameron and Gatewood (2003) suggest that the motivation for the increasing popularity of heritage-site tourism is spiritual, which fits in with Maslow's concept of self-actualization. Surveys show that actual historical knowledge is not an important factor, and suggest that people's imaginations, feelings, empathy, and memories are more important motivators in making these visits. Typical statements that bring agreement include:

- I like to use my mind to go back in time while visiting historic sites and museums.
- I am sometimes able to connect deeply with the objects displayed in exhibits.
- I enjoy reflecting on a site or museum after visiting it.
- I enjoy imagining the day-to-day life of people who lived in the past.
- Some sites and museums provoke an almost "spiritual" response in me.

Evaluation

- (+) Maslow's approach to motivation is unusually comprehensive in scope.
- (+) Maslow emphasized the more positive aspects of human motivation, whereas many previous theorists (e.g., Freud) had devoted most of their attention to the negative side of human nature.
- (+) Individuals whose lower needs are satisfied are often more likely to focus on higher needs than those whose lower needs aren't satisfied. However, some evidence (e.g., Sumerlin & Norman, 1992) doesn't support the prediction.
- (−) As Hanley and Abell (2002, p. 37) pointed out, Maslow's model "is based heavily on Western and individualistic ideals of personal growth that de-emphasize the importance of relatedness in self-actualization." They argued that relatedness to other people is crucial at all levels of psychological development, especially in collectivistic cultures.
- (−) Maslow was too optimistic in his assumption that everyone has the potential to become self-actualized. The fact that the average British person spends 25 hours a week slumped in front of a television set suggests there are many people whose motivation for personal growth is not enormous!
- (−) Maslow didn't emphasize enough the importance of the environment in facilitating the development of self-actualization. In fact, individuals who become self-actualized usually owe much to environmental factors such as schooling, supportive parents, and interesting opportunities for training.

HUNGER MOTIVATION

It may seem as if it is easy to understand hunger and eating behavior. We start eating when our stomach and other parts of the body signal that the level of nutrients [nourishing substances] is too low, and we stop eating when our stomach is full. In fact, that is only a small part of what actually happens. For example, the fact that we generally eat *before* we experience much hunger suggests that basic physiological responses may not be all that important. Of particular significance, we often eat simply because it is the normal time for lunch or dinner. As Bolles (1990) pointed out, our wristwatch is one of the most important determinants of whether we feel hungry and start eating.

De Castro and de Castro (1989) found that social factors are important influences on eating behavior. Participants kept a diary record of all the food they ate and the number of other people present when they were eating. There were two key findings. First, the more people who were present, the more food the participants consumed. Second, the amount of food eaten was influenced by the time since the last meal for participants eating on their own, but not for those eating with other people. Thus, social factors were more important than the body's energy needs in determining how much food was eaten. Hetherington et al. (2006) shed light on why eating in the presence of others leads to more eating. They found that eating with friends increased energy intake by 18% compared to eating alone, and that eating alone while watching television increased energy intake by 14%. What happens is that people tend to eat more when they are *distracted* from attending to the food they are eating.

Standardized eating times are the norm, with work and social schedules being planned around them.

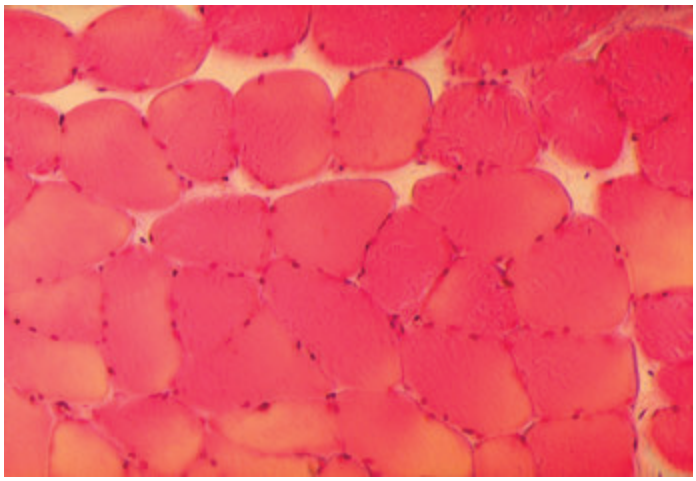
BASIC PROCESSES

There are more factors determining when, what, and how much we eat than you can shake a stick at. Here we will

consider only the most important ones. The body needs to turn food into energy, and glucose is a sugar playing a key role in energy utilization. Glucose is the main source of energy used by the brain, and the body can also make use of glucose as an energy source. It would be very dangerous if no glucose were readily available at any time. This danger is avoided because there is a storage system in the liver for excess glucose. More specifically, glucose molecules are combined to form a carbohydrate known as **glycogen**. When the need arises, the liver simply converts glycogen back into glucose molecules and releases them into circulation.

How is glucose turned into glycogen, and glycogen into glucose? A protein hormone in the pancreas known as insulin assists in the breakdown of glucose into glycogen. Another protein hormone in the pancreas (glucagon) assists in the breakdown of glycogen into glucose.

So far we haven't considered long-term energy storage. This is provided in the form of fat cells, which form part of what is known as adipose tissue. Some fat is present in the food we eat, but fat is also manufactured in the body from various nutrients including glucose. As overweight people know to their cost, when we eat more than is needed for current energy demands, some of the surplus is stored away in fat cells.



Magnification of the adipocytes (fat cells) that make up adipose connective tissue. Adipose connective tissue forms a thick layer under the skin, which insulates the body and acts as a reserve energy store.

Our discussion so far has minimized the fundamental importance of the protein hormone insulin in energy utilization. We have already seen that insulin is involved in converting glucose into glycogen. In addition, insulin is needed for the body to make use of glucose. If insulin is not available, our bodies are reliant on fatty acids to provide energy.

What roles do glucose, insulin, and adipose or fat tissue play in weight regulation? According to Woods, Seeley, Porte, and Schwartz (1998), weight regulation depends crucially on maintaining a relatively constant amount of adipose or fat tissue in the body. To achieve this, information about levels of adipose tissue must be transmitted to the brain and other regions having a direct influence on eating behavior and satiety. Two hormones (insulin and leptin) are heavily involved. **Leptin** is a protein hormone secreted by fat cells and is associated with reduced levels of eating.

According to the theory, insulin and leptin are both secreted in large amounts when the fat stores are larger than usual. However, they are secreted in small amounts when the fat stores are smaller than usual. Large amounts of insulin and leptin inhibit eating behavior, and so help to maintain a moderate body weight.

Findings

According to the theory, individuals with large fat stores should generally have higher levels of leptin and insulin. Considine et al. (1996) found that leptin levels were *four* times higher in obese people than in those of normal weight, and Venner, Lyon, and Doyle-Baker (2006) reviewed similar findings in obese children. Why don't such high levels of leptin lead obese people to reduce their food intake? Many obese individuals are relatively insensitive to leptin, which doesn't reduce their hunger in the way that it does with individuals of normal weight.

As predicted, insulin and leptin both act to reduce food intake. For example, Woods, Camacho-Hubner, Savage, and Clark (1996) found that the more insulin was injected into animals' brains, the greater the reduction in their food intake and body weight. In similar fashion, Campfield et al. (1995) found there was a decrease in hunger when the levels of leptin injected into the hypothalamus were high. Some of the most dramatic findings were reported by Farooqi et al. (2002). They studied three obese children who had suffered from leptin deficiency since birth. When given leptin therapy, these children showed very large reductions in weight. Their food intake when allowed to decide how much to eat at a given meal was reduced by up to 84%.

Key Terms

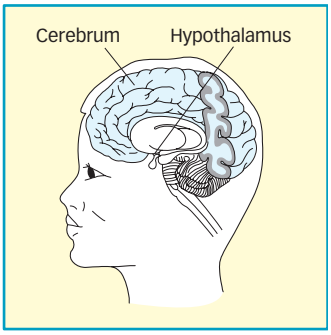
Glycogen:
a carbohydrate produced by combining glucose molecules to create an energy store.

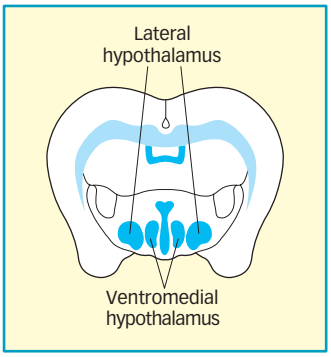
Leptin:
a protein secreted by fat cells that decreases feeding behavior.

How does leptin reduce hunger? Leptin and insulin both activate receptors in the hypothalamus, which plays an important role in eating behavior (see below). When leptin activates receptors in the hypothalamus, this inhibits the release of neuropeptide Y. **Neuropeptide Y** is a neurotransmitter stimulating hunger and eating behavior. Injections of neuropeptide Y into the hypothalamus cause satiated rats to start eating again immediately (Wickens, 2000). Repeated injections of neuropeptide Y into the paraventricular nucleus of the hypothalamus produce obesity within several days (Stanley, Kyrkouli, Lampert, & Leibowitz, 1986). The overall situation is complex: neuropeptide Y *increases* eating behavior, but this increase is prevented by leptin. As a result, leptin leads to a *reduction* in eating behavior and to a loss of body weight.

Evaluation

- (+) Overweight individuals typically have higher levels of leptin and insulin than those who are not.
- (+) Regulation of body weight in most people seems to depend on levels of insulin and leptin.
- (−) Obese individuals are often insensitive to the effects of leptin, but we generally don't know why that is the case.
- (−) It isn't known in detail how the system described in the theory interacts with other physiological processes underlying satiety.





Key Term

Neuropeptide Y: a neurotransmitter that increases feeding behavior.

BRAIN SYSTEMS

At one time, it was believed that *two* brain systems influence eating behavior. First, there was a brain system responsible for initiating food intake (the feeding center). This feeding center was allegedly based in the lateral [side] hypothalamus at the base of the brain (Anand & Brobeck, 1951). Second, there was a brain system responsible for cessation of feeding. It was known as the satiety center (meaning that it signaled that enough had been eaten), and was allegedly based in the ventromedial [bottom middle] hypothalamus (Hetherington & Ranson, 1940).

Perhaps predictably, matters are actually less simple than described in the previous paragraph. In this section, we will show that the traditional view of feeding and satiety centers based in different parts of the hypothalamus cannot account for several important findings. Note that much research has involved various species of mammals other than humans. It is generally assumed that the basic processes involved in eating behavior and weight regulation are very similar across nearly all mammals. However, this assumption may be only partially true.

Feeding center

If the feeding center is located in the lateral hypothalamus, then a lesion [deliberate cut] in that area should lead to a refusal to eat. Precisely that result was obtained by Anand and Brobeck (1951). Rats with lesions of the lateral hypothalamus stopped eating and rapidly lost weight. Teitelbaum and Stellar (1954) also found that lesions of the lateral hypothalamus in rats caused substantial reductions in eating. However, some of the rats began to eat again about a week after the operation, suggesting that other areas of the brain can be involved. These other brain areas include the frontal cortex and parts of the amygdala in the base of the brain (Rosenzweig, Leiman, & Breedlove, 1999).

More evidence that the lateral hypothalamus may be less crucial than originally thought was reported by Keesey and Boyle (1973) in a study on rats having lesions in that area. The lesioned rats maintained a lower body weight than healthy rats. However, both groups of rats responded in similar ways to manipulations of their diet. For example, lesioned and healthy rats both showed a substantial increase in body weight when only very rich food (eggnog) was available.

What are the effects of damage to the lateral hypothalamus on hunger in humans? Lesions or tumors of the lateral hypothalamus have variable effects on humans. However, such lesions often lead to considerable weight loss (White & Hain, 1959).

The lateral hypothalamus has a broader range of functions than simply acting as a feeding center. Pinel (2006) reviewed the research evidence, and concluded that, "LH [lateral hypothalamus] lesions produce a wide range of severe motor disturbances and a general lack of responsiveness to sensory input (of which food and drink are but two examples)."

Satiety center

If the satiety center is located in the ventromedial hypothalamus, then damage to this area should cause substantial weight gain. As predicted, rats with lesions in the ventromedial hypothalamus became obese (Hetherington & Ranson, 1940). Humans with a tumor in this part of the hypothalamus sometimes put on weight at the rate of over 10 kilos a month (Al-Rashid, 1971). However, their weight eventually reaches a plateau at a high level.

In spite of the above findings, we should reject the hypothesis that the satiety center is located in the ventromedial hypothalamus. First, rats with lesions in that area become obese, but strangely they don't seem very hungry in some ways. For example, lesioned rats given bitter-tasting food don't eat very much (Sclafini, Springer, & Kluge, 1976). Indeed, their body weight sometimes becomes *lower* than that of healthy rats exposed to the same bitter food.

Second, Hoebel and Teitelbaum (1966) found that lesions in the ventromedial hypothalamus produced complex effects. There was an initial dynamic phase (lasting 4–12 weeks), during which rats ate two or three times the normal amount of food. After that, there was a static phase. During that phase, the rats showed no further increase in body weight—they regulated their food consumption to maintain the weight reached at the end of the dynamic phase.

Third, it is not *only* damage to the ventromedial hypothalamus that produces larger increases in feeding. For example, Ahlskog, Randall, and Hoebel (1975) found large increases in body weight following damage to the ventral noradrenergic bundle running through the hypothalamus. Rats with damage to the paraventricular nucleus of the hypothalamus also put on substantial amounts of weight (Leibowitz, Hammer, & Chang, 1981).

Fourth, the pattern of feeding shown by rats with lesions in and around the ventromedial hypothalamus is not precisely as predicted. We would expect such rats to eat much larger meals than healthy ones because they have lost their satiety center. In fact, lesioned rats differ from non-lesioned ones in having *more* meals rather than *larger* ones (Hoebel & Hernandez, 1993).

What is the role of the ventromedial hypothalamus? According to Pinel (2006), the original notion that animals with lesions to the ventromedial hypothalamus become obese because they overeat is wrong. It is more accurate to say that such animals overeat because they become obese. King, Smith, and Frohman (1984) found that damage to the ventromedial hypothalamus produced a long-lasting increase in blood insulin levels leading to increased production of body fat. Since many of the calories ingested by lesioned animals are simply converted into fat, they have to eat large amounts of food to provide themselves with enough energy.

Hunger and cannabis

The brain produces naturally occurring cannabis-type compounds, called cannabinoids, and these compounds bind with brain receptors to give us normal hunger pangs. When cannabis is smoked or ingested the plant cannabinoids have a similar effect, giving rise to the strong hunger pangs sometimes called "the munchies." Scientists in France, the USA, and Britain have been working to produce drugs that block these receptors, thus suppressing hunger, and the British drug is currently being trialed as a possible treatment for obesity.

Overall Evaluation

- (+) The lateral hypothalamus plays a role in initiating eating behavior and the ventromedial hypothalamus has some involvement in the cessation of eating.
- (−) Initiation and cessation of eating both involve brain areas outside of the hypothalamus.
- (−) Lesions in the lateral hypothalamus reduce responsiveness to most sensory input including food and drink, and so that area is not simply a hunger center.
- (−) Animals with lesions in the ventromedial hypothalamus are "finicky, lazy and show exaggerated reactions to palatability [pleasantness of taste] . . . these findings do not square very well with the theory that the ventromedial hypothalamus is the brain's satiety center" (Wickens, 2000, p. 118).
- (−) Lesions to the ventromedial hypothalamus lead to increased blood insulin levels and production of body fat, and so this area can't accurately be described as a satiety center.

DIETARY VARIETY

You have probably had the experience of working your way through a three- or four-course meal. When you have finished, you may feel surprised how easy it was to eat much more food than usual. What is going on here? We typically consume more food when a meal contains plenty of variety in taste. This helps to explain why the courses served up in large meals generally contain a mixture of savory (salty or spicy) and sweet dishes.

A number of studies have concluded that increased dietary variety leads to increased consumption of food. The availability of a wide variety of high-calorie foods may have contributed to the increase in obesity in Western societies.

Evidence that dietary variety is important was provided by Rolls, van Duijvenvoorde, and Rolls (1984). Human participants were provided with a meal consisting of four courses. In the dietary variety condition, one course consisted of sausages, one of bread and butter, one of chocolate dessert, and one of bananas. In the other condition, participants were given four courses consisting of only one of these foods presented four times. Those participants exposed to dietary variety consumed 44% more food and 60% more calories than those receiving the same food throughout.

Lack of dietary variety can influence long-term eating patterns as well as short-term ones. For example, Cabanac and Rabe (1976) persuaded participants to consume only a vanilla-flavored diet for 3 weeks. There was an average weight loss of 3.12 kilos (7 pounds) over the three-week period.

Sensory-specific satiety

Why does dietary variety lead to greater food consumption? According to Rolls (1981), the main reason is **sensory-specific satiety**: the pleasantness of any given taste or flavor decreases progressively with continuous exposure to it. The effects are specific because there is generally no reduction in the perceived pleasantness of other tastes or flavors. Sensory-specific satiety encourages us to consume a varied diet, which helps to ensure that we have the full range of nutrients we need.

Key Term

Sensory-specific satiety: reduced pleasantness of any taste (or food smell) to which an individual has been repeatedly exposed.

Evidence for sensory-specific satiety was obtained by Rolls et al. (1984). They classified sausages, bread and butter, potato chips, and cheese and crackers as savory foods, and chocolate whipped dessert, yogurt, bananas, and oranges as sweet foods. When *one* of the sweet foods was eaten, this decreased the pleasantness ratings of *all* the

sweet foods, but had no effect on the pleasantness ratings of savory foods. In similar fashion, eating one of the savory foods reduced the pleasantness ratings of the other savory foods but not of the sweet ones.

Sensory-specific satiety was originally studied in connection with taste. However, it applies to other aspects of food as well. For example, Rolls and Rolls (1997) found sensory-specific satiety with respect to the smells of different foods. Rolls, Rowe, and Rolls (1982) asked participants to eat chocolate sweets of a given color. The rated pleasantness of chocolate sweets of that color decreased more than that of chocolate sweets of a different color even though the taste was the same. Thus, sensory-specific satiety extends to food color.

OBESITY

Obesity is defined as a body mass index (BMI) of more than 30. **Body mass index** is defined as weight in kilos divided by height in meters squared. Individuals with a BMI lying between 20 and 25 are of normal weight, and those with BMIs between 25 and 30 are overweight. Finally, those with BMIs over 30 are obese. BMI is limited in some ways. For example, professional footballers with highly developed muscles sometimes have a BMI that categorizes them as overweight!

There is an epidemic of obesity in the Western world. For example, in the United States, 22% of adults are obese and 54% are overweight (Hill & Peters, 1998). In the United Kingdom in 2003, 22% of men were obese and 43% overweight, and 23% of women were obese and 33% overweight (Zaninotto et al., 2006).

Most people assume that obesity poses extremely serious health risks. It is certainly true that obesity is associated with several health problems (e.g., high blood pressure; heart attacks; various cancers) (Wickelgren, 1998). However, we are talking about an *association*, which doesn't prove that obesity is the causal factor. For example, most obese individuals take less exercise than other people, and their lack of physical fitness may be important. Wickelgren discussed an American study in which it was found that unfit men of normal weight had twice the mortality of physically fit men who were obese or nearly so. Being obese and being physically unfit both contribute to physical ill-health and reduced longevity.

What causes obesity?

Genetic factors play a part in determining who does (and who doesn't) become obese. Maes et al. (1997) analyzed data from over 30 twin studies. Monozygotic or identical twins were much more similar to each other in weight and body mass than were dizygotic or fraternal twins, with genetic factors accounting for much of the variation in BMI across individuals. Plomin, DeFries, and McClearn (1997) found that 60–70% of identical twins were very similar in weight, compared to only 30–40% of fraternal twins. The much greater genetic similarity of identical twins than fraternal twins (100% vs. 50%, respectively) accounts for their much greater similarity in weight. In a study specifically on obesity, Bulik, Sullivan, and Kendler (2003) studied 2163 female twins. The key finding was that the heritability of obesity was 0.86, meaning that 86% of individual differences in obesity are attributable to genetic factors.

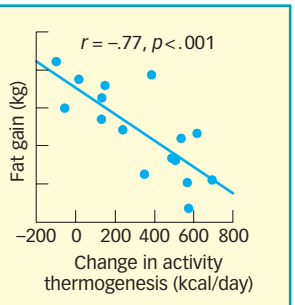
The notion that genetic factors are of prime importance in determining weight suggests that family environment should have little or no effect. Stunkard et al. (1986) considered the weight of adults adopted as infants. Their body weight wasn't correlated with that of their adoptive parents. However, it was highly correlated with the body weight of their biological parents, suggesting that genetic factors are more important than environmental ones.

Dramatic environmental changes can also have powerful effects on weight. The inhabitants of the island of Nauru used to have a very low standard of living. However, their island has rich supplies of seabird excrement, which has for many years been used by fertilizer companies as a source of phosphates. The Nauru islanders now have one of the highest standards of living in the world, and buy a wide range of expensive imported foods. As a result, large numbers of them became obese within a single generation (Gibbs, 1996).

Key Terms

Obesity: the condition of being substantially overweight, defined as having a **body mass index** exceeding 30.

Body mass index (BMI): an individual's weight in kilos divided by his/her height in meters squared; the normal range is between 20 and 25.



Fat gain following 8 weeks of overfeeding as a function of increases or decreases in non-exercise changes in thermogenesis (kcal/day). From Levine et al. (1999). Copyright © 1999 AAAS. Reproduced with permission.

Reduced amounts of exercise in Western countries help to account for the steep increase in obesity. Over the past 25 years or so, the average daily calorie intake in several Western countries has actually *decreased* (Hill & Peters, 1998). This hasn't led to a reduction in obesity because most people walk less and use cars more than ever. Exercise uses up energy (and therefore calories), and anyone will put on weight if the calories he/she consumes are greater than those used in energy expenditure.

A somewhat neglected factor is nonexercise activity thermogenesis, which is heat generated by activities such as fidgeting and the maintenance of posture. Levine, Eberhardt, and Jensen (1999) carried out a study in which volunteers were fed 1000 calories per day more than were needed for weight maintenance. Those individuals who had the lowest levels of nonexercise activity thermogenesis showed the greatest weight gain (see the figure on the left).

Finally, obese individuals typically have problems with **adipocytes**, which are body cells that store fat. There are two major kinds of problems. First, while most people have about 2.5 billion adipocytes, many obese individuals have a much larger number. Second, the fat cells in many obese individuals are enlarged rather than unduly numerous.

In sum, several factors are involved in obesity. Genetic factors are very important, but environmental factors (e.g., increased access to rich and fatty foods) also play a role. In addition, reductions in the amount of exercise taken by most people can lead to weight increases. Finally, most obese individuals store fat more readily than nonobese ones.

SEX AND SEXUAL BEHAVIOR

Human sex drive involves several biological factors (e.g., sex hormones). However, that is only part of the story. As Westen (1996, p. 387) remarked, "The primary sexual organ in humans is arguably not the genitals but the brain." In this section of the chapter, we initially consider biological influences on sexual behavior. After that, we focus on relevant psychological factors.

Key Terms

Adipocytes: body cells that store fat; overweight individuals often have many more of these cells than those of normal weight.

Gametes: sexual reproductive cells consisting of sperm in males and of eggs in females.

SEXUAL REPRODUCTION

Why does sexual reproduction exist? That may seem like an odd question, and you may well think that the answer is obvious. However, as Grier and Burk (1992, p. 319) pointed out there are several disadvantages associated with sex:

> *Sexual behavior involves the expenditure of large amounts of time and energy, and its conspicuousness often increases the risk of predation [being preyed upon] . . . Worst of all, from an evolutionary standpoint, sexual reproduction is a particularly ineffective method of passing on one's particular alleles [genes].*

What are the evolutionary advantages of sexual reproduction? The most important one is that sexual reproduction produces genetic diversity. As can be seen in large human families, two parents typically produce offspring differing significantly in height, shape, intelligence, and personality. This occurs in part because the precise genetic make-up of each child is different except in the case of monozygotic or identical twins. Environmental conditions often change in unpredictable ways, and genetic diversity maximizes the chances of the members of any given species coping with such changes.

Fertilization of a human egg by a sperm. An example of anisogamy, where the gametes of the two sexes are dissimilar.

Of fundamental importance to reproduction are **gametes**. These are sexual reproductive cells (eggs in females and sperm in males) that fuse together during fertilization. If any individual's genes are to be passed on directly to the next generation his/her gametes need to survive long enough for them to be involved in sexual reproduction. One strategy for achieving this is to produce a few large gametes designed to survive in an unfriendly environment. This strategy is used by females with their

eggs. Another strategy is to produce large numbers of very mobile gametes so that one or more of them may fertilize the female's egg before this is done by another individual. This strategy is used by males with their sperm.

Human females produce relatively few eggs, whereas males produce extremely large numbers of sperm. Indeed, there are enough sperm in a typical male ejaculation to fertilize 500 million females! Thus, each female gamete is much more valuable than each male gamete or sperm. Females can usually maximize their reproductive success by providing food and care for a relatively small number of offspring. In contrast, males can often maximize their reproductive success by fertilizing several females rather than by caring for their offspring (see Chapter 2).

Human females have a menstrual cycle lasting about 28 days, with ovulation (release of an egg from the ovaries) occurring in the middle of each cycle. Sexual intercourse has to occur around the time of ovulation to maximize the chances of conception. Most evidence suggests that women don't have more sex around the time of ovulation than at other points in the menstrual cycle. However, as Wallen (2001, p. 354) pointed out, what is true of sexual behavior isn't necessarily true of sexual desire:

Ovulation in humans is hidden but in many other species there is a visual manifestation of ovulation. For example, in the female chacma baboon (above) a swelling and reddening of the rump occurs around the time of ovulation. This indicates to the males that the female is sexually receptive.

> *The specific patterns of sexual behavior engaged in by women reflect an interaction between their level of sexual desire, which is affected by their hormonal state, the level of their partner's sexual desire, and the woman's or the couple's desire to avoid, or achieve, pregnancy.*

There is considerable evidence that women's sexual desire peaks around the time of ovulation. For example, Stanislaw and Rice (1988) asked married women to keep a daily record of their sexual desire over a 2-year period. The women expressed sexual desire much more frequently around the time of ovulation, with a steady increase in the days beforehand and a steady decrease afterwards. Pillsworth, Haselton, and Buss (2004) replicated that finding among women in long-term committed relationships who were not taking oral contraceptives. However, there was no peak in sexual desire around the time of ovulation for women not in a committed relationship.

Hormones and attractiveness

A small study in Texas (Davis, 2001) showed physiological and psychological changes when a woman is most fertile, but these changes relate to her attractiveness or sexiness. The female curvy shape becomes accentuated around ovulation as the breasts are more symmetrical and the waist shrinks by a centimeter or so. Figure-hugging clothing is chosen, which also reveals more skin, and more make-up is worn. The participants' diaries also showed increased thoughts about love and sex, decreased stress levels, more positive moods, and fewer headaches. Presumably all these effects are down to the balance of sex hormones at ovulation.

Orgasm

The experience of orgasm represents the peak of sexual pleasure during sexual intercourse. William Masters and Virginia Johnson (1966) directly observed and measured the sexual behavior of 700 people having intercourse to clarify the role of orgasm within the sexual response cycle. They identified four phases in this cycle:

1. *Excitement phase*: There is increased muscle tension, filling of blood vessels in the genitals, and sometimes flushing of the skin.
2. *Plateau phase*: This involves the highest level of arousal with maximum heart rate, muscle tension, and blood pressure.
3. *Orgasm phase*: During this phase, males release sperm and females experience vaginal contractions.
4. *Resolution phrase*: This phase involves a gradual return to normal psychological and physiological functioning.

Vance and Wagner (1976) found that the subjective experiences associated with orgasm were very similar in males and females. Indeed, psychologists and gynecologists couldn't distinguish between men's and women's descriptions of their orgasms. Here are two descriptions obtained by Vance and Wagner:

> *The feeling of orgasm in my opinion is a feeling of utmost relief of any type of tension. It is the most fulfilling experience I have ever had of enjoyment. The feeling is exuberant and the most enjoyable feeling I have ever experienced.*
>
> *An orgasm feels like heaven in the heat of hell; a tremendous build-up of pleasure that makes the tremendous work of releasing that pleasure worthwhile.*

One of those descriptions was written by a man and the other by a woman. Can you work out which is which? In fact, the first one was written by a woman and the second by a man.

Hormonal factors

There are two major classes of sex hormones: **androgens** and **estrogens**. The most common androgen is testosterone, and the most common estrogen is estradiol. Males have higher levels of androgens than estrogens, whereas the opposite is the case for females. This gender difference has led some people to describe androgens as "male hormones" and estrogens as "female hormones." This is misleading because males and females produce both types of hormones. However, the level of androgens is 10 times higher in men than in women, and the level of estrogens is 10 times higher in women than in men.

How important are sex hormones in influencing human sexual behavior? They are of some importance, but less so than in many other species. For example, estrogen levels in females are 10 times higher around the time of ovulation than at the start of the menstrual cycle. However, this large increase is associated with only small effects on sexual behavior and fairly modest effects on sexual desire. Evidence that estrogen levels can have a fairly large effect on women's sexual interest was reported by Sherwin (1991). Different groups of post-menopausal women were given varying amounts of estrogen. Those receiving the largest doses showed the greatest increases in sexual interest during the course of treatment. The effects of estrogen on male sexuality tend to be very small and inconsistent (see Bancroft, 2005, for a review).

There is strong evidence that androgens (especially testosterone) can influence male and female sexual desire. Bancroft (2005) discussed studies on hypogonadal men who do not produce sex hormones. Testosterone replacement therapy typically restores sexual desire and arousability, whereas withdrawal of testosterone leads to a reduction in sexual desire. However, most healthy men have sufficiently high testosterone levels that additional testosterone has little or no effect on their level of sexual desire.

Female sex drive may be determined more by androgens such as testosterone than by estrogens such as estradiol. Shifren et al. (2000) studied surgically menopausal women with low sexual desire and sexual satisfaction who were given estrogen. Those who also received a large dose of the androgen testosterone showed the greatest increase in sexual functioning. Segraves and Woodard (2006) reviewed the evidence on the treatment of

Key Terms

Androgens: sex hormones found in greater amounts in males than in females.

Estrogens: sex hormones found in greater amounts in females than in males.

Case Study: *Testosterone Replacement Therapy*

Additional evidence that sex hormones are important to male sexuality comes from studies of testosterone replacement therapy. For example, consider the case of a 38-year-old World War I veteran whose testes had been destroyed by a shell fragment. Testosterone replacement therapy had a dramatic effect on him: "Testosterone had resurrected a broken man to a manhood he had believed lost forever" (de Knuif, 1945, p. 100).

hypoactive sexual desire disorder [unusually low levels of sexual interest] in women. They concluded that, "The major evidence of efficacy concerns the use of testosterone therapy" (Segraves & Woodard, 2006, p. 408). Finally, Morris, Udry, Khan-Dawood, and Dawood (1987) found that frequency of intercourse in married women was associated much more with their testosterone levels than with their estradiol levels. In spite of these findings, it should be noted that the evidence generally indicates that there are substantial differences among women in terms of their responsiveness to testosterone (Bancroft, 2005).

In sum, sex hormones play some role in determining sexual desire and sexual behavior in men and women. However, psychological factors (e.g., availability of a sexually attractive member of the opposite sex) are generally far more important. The one major exception may be that women with high levels of testosterone experience higher levels of sexual desire and have more frequent sexual intercourse than other women.

EVOLUTIONARY PSYCHOLOGY

One of the most ambitious theoretical approaches to human sexuality is provided by evolutionary psychology (see Chapter 2). According to evolutionary psychologists, much of human behavior and cognition depends on evolutionary processes of natural selection. Evolutionary psychology has provided explanations for many of the differences in sexual attitudes and behavior between men and women. Of crucial importance is the notion that having sex can have much greater long-term consequences for a woman than for a man. In the words of Buss (1999, p. 102):

> *A man in evolutionary history could walk away from a casual coupling having lost only a few hours or even a few minutes. A woman in evolutionary history risked getting pregnant as a result, and therefore could have incurred the cost of that decision for years.*

The evolutionary approach could help to explain a striking difference between American male and female students reported by Clark and Hatfield (1989). Attractive male and female students approached students of the opposite sex, and said: "Hi, I've been noticing you around town lately, and I find you very attractive. Would you have sex with me?" This offer was received much more enthusiastically by male students. None of the female students accepted the invitation, whereas 75% of the male students did. Some of the men who refused offered their apologies (e.g., "My fiancée is in town at the moment").

According to evolutionary psychology, the fact that women typically have a much greater parental investment in their offspring than do men has important implications for their sexual behavior. More specifically, men in all cultures should be less attracted to monogamy and heavy emotional investment in relationships. This hypothesis was tested by Schmitt (2005) in a study in which the Sociosexual Orientation Inventory was administered to people in 48 countries. High scores on this questionnaire indicate a preference for promiscuity and avoidance of emotional investment. As predicted, men in every country had significantly higher sociosexual scores than women. However, the differences between men and women in sociosexual scores were less in countries in which there was reasonable equality of the sexes in terms of, for example, career opportunities. Women in such countries have access to money and to power, which may make their sexual attitudes and behavior more like those of men. Another possibility is that women in countries with reasonable equality are more likely than other women to have access to modern contraception and safe abortion.

GENDER DIFFERENCES IN SEXUALITY

Peplau (2003) argued that there are four important gender differences in sexuality: sexual desire; importance of committed relationships; sexuality and aggression; and sexual plasticity. We will consider all four briefly.

Key Study

Buss (1989): Cross-cultural support for the evolutionary account of mate choice

According to evolutionary psychology, people should select a mate who maximizes their chances of having offspring that will survive and procreate. Buss obtained findings from 37 cultures around the world which he claimed provided support for that prediction. Men in all 37 cultures said they would prefer a mate younger than they were, whereas women in 36 cultures (Spain was the exception) preferred men older than themselves. This can be explained by assuming that younger women are more likely to be able to have children, and older men are more likely to have the resources to be able to provide adequately for children. As expected, women rated good financial prospects in a potential mate as more important than did men.

There are two limitations with Buss's (1989) study. First, he only assessed preferences, and there can be a large gap between preferences and people's actual behavior. Second, there were large differences across cultures. In general, there were much smaller sex differences in mate preferences in more developed countries.

Discussion points

1. Does this research provide strong support for the evolutionary approach?
2. Why do you think that sex differences in mate preference vary between Western and non-Western cultures?

KEY STUDY EVALUATION

The findings of Buss (1989) are of key importance, but they are less clear cut than they seem for two main reasons. First, they do not actually show that sex differences in mate preference are consistent across cultures. In fact, there were much smaller sex differences in more developed cultures than in less developed ones on most measures, including preferred age differences, importance of financial prospects, and the value of chastity in a mate. Second, the sociobiological approach is more concerned with behavior than with the preferences assessed by Buss. In fact, the actual average age difference between husband and wife across cultures was 2.99 years, which is similar to the preferred age differences for males (2.66 years) and for females (3.42 years). However, it is by no means clear that there would be this level of agreement between preferences and behavior for the other measures obtained by Buss.

First, men are generally more interested in sex than women. For example, Oliver and Hyde (1993) found that men masturbate much more often than women. In addition, as Peplau (2003) pointed out, when heterosexual couples disagree about the frequency with which they have sex, it is typically the man who wants to have sex more often than the woman does.

Second, men are less concerned than women to express their sexuality within a committed relationship. As we saw earlier, Schmitt (2005) found that men in 48 different countries were more interested than women in promiscuity and in uninvolved sex. Oliver and Hyde (1993) found that men were much more accepting than women of casual premarital sex and extramarital sex.

Third, there is a much closer link between sexuality and aggression in men than in women. For example, men in heterosexual relationships are typically more assertive than women in initiating sexual interactions. Andersen, Cyranowski, and Espindle (1999) studied people's sexual self-concepts. Only men's sexual self-concepts were characterized by a dimension of aggression (e.g., being aggressive; being powerful).

Fourth, men have less sexual or erotic plasticity than women. According to Baumeister (2000, p. 348), "The female sex drive is more malleable [flexible] than the male, indicating

Women are promiscuous, naturally

"So many men, so little time!" The actress Mae West jested about it, but scientists—male ones anyway—are convinced they have proved it. Women—far from being naturally monogamous—are, like men, naturally promiscuous. Biologists believe that women are genetically programmed to have sex with several different men in order to increase their chances of healthy children.

This theory helps to explain the high incidence of mistaken paternity. One study suggested that as many as one in seven people may not be the biological child of the man he or she thinks is the father but other studies suggest the true figure is much lower.

Two recent reports have added to a growing body of evidence that females from across the animal kingdom—including birds, bees, fish, scorpions, crabs, reptiles, and mammals—are promiscuous. Promiscuity is suggested by the "good gene" theory, as shown in the great weed warbler. The female warbler may nest with a male with a small song repertoire but she will seek "extra-pair copulation" with males with big song repertoires, which tend to live longer. This way she gets the best offspring (from mate 2) and they are looked after (by mate 1).

"We don't all get the exact partner we want, we make some kind of compromise. That's true of humans as well. A woman might find a man who is good at providing food and looking after children, but she doesn't necessarily want him to be the father of her kids," says Tim Birkhead, professor of evolutionary psychology.

The only comfort that men can take from the animal world is that females have an incentive not to have all their offspring from adulterous liaisons.

"If they are totally unfaithful to their social partner, they might just be abandoned," said Birkhead.

Adapted from A. Brown (2000). "Women are promiscuous, naturally." The *Observer*, 3 September.

higher average erotic plasticity. More precisely, female sexual responses and sexual behaviors are influenced by cultural, social, and situational factors to a greater extent than male." Evidence in line with this hypothesis was reported by Barry and Schlegel (1984). They reviewed findings on adolescent sexual behavior in 186 cultures, and found that females showed greater cross-cultural variation than males on all their measures of sexual behavior. According to the erotic plasticity hypothesis, genetic factors should influence male sexuality more than female sexuality. Evidence relevant to this prediction was reported by Dunne et al. (1997). They studied age at first intercourse among people growing up after the "sexual revolution" of the 1960s. Genetic factors accounted for 72% of individual differences among males in age at first intercourse compared to only 40% in females.

Women's sexual orientations

Veniegas and Conley (2000) evaluated the available scientific evidence on factors influencing female homosexual behavior. They point out that only gay male brains have been studied. Only one pair of female twins raised apart has been studied for sexual orientation, and no genetic markers for lesbian behavior have been found. The public belief that exposure in utero to abnormal hormone levels leads, in females, to lesbian behavior is challenged by empirical research, which shows the great majority to be heterosexual in behavior and also in their fantasies. Levels of hormones and body shape and type are also unrelated to sexual orientation. This seems to mean that we know quite a lot about what does not affect sexuality, but not much about what does!

In sum, as Peplau (2003, p. 39) concluded, "The size of gender differences [in sexuality] tends to be large . . . These differences are pervasive, encompassing thoughts, feelings, fantasies, and behavior."

WORK MOTIVATION AND PERFORMANCE

A high level of motivation is essential for success in academic courses and in a career. In this section, we consider the relationship between work motivation and performance. Any given individual's level of work motivation depends on several factors. For example, his/her personality makes a difference. Workers' motivation also depends on whether they feel fairly treated, on the amount of support and encouragement provided by their employers, and so on. According to Bandura, the individual's belief in his/her ability to perform a given task also important (see Chapter 12).

In order to succeed in an academic course a high level of motivation is needed!

However, what most determines our level of performance on a task or at work is the goals we set ourselves. Accordingly we will focus on goal-setting theory, which has probably been the most influential approach to work motivation. According to Mitchell and Daniels (2003, p. 231), "It [goal-setting theory] is quite easily the single most dominant theory in the field, with over a thousand articles and reviews published on the topic in a little over 30 years."

GOAL-SETTING THEORY AND BEYOND

Goal-setting theory was originally put forward by Edwin Locke (1968) and subsequently modified (e.g., Locke & Latham, 1990, 2002, 2006). It has probably been the most influential approach to work motivation. What are the key assumptions of goal-setting theory? First, it is assumed that conscious goals have a major impact on people's motivation and behavior. A goal is "the object or aim of an action, for example, to attain a specific standard of proficiency, usually within a specified time limit" (Locke & Latham, 2002, p. 705). Ideally, the goal should be "specific, measurable, attainable, relevant, and have a time-frame (SMART)" (Latham, 2003, p. 309). We can generally discover what an individual's goal is by direct questioning.

Second, it is assumed that there is a straightforward relationship between goal difficulty and performance. According to Locke (1968, p. 162), "the harder the goal the higher the level of performance." The reason is that individuals try harder and show more persistence when they have set themselves difficult goals.

Third, Locke (1968) argued that task performance also depends on goal commitment, which is the determination to reach the goal. According to the theory, high performance occurs only when goal difficulty *and* goal commitment are both high. Goal commitment is especially important when goals are difficult, because such goals require high levels of effort and are associated with smaller chances of success than easy goals. Expressed differently, the beneficial effects on performance of setting high goals are greater when goal commitment is high than when it is low. These assumptions lead to the predictions shown in the figure on the following page.

Findings

In an early test of goal-setting theory, Latham and Yukl (1975) studied workers whose job involved cutting and transporting wood. The workers were divided into three kinds of groups:

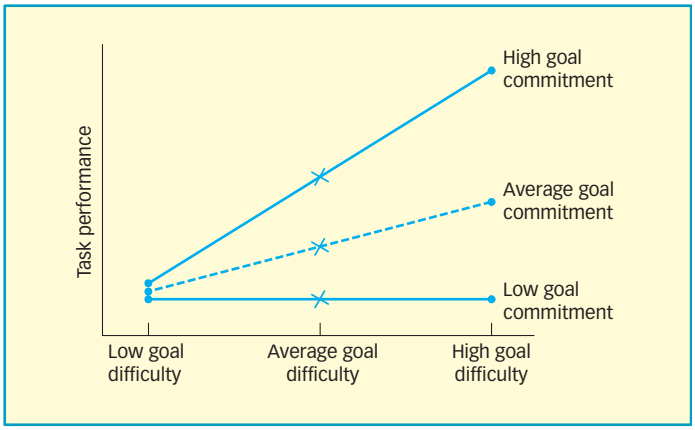
1. Groups simply instructed to "do your best" (do-your-best groups).
2. Groups assigned to a specific hard goal in terms of cubic feet of wood per week (assigned groups).
3. Groups in which everyone participated in setting a hard production goal (participative groups).

Latham and Yukl (1975) found that the do-your-best groups set the easiest goals, and so were predicted to have the poorest work performance. In contrast, the participative groups set the hardest goals, and so were predicted to perform the best. In line with the predictions, the do-your-best groups averaged 46 cubic feet, the assigned groups averaged 53 cubic feet, and the participative groups averaged 56 cubic feet. These differences may not seem large. However, the work performance of the participative groups was almost 22% higher than that of the do-your-best groups and any company would be delighted to increase the productivity of its workers by 22%! For example, assigning truck drivers a hard goal involving increasing their daily trips of logs to the mill produced savings of 2.7 million dollars (over £1.4 million) in 18 weeks (Latham & Saari, 1982).

Latham and Brown (2006) investigated the academic performance of students doing an MBA (Master's in Business Administration). Some of the students set themselves vague

general goals (e.g., performing well at the end of the program), whereas others set themselves hard, specific goals (e.g., learn to network; master key course subject matter). Those who set themselves hard, specific goals performed better and had higher satisfaction with their course than did those setting themselves general goals.

Klein et al. (1999) carried out a meta-analysis of studies on the effects of goal setting and goal commitment to task performance. The pattern of the findings was as predicted from goal-setting theory (see figure on the right). Higher levels of goal commitment were associated with higher levels of performance, especially when goal difficulty was high. Various factors influenced the level of goal commitment. Two of the key factors were attractiveness of goal attainment and expectancy of goal attainment provided that the individual applied reasonable effort. Other factors producing high levels of goal commitment were having high ability, being personally involved in the setting of the goal, and receiving performance feedback.



The effects of goal difficulty and goal commitment on task performance according to Locke's goal-setting theory. From Klein, Wesson, Hollenbeck, and Alge (1999). Copyright © American Psychological Association. Reproduced with permission.

There is considerable support for the theory, as was emphasized by Locke and Latham (2006, p. 265): "Support for goal-setting effects has been found on more than 88 different tasks, involving more than 40,000 male and female participants in Asia, Australia, Europe, and North America . . . Goal effects have been found in both laboratory and field settings, using both correlational and experimental designs." In spite of this success, there are various limitations with goal-setting theory. Two of the most important ones are discussed below.

First, most of the research on the theory has involved situations in which a single, specific task is performed over a short period of time in the absence of distractions. In contrast, as Yearta, Maitlis, and Briner (1995, p. 239) pointed out, "Employees in organizations are often trying to achieve multiple goals simultaneously, in the midst of many other distractions, and over an extended period of time . . . 54 per cent of organizations surveyed set performance requirements over a six- to 12-month period." Do these differences matter? They probably do. Yearta et al. studied scientists and professional staff working at the research center of a large multi-national company. Within that organization, work performance was *negatively* related to goal difficulty, which is diametrically opposite to the prediction from goal-setting theory.

Second, the theory focuses on factors (e.g., goal setting; goal commitment) that influence motivation and performance. However, that is nothing like the whole story. There are clearly individual differences in the difficulty level of the goals that people set themselves and in their commitment to those goals. We all know some people who are consistently well-motivated, committing themselves to difficult goals, whereas other people are very poorly motivated. Any complete theory would include an analysis of relevant individual-difference variables. As yet, there has been relatively little progress in this area. However, Locke and Latham (2006) argued that goal commitment is influenced by individual differences in self-efficacy (expectations concerning one's ability to perform a task successfully).

Motivation and children's behavior

A study in Beijing has shown that high motivation links to a reduction in noncompliant behavior. In this study 216 preschool children were videotaped as they played with a familiar toy. A novel toy was available, but the children had to wait before being allowed to play with it. The most compliant, and perhaps the most motivated, children were the girls. According to Alderfer (1969), this could mean that the boys found the wait more frustrating, and redirected their focus elsewhere in a noncompliant way.

We have discussed two major limitations with goal-setting theory. In what follows, we consider ways of addressing these limitations.

Implementation intentions

As we have seen, the complex issue of how people can move from goal setting to goal attainment in a world full of complications and distractions is de-emphasized within goal-setting theory. Gollwitzer has focused on precisely this issue. His key concept is that

of **implementation intentions**, which "specify the when, where, and how of responses leading to goal attainment" (Gollwitzer, 1999, p. 494). Suppose a student called Natalie has set herself the goal of spending 4 hours on a given Saturday revising for a forthcoming exam. However, there are obstacles in the way. Natalie normally chats for several hours a day with her flatmates, and she also likes to watch television. Thus, there is a real danger that Natalie will be distracted from her studies, and so finish up doing much less revision than she intended.

How can Natalie ensure her revision gets done? According to Gollwitzer's (1999) theory, this is where implementation intentions come in. Two possible implementation intentions are as follows: (1) "When one of my flatmates knocks on the door, I will tell her that I'll see her in the pub at 8 o'clock"; (2) "If I discover there's something interesting on television, I'll ask my flatmates to video it so I can watch it later." According to Gollwitzer, most goals are much more likely to be attained if individuals form implementation intentions.

Evidence supporting the importance of implementation intentions was reported by Gollwitzer and Brandstätter (1997). Participants were given the goal of writing a report on how they spent Christmas Eve within the following 2 days. Half the participants formed implementation intentions by indicating when and where they intended to write the report. The goal of writing the report very shortly after Christmas was achieved by 75% of those who formed implementation intentions but by only 33% of those who didn't.

Implementation intentions have been found to increase the chances of people achieving health-related goals. For example, Orbell, Hodgkins, and Sheeran (1997) studied women who reported strong goal intentions to perform a breast self-examination during the next month. Of those women told to form implementation intentions, 100% performed the breast self-examination compared to only 53% of women not forming such intentions. In similar fashion, Armitage (2004) found that people were more successful in reducing their fat intake over a 1-month period if they had formed an implementation intention (e.g., "I will eat only low-fat food for lunch every day starting tomorrow").

Why are implementation intentions so effective in enhancing the chances of people achieving their goals? According to Gollwitzer (1999), forming an implementation intention is like creating an "instant habit." Our habits (e.g., always going for lunch at 1 o'clock; always having a Coke in the Student Union) are reliably triggered by relevant cues providing information about *when* and/or *where* certain actions occur. In a similar way, implementation intentions specify where and when we are going to initiate behavior to attain our goal.

Individual differences: Core self-evaluations

Which kinds of people are highly motivated and generally commit themselves to hard goals? Various answers have been proposed. For example, it seems reasonable that individuals high in conscientiousness (one of the Big Five personality factors—see Chapter 12) should be highly motivated. Barrick and Mount (1993) found that sales representatives high in conscientiousness set themselves harder goals (and were more committed to them) than those low in conscientiousness. As predicted, conscientiousness was positively associated with work performance.

Judge, Locke, and Durham (1997) adopted an alternative approach to individual differences in motivation based on core self-evaluations (the basic evaluations individuals make about themselves). They argued that four personality traits are of direct relevance to core self-evaluations. First, there is self-esteem, which reflects the overall value one places on oneself as a person. Second, there is emotional stability (low neuroticism), which indicates the tendency to be confident and secure. Third, there is internal locus of control, with internals believing they can control numerous factors in their lives. Fourth, there is generalized self-efficacy, which is the ability to perform effectively and to be successful.

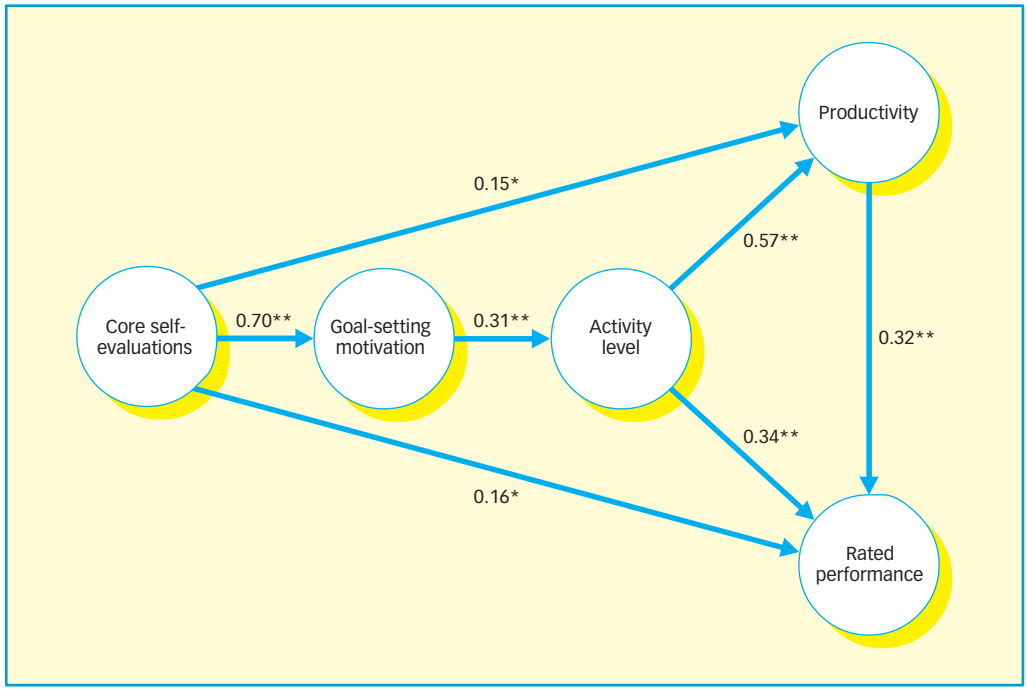
Judge et al. (2002) found that all four traits correlated moderately highly with each other, suggesting they were assessing the same underlying construct (i.e., core self-evaluations). As a result, Judge, Erez, Bono, and Thoresen (2003) developed a measure of core self-evaluations called the Core Self-Evaluations Scale. This scale correlated highly with all four personality traits.

Key Term

Implementation intentions: intentions specifying in detail how an individual is going to achieve some goal.

Judge and Bono (2001) carried out meta-analyses to assess the ability of the four personality traits underlying core self-evaluations to predict job performance. All of the correlations were significantly positive: self-esteem correlated +.26 with job performance, generalized self-efficacy correlated +.23, internal locus of control correlated +.22, and emotional stability correlated +.19.

Erez and Judge (2001) found that the core self-evaluations factor correlated +.35 with task performance in a laboratory study. In a second study, they considered the job performance of insurance agents. Core self-evaluations correlated +.44 with supervisory ratings of job performance and +.35 with sales volume. Of particular relevance here, core self-evaluations correlated +.42 with goal setting and +.59 with goal commitment. When they combined goal setting and goal commitment into a single measure of goal-setting motivation, Erez and Judge (2001) found that core self-evaluations influenced goal-setting motivation, which influenced activity level (e.g., phone calls to prospective clients; number of interviews with clients), which influenced productivity (i.e., sales volume) and rated performance (see the figure below). Thus, the beneficial effects of high core self-evaluations on performance occur mainly because they lead individuals to adopt hard goals and to be committed to them.



The estimated relationships of core self-evaluations to goal-setting motivation, activity level, productivity, and rated performance. The numbers indicate the strengths of each relationship. From Erez and Judge (2001). Copyright © American Psychological Association. Reproduced with permission.

Overall Evaluation

- + Goal setting and goal commitment both partially determine the level of work performance as predicted by goal-setting theory.
- + Highly motivated workers set themselves higher goals and are more committed to them than are other workers.
- + Goal-setting theory could be made more comprehensive by including implementation intentions and core self-evaluations within its scope.
- − Goal-setting theory in its present form is less applicable within work organizations than in the laboratory. This is partly because it doesn't emphasize enough the processes (e.g., implementation intentions) intervening between goal setting and goal achievement.

- An individual's goals and his/her commitment to them are seen as corresponding to his/her conscious intentions. However, people's motivational forces are not always accessible to conscious awareness.
- Goal-setting theory focuses too much on cognitive factors associated with motivation and not enough on emotional factors. For example, some people are very motivated because they fear failure or because they anticipate experiencing pride or joy if they succeed.

Chapter Summary

Maslow's hierarchical theory

- According to Maslow, we have a hierarchy of needs with deficiency needs at the bottom and growth needs at the top.
- At the very top of the hierarchy of needs is self-actualization. Self-actualized individuals realize their potential, accept themselves, are creative, and have many peak experiences.
- There is evidence that those whose lower needs are satisfied are more likely to focus on higher needs as predicted by the theory.
- Maslow's approach to self-actualization has an excessive focus on individual growth and de-emphasizes the importance of relatedness.

Hunger motivation

- Weight regulation involves maintaining a relatively constant amount of fat tissue in the body. Two hormones (leptin and insulin) are secreted in large amounts when the fat stores are larger than usual; these hormones inhibit eating behavior.
- It used to be argued that there is a feeding center in the lateral hypothalamus. In fact, this area has broader functions. It is responsible for sensory input of many kinds including food and drink.
- It used to be argued that there is a satiety center located in the ventromedial hypothalamus. Animals with lesions in that area become obese. However, this is because they need to eat large amounts of food to provide themselves with enough energy rather than because it is a satiety center.
- Obesity depends to a large (!) extent on genetic factors. Easy access to fatty foods, lack of exercise, and little nonexercise activity thermogenesis are other contributory factors.

Sex and sexual behavior

- The most important evolutionary advantage of sexual reproduction is that it produces genetic diversity.
- The sexual response cycle consists of successive excitement, plateau, orgasm, and resolution phases.
- Sexual desire in humans is only modestly influenced by sex hormones such as testosterone and estradiol. Female sex drive may be influenced more by "male hormones" than by "female hormones."
- According to evolutionary psychologists, the fact that women typically have a much greater parental investment in their offspring than men means that women are less interested in casual sex and in promiscuity. This has been found in virtually every culture.
- There are several gender differences in sexuality. On average men have more sex desire than women, men are less concerned about having committed relationships, men associate aggression more closely with sexuality than do women, and men have less erotic or sexual plasticity than women.

Work motivation and performance

- According to goal-setting theory, performance depends on the difficulty of the goals we set ourselves and our commitment to those goals.
- There is considerable support for the theory, especially when a single task is performed over a short period of time in the absence of distraction.
- One of the omissions from goal-setting theory is the notion of implementation intentions. These consist of detailed strategies for achieving goals and resemble "instant habits."
- Individuals who set themselves difficult goals and commit themselves to those goals are often high in core self-evaluations. Such individuals have high self-esteem and high emotional stability.
- Goal-setting theory focuses too much on cognitive factors associated with motivation and not enough on emotional factors.

Further Reading

- Kalat, J.W. (2004). *Biological psychology* (8th ed.). Pacific Grove, CA: Brooks/Cole. Reasonably detailed accounts of most of the topics discussed in this chapter are contained in this well-written textbook.
- Latham, G.P., & Pinder, C. (2005). Work motivation theory and research at the dawn of the twenty-first century. *Annual Review of Psychology*, *56*, 485–516. This article contains a good review of theories of work motivation including goal-setting theory.
- Locke, E.A., & Latham, G.P. (2006). New directions in goal-setting theory. *Current Directions in Psychological Science*, *15*, 265–268. This article provides a short and readable account of goal-setting theory.
- Pinel, J.P.J. (2006). *Biopsychology* (6th ed.). Boston: Allyn & Bacon. This textbook provides reader-friendly accounts of key topics in motivation.
- Reeve, J. (2005). *Understanding motivation and emotion* (4th ed.). Hoboken, NJ: Wiley. Most of the main topics in motivation are dealt with at length in this textbook.
- Rosenzweig, M.R., Breedlove, S.M., & Leiman, A.L. (2004). *Biological psychology: An introduction to behavioral, cognitive, and clinical neuroscience* (4th ed.). Sunderland, MA: Sinauer Associates. There are readable and fairly comprehensive accounts of biological approaches to motivation in this textbook.
- Wade, C. (2005). *Psychology* (8th ed.). New York: Prentice Hall. Chapter 12 in this introductory textbook is devoted to motivation, including a discussion on hunger and sexual motivation.

Chapter 4

Contents

4

Emotion, stress, and coping

Most (or even all!) of the really important events in our lives are associated with high levels of emotion. When we embark on a new relationship we feel excited, when we pass major examinations we feel elated, when we fail to achieve something we had set our heart on we feel depressed, and when someone close to us dies we experience overpowering grief. Thus, emotions play a central role in our lives. We start this chapter with a discussion of research and theory on emotion. After that, the focus shifts to stress. Among the issues considered are an assessment of the effects of stress on our physical health and ways of coping with stress.

PSYCHOLOGY OF EMOTION

What is emotion? According to Watson and Clark (1994, p. 89):

> *[Emotions] we can define as distinct, integrated psychophysiological response systems . . . An emotion contains three differentiable response systems: (1) a prototypic form of expression (typically facial), (2) a pattern of consistent autonomic changes, and (3) a distinct subjective feeling state.*

We will apply the above definition to fear. When someone is fearful, they typically have a particular expression on their face. The eyebrows are raised and close together, the eyes are opened wider than usual, the lips are pulled back, and there is tension in the lower lip. So far as the second component of emotion is concerned, fear is associated with a substantial increase in autonomic nervous system activity (e.g., sweating; faster heart rate). Finally, fearful individuals describe their subjective feeling state as "nervous," "frightened," and "scared to death."

HOW MANY EMOTIONS ARE THERE?

The question, "How many emotions are there?" sounds easy. Alas, there is little agreement on the answer, in part because the question is ambiguous. When answering the question, we can focus either on the number and nature of *basic* emotions or we can also include *complex* emotions derived from the basic ones. In either case, the boundary between one emotion and another is often fuzzy. Indeed, we sometimes find it hard to decide which emotion we are experiencing!

In what follows, we consider only the basic emotions. In doing so, we focus on three main kinds of evidence: (1) facial expressions; (2) self-reports; and (3) brain systems.

Facial expressions

We all display many facial expressions, and it seems reasonable to assume that each of our basic emotions has its own distinctive expression. Ekman, Friesen, and Ellsworth

Facial expressions associated with emotion are generally recognized across cultures, suggesting that the expressive aspect of emotion is innate.

(1972) reviewed the literature on facial expressions and emotion. They concluded that observers can reliably detect six emotions in faces: happiness; surprise; anger; sadness; fear; and disgust combined with contempt.

Nearly all the studies reviewed by Ekman et al. (1972) were carried out in Western societies and are thus limited in scope. Accordingly, Ekman et al. (1987) carried out cross-cultural research on facial expressions in 10 different countries (Estonia, Germany, Greece, Hong Kong, Italy, Japan, Scotland, Sumatra, Turkey, and the United States). The findings were very similar across all cultures, suggesting that the six emotions identified by Ekman et al. (1972) are universal.

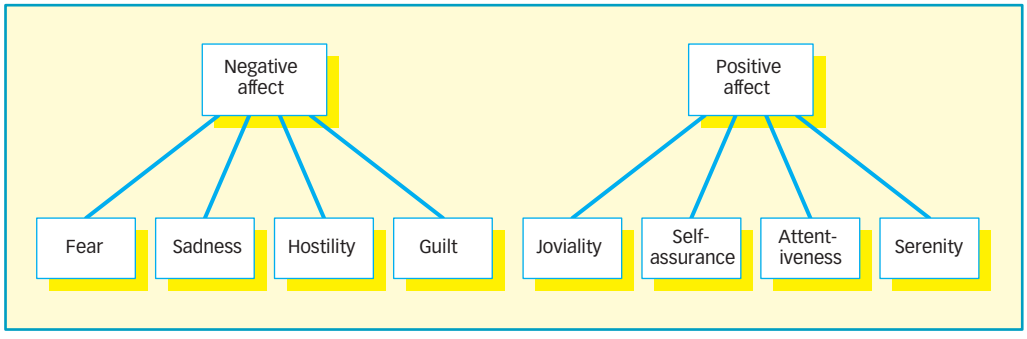
Much research on facial expressions is rather narrow and artificial. Individuals typically follow instructions about which muscles to contract to produce the facial expressions characteristic of various emotions. When they have succeeded, photographs are taken and presented to observers. Apart from its artificiality, this type of research is limited because it ignores two of the three main components of emotion (i.e., autonomic changes; subjective feeling state). Levenson, Ekman, and Friesen (1990) addressed the above issues. Participants moved their facial muscles to produce certain expressions while their autonomic activity was measured. They also described the emotions they experienced. Voluntarily producing various facial expressions generated real emotions in which all three emotion components (expression; autonomic changes; subjective feeling state) were present. Of most importance, participants mostly reported experiencing the predicted emotional states associated with the various facial expressions.

The greatest limitation with Ekman's approach is that there are no good reasons for assuming that *all* emotions are associated with a readily identifiable facial expression. As a result, Ekman has omitted some important emotions. For example, Sabini and Silver (2004) argued persuasively that jealousy and love should be regarded as emotions. As they pointed out, "The short answer to why love and jealousy are missing from [Ekman's] list is that they do not have unique facial expressions; there is no facial expression that all and only jealous people have, or that all and only people experiencing love have" (Sabini & Silver, 2004, p. 700).

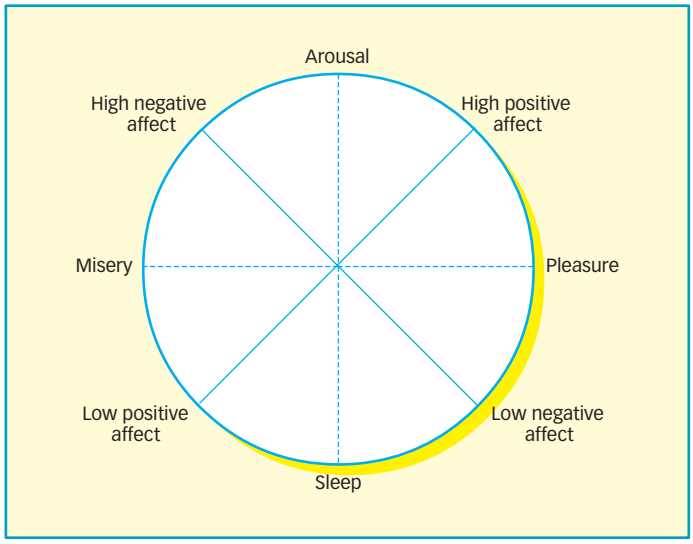
Self-report approach

We can address the issue of the number of emotions by using self-report inventories. These inventories typically consist of numerous adjectives (e.g., sad, lonely, happy, nervous, irritable), and participants indicate those indicating their feelings "at this moment." The Positive and Negative Affect Schedule (PANAS-X; Watson & Clark, 1994) measures 11 different emotions or moods (fear, sadness, hostility, guilt, shyness, fatigue, surprise, joviality, self-assurance, attentiveness, and serenity). However, as we will see, that doesn't necessarily mean there are 11 basic emotions. Many of the scales correlated highly with other scales, suggesting that they are measuring similar emotional states.

A two-level hierarchical model of emotion. Based on Watson and Clark (1992).



Watson and Tellegen (1985) and Watson and Clark (1992) argued that the evidence was consistent with a hierarchical model (see the figure on the left). In this model, there are several correlated (but distinguishable) emotional states at the lower level. At the upper level, there are two broad and independent factors called Negative Affect and Positive Affect. All emotional or mood states can be related to the two-dimensional structure formed by Negative and Positive Affect. You probably find it difficult to think of positive and negative affect as being *independent* of each other rather than as *opposites*. Russell (e.g., Barrett & Russell, 1998) proposed a two-dimensional model of emotion more in line with our intuitions. According to this model, there are two independent dimensions: (1) pleasure–misery; and (2) arousal–sleep. The first dimension concerns the type of emotional experience (i.e., pleasurable or displeasurable) and the second dimension concerns its intensity. This model seems rather different from the one put forward by Watson and Tellegen (1985) but is actually remarkably similar (see the figure on the right). Detailed analyses of findings using emotion questionnaires indicate that these two models are alternative descriptions of the same two-dimensional space (Russell & Barrett, 1999).



The two-dimensional framework for emotion showing the two dimensions of pleasure–misery and arousal–sleep (Barrett & Russell, 1998) and the two dimensions of Positive Affect and Negative Affect (Watson & Tellegen, 1985). Based on Barrett and Russell (1998).

Brain systems

Panksepp (2000, p. 143) argued that the brain is of special importance in distinguishing among emotions. He proposed that our main emotions are based on various circuits involving the limbic area and the midbrain. He identified seven basic emotional systems centered on the brain:

- Seeking/expectancy
- Rage/anger
- Fear/anxiety
- Lust/sexuality
- Care/nurturance
- Panic/separation
- Play/joy.

We can compare this list with the one proposed by Ekman et al. (1972; discussed above) on the basis of facial expressions. The good news is that three of the emotions identified by Ekman et al., namely, anger, fear, and happiness, are very similar to emotions identified by Panksepp (2000). The bad news is that there is otherwise practically no overlap! Ekman et al. also identified surprise, sadness, and disgust, which are simply missing from Panksepp's list.

HOW USEFUL ARE EMOTIONS?

It is popularly believed that negative emotions such as anxiety and depression are useless and undesirable. That belief is understandable for various reasons. First, no one wants to become anxious or depressed. Second, emotions often disrupt our current activities and behavior. Third, as Keltner and Gross (1999, pp. 467–468) pointed out, emotions "generally lack the logic, rationality, and principled orderliness of reason and other cognitive processes."

Case Study: *Phineas Gage*

The link between brain damage and emotions was famously demonstrated in the case of Phineas Gage, who was working on the construction of a railway. On September 13, 1848, he had a terrible accident, in which an explosion caused a large iron rod to enter his skull close to his left eyebrow and to exit through the top of his head. The force of the explosion was such that the iron rod landed 30 meters away! Gage survived this accident, and eventually showed good physical recovery. However, the accident changed his personality, making him much more aggressive and irritable than before, and unable to make long-term plans. After his death, Gage's skull was kept in a museum at Harvard Medical School, and was re-examined by Damasio, Grabowski, Frank, Galaburda, and Damasio (1994) using neuroimaging techniques involving computer simulation. They concluded the brain damage Gage suffered was in both frontal lobes, especially the left orbitofrontal cortex.

Danger causes anxiety, which produces an epinephrine (adrenaline) rush. This is adaptive as it enables the person to react quickly to avoid the danger.

In spite of the above arguments, the dominant view nowadays is that emotions are useful and serve valuable functions. For example, anxiety is associated with selective attention to threat-related stimuli, and rapid detection of danger can be extremely valuable in threatening environments (Eysenck, 1992). In addition, the increased physiological activity associated with fear and anxiety is useful because it prepares the individual for fight or flight. Lee, Wadsworth, and Hotop (2006) found another advantage. Individuals rated as highly anxious by their teachers at the age of 13 were much less likely than those rated as nonanxious to die in accidental circumstances before the age of 25 (0.1% vs. 0.7%, respectively). Anxious individuals are more cautious and so more inclined to avoid taking risks than their less anxious counterparts.

According to Watson and Andrews (2002), depression is caused by an important loss, and serves two valuable functions. First, it increases the focus on accurate analysis and solution of major problems facing the individual. Second, the obvious distress and unhappiness displayed by depressed individuals may help to persuade other people to help them. As predicted, recovery from depression is speeded up when depressed individuals have strong social support (e.g., Brugha et al., 1997). This approach minimizes the downside of depression. It is associated with very low levels of energy and motivation, which is hardly the ideal state for engaging in complex social problem solving! In addition, depressed people who make their partner's life a misery often find themselves losing their partner rather than receiving the help they seek.

Oatley and Johnson-Laird (1987) focused on the positive functions of emotions in their influential theory. They identified five basic emotions, and argued that each one occurs at a key point with respect to a current goal or plan:

1. *Happiness*: Progress has been made on a current goal.
2. *Anxiety*: The goal of self-preservation is threatened.
3. *Sadness*: The current goal can't be achieved.
4. *Anger*: The current goal is frustrated or blocked.
5. *Disgust*: A gustatory [taste] goal is violated.

An unconscious subjective emotional response

Murphy and Zajonc (1996) have found that subliminal viewing of smiling faces produces a measurable rise in positive frame of mind—a 4 millisecond presentation is too short-lived to reach the conscious mind, and yet it makes the viewer happier. This positive emotion then influences the viewer's response to other things, i.e., their mood.

According to Oatley and Johnson-Laird (1987), emotions serve the crucial function of influencing individuals to pursue whatever goal has the greatest survival or other value in the current situation. For example, happiness encourages the individual to continue with the current goal. In contrast, sadness leads people to abandon their current (unachievable) goal and to conserve energy so they can subsequently pursue a more realistic goal. Anxiety motivates individuals to deal with threats to the achievement of some important goal.

You may still not be convinced that all emotions are useful, especially if you consider that negative ones can be disruptive and unpleasant. Levenson (1999, p. 496) made an interesting attempt to bridge the gap between the emotions-are-useful and the emotions-are-disruptive positions: "Viewed from the perspective of what we were trying to accomplish prior to the emotion taking hold, the subsequent emotional behaviour may appear chaotic and *disorganized*. But, viewed from the perspective of the survival of the organism, the emotional behavior represents an elegant, adaptive, and highly *organized* state of affairs."

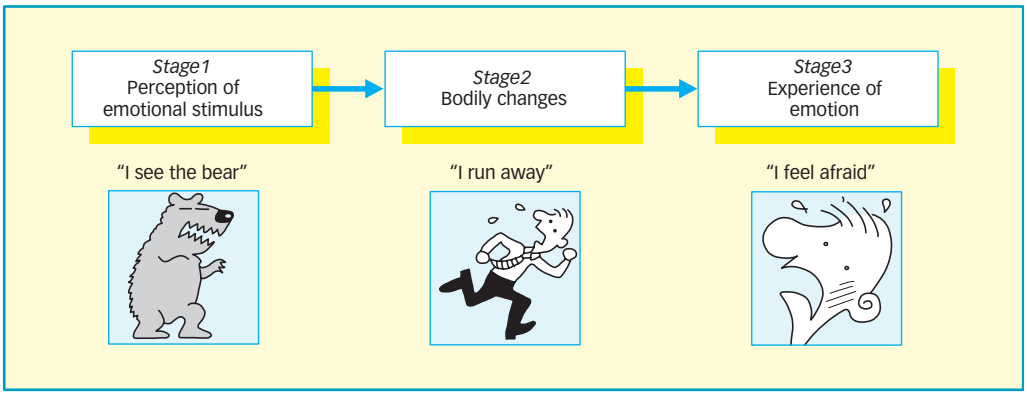
THEORIES OF EMOTION

There is a bewildering variety of theories of emotion. They differ considerably because of the different aims of the theorists concerned. Some theorists have viewed emotion mainly from a physiological perspective, whereas others emphasize the cognitive processes associated with emotion. Still other theorists have provided an overall account of the relationships among the cognitive, physiological, and behavioral systems.

The first major theory of emotion was put forward independently by William James in the United States and Carl Lange in Denmark in the mid-1880s. This could explain why the theory is generally known as the James–Lange theory. According to this theory, three successive stages are involved in producing emotion:

1. There is an emotional stimulus (e.g., a car comes rapidly towards you as you cross the road).
2. This produces bodily changes (e.g., arousal in the autonomic nervous system).
3. Feedback from the bodily changes leads to the experience of emotion (e.g., fear or anxiety).

Common sense might suggest that (2) and (3) are in the wrong order. For example, James gave this example of the predicted sequence according to the theory: "I see a bear, I run away, I feel afraid" (see the figure below). It seems more likely that the sequence would be as follows: "I see a bear, I feel afraid, I run away."



There is some mileage in the James–Lange theory. For example, consider patients with panic disorder experiencing a panic attack. The key reason they experience extremely high levels of anxiety is because they catastrophically misinterpret their own bodily symptoms (e.g., interpreting a fast heart rate as indicating an imminent heart attack) (Clark, 1986). However, the theory assumes mistakenly that each emotion is associated with its own specific pattern of physiological activity. In addition, evidence from patients with damage to the spinal cord is not favorable to the theory. These patients have greatly restricted awareness of their own physiological symptoms, and so should have a large reduction in their emotional experience. However, Bermond, Nieuwenhuyse, Fasotti, and Schwerman (1991) found that most of their patients with spinal damage reported *increased* intensity of emotions. Cobos, Sánchez, Pérez, and Vila (2004) found that patients with spinal cord injuries reported that their current emotional experiences across several emotions were at least as great as prior to injury. Thus, strong feedback from bodily changes is *not* essential for emotion to be experienced.

AROUSAL-INTERPRETATION THEORY

Schachter and Singer (1962) started the modern era in emotion research with its emphasis on cognitive factors. According to their arousal-interpretation theory, the experience of emotion depends on two factors both of which must be present:

1. High physiological arousal.
2. An emotional interpretation of that arousal.

They argued that very similar states of physiological arousal are associated with every emotion. We experience fear, anger, or whatever, because of the specific way in which the arousal is interpreted.

The theory predicts that no emotion will be experienced if *either* high physiological arousal *or* an emotional interpretation is missing. Marañon (1924) obtained findings

supporting that prediction. Participants were injected with epinephrine (adrenaline), a drug whose effects resemble those of a naturally occurring state of arousal. When asked how they felt, 71% simply reported their physical symptoms with no emotional experience. Most of the remaining participants reported "as if" emotions, that is, emotions lacking their normal intensity. Participants perceived their state of arousal as having been produced by the drug, and so they didn't interpret it as indicating an emotional state.

Schachter and Singer (1962) carried out an expanded version of Marañon's (1924) study—see the Key Study below.

Findings difficult to account for on the theory were reported by Mezzacappa, Katkin, and Palmer (1999). Participants watched film clips known to produce anger, fear, or amusement. Those given epinephrine (but misinformed about its effects) expressed increased fear to the fear films, but didn't report increased anger to the anger films or amusement to the amusement

Key Study

Schachter and Singer (1962): Suproxin

All participants were told the study was designed to test the effects of the vitamin compound "Suproxin" on vision. In fact, they were injected with epinephrine (adrenaline) (to produce arousal) or a salt-based solution having no effect on arousal. Some of those given epinephrine were correctly informed about the drug's effects. Others were misinformed or uninformed (being told that the injection would have no side-effects). After the injection, participants were put in a situation designed to produce either euphoria (joy) or anger. This was done by putting them in the same room as someone who acted joyfully or angrily.

Which groups were the most emotional? Theoretically, it should have been those groups given epinephrine who wouldn't have interpreted the arousal created as having been produced by the drug. Thus, the misinformed and uninformed groups given epinephrine should have been the most emotional. The findings broadly supported the predictions, but many effects were rather small or nonsignificant.

Discussion points

1. How does the approach adopted by Schachter and Singer differ from those of previous theorists?
2. What are the weaknesses with this research and this theoretical approach?

KEY STUDY EVALUATION

For such a classic study, it is surprising how inadequately it was carried out. Here are just a few of the problems. First, physiological arousal was assessed only by means of pulse rate, which is a poor single measure to use. Second, the judges who rated emotion knew which condition the participants were in, and this may have biased their ratings. Third, the judges didn't use a standardized coding system for recording the participants' behavior.

One of the reasons why the study by Schachter and Singer (1962) didn't produce convincing findings may have been because those given the salt-based solution became physiologically aroused by being put into an emotional situation. If so, they would have had the high arousal *and* emotional interpretation, which together produce a strong emotional state. Schachter and Wheeler (1962) argued that the way to stop people becoming aroused was to give them a depressant drug to reduce arousal. The participants were given a depressant, or epinephrine, or a substance having no effects, and were told in each case that the drug had no side-effects. They then watched a slapstick film called *The Good Humour Man*. As predicted, those given epinephrine (and thus aroused) found the film the funniest, whereas those given the depressant (and thus de-aroused) found it least funny.

films. People interpret high levels of unexpected arousal as signaling a negative state of affairs, whereas the theory claims that epinephrine should enhance *any* emotional state.

Evaluation

- (+) Emotional experience depends on arousal and on emotional interpretation.
- (+) The arousal-interpretation theory was very influential in its emphasis on the role of cognitive factors in emotion.
- (−) The theory has little to say about how the interpretive process works and leads to the experience of a given emotion (this deficiency was addressed by appraisal theory, discussed below).
- (−) High levels of unexpected arousal are interpreted negatively regardless of the situation.
- (−) Different emotions are associated with different patterns of physiological arousal (e.g., Levenson et al., 1990), whereas the theory predicts the same arousal pattern for every emotion.
- (−) Schachter and Singer (1962) focused on very artificial situations in which high levels of arousal were difficult to interpret. The relevance of such situations to typical everyday situations is unclear.

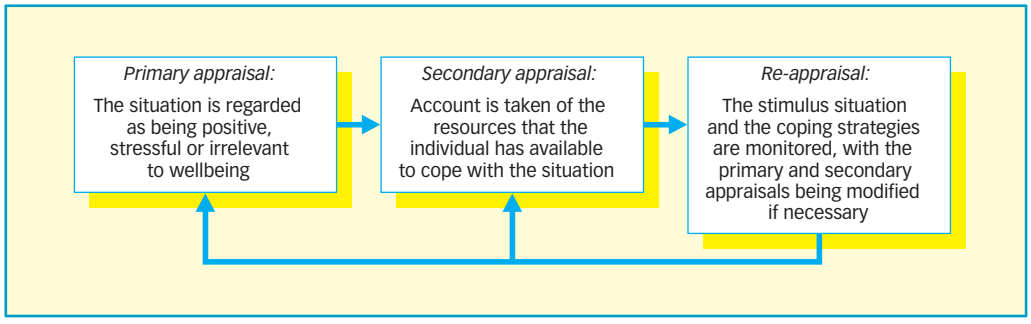
APPRAISAL THEORY

According to Lazarus (1982, 1991) emotional experience is crucially dependent on **cognitive appraisal**, which is the interpretation of the current situation. Cognitive appraisal can be subdivided into three more specific forms of appraisal:

- *Primary appraisal*: The situation is perceived as being positive, stressful, or irrelevant to wellbeing.
- *Secondary appraisal*: Account is taken of the resources available to the individual to cope with the situation.
- *Re-appraisal*: The stimulus situation and coping strategies are monitored, with the primary and secondary appraisal being modified if necessary.

This approach was developed by Smith and Lazarus (1993) to account for our experience of different emotions. They argued that there are six appraisal components, two involving primary appraisal and four involving secondary appraisal (see the figure below):

- *Primary*: Motivational relevance—related to personal commitments?
- *Primary*: Motivational congruence—consistent with the individual's goals?
- *Secondary*: Accountability—who deserves the credit or blame?
- *Secondary*: Problem-focused coping potential—how can the situation be resolved?
- *Secondary*: Emotion-focused coping potential—can the situation be handled psychologically?
- *Secondary*: Future expectancy—how likely is it the situation will change?



Key Term

Cognitive appraisal: assessment of a situation to decide whether it is stressful and whether the individual has the resources to cope with it.

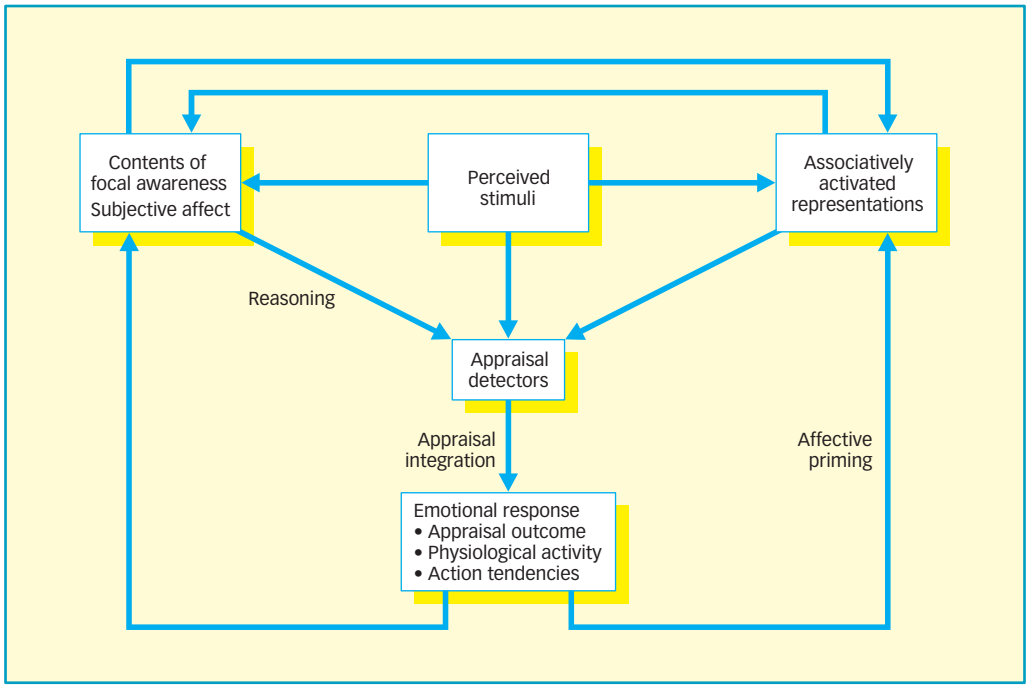
Different emotional states can be distinguished on the basis of which appraisal components are involved. For example, anger, guilt, anxiety, and sadness all possess the primary appraisal components of motivational relevance and motivational incongruence (these emotions only occur when goals are blocked). However, they differ in terms of secondary appraisal components. Guilt involves self-accountability, anxiety involves low or uncertain emotion-focused coping potential, and sadness involves low future expectancy for change.

Smith and Lazarus (1993) used scenarios in which participants identified with the central character. In one scenario, the central character has performed poorly in an important course, and he appraises the situation. Other-accountability was produced by having him put the blame on the unhelpful teaching assistants. Self-accountability was produced by having him accept he made many mistakes (e.g., doing work at the last minute). Low emotion-focused coping potential was produced by thinking there was a great danger he would finish with a poor academic record. Low future expectancy for change was produced by having him think it was impossible to succeed with his chosen academic path. The appraisal mechanisms generally had the predicted effects on participants' reported emotional states, indicating that there are fairly close links between appraisal and experienced emotion.

Kuppens, van Mechelen, Smits, and de Boeck (2003) found that the relationship between cognitive appraisal and specific emotional experience is more *flexible* than is assumed in appraisal theory. They studied four appraisals (goal obstacle; other accountability; unfairness; and control) relevant to the experience of anger. Participants described recently experienced unpleasant situations in which one of the four appraisals was present or absent. The key finding was that none of the four appraisals was either necessary or sufficient for anger to be experienced. Thus, for example, we can feel angry without the appraisal of unfairness or the presence of a goal obstacle.

The main limitation with earlier versions of appraisal theory is that little was said about the *processes* involved in appraisal. Smith and Kirby (2001) addressed this issue (see the figure below). They distinguished between two types of appraisal:

1. *Reasoning*: This involves a controlled and deliberate thinking process that takes time and requires attentional resources;
2. *Associative processing*: This involves rapid activation of relevant information stored in memory and occurs rapidly and automatically.



Mechanisms involved in the appraisal process. From Smith and Kirby (2001), Toward delivering on the promise of apprais theory. In K.R. Scherer, A. Schoor, & T. Johnson (Eds.), *Appraisal processes in emotion: Theory, methods, research*. Reprinted by permission of Oxford University Press, Inc.

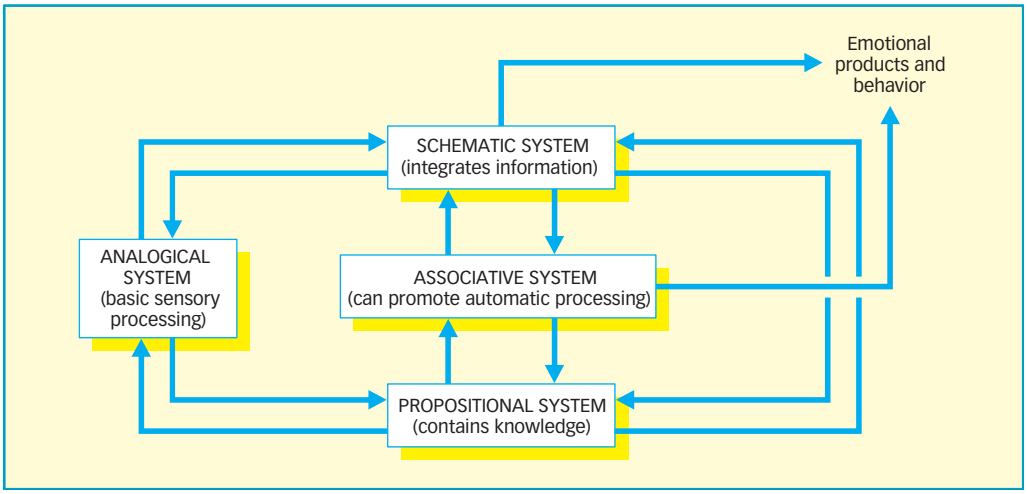
Appraisal detectors monitor appraisal information from the reasoning and associative processes. This appraisal information determines the individual's emotional experience. This newer approach draws a clear distinction between appraisal processes of which the individual is aware and those of which he/she is not aware.

Evaluation

- (+) Lazarus's appraisal theory sheds light on the cognitive processes influencing the emotions we experience in different situations.
- (+) The theory also helps to explain why people vary in their emotional experience in any given situation.
- (−) The notion of appraisal is broad and vague. For example, Lazarus (1991, p. 169) referred to two kinds of appraisal processes: "one that operates automatically without awareness or volitional [deliberate] control, and another that is conscious, deliberate, and volitional." However, Smith and Kirby (2001) have made a start on increasing the precision with which appraisal processes are described.
- (−) Smith and Lazarus (1993) argued that the exact emotions we experience depend crucially on the various appraisal components. However, as Parkinson (2001) pointed out, the appraisal components only predicted emotion ratings to a fairly modest extent in the Smith and Lazarus study.
- (−) The relationship between different types of cognitive appraisal and the experience of a given emotion is more flexible and variable than assumed by the theory.
- (−) The focus is too much on an individual thinking about his/her personal reactions to the current situation. What is relatively ignored is the *social context* in which emotion is typically experienced.

MULTI-LEVEL APPROACH

Many people report complex reactions to certain potentially threatening stimuli or situations. For example, some people are scared to fly in airplanes even though they know flying is very safe. In similar fashion, spider phobics become very frightened in the presence of a spider in spite of knowing that most spiders are harmless. Such reports suggest that the emotion system is complex, with emotional processing at one level sometimes combined with a lack of such processing at another level. Precisely this assumption was included by Power and Dalgleish (1997) in their Schematic Propositional Associative and Analogical Representational Systems (SPAARS) approach.



The Schematic Propositional Associative and Analogical Representational Systems (SPAARS) approach put forward by Power and Dalgleish (1997).

Emotion: Is it a physiological or a cognitive experience?

Some kinds of emotional experience are more physiological, others are more cognitive.

- *A physiological experience*. A jet screams over your head, you duck and experience a tightness in your chest. Past experience and individual differences will determine the emotion you might report feeling—fear, surprise, elation. For each of us it will be different, but the basis will be arousal. Such responses are more related to emotion as an adaptive response.
- *A cognitive experience*. You hear that you have passed an exam and feel ecstatic, which may lead to physiological sensations.

This might explain why emotion can sometimes occur with arousal and sometimes without it. It also fits in with LeDoux's suggestion that there are two pathways in the brain, one more physiological and the other more related to higher-order processing.

The SPAARS approach is shown in the figure on the previous page. Its main components are as follows:

- *Analogical system*: This is involved in basic sensory processing of environmental stimuli.
- *Propositional system*: This is an essentially emotion-free system containing information about the world and the self.
- *Schematic system*: In this system, facts from the propositional system are combined with information about the individual's current goals to produce a model of the situation. This produces an emotional response if the current goals are being thwarted.
- *Associative system*: "If the same event is repeatedly presented in the same way at the schematic level, then an associative representation will be formed such that, on future encounters of the same event, the relevant emotion will be *automatically* elicited" (Dalgleish, 1998, p. 492).

We can use the SPAARS approach to shed light on the reactions of people who are scared of flying or who have a spider phobia. Such people exhibit an automatic fear reaction via the associative system but realize that airplanes and spiders are not threatening via the propositional and schematic systems. Evidence that emotional processing can be automatic and below the level of conscious awareness was reported by Ohman and Soares (1994). They presented snake and spider phobics with pictures of snakes, spiders, flowers, and mushrooms, shown so rapidly they couldn't be identified consciously. In spite of that, the spider phobics reacted emotionally to the spider pictures, as did the snake phobics to the snake pictures. There were greater physiological responses to the phobia-relevant pictures, and the participants felt more negative when exposed to those pictures.

Evidence for the existence of two systems for fear has been obtained by LeDoux (1992, 1996). He emphasizes the role of the amygdala which forms part of the limbic system. According to LeDoux, sensory information about emotional stimuli is relayed from the thalamus simultaneously to the amygdala and to the cortex. There are two different emotion circuits for fear (both supported by much evidence):

1. A slow-acting thalamus–cortex–amygdala circuit involving detailed analysis of sensory information and resembling the system within SPAARS involving the propositional and schematic systems.
2. A fast-acting thalamus–amygdala circuit based on simple stimulus features (e.g., intensity). This circuit bypasses the cortex and resembles the associative system within SPAARS.

Evaluation

- (+) Multi-level theories such as SPAARS explain emotional conflict.
- (+) Emotional reactions can be produced automatically at the associative level without involving conscious processing.
- (−) SPAARS de-emphasizes the role of physiological processes in emotion.
- (−) SPAARS provides a framework within which to understand emotion rather than a detailed theory generating several testable hypotheses.

Amygdalotomies

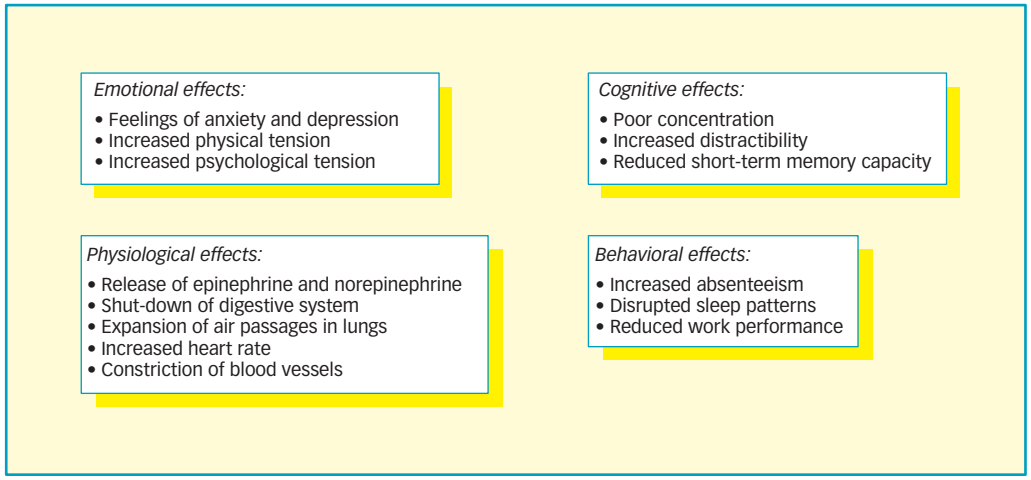
As a result of work such as that of Kluver and Bucy (1939), "psychosurgeons" in the United States carried out numerous operations on criminals serving jail sentences. Many of these operations were amygdalotomies, in which parts of the amygdala were destroyed. This was done by putting fine wire electrodes into the amygdala through a small hole drilled in the skull, and then passing strong electric currents through the electrodes. These amygdalotomies reduced fear and anger in those operated on, but they often had very unfortunate side-effects. For example, Thomas R was a 34-year-old engineer who suffered delusions and could not work after surgery. He was found on one occasion walking about with his head covered by bags, rags, and newspapers. He justified his behavior by saying he was frightened other bits of his brain might be destroyed. Thankfully, amygdalotomy is very rarely carried out nowadays.

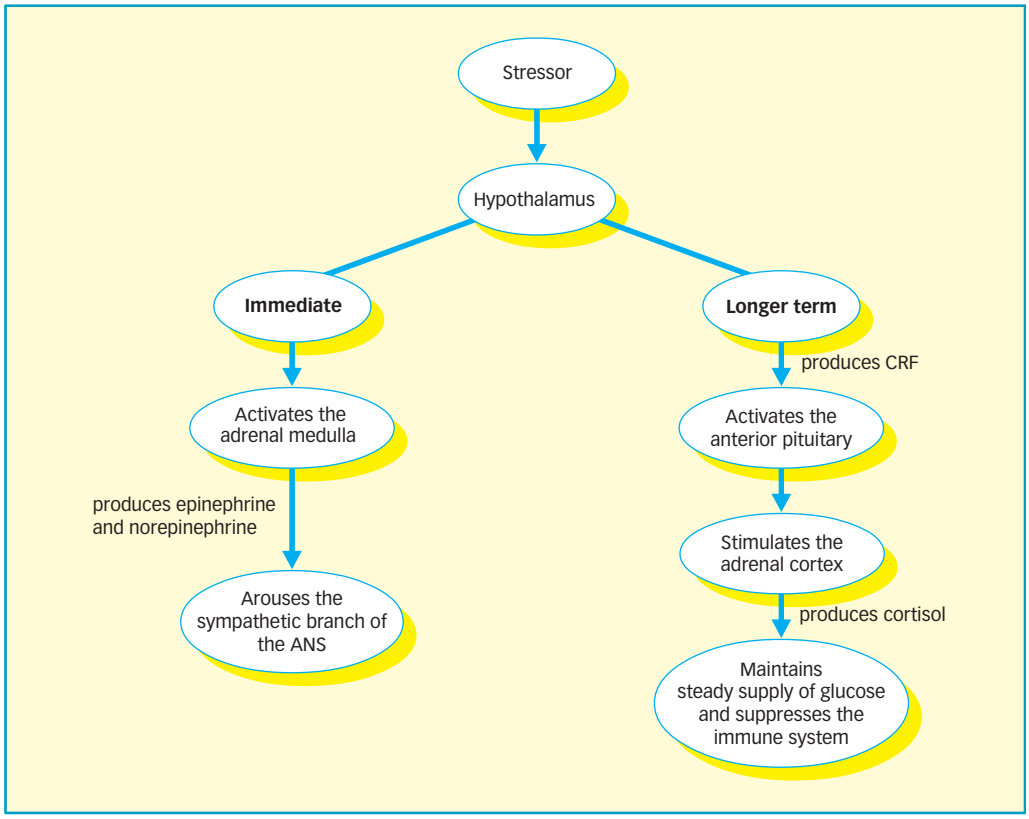
STRESS

It has often been said that ours is the "age of stress." It is probably true that more people than ever *report* being highly stressed. However, it isn't clear that most people are more stressed than used to be the case. Our ancestors had to contend with major epidemics, poor life expectancy, poverty, and an almost complete absence of holidays. Taking all that into account, my hunch is that stress levels nowadays are much the same as in the past.

What is stress? According to Colman (2001, p. 711), stress is "the psychological and physical strain or tension generated by physical, emotional, social, economic, or occupational circumstances, events, or experiences that are difficult to manage or endure." Thus, for example, driving is stressful to a learner driver because he/she has limited ability to meet the demands of handling a car in traffic. Driving is not stressful to experienced drivers, because they are confident their driving ability will allow them to cope with most driving situations.

What are the effects of being exposed to stress? There are four major kinds of effects: physiological; emotional; cognitive; and behavioral (see the figure below). We start by considering physiological or bodily effects. Stress involves an immediate shock response followed by a countershock response. The first (shock) response depends mainly on the sympathetic adrenal medullary system (SAM), whereas the second or countershock response involves the hypothalamic–pituitary–adrenocortical axis (HPA). These two response systems (discussed below) are shown in the figure on the following page.





Sympathetic adrenal medullary system

The initial shock response involves the sympathetic adrenal medullary system (SAM). Activity in the sympathetic branch of the autonomic nervous system (ANS) stimulates the adrenal medulla, which forms part of the adrenal glands. The adrenal medulla secretes the hormones epinephrine and norepinephrine (outside of the US widely referred to as adrenaline and noradrenaline, respectively). These hormones lead to increased arousal of the sympathetic nervous system and reduced activity in the parasympathetic nervous system (see the "Introduction to biological psychology" section).

Heightened activity of the sympathetic nervous system prepares us for "fight or flight." There is an increase in energy, increased alertness, increased blood flow to the muscles, increased heart and respiration rate, reduced activity in the digestive system, and increased release of clotting factors into the bloodstream to reduce blood loss in the event of injury. Epinephrine and norepinephrine increase the output of the heart, which can cause an increase in blood pressure.

SAM activity forms an important part of the stress response, because it prepares us for fight or flight. However, SAM activity is not only associated with stress. We also have elevated levels of epinephrine and norepinephrine when concentrating on a task. Sometimes we perceive heightened activity in SAM as indicating we are stressed, but at other times we interpret such activity as excitement.

Hypothalamic–pituitary–adrenocortical axis

If someone is exposed to any given stressor for several hours or more, activity within the SAM system increasingly uses up bodily resources. As a result, there is a countershock designed to minimize any damage. This countershock response involves the hypothalamic–pituitary–adrenocortical axis (HPA), the details of which are discussed below.

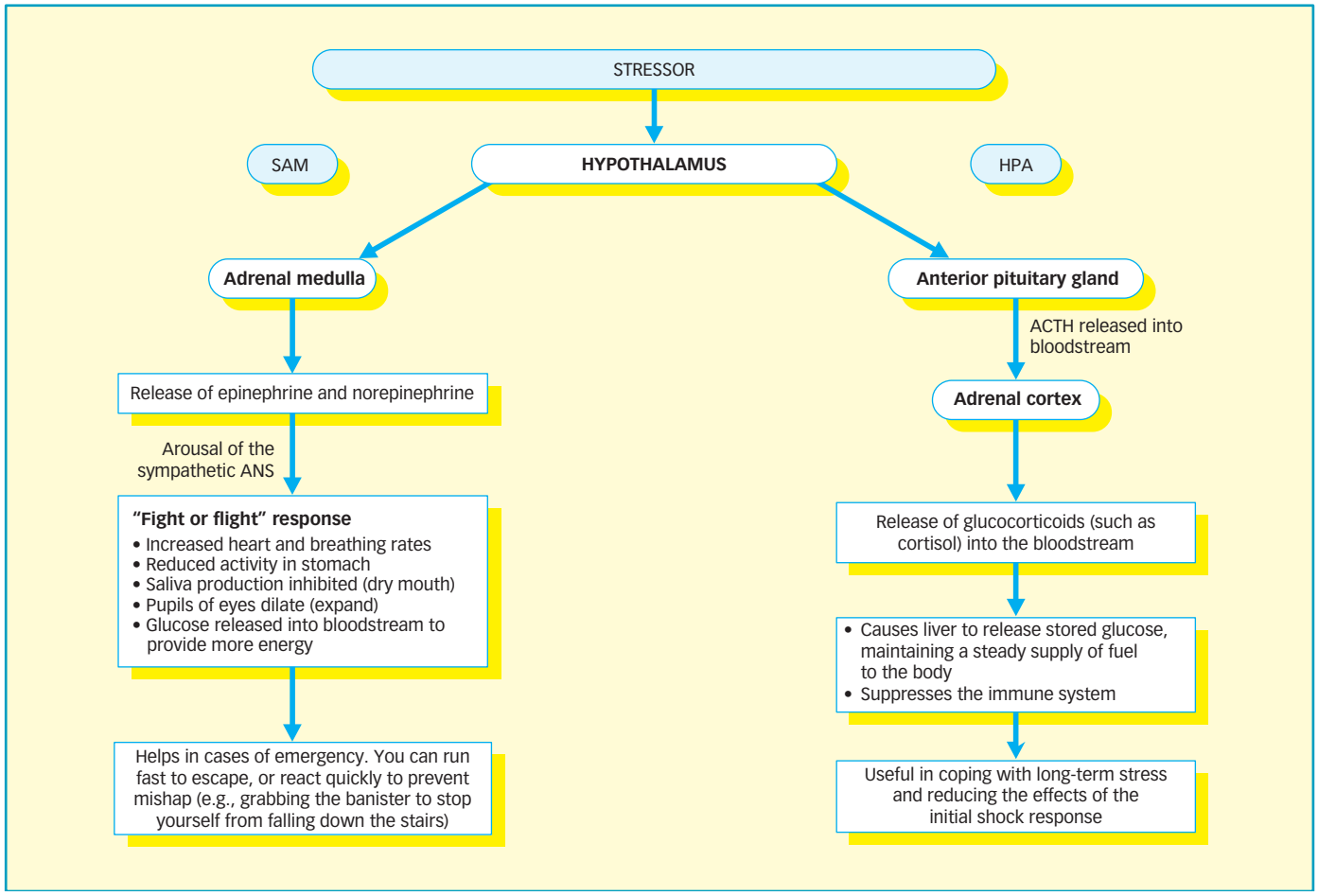
The glands of the endocrine system are distributed throughout the body, with most of the system being controlled by the hypothalamus (see the "Introduction to biological psychology" section). This is a small structure at the base of the brain producing hormones (e.g., corticotropin-releasing factor or CRF) that stimulate the anterior pituitary gland. The anterior pituitary gland releases several hormones, of which the most

important is adrenocorticotropic hormone (ACTH). ACTH stimulates the adrenal cortex, which forms part of the adrenal glands. The adrenal cortex produces glucocorticoids, which are hormones having effects on glucose metabolism. The key glucocorticoid with respect to stress is cortisol, which is sometimes called the "stress hormone." This is because excess amounts are found in the urine of individuals experiencing stress.

What kinds of stress produce increased levels of cortisol? This issue was addressed by Dickerson and Kemeny (2004) in a meta-analysis of 208 laboratory stress studies using motivated performance tasks. Tasks that were uncontrollable and associated with social-evaluative threat produced the highest levels of cortisol, the greatest ACTH changes, and the longest recovery time. Stroud, Salovey, and Epel (2002) reported interesting sex differences in stress response. Male and female participants were exposed to achievement stressors (complex tasks) and to social rejection (being excluded from a conversation). Only male participants showed a significant increase in cortisol after exposure to achievement stressors, and only female participants had increased cortisol after social rejection. These sex differences are consistent with stereotyped notions about men being more concerned than women about achievement and women being more concerned about social acceptance.

Cortisol is important for coping with long-term stress, because it permits maintenance of a steady supply of fuel. The secretion of cortisol and other glucocorticoids has various effects. First, the glucocorticoids help to conserve glucose for neural tissues. Second, they elevate or stabilize blood glucose concentrations. Third, they mobilize protein reserves. Fourth, they conserve salts and water.

Activity of the hypothalamic–pituitary–adrenocortical axis is very useful in allowing us to cope with stress. The HPA reduces many of the effects of the first or shock response to stress. We can see this by considering individuals without adrenal glands who can't



produce the normal amounts of glucocorticoids. When exposed to a stressor, they have to be given additional quantities of glucorticoids to survive (Tyrell & Baxter, 1981).

The beneficial effects of HPA activity are achieved at considerable cost. As Westen (1996, p. 427) pointed out, "The blood still has elevated levels of glucose (for energy) and some hormones (including epinephrine and the pituitary hormone ACTH), and the body continues to use its resources at an accelerating rate. Essentially, the organism remains on red alert." Among the disadvantages of continuing HPA activity is that the anti-inflammatory action of glucocorticoids slows wound healing. More generally, glucocorticoids suppress the immune system, which protects the body against intruders such as viruses and bacteria. When immune responses are low, we are more likely to develop a disease (e.g., Kiecolt-Glaser et al., 1984).

The SAM and HPA have been discussed as if they form different systems. This is approximately correct, but the two systems don't operate in complete independence of each other (see the figure on the previous page). As Evans (1998, p. 60) pointed out, "At the level of the central nervous system, the crucially important SAM and HPA systems can be considered as one complex: they are as it were the lower limbs of one body."

STRESS AND ILLNESS

A key topic within stress research is the relationship between stress and disease. Stress has been linked with numerous physical illnesses, including headaches, infectious disease (e.g., influenza), cardiovascular disease, diabetes, asthma, and rheumatoid arthritis (Curtis, 2000). It has also been linked with various mental disorders including the anxiety disorders and depression. In a short while, we will discuss the broad issue of the relationship between stressful experiences and physical disease or mental disorder. After that, we focus on individual differences in susceptibility to stress. Finally, we consider the mechanisms causing stress to have adverse effects on our health. First of all, however, we consider the negative effects of occupational stress on health.

Millions of adults attribute their highly stressed state mainly to the demands of their work. This is unsurprising given that most of them spend almost 2000 hours a year at work. Cartwright and Cooper (1997) estimated that occupational stress costs American businesses more than 150 billion euros every year (about $220 billion). What is it about the work environment that makes people stressed? Karasek (1979) argued persuasively that lack of perceived control is of key importance. He claimed that workers can cope successfully with highly demanding jobs if they perceive that they have control over their work activities.

Spector, Dwyer, and Jex (1988) assessed perceived control in workers. Low levels of control were associated with frustration, anxiety, headaches, stomach upsets, and visits to the doctor. Ganster, Fox, and Dwyer (2001) studied occupational stress in a 5-year study on nurses. High perceived control at the start of the study predicted less use of medical services and better mental health over the course of the study.

Marmot et al. (1997) and Bosma, Stanfeld, and Marmot (1998) reported dramatic findings from a 5-year study on over 9000 British civil servants. Workers on the lowest employment grades were *four* times more likely to die of a heart attack than those on the most senior grade. They were also more likely to suffer from cancer, strokes, and gastrointestinal disorders. These differences seemed to occur because those in the lower positions had much less control over their work than those in the higher positions. However, all the findings were based on associations or correlations between control and various diseases, and this doesn't prove that lack of control actually caused the diseases. Individuals who are mentally and physically robust may be more likely to rise to senior job positions *and* to be resistant to the effects of stress, but it is unlikely that this accounts for all the findings.

There is a final point on occupational stress. Several work factors other than perceived control influence workers' psychological wellbeing. For example, Warr

Workplace stress in a sawmill

Frankenhaeuser (1975) found a link between perceived lack of control at work and high levels of stress. Some sawmill workers were given jobs where they fed logs into the mill machines, continually, all day. This repetitive and monotonous task also isolated them as it was extremely noisy, and the machine speeds dictated how fast the workers fed in the logs. The workers felt isolated, with a minimum of control. And, compared to the other mill workers who had more control and were not similarly isolated, these workers suffered far more from headaches, digestive disorders such as ulcers, and high blood pressure.

(1996) identified the following important factors: availability of money; opportunity for skills' use; work demands; variety; physical security; opportunity for interpersonal contact; environmental clarity; and valued social position. Thus, workers with high levels of control in their work may still suffer from occupational stress if their work is very demanding, poorly paid, and dangerous!

LIFE EVENTS AND HASSLES

We can draw a distinction between life events and hassles. **Life events** are often major negative events or occurrences (e.g., death of a loved one) that cause high levels of stress, although some life events are relatively minor. In contrast, **hassles** are the minor challenges and interruptions (e.g., arguing with a friend; malfunctioning computer) of everyday life. On average, people experience at least one hassle on about 40% of the days in each week (Almeida, 2005).

Holmes and Rahe (1967) developed the Social Readjustment Rating Scale to assess life events. Participants indicate which out of 43 life events have happened to them over a period of time (usually 6 or 12 months). These life events are assigned a value according to their likely impact. Here are a few life events taken from this scale with their associated life change units in brackets:

death of a spouse (100)
divorce (73)
marital separation (65)
jail (63)
death of a close family member (63)
change in eating habits (15)
holiday (13)
minor violation of the law (11).

Changes can be stressful, even the usually pleasant ones associated with going on holiday.

Why are holidays (which are supposed to be fun!) treated as stressful life events? According to Holmes and Rahe, any change (whether desirable or undesirable) can be stressful.

There is reasonable evidence that life events are associated with various diseases. Rahe, Mahan, and Arthur (1970) used the Social Readjustment Rating Scale to divide naval personnel into high-risk and low-risk groups on the basis of their life events over the previous 6 months. Members of the high-risk group were twice as likely to develop illnesses during their first month at sea. In general, people experiencing events totaling more than 300 life change units over a period of 1 year are more at risk for many physical and mental illnesses (see Martin, 1989, for a review). These illnesses include heart attacks, diabetes, TB, asthma, anxiety, and depression. However, the correlations between number of life change units and susceptibility to any particular illness are rather low, indicating a weak relationship between life events and illness.

There are individual and group differences in the reactions to life events. Miller and Rahe (1997) compared the reactions of men and women to several life events. Women experienced more stress than men following the death of a close family member, a major injury or illness, loss of a job, reduced income, or moving home.

There are some limitations with most of the evidence. First, and most important, it is generally not clear whether life events have caused stress or some stress-related illness or whether stress caused the life events. For example, divorce can cause stress, but someone who is already stressed may be more likely to behave in ways that lead to divorce. Van Os, Park, and Jones (2001) studied life events in individuals low and high in the personality dimension of neuroticism (involving anxiety, depression, and susceptibility to stress). Neuroticism assessed at the age of 16 predicted the number of stressful life events experienced 27 years later. Thus, individuals with a susceptibility to stress have an increased likelihood of experiencing stressful life events.

Second, the impact of any given life event varies considerably depending on the individual's particular circumstances. For example, marital separation is likely to be less

Key Terms

Life events: predominantly negative occurrences (and often of major consequence) that typically produce increased stress levels.

Hassles: the irritating challenges of everyday life that can increase stress levels.

stressful for someone who has already established an intimate relationship with someone else. Third, it has too often been assumed that *any* major life event can help to produce almost *any* type of illness. However, there are more specific effects. For example, anxious patients are more likely than depressed patients to have experienced danger events (involving future threats) than depressed patients. In contrast, depressed patients are more likely to have experienced loss events (involving past losses such as death of a loved one) (Finlay-Jones & Brown, 1981).

Hassles

What are the main categories into which our daily hassles and stressors fall? Almeida (2005) found that 37% involved danger (e.g., potential for future loss), 30% involved some kind of loss (e.g., of money), and 27% were frustrations or events outside the individual's control. People reported more psychological distress and physical symptoms on days when they encountered hassles than on stress-free days. However, college-educated adults had less psychological distress and fewer physical symptoms than less-educated ones in spite of experiencing more daily stressors. Presumably college-educated people have more effective coping strategies at their disposal.

Stone, Reed, and Neale (1987) considered the hassles and desirable events experienced by participants during the 10 days before they developed a respiratory illness. They had experienced more hassles and fewer desirable events during that period than had control participants who didn't develop a respiratory illness.

VULNERABILITY TO STRESS

What kinds of people are most vulnerable to the adverse effects of stress? We consider two of the best-known attempted answers in turn. First, we consider the **Type A personality**. Individuals with this personality type possess "extremes of competitive achievement striving, hostility, aggressiveness, and a sense of time urgency" (Matthews, 1988, p. 373). Second, we focus on **negative affectivity**, a personality dimension characterized at the high end by frequent unpleasant emotional states (e.g., anxiety; depression). The dimension of negative affectivity is essentially the same as neuroticism (discussed in Chapter 12).

Key Terms

Type A personality: a personality type characterized by impatience, competitiveness, time pressure, and hostility.

Negative affectivity: a personality dimension involving a tendency to experience negative emotional states such as anxiety and depression.

Type A personality

Meyer Friedman and Ray Rosenman (1959) distinguished between individuals with Type A personality and those with Type B personality. Type A individuals are hard-driving, competitive, and aggressive individuals, whereas Type B individuals are more relaxed and laid-back. These personality types were identified by using the Structured Interview, during the course of which the interviewer deliberately interrupts the person being interviewed. Account is taken of the individual's answers to the questions as well as his/her behavior (e.g., speed of talking; impatience or irritability when interrupted).

The stock exchange is the ideal environment for individuals with a Type A behavior pattern.

Friedman and Rosenman (1959) predicted that Type A individuals would be more stressed and thus more at risk of coronary heart disease than Type Bs. These predictions were tested in the Western Collaborative Group Study (Rosenman et al., 1975). Of nearly 3200 men having no symptoms at the start of the study, Type As were nearly twice as likely as Type Bs to have developed coronary heart disease over the following 8.5 years. The findings remained basically unchanged when account was taken of other factors (e.g., blood pressure; smoking) known to be associated with heart disease.

There have been numerous studies of Type A and heart disease since the pioneering study by Rosenman et al. (1975). The findings have been rather inconsistent. Miller et al. (1991) found that positive findings were more common when the Structured Interview was used rather

than self-report measures. This is probably because only the Structured Interview provides information about people's actual behavior in a stressful situation.

There have been various attempts to identify the most important aspect of the Type A personality. Matthews, Glass, Rosenman, and Bortner (1977) re-analyzed the data from the Western Collaborative Group Study, finding that the hostility component of Type A was most closely associated with heart disease. Ganster, Schaubroeck, Sime, and Mayes (1991) put participants in stressful situations. Only the hostility component of Type A was associated with high levels of physiological reactivity (e.g., blood pressure; heart rate).

Negative affectivity and Type D personality

Individuals high in negative affectivity generally report being much more stressed and distressed than those low in negative affectivity (see Watson & Clark, 1984, for a review). However, Watson and Pennebaker (1989) found that it is very important to distinguish between *complaints* about poor health and *actual* physical disease. Individuals high in negative affectivity report suffering more than those low in negative affectivity from colds, coughing, sore throats, dizziness, stomach pains, irritable bowel syndrome, and so on. They also report more chest pain and angina pectoris (sudden intense pains in the chest) than other people. However, high negative affectivity is scarcely associated with physical illness more objectively considered. For example, a meta-analysis of studies on heart disease found only a very small correlation (+.14) between anxiety (closely related to negative affectivity) and heart disease (Booth-Kewley & Friedman, 1987). Shekelle et al. (1981) found that measures of negative affectivity were not associated with overall mortality among middle-aged men. Thus, individuals high in negative affectivity exaggerate the extent to which the stresses of life are impairing their physical health.

Denollet (2005) argued that individuals highest in susceptibility to stress are those having the Type D personality. The **Type D personality** consists of a combination of high

Case Study: *Don't Let It Get You Down*

"Comfort always, cure rarely" is an old medical motto. And it may be nearer the truth than modern medicine would like to admit. Perhaps if patients were less depressed and more optimistic they might be more likely to recover from stressful operations.

In one study of 100 patients about to undergo bone marrow transplants for leukemia it was found that 13 of the patients were severely depressed. Of these patients 12 had died within a year of the operation (92%) whereas only 61% of the not-depressed died within 2 years of the study.

Other research has looked at the effects of pessimism and found this to be the biggest single predictor of death from a heart attack. For example, 122 men were evaluated for pessimism or optimism at the time they had a heart attack. Eight years later their state of mind was found to correlate with death more highly than any of the other standard risk factors such as damage to the heart, raised blood pressure, or high cholesterol levels. Of the 25 men who were most pessimistic 21 had died, whereas only 6 of the most optimistic 25 had died.

Peterson, Seligman, and Vaillant (1988) studied optimists and pessimists. They suggested that pessimists tended to explain setbacks in their lives as the result of things within their personality that were unchangeable. In contrast, optimists tended to explain setbacks as the result of things arising from situations within their control, but which were not their own fault. Peterson et al. rated a number of Harvard undergraduates for pessimism and optimism on the basis of essays they wrote `about their wartime experiences. After an interval of more than 20 years, the pessimists (aged 45) were more likely to be suffering from some chronic disease. However, smaller effects of personality on disease have been reported in other research.

Adapted from Goleman (1991).

Key Term

Type D personality: a personality type characterized by high **negative affectivity** and social inhibition.

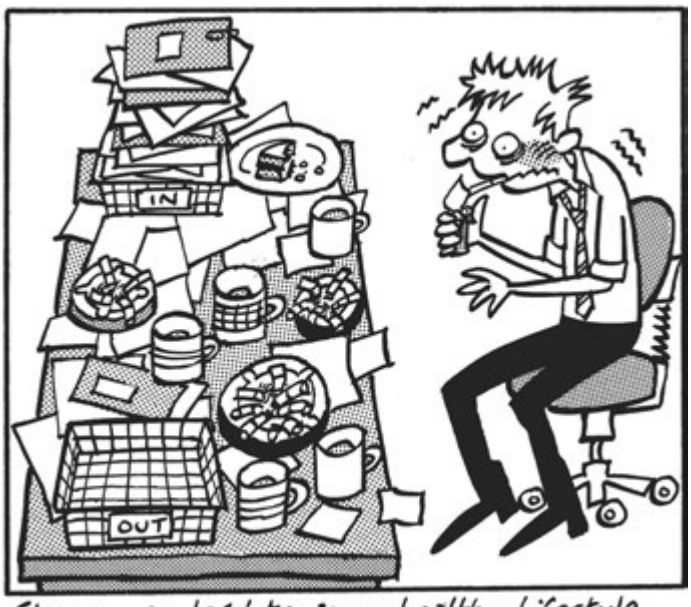
negative affectivity plus high social inhibition (inhibited behavior in social situations to avoid disapproval). Denollet reported findings from people aged between 40 and 70. Type D personality was much more common among hypertension patients (54%) and coronary patients (27%) than it was among people from the general population (19%). Type D individuals are also at much greater risk than non-Type D ones for post-traumatic stress, reduced longevity, and development of cancer (see Denollet, 2005, for a review). The size of many of the effects is impressive. In one study, for example, 27% of cardiac patients with Type D personality died over a 10-year period compared to only 7% of the others (Denollet et al., 1996).

Overall Evaluation

- \+ Type A individuals report high levels of stress, as do those high in negative affectivity or with Type D personality.
- \+ Type A individuals are generally slightly more likely than Type Bs to develop coronary heart disease.
- \+ Type D individuals are more susceptible than others to various diseases, especially heart disease. The evidence suggests that the Type D personality may be the personality type most associated with stress-related diseases.
- − Negative affectivity is only slightly associated with actual physical illness.
- − Some evidence suggests that the hostility component of Type A personality is most associated with coronary heart disease, but this has not been clearly established.

MECHANISMS: HOW DOES STRESS CAUSE ILLNESS?

At the most general level, there are two main ways in which stress might cause illness:



Stress can lead to an unhealthy lifestyle.

1. *Indirect route*: Stressed individuals tend to adopt an unhealthy lifestyle (e.g., smoking or drinking too much).
2. *Direct route*: Stress reduces the body's ability to fight illness.

Indirect route

Lifestyle has a major impact on illness and longevity. For example, Belloc and Breslow (1972) asked residents of Alameda County in California to indicate which of the following seven health behaviors they practiced regularly:

- Not smoking
- Having breakfast each day
- Having no more than one or two alcoholic drinks per day
- Taking regular exercise
- Sleeping 7 to 8 hours per night
- Not eating between meals
- Being no more than 10% overweight.

Adults practicing most of the above health behaviors reported they were healthier than those practicing few or none. More striking findings were reported in a follow-up study 9.5 years later. Breslow and Enstrom (1980) found that individuals practicing all seven health behaviors had only 23% of the mortality of those practicing fewer than

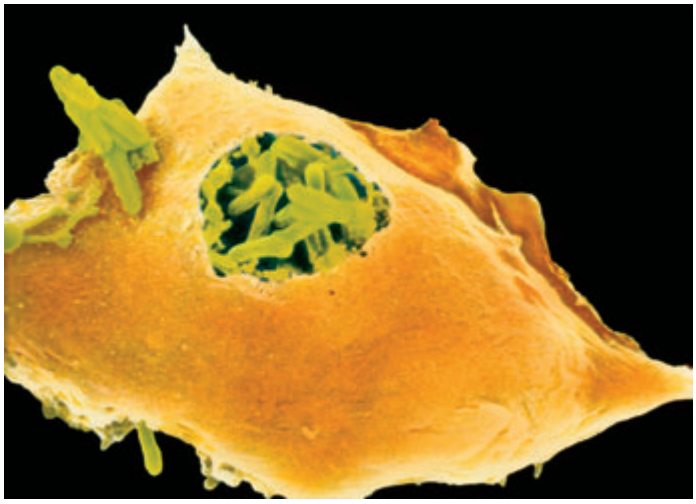
three. My personal score is five which is modestly encouraging! Schoenborn (1993) carried out a follow-up 17 years after the first survey. The strongest predictors of longevity were not smoking, taking physical exercise, and regular breakfast eating.

Stressed individuals tend to smoke more, to drink more alcohol, to take less exercise, and to sleep less than non-stressed individuals (Cohen & Williamson, 1991). For example, adolescents experiencing high levels of stress are more likely to start smoking than those whose lives are less stressful (Wills, 1985). Adults experiencing much stress in their lives are more likely to resume smoking after having given up (Carey et al., 1993). Stress also influences alcohol consumption. There is much support for tension reduction theory (Ogden, 1996). According to this theory, tension in the form of anxiety or depression leads to increased alcohol consumption to reduce the level of tension.

Direct route

It is often believed that stress causes illness fairly directly by impairing the functioning of the **immune system**. This system is located in various parts of the body including the bone marrow, lymph nodes, tonsils, spleen, appendix, and small intestines. Cells in the immune system have receptors for various chemical substances (hormones and neurotransmitters) involved in the stress response, so stress certainly might influence immune system functioning.

The immune system is very complex, and so it is difficult to decide how well it is functioning. As Evans, Clow, and Hucklebridge (1997, p. 303) pointed out, we should "think of the immune system as striving to maintain a state of delicate balance." There is an important distinction between natural immunity and specific immunity (Segerstrom & Miller, 2004). Cells involved in natural immunity (e.g., natural killer cells) are all-purpose cells that can attack various **antigens** (foreign bodies) such as viruses relatively rapidly. In contrast, cells involved in specific immunity (e.g., T-helper cells; B cells) are much more specific in their effects and take longer to work.



Like some monster in a movie, some cells of the immune system kill "invaders" by engulfing them. In the photograph a macrophage cell is engulfing *M. tuberculosis* bacteria.

Long-term or chronic stress often impairs the functioning of the immune system. For example, Schliefer et al. (1983) studied husbands whose wives had breast cancer. The husbands' immune system seemed to function less well after their wives had died than before. Segerstrom and Miller (2004) analyzed the findings from six studies in which the death of a spouse was the stressor. Overall, losing a spouse was associated with a highly significant reduction in effectiveness of natural killer cells within the immune system.

So far we have seen that long-term stress often has adverse effects on immune system functioning. However, stress does *not* invariably impair immune system functioning. Indeed, short-term stress sometimes produces an improvement in some aspects of immune system functioning. Zeier, Brauchli, and Joller-Jemelka (1996) studied air traffic controllers on a work shift. During this shift, they showed an increase in **antibodies** (protein molecules that mark invaders out for destruction), suggesting some enhancement of immune system functioning. In similar fashion, Delahanty et al. (1996) found increased natural killer cell activity during two short stressful tasks (e.g., immersing hand in very cold water) performed under laboratory conditions.

Segerstrom and Miller (2004) pointed out that it wouldn't make any sense in evolutionary terms if humans were designed so that even short-term stress impaired the functioning of the immune system. An adaptive response would be for short-term stress to be associated with enhanced functioning of at least some aspects of the immune system. Segerstrom and Miller (2004) carried out various meta-analyses to clarify the precise effects of stress on immune system functioning. Their key findings were as follows:

- Short-lived stressors (e.g., public speaking) produce increased natural immunity (e.g., increased availability of natural killer cells) but don't alter specific immunity.

Key Terms

Immune system: a system of cells in the body involved in fighting disease.

Antigens: foreign bodies such as viruses.

Antibodies: protein molecules that attach themselves to invaders, marking them out for subsequent destruction.

- Stressful event sequences involving loss of a spouse produces a reduction in natural immunity (e.g., reduced effectiveness of natural killer cells).
- Stressful event sequences involving disasters produce small increases in natural and specific immunity.
- Life events are associated with significant reductions in natural and specific immunity in individuals over 55 years or age, but aren't associated with changes in the immunity system in those under 55.

In sum, the precise effects of stress depend much more than is generally thought on the specific nature and duration of the stressor.

Evaluation

- (+) Stress produces various changes in the immune system, and increases the likelihood of developing certain physical diseases.
- (+) We now have a fairly clear picture of the effects of different kinds of stressor on the immune system.
- (−) Stress typically has fairly modest effects on the functioning of the immune system. Indeed, its functioning typically remains within the normal range (Bachen, Cohen, & Marsland, 1997).
- (−) We know that stress affects the immune system and also increases the probability of certain illnesses. However, we still don't know the extent to which the effects of stress on susceptibility to disease depend on changes within the immune system.

COPING WITH STRESS

We have considered stress in some detail. How do we manage to handle and resolve it in our everyday lives? Much research has been devoted to **coping**, defined as "the thoughts and behaviours used to manage the internal and external demands of situations that are appraised as stressful" (Folkman & Moskowitz, 2004, p. 745). Thus, coping can involve behavioral or cognitive strategies (or both). As the definition implies, most research on coping has focused on how people cope with events that have occurred or are occurring in the present. However, coping can also involve preparing to deal with possible future stressors. Aspinwall and Taylor (1997) identify various forms of proactive coping (e.g., increasing one's financial and social resources).

Most of the coping strategies that have been identified (and which are discussed shortly) focus on what the individual can do through his/her own efforts. However, there is often value in relying on the help provided by other people. We can distinguish between structural social support and functional social support. The former is an individual's basic network of social relationships whereas the latter is concerned with the *quality* of social support. According to Schaefer, Coyne, and Lazarus (1981), functional social support is positively related to health and to wellbeing. In contrast, structural social support is unrelated to wellbeing. There can even be negative effects, because it is very time-consuming and demanding to maintain a large social network.

Brown and Harris (1978) showed the importance of functional social support in a study on women who had experienced a very stressful life event in the previous 9 months. Of these women, 37% of those without an intimate friend became depressed, against only 10% of those who had a very close friend.

There are important implications of social support for physical health as well as mental health. House, Landis, and Umbesson (1988) reviewed several large studies, and reported that individuals with high levels of social support had much lower mortality rates than those with poor social support. How does social support influence mortality? Uchino, Cacioppo, and Kiecolt-Glaser (1996) reported across numerous studies that

Key Term

Coping: efforts to deal with demanding situations to master the situation or reduce the demands.

blood pressure was lower in individuals with good social support. Individuals with good social support also tended to have stronger functioning of the immune system (e.g., greater natural killer cell responses).

Two points need to be borne in mind. First, social support doesn't always improve matters. For example, Bolger, Foster, Vinokur, and Ng (1996) found that high levels of social support for patients suffering from breast cancer didn't reduce their distress or the progression of the disease. Second, most studies report an association or correlation between social support and some measure of wellbeing. Perhaps part of what is happening is that individuals who enjoy good mental and physical health find it easier to develop strong friendships and relationships than those who do not. Thus, we can't always be confident that social support has causal effects on wellbeing.

GENDER DIFFERENCES

How do men and women react differently to stress? A major difference was identified by Schachter (1959). Some participants were told they were going to receive mild electric shocks whereas the others were told they would receive painful electric shocks. They had the choice of waiting alone or with another participant while the equipment was set up. Those expecting a painful electric shock were far more likely to choose to wait with another participant. Of key importance, the wish to affiliate or be close to others when under stress was much stronger in women than in men. Indeed, Schachter found so little evidence of affiliative behavior in stressed men that he used only females in all his subsequent research! Luckow, Reifman, and McIntosh (1998) reviewed 26 studies on gender differences in seeking and using social support. Women sought social support more than men in 25 of these studies.

Women are more likely than men to "tend and befriend" in times of anxiety and stress and will often seek the social support of others.

Taylor et al. (2000) developed a theory based in part on findings such as those just discussed. They argued that men are much more likely to respond to stressful situations with a "fight-or-flight" response, whereas women generally respond with a "tend-and-befriend" response. Thus, women respond to stressors by protecting and looking after their children (the tend response) and by actively seeking social support from others (the befriend response). Taylor et al. emphasized the role of **oxytocin**, a hormone secreted by men and women as part of the stress response. Oxytocin makes people less anxious and more sociable, and so is associated with the tend-and-befriend response. Of crucial importance, its effects are reduced by male sex hormones but increased by the female hormone estrogen.

Findings

David and Lyons-Ruth (2005) found that female infants show more evidence of the tend-and-befriend response than male ones. When their mother's behavior became more frightening, female infants were more likely than male infants to approach her. Turton and Campbell (2005) identified the four factors of fight, flight, tend, and befriend in a factor analysis of stress responses. As predicted by Taylor et al.'s (2000) theory, females were more likely than males to report using tend-and-befriend responses in stressful situations. There is also support for the notion that males are more likely than females to respond to stressful situations with the fight-or-flight response. Eagly and Steffen (1986) carried out a meta-analysis and found that males are on average somewhat more physically aggressive than females.

Uvnäs-Moberg (1996) found that oxytocin in breastfeeding women was associated with calm and self-reported sociability. Taylor, Klein, Greendale, and Seeman (1999) found that higher levels of oxytocin in women were associated with smaller cortisol stress responses and with faster recovery of the HPA after exposure to a stressful situation.

Key Term

Oxytocin: a hormone produced in response to stress that reduces anxiety and increases sociability.

Evaluation

- ⊕ The theory identifies some of the major behavioral responses to stress (i.e., fight, flight, tend, and befriend).
- ⊕ The theory identifies important gender differences in coping with stress.
- ⊕ The theory may help us to understand why women live on average 5–7 years longer than men.
- ⊖ As Taylor et al. (2000, p. 422) admitted, "We have suggested that oxytocin and endogenous opioids may play important roles in female responses to stress, and it remains to be seen if these are as significant players as we have suggested."
- ⊖ Neuroendocrine responses vary from stressor to stressor (Sapolsky, 1992), but the theory doesn't account for such variations.
- ⊖ Any individual's behavioral response to a stressful situation depends on his/her personality, past experience, and the precise nature of the stressor as well as on gender.

COPING STRATEGIES: TRADITIONAL

One of the most common ways of studying coping strategies is by means of self-report questionnaires. These questionnaires differ in many ways, but traditionally there was reasonable agreement that there are only a few major coping strategies. The Multidimensional Coping Inventory (Endler & Parker, 1990) is fairly representative, and we will consider it in some detail. It assesses three major coping strategies:

1. *Task-oriented strategy*: This involves obtaining information about the stressful situation and alternative courses of action and their probable outcome. It also involves deciding on priorities and dealing directly with the stressful situation.
2. *Emotion-oriented strategy*: This can involve efforts to maintain hope and to control one's emotions. It can also involve venting feelings of anger and frustration, or deciding that nothing can be done to change things.
3. *Avoidance-oriented strategy*: This involves denying or minimizing the seriousness of the situation. It also involves conscious suppression of stressful thoughts and their replacement by self-protective thoughts.

Individuals high in the personality dimension of trait anxiety experience much stress and anxiety. They tend to use the emotion-oriented and avoidance-oriented strategies rather than the task-oriented strategy (Endler & Parker, 1990). In contrast, individuals low in trait anxiety tend to use the task-oriented strategy.

Which coping strategy do you think is the most effective? As Lazarus (1993, p. 238) pointed out, "Of the two functions of coping, problem-focused [task-oriented] and emotion-focused, there is a strong tendency in western values to venerate the former and distrust the latter . . . taking action against problems rather than re-appraising the relational meaning seems more desirable." There is support for this point of view. Folkman et al. (1986) asked people to report the coping strategies they had used to handle stressful events. They also asked them to rate the extent to which the outcome had been satisfactory. Planned problem solving tended to be associated with satisfactory outcomes, whereas confrontational coping (e.g., expressing anger) and distancing (trying to forget about the problem) were associated with unsatisfactory outcomes.

Problem-solving coping sometimes produces negative as well as positive outcomes. For example, Wu, Forkman, McPhee, and Lo (1993) found that doctors who accepted responsibility for their own mistakes made constructive changes to their work habits, which was a positive outcome. In addition, however, they experienced more distress (a negative outcome) at the same time.

Carver et al. (1993) found that avoidance-oriented coping was relatively ineffective in a study on women with breast cancer. Women who used avoidant coping strategies

such as denial or simply refusing to try to cope had higher levels of distress than those who accepted the diagnosis and retained a sense of humor. Epping-Jordan, Compas, and Howell (1994) studied young men and women suffering from cancer. The disease had progressed further over a 1-year period among those who used avoidant coping (e.g., "I try not to think about it") than among those who did not.

In spite of the evidence discussed so far, we should not conclude that any given type of coping is *always* effective or ineffective. In reality, the effectiveness of any coping strategy depends on the individual, the context, and the nature of the stressful situation. The task- or problem-oriented coping strategy is generally effective but not when there is little or nothing the individual can do to improve matters. For example, Collins, Baum, and Singer (1983) considered people living close to Three Mile Island shortly after a major nuclear incident. Those using problem-oriented coping were more distressed than those using emotion-oriented coping.

Avoidance-oriented coping is also effective in some circumstances. For example, Cohen and Lazarus (1973) considered the coping strategies used by patients during hospitalization after surgery. Patients using denial showed an improved rate of healing (and had fewer minor complications) than those who did not.

Many stressful situations change over time, and so the best coping strategy may also change. For example, Folkman and Lazarus (1985) found students faced with a stressful examination sought information and social support before the examination. Afterwards, while waiting to hear the results, they typically made use of avoidance coping (e.g., forgetting all about the examination). In a different context, the avoidance-oriented strategy of denial is dangerous when an individual has just suffered a heart attack, but is useful during the subsequent period of hospitalization (Levine et al., 1987). Denial becomes dangerous again if it continues for a long period of time after discharge from hospital (Levine et al., 1987).

Evaluation

- (+) Coping strategies are important in determining the effects of stressful events on an individual's mental and physical state.
- (+) There is reasonable agreement on the major coping strategies (e.g., task-oriented; avoidance-oriented).
- (−) The coping strategies used by individuals in their actual behavior may not be the same as the coping strategies they claim to use on self-report questionnaires.
- (−) Questionnaires often focus on individuals' preferred coping strategies in a very *general* way. Such a broad assessment may not allow us to predict how individuals will respond to a *specific* stressor.
- (−) As Lazarus (1993, p. 242) pointed out, "Coping process measures would be far more meaningful and useful if we knew more about the persons whose coping thoughts and actions are being studied." For example, responding to possible failure on a future examination by using an avoidance-oriented coping strategy makes sense *only* if the individual is not motivated to achieve success.

COPING STRATEGIES: CORE FAMILIES

Skinner, Edge, Altman, and Sherwood (2003) identified some additional limitations with approaches to coping strategies such as that of Endler and Parker (1990). First, task- or problem-oriented coping and emotion-focused coping are not really mutually exclusive: "Most ways of coping can serve both functions and thus could fit into both categories. For example, making a plan not only guides problem solving but also calms emotion" (Skinner et al., 2003, p. 227). Second, several forms of coping don't fit neatly into the traditional approach based on two or three major types of coping strategy. Examples include observation, aggression, rumination [contemplation], and accommodation [active attempts to adjust to the situation].

What is the way forward? Skinner et al. (2003) used comprehensive information from 100 different assessments of coping to identify the most important coping strategies. Their analyses suggested that there are several families of coping. Each family is a broad category and contains within it several specific forms of categories. According to Skinner et al. (2003), nine families of coping are of special importance:

1. *Problem solving*: This includes various activities, including instrumental action; direct action; decision making; and planning.
2. *Support seeking*: This includes comfort seeking; help seeking; and spiritual support.
3. *Escape*: This includes avoidance; disengagement; and denial.
4. *Distraction*: This includes acceptance and engaging in alternative pleasurable activities (e.g., exercise; reading).
5. *Positive cognitive restructuring*: This includes positive thinking and self-encouragement.
6. *Rumination*: This includes intrusive thoughts; negative thinking; self-blame; and worry.
7. *Helplessness*: This includes inaction; passivity; giving up; and pessimism.
8. *Social withdrawal*: This includes social isolation; avoiding others; and emotional withdrawal.
9. *Emotional regulation*: This includes emotional expression; emotional control; and relaxation.

This approach to coping represents one of the most thorough attempts to identify all of the major coping strategies used when people are stressed. It is more realistic than previous approaches based on assuming that there are only two or three coping responses. What remains to be done is to investigate in detail the effectiveness of these nine coping strategies across different kinds of stressful situations.

Chapter Summary

Psychology of emotion

- Six emotions can be reliably identified from facial expressions across cultures. Self-report measures of emotion produce two main independent dimensions (positive affectivity vs. negative affectivity or pleasure–misery vs. arousal–sleep). Seven basic emotional systems (expectancy; anger; anxiety; sexuality; nurturance; separation; and joy) have been identified in the brain.
- Most (or all) emotions serve useful functions. According to Oatley and Johnson-Laird, emotions influence individuals to pursue whatever goal has the greatest survival or other value in the current situation.

Theories of emotion

- According to the James–Lange theory, our emotional experience is determined by perceiving our own bodily changes. However, most patients with spinal cord damage having greatly restricted awareness of their own physiological activity nevertheless report intense emotional experiences.
- According to Schachter and Singer, the experience of emotion requires high physiological arousal *and* an emotional interpretation of that arousal. This theory makes the erroneous assumption that all emotions are associated with the same arousal pattern.
- According to Lazarus, emotional experience is crucially dependent on cognitive appraisal of the current situation. It is difficult to assess cognitive appraisals, many of which occur below the level of conscious awareness.
- According to the SPAARS approach, emotions can be produced either fairly automatically via the associative system or in a more controlled way via the propositional and schematic systems.

Stress

- Stress involves an immediate shock response involving the sympathetic adrenal medullary system followed by a countershock response involving the hypothalamic–

pituitary–adrenocortical axis. The countershock response reduces many of the effects of the shock response but at the cost of impairing immune functioning.
- The key factor in work stress is lack of perceived control. Those in lower positions within a work organization have less control than those in higher positions and suffer more from various illnesses.
- Life events and daily hassles both increase the chances of a wide range of mental and physical health problems.
- Type A individuals high in hostility are at increased risk of cardiovascular disease. Those with Type D personality are vulnerable to a range of diseases.
- Long-lived stressors affect health via impaired immune system functioning and via lifestyle changes. However, short-lived stressors enhance immunity.

Coping with stress

- Social support (especially provided by an intimate friend) reduces the adverse effects of stress on physical health.
- According to Taylor et al., men respond to stress with a fight-or-fight response, whereas women respond with a tend-and-befriend response that may be due in part to oxytocin.
- Many theorists have argued there are a few main coping strategies (e.g., task-oriented; emotion-oriented; avoidance-oriented). The effectiveness of any coping strategy depends on the individual and the situation.
- Coping strategies are generally assessed by self-report questionnaires and may not reflect people's actual behavior.
- Skinner et al. have developed a new approach to coping strategies based on the entire literature in the area. They identified nine families of coping to provide a comprehensive account.

Further Reading

- Belaise, C., with contributions by S. Acharya, R.A. Askew, E. Caffo, D.G. Cruess, & K.V. Oxington (2005). *Psychology of stress*. Hauppauge, NY: Nova Biomedical Books. Most of the main issues in stress research are discussed in this book.
- Folkman, S., & Moskowitz, J.T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology*, *55*, 745–774. The authors provide an overview of coping research with an emphasis on relatively recent developments.
- Niedenthal, P.M., Krauth-Gruber, S., & Ric, F. (2006). *Psychology of emotion: Interpersonal, experiential, and cognitive approaches*. Hove, UK: Psychology Press. This book provides an unusually comprehensive account of theory and research on emotion, and relates contemporary thinking to its historical context.
- Reeve, J. (2005). *Understanding motivation and emotion* (4th ed.). Hoboken, NJ: Wiley. Much of this introductory textbook is devoted to mainstream research and theory on emotion.
- Segerstrom, S.C., & Miller, G.E. (2004). Psychological stress and the human immune system: A meta-analytic study of 30 years of inquiry. *Psychological Bulletin*, *130*, 601–630. The authors provide an excellent analysis of what is known about the effects of psychological stress on the workings of the immune system and on disease.
- Skinner, E.A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin*, *129*, 216–269. Previous approaches to categorizing coping strategies are criticized effectively, and an alternative approach is discussed in detail.
- Strongman, K.T. (2003). *Psychology of emotion: From everyday life to theory*. Hoboken, NJ: Wiley. Strongman provides accessible accounts of the leading theories of emotion in the context of our day-by-day experiences.
- Wade, C. (2005). *Psychology* (8th ed.). New York: Prentice Hall. Chapter 11 of this introductory textbook is devoted to emotion from the physiological, psychological, and cultural perspectives.

Chapter 5

Contents

States of awareness

5

Every day of our lives we experience various states of awareness. Some of the main states of awareness form the basis of this chapter. For example, there is clearly an important difference between the waking and sleeping states, and within the sleeping state we need to distinguish between dreaming and nondreaming. In this chapter, we consider the sleeping state. This includes a discussion of dreaming, and of the various theories accounting for our dreams. Before discussing sleep and dreaming, however, we focus on the key issue of consciousness. Our coverage deals with the functions of consciousness, whether it is possible to have more than one consciousness, and theoretical attempts to understand the underlying differences between conscious and nonconscious states and processes. Before embarking on a discussion of consciousness, however, we briefly discuss a few states of awareness, including some not considered later in the chapter.

TRANSIENT HYPOFRONTALITY HYPOTHESIS

Dietrich (2003) discussed several states of consciousness, including hypnosis, dreaming, and meditation. In spite of the fact that there are obvious differences among these states of consciousness, Dietrich argued in his transient hypofrontality hypothesis that they all share one crucial feature—there is a relatively short-lived reduction in activation within the prefrontal area of the brain. Why is this important? In essence, the prefrontal cortex (especially the dorsolateral prefrontal cortex) plays a significant role in several complex functions including attentional control, willed action, self-reflection, and cognitive flexibility. As is discussed in the next section, several different areas of the brain in addition to the prefrontal cortex are typically activated when an individual is in a state of alert consciousness. However, as Dietrich (2003, p. 232) pointed out, "The prefrontal cortex enables the top layers of consciousness by contributing the highest-order cognitive functions to the conscious experience."

Two main lines of evidence support Dietrich's (2003) transient hypofrontality hypothesis. First, there is research focusing on the cognitive functions impaired or absent in various altered states of consciousness. According to the hypothesis, functions involving the prefrontal cortex should be the ones most adversely affected. Second, there is research designed to assess brain activation when individuals are in various states of consciousness. The obvious prediction is that states of consciousness such as dreaming and daydreaming should be associated with reduced activation within the prefrontal cortex.

The evidence on hypnosis is broadly supportive of the theory. The main distinguishing feature of the hypnotic state is that individuals show a lack of willed action. Gruzelier (2000) attributed this to frontal inhibition (impairments in the inhibition function of the prefrontal cortex). Inhibition is important on the Stroop task. On this task, participants see a series of color words, each presented in a color that differs from its associated word (e.g., RED is presented in green; BLUE is presented in yellow). The task involves naming the colors as rapidly as possible while inhibiting the color words. Hypnotized individuals perform poorly on this task (e.g., Kallio et al., 2001). Studies using event-related potentials indicate that hypnotized individuals have decreased prefrontal activation compared to nonhypnotized ones (e.g., Nordby et al., 1999).

This late nineteenth century photograph shows a group of doctors observing a colleague putting his patient into a hypnotic trance. Once hypnotized, individuals generally show a lack of willed action, and a decrease in prefrontal activation.

The evidence on dreaming is strongly supportive of the theory (see discussion later in the chapter). Dreaming is associated with an absence of self-reflection, distortions of time, reduced motivational control, and unfocused attention (Dietrich, 2003), all of which are associated with impaired functioning of the prefrontal cortex. Most (but not all) dreaming occurs during rapid eye movement (REM) sleep in which most of the brain is active with the exception of the prefrontal cortex. As Braun et al. (1997, p. 1190) pointed out, "REM may constitute a state of generalized brain activity with the specific exclusion of executive systems."

The evidence on meditation partially supports the hypothesis, but there are some complicating factors. On the positive side, meditators report a sense of timelessness, an absence of planning, little emotional experience, and a lack of self-reflection (Dietrich, 2003), all of which are indicative of reduced prefrontal functioning. In addition, meditation is often associated with increased alpha activity in the EEG across the brain that is consistent with reduced brain activation (Cahn & Polich, 2006). However, meditation is typically experienced as a state in which there is sustained concentration and good attentional control, both of which are suggestive of good prefrontal functioning. In addition, brain-imaging techniques typically indicate that meditation is associated with *increased* activation in dorsolateral prefrontal cortex. The meditative state is often described as involving "relaxed alertness"—it may be a state in which *some* aspects of prefrontal functioning (especially attentional control) are functioning well even though most are not.

In sum, it is a reasonable generalization that most altered states of consciousness involved reduced activation in the prefrontal cortex. However, that generalization applies better to hypnosis and to dreaming than it does to meditation. The transient hypofrontal hypothesis does not directly explain how states of consciousness differ from each other. However, part of what is happening would seem to be that the precise prefrontal functions that are impaired vary from one state to another.

CONSCIOUSNESS

This section of the chapter is concerned with consciousness. What exactly do we mean by the term "consciousness"? According to Colman (2001, p. 160), consciousness is, "the normal mental condition of the waking state of humans, characterized by the experience of perceptions, thoughts, feelings, awareness of the external world, and often in humans . . . self-awareness."

Understanding consciousness is often regarded as one of psychology's great unsolved mysteries. However, that view is becoming increasingly out of date. There has been a dramatic increase in the amount of research devoted to consciousness, and researchers are starting to grapple successfully with important issues.

FUNCTIONS OF CONSCIOUSNESS

Why do humans have consciousness? Humphrey (1983) argued that the main function of consciousness is social. Humans have lived in social groups for tens of thousands of years. In such groups, you need to predict, understand, and manipulate the behavior of other people. This is much easier to do if you possess the ability to imagine yourself in their position. Humans developed conscious awareness of themselves, and this helped them to understand others. In the words of Humphrey (2002, p. 75), "Imagine that a new form of sense organ evolves, an 'inner eye,' whose field of view is not the outside world but the brain itself."

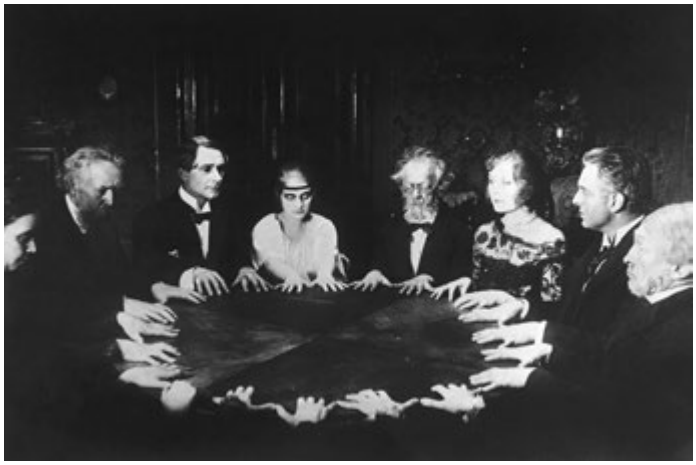
It is argued that another reason we have consciousness is to control our actions. Much of the time we find ourselves consciously thinking of doing something and then

doing it. For example, "I think I'll go to the pub" is followed by us finding ourselves in the familiar surroundings of our local pub. As Wegner (2003, p. 65) pointed out, "It certainly doesn't take a rocket scientist to draw the obvious conclusion . . . consciousness is an active force, an engine of will."

I imagine you agree with what was said in the previous paragraph, because it fits with our everyday experience. However, there has been a systematic onslaught on that position in recent years. This onslaught is considered below.

Conscious intentions?

Wegner (2002) argued that we have only the *illusion* of conscious or free will. According to him, our actions are actually caused by unconscious processes. However, we *infer* that our thoughts cause our actions. Inferences can be wrong, and so it follows that we should often make mistakes (e.g., assuming we didn't cause something to happen even though we did). Support for this position comes from the unlikely source of the spiritualist movement that swept through nineteenth century Europe. Advocates of spiritualism believed that spirits of the dead could convey messages and even move tables. For example, several people would sit around a table with their hands resting on the top and pressing down on it. After a while, the table would start to vibrate and eventually would move about and spell out answers to questions. The sitters firmly believed that they had not caused movements of the table but that spirits were responsible. Unfortunately for the spiritualists, the scientist Michael Faraday showed convincingly that the sitters were causing the table to move.



Late nineteenth century European spiritualists would indulge in activities such as séances, where inanimate objects and tables seemed to inexplicably move of their own accord. Michael Faraday demonstrated, however, that the sitters themselves were unwittingly causing the objects to move.

The spiritualists made much use of ouija boards (the odd name comes from the French and German words for "yes"). Several people sit around a table with their forefingers on an upturned glass in the center of a ring of letters. Eventually the glass moves and spells out words. Everyone denies they moved the glass, and so it is assumed that spirits of the dead are communicating to the living.

Wegner and Wheatley (1999) used an updated version of the ouija board using a 20 cm square board mounted onto a computer mouse. Two participants placed their fingers on the board. When they moved the board, this caused a cursor to move over a screen showing numerous pictures of small objects. Every 30 seconds or so, the participants were told to stop the cursor and to indicate the extent to which they had consciously intended the cursor to stop where it did.

Both participants wore headphones. One participant was genuine but the other was a confederate working for the experimenter. This confederate received instructions through the headphones to make certain movements. On crucial trials, the confederate was told to stop on a given object (e.g., a cat) and the genuine participant heard the word "cat" 30 seconds before, 5 seconds before, 1 second before, or 1 second after the confederate stopped the cursor. Genuine participants believed they had caused the cursor to stop where it did when they heard the name of the object on which it stopped 1 or 5 seconds beforehand. Thus, they mistakenly believed their conscious intention had caused the action when it hadn't.

How can we explain Wegner and Wheatley's (1999) findings? According to Wegner (2003, p. 67), we infer that

Unconscious and conscious

Asking a pendulum to answer a question might seem very far-fetched, but as Libet found in 1983 this is not as silly as it sounds. You can try this! Make a simple pendulum with a paper clip as a weight hung on a length of cotton thread. Let the paper clip hang down over a cross drawn on a piece of paper, with the other end of the thread held between thumb and first finger tips. Now tell yourself the paper clip swinging clockwise means "Yes," and swinging anticlockwise means "No" and, taking care not to move your hand, ask a question to which you know the answer, such as "Is my psychology teacher's name Ms. Bloggs?" and see how it swings. This only works if you know the answer!

How does it work? According to *New Scientist* as soon as you ask the question the unconscious brain activates the motor preparation circuits in anticipation of the expected answer. This neural activity leads to tiny muscle movements, too small for us to be aware of normally but the pendulum amplifies them making their effect visible.

http://www.newscientist.com/channel/being-human/mg19526221.300-mind-tricks-six-ways-to-explore-your-brain.html

our conscious thoughts have caused our action based on the principles of priority, consistency, and exclusivity:

> *When a thought appears in consciousness just before an action (priority), is consistent with the action (consistency), and is not accompanied by conspicuous alternative causes of the action (exclusivity), we experience conscious will and ascribe authorship to ourselves for the action.*

Pronin, Wegner, and McCarthy (2006) carried out an interesting study on voodoo curses in American college students. Some participants encountered another person (the "victim") who was offensive. After the encounter, they stuck pins into a voodoo doll representing the victim in his presence. When the victim subsequently reported a headache, participants tended to believe that their practice of voodoo had helped to cause his symptoms. They had this belief because their negative thoughts and actions about the victim occurred shortly before his symptoms developed.

The above findings are not really the kiss of death for the notion that conscious intentions play an important role in determining our actions. For example, Wegner and Wheatley (1999) used a very elaborate and artificial set-up to show that we are sometimes mistaken when we decide we caused an action. To draw a comparison, no one would argue that visual perception is hopelessly fallible simply because we make mistakes when identifying objects in a thick fog.

Libet et al. (1983) used a very different approach in an attempt to show that conscious intentions are less important than we imagine. Participants were asked to bend their wrist and fingers at a time of their choosing. The moment at which they became consciously aware of the intention to perform the movement and the moment at which the hand muscles were activated were both recorded. Libet et al. (1983) also recorded the readiness potential in the brain—this is thought to reflect pre-planning of a bodily movement. The readiness potential occurred 350 ms *before* participants were consciously aware of the intention to bend the wrist and fingers. Thus, it seemed as if the brain "decided" to make a movement before there was any conscious awareness of the decision.

Conscious awareness of pain

If you have ever stepped on a sharp object, or mistakenly picked up a very hot plate, you will know that first of all you leap off the nail or drop the plate. Only then does the pain kick in, after we are "safe." This is so because the nerves (known as the reflex arc) organizing the reception of and response to the threat are fast, and those transmitting pain are slow. It's obvious that it is more important to retreat from the harmful stimulus and that feeling the pain and learning from it can wait a second.

Libet et al.'s (1983) study is somewhat limited. The readiness potential isn't a direct measure of preparation for bodily movement. Trevena and Miller (2002) repeated Libet et al.'s (1983) experiment measuring lateralized readiness potential, which is a more direct measure. This lateralized readiness potential typically occurred (on about 80% of trials) before participants were consciously aware of the decision to move their hand. Thus, voluntary initiation of hand movement (as reflected in brain activity) generally preceded conscious awareness that the decision had been made. However, this time difference was much less than in Libet et al.'s (1983) research, and so the findings are not really clear-cut.

In sum, our assumption that our actions are closely related to our immediately preceding conscious thoughts may need revision. Sometimes people think their conscious intentions are responsible for their actions when that doesn't seem to be the case (e.g., Libet et al., 1983; Pronin et al., 2006; Trevena & Miller, 2002; Wegner & Wheatley, 1999). However, this is such a complex issue that we need much more research before coming to any definitive conclusions.

IN TWO MINDS?

Nearly everyone agrees that we possess a single, unitary consciousness. Suppose, however, we consider individuals in whom the connections between the two halves of the brain have been severed. In these **split-brain patients**, the corpus callosum (the major connection between the two halves or hemispheres of the brain) was cut surgically to contain severe epileptic seizures within one hemisphere. Do split-brain patients have two minds, each with its own distinctive consciousness?

Key Term

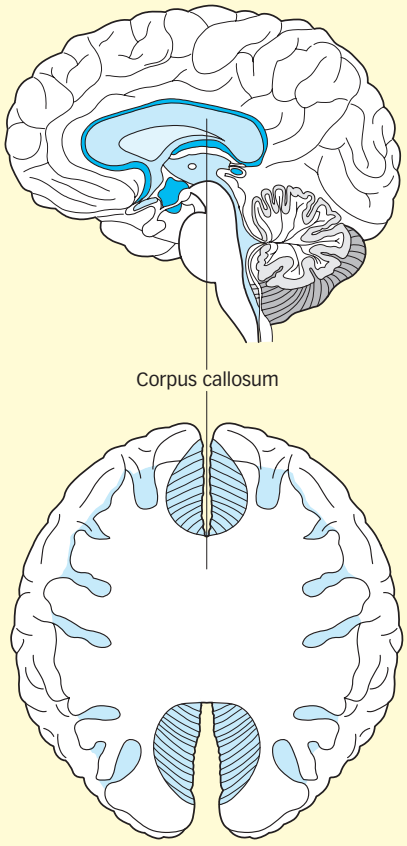
Split-brain patients: individuals in whom the corpus callosum connecting the two halves of the brain has been severed.

Different answers to the above question have been offered by experts. On one side of the argument is Roger Sperry (1913–1994), who won the Nobel Prize for his influential

research on split-brain patients. He claimed that these patients have two consciousnesses:

> *Each hemisphere seemed to have its own separate and private sensations . . . the minor hemisphere [the right one] constitutes a second conscious entity that is characteristically human and runs along in parallel with the more dominant stream of consciousness in the major hemisphere [the left one] (Sperry, 1968, p. 723).*

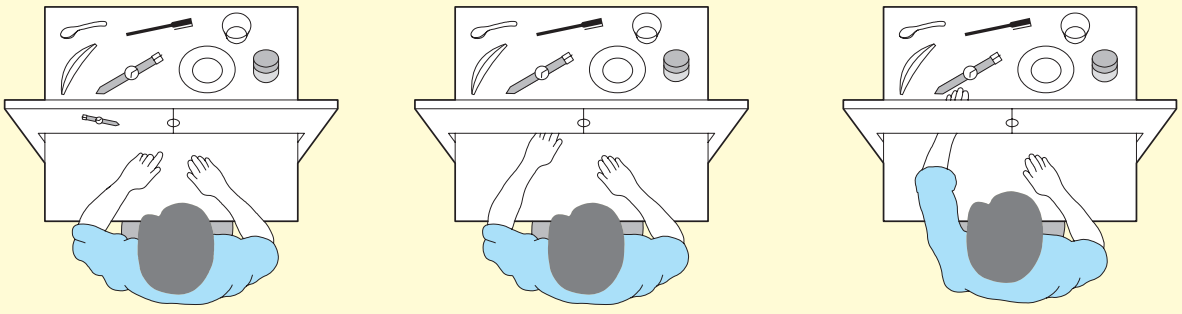
On the other side of the argument are Gazzaniga, Ivry, and Mangun (2002). According to them, split-brain patients have only a single conscious system based in the left hemisphere. They called this system the interpreter, defining it as, "A left-brain system that seeks explanation for internal and external events in order to produce appropriate response behavior" (Gazzaniga et al., 2002, p. G-5). Cooney and Gazzaniga (2003) argued that brain-damaged patients use the interpreter to produce an understanding of what is happening even when it has access to only very limited information. As a result, brain-damaged patients' understanding is often incorrect.



Findings

The first split-brain patient studied by Sperry and his colleagues was W.J., a charming and socially dominant Second World War veteran. Discovering that each of his brain hemispheres could process information independently of the other was a major scientific contribution. According to Gazzaniga (who studied him), "W.J. lives happily in Downey, California, with no sense of the enormity of the findings or for that matter any awareness that he had changed."

It is easy to imagine that split-brain patients struggle to cope effectively with the world around them. In fact, this is *not* the case. They move their eyes around to make sure that all the important information from the environment reaches both hemispheres. It was only when Sperry conducted experiments in which visual stimuli were presented so rapidly that no eye movements could be made that split-brain patients showed severely impaired performance.



A picture of an object is presented to the left visual field (right hemisphere)

The split-brain patient cannot name the object

The patient can pick out the correct object using the left hand

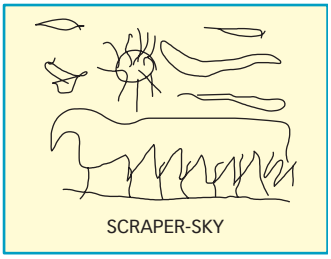
Each hemisphere in split-brain patients has its own strengths. The right hemisphere is better than the left hemisphere on tasks that require taking account of the shapes of objects. For example, only the right hemisphere can recognize the faces of familiar people (Uddin, Rayman, & Zaidel, 2005). In contrast, the left hemisphere is better than the right hemisphere on tasks requiring speech. In Sperry's research, patients generally responded fluently when tasks were presented to the left hemisphere. When tasks were presented to the right hemisphere, "The subjects often gave no response. If urged to reply, they said that there might have been some weak and ill-defined event, or else they confabulated [invented] experiences" (Trevarthen, 2004, p. 875). Note, however, that the right hemisphere showed some ability to understand simple language.

The fact that the right hemisphere of most split-brain patients lacks speech makes it difficult to know whether it possesses its own consciousness. However, Paul S. is a split-brain patient with reasonably good language abilities in his right hemisphere. The left hand is connected to the right hemisphere, and Paul S. showed limited evidence of consciousness in his right hemisphere by responding accurately to questions using his left hand. For example, he could spell out his own name, that of his girlfriend, his hobbies, and his current mood.

Paul S. showed some interesting differences between his hemispheres. His right hemisphere said he wanted to be a racing driver whereas his left hemisphere wanted him to be a draughtsman!

In one study (Gazzaniga, 1992), Paul S. was presented with a chicken claw to his left hemisphere and a snow scene to his right hemisphere. When asked to select relevant pictures from an array, he chose a picture of a chicken with his right hand (connected to the left hemisphere) and a picture of a shovel with his left hand (connected to the right hemisphere). These findings *don't* indicate that Paul S. had a separate consciousness in each hemisphere. When asked to explain his choices, Paul said, "Oh, that's simple. The chicken claw goes with the chicken, and you need a shovel to clean out the chicken shed" (Gazzaniga, 1992, p. 124). As Gazzaniga pointed out, Paul's left hemisphere was interpreting behavior initiated by the right hemisphere, and there was no clear evidence that the right hemisphere was contributing much to the interpretation.

Findings indicating that Paul S.'s left hemisphere often overruled his right hemisphere led Gazzaniga et al. (2002) to argue that he (and other split-brain patients) has very limited right-hemisphere consciousness. For example, the right hemispheres of split-brain patients can understand words such as "pin" and "finger," but they find it very difficult to decide which of six words best describes the causal relationship between them ("bleed"). According to Gazzaniga et al. (2002, p. 680), "[The right hemisphere] deals mainly with raw experience in an unembellished [basic] way. The left hemisphere, though, is constantly . . . labeling experiences, making inferences as to cause, and carrying out a host of other cognitive activities. The right hemisphere is simply monitoring the world." The evidence suggests that the left hemisphere contains an interpreter that provides coherent interpretations of experienced events.



A left-handed drawing by a split-brain patient attempting to draw a skyscraper. He saw the word "scraper" in the left visual field and the word "sky" in the right visual field. He managed to draw sky and scraper, but neither hemisphere could combine the two words to make the emergent concept "skyscraper."

Wolford, Miller, and Gazzaniga (2000) reported findings consistent with the notion that there is an interpreter in the left hemisphere but not in the right one. Split-brain patients predicted whether a light would appear in the top or the bottom of a computer screen on numerous trials. The right hemisphere adopted the simple strategy of choosing the more probable alternative on nearly every trial. In contrast, the left hemisphere adopted the more complex strategy of interpreting the structure of the task, and so distributed its responses according to the probability that each was appropriate.

More promising evidence that dual consciousness may exist in some split-brain patients was reported by Baynes and Gazzaniga (2000). They discussed the case of V.J., whose writing is controlled by the right hemisphere whereas her speech is controlled by the left hemisphere. According to Baynes and Gazzaniga (2000, p. 1362), "She [V.J.] is the first split . . . who is frequently dismayed by the independent performance of her right and left hands. She is discomfited by the fluent writing of her left hand [controlled by the right hemisphere] to unseen stimuli and distressed by the inability of her right hand to write out words she can read out loud and spell." Perhaps V.J. has somewhat separate consciousnesses in each hemisphere.

Evaluation

- + The left hemisphere in split-brain patients plays the dominant role in consciousness, and is the location of an interpreter or self-supervisory system.
- + The evidence generally suggests that the right hemisphere can engage in various low-level processing activities (e.g., identifying shapes) but lacks its own consciousness.
- − The fact that the right hemisphere in most split-brain patients has a limited ability to communicate makes it difficult to decide the extent to which it may have its own consciousness.
- − The emphasis has been on the independent functioning of the two hemispheres in split-brain patients, but most of the time their two hemispheres function effectively together.

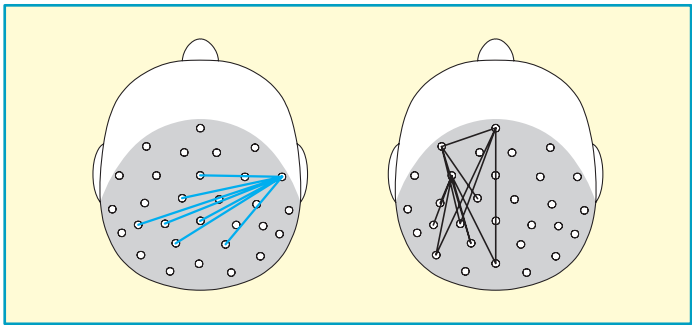
THEORETICAL APPROACHES

Several theorists (e.g., Baars, 1997; Baars & Franklin, 2003; Dehaene & Naccache, 2001) have put forward similar theories of consciousness. These theories are known as global workspace theories because it is assumed that consciousness is associated with a global workspace in the brain. Here are the main assumptions built into these theories:

1. Most information processing occurs in parallel (more than one process at a time) below the level of conscious awareness.
2. Conscious awareness depends very much on focal attention. Baars (1997) invited us to consider sentences such as, "We look in order to see" or "We listen in order to hear." According to Baars (1997, p. 364), "The distinction is between selecting an experience and being conscious of the selected event. In everyday language, the first word of each pair ["look"; "listen"] involves attention; the second word ["see"; "hear"] involves consciousness." Thus, attention resembles choosing a television channel and consciousness resembles the picture on the screen.
3. Consciousness involves integrating and combining information from various specific nonconscious processes distributed throughout the brain. It is involved in planning novel strategies and ensuring their successful execution.
4. The specific brain areas associated with consciousness depend in part on the content of the conscious experience and the specific processes involved. However, Dehaene and Naccache (2001) argued that the prefrontal cortex and the anterior cingulate are typically activated during conscious experience.

Findings

The most general theoretical prediction is that brain activation is more *coordinated* or *integrated* (and sometimes more widespread) during conscious processing than during processing below the conscious level. One way of testing this prediction is to present all participants with the same stimuli and the same task. Brain-imaging data are then analyzed separately for those who were consciously aware of some aspect of the experimental situation and for those who weren't. For example, Rodriguez et al. (1999) presented pictures that were easily perceived as faces when presented upright (face-perception condition) but which were seen as meaningless black-and-white shapes when presented upside-down (control condition). The key



Phase synchrony (black lines) and phase desynchrony (blue lines) in EEG 180–360 ms after stimulus presentation in the no-face-perception (left side) and face-perception (right side) conditions. From Rodriguez et al. (1999). Copyright © 1999 by the Nature Publishing Group. Reproduced with permission.

findings related to brain activity at the time after picture presentation (180–360 ms) at which faces were perceived in the upright condition. As predicted, there was much more coordinated or synchronized activity across the brain on the face-perception condition than in the control condition (see the figure on the previous page).

An alternative approach involves presenting the same stimuli so they can (one condition) or can't (second condition) be perceived consciously. One way of preventing a stimulus being perceived consciously is to follow it almost immediately with a second stimulus that acts as a mask and inhibits processing of the first stimulus. Dehaene et al. (2001) presented words either masked or unmasked. When the words were masked and so not consciously perceived, brain activation was mostly restricted to the visual cortex. When the same words were unmasked, there was a much larger increase in activation in the visual cortex, and there was also widespread parietal and prefrontal activation. Baars (2002) reviewed 13 studies in which conscious and nonconscious conditions were compared. He concluded, "Conscious perception . . . enables access to widespread brain sources, whereas unconscious input processing is limited to sensory regions."

The prefrontal cortex and anterior cingulate are typically involved in conscious awareness (see Dehaene & Naccache, 2001, for a review). For example, Lumer, Friston, and Rees (1998) carried out a study on binocular rivalry. What happens in **binocular rivalry** is that two visual stimuli are presented (one to each eye), but the observer consciously perceives only one of them. The stimulus that is consciously perceived changes over time. Lumer et al. presented a red drifting grating to one eye and a green face to the other, and observers indicated which stimulus they were consciously perceiving. As predicted, the prefrontal cortex and anterior cingulate were among the brain areas showing increased activation immediately prior to a switch in conscious perception from one stimulus to the other.

Evaluation

- (+) The notion that conscious awareness is associated with integrated or coordinated widespread brain activity has received much support.
- (+) Activation of the prefrontal cortex and anterior cingulate is typically associated with conscious awareness.
- (−) We now have a reasonable knowledge of brain processes associated with conscious awareness. However, we are still a long way away from knowing *why* physical processes in the brain give rise to conscious experience.
- (−) The theory has little to say about the nature and content of our conscious experiences.

SLEEP

Sleep is an important part of our lives. It is probably the most time-consuming form of human behavior (apart from breathing!). Sleep generally occupies about one-third of our time, but the proportion decreases as we get older. First of all, we consider some of the basic facts about sleep. After that, we address the complex issue of the precise functions served by sleep—*why* do we need to sleep?

Key Terms

Binocular rivalry: this occurs when an observer perceives only one visual stimulus when two are presented, one to each eye.

Circadian rhythm: any biological rhythm repeating every 24 hours or so.

SLEEP–WAKE CYCLE

There is a 24-hour sleep–wake cycle, meaning that each day is typically divided into one period awake and one period asleep. The term **circadian rhythm** describes any biological rhythms that last about 24 hours. Why is the sleep–wake cycle 24 hours long? Perhaps it is strongly influenced by external events such as the light–dark cycle, and the fact that each dawn follows almost exactly 24 hours after the previous one. Another possibility is

Case Study: *Sleep Problems on a Space Station*

Back in 1997 Jerry Linenger lived on space station Mir for 5 months. He had real sleep problems because the station lights, which were meant to mimic a 24-hour light–dark cycle, were so dim. The best light cues came in through the windows, and the sun's light was very, very bright. But as Mir orbited the earth every 90 or so minutes this produced 15 day–night (i.e., light–dark) cycles every 24 hours. Jerry says he tried to cope, but couldn't, and that he'd see his Russian colleagues suddenly nod off and float around the cabin. Monk (2001) monitored Jerry during his time in space and reported findings that after 90 days the astronaut's quality of sleep deteriorated very rapidly. Monk thinks the brain's endogenous pacemaker had become disrupted by the abnormal light rhythm.

Case Study: *The Sleep–Wake Cycle*

Michel Siffre was studied for 7 months in 1972 when he volunteered to live underground in caves out of any contact with daylight and without any other clues about what time of day it was, that is, no watch or clocks or TV. He was safe and well fed, and the caves were warm and dry. He was always monitored via computers and video cameras, he had a 24-hour phone-link to the surface, and was well catered for in mind and body with books and exercise equipment. In this isolated environment he quickly settled into a regular cycle of sleeping and waking. The surprise was that his cycle was of almost 25 hours, not 24! It was a very regular 24.9-hour rhythm, so that each "day" he was waking up nearly an hour later. The effect of this was that by the end of his months underground he had "lost" a considerable number of days and thought he had been underground for much less time than had actually passed (Bentley, 2000).

that the sleep–wake cycle is based on **endogenous mechanisms**, that is, ones that are internal and biological.

One way of exploring the sleep–wake cycle is to study individuals having no contact with daylight. For example, Michel Siffre spent 7 months in a dark cave. He developed a regular 25-hour sleep–wake cycle, which misled him into thinking he had been underground for several days less than was actually the case. Similar findings have been reported in studies on people spending weeks or months in a bunker or isolation suite (Wever, 1979). Such findings suggest there is an endogenous pacemaker having a period of about 25 hours.

The above findings are rather odd, because it isn't clear *why* we would have an endogenous rhythm differing in length from the 24-hour day we typically experience. In fact, there is an important limitation in the studies, because the participants controlled their own lighting conditions (free-running paradigm). Czeisler et al. (1999) also made use of a forced desynchrony paradigm in which artificial 20- or 28-hour days were imposed on participants, because they couldn't control the lighting conditions. There was a 25-hour circadian rhythm in temperature with the free-running paradigm. However, the temperature circadian rhythm averaged 24 hours and 10 minutes with both the 20- and 28-hour days. Thus, the endogenous circadian pacemaker has a period of 24 hours, but can be lengthened in artificial environments.

The free-running paradigm led to overestimation of the duration of the circadian pacemaker because participants could turn the lights on whenever they wanted. This is important because light is a **zeitgeber** (literally,

Key Terms

Endogenous mechanisms: mechanisms that are internal and biological and are relatively uninfluenced by external factors.

Zeitgeber: external events (e.g., light) that partially determine biological rhythms.