INTEGRAL UNIVERSITY, LUCKNOW

DIRECTORATE OF DISTANCE EDUCATION

BBA-402 Paper Code: GP/B

GENERAL PSYCHOLOGY

CONTENTS

UNIT-1 INTRODUCING PSYCHOLOGY

CONTENTS

INTRODUCTION

Psychology is the scientific study of mind and behavior. The word "psychology‖ comes from the Greek words "p syche,‖ meaning life, and " logos,‖ meaning explanation. Psychology is a popular major for students, a popular topic in the public media, and a part of our everyday lives. Television shows such as Dr. Phil feature psychologists who provide personal advice to those with personal or family difficulties. Crime dramas such as CSI, Lie to Me, and others feature the work of forensic psychologists who use psychological principles to help solve crimes. And many people have direct knowledge about psychology because they have visited psychologists, for instance, school counselors, family therapists, and religious, marriage, or bereavement counselors.

Because we are frequently exposed to the work of psychologists in our everyday lives, we all have an idea about what psychology is and what psychologists do. In many ways I am sure that your conceptions are correct. Psychologists do work in forensic fields, and they do provide counseling and therapy for people in distress. But there are hundreds of thousands of psychologists in the world, and most of them work in other places, doing work that you are probably not aware of.

Most psychologists work in research laboratories, hospitals, and other field settings where they study the behavior of humans and animals. For instance, my colleagues in the Psychology Department at the University of Maryland study such diverse topics as anxiety in children, the interpretation of dreams, the effects of caffeine on thinking, how birds recognize each other, how praying mantises hear, how people from different cultures react differently in negotiation, and the factors that lead people to engage in terrorism. Other psychologists study such topics as alcohol and drug addiction, memory, emotion, hypnosis, love, what

makes people aggressive or helpful, and the psychologies of politics, prejudice, culture, and religion. Psychologists also work in schools and businesses, and they use a variety of methods, including observation, questionnaires, interviews, and laboratory studies, to help them understand behavior.

This Unit provides an introduction to the broad field of psychology and the many approaches that psychologists take to understanding human behavior. We will consider how psychologists conduct scientific research, with an overview of some of the most important approaches used and topics studied by psychologists, and also consider the variety of fields in which psychologists work and the careers that are available to people with psychology degrees. I expect that you may find that at least some of your preconceptions about psychology will be challenged and changed, and you will learn that psychology is a field that will provide you with new ways of thinking about your own thoughts, feelings, and actions.

Psychology as a Science

Despite the differences in their interests, areas of study, and approaches, all psychologists have one thing in common: They rely on scientific methods. Research psychologists use scientific methods to create new knowledge about the causes of behavior, whereas psychologist-practitioners, such as clinical, counseling, industrial-organizational, and school psychologists, use existing research to enhance the everyday life of others. The science of psychology is important for both researchers and practitioners.

In a sense all humans are scientists. We all have an interest in asking and answering questions about our world. We want to know why things happen, when and if they are likely to happen again, and how to reproduce or change them. Such knowledge enables us to predict our own behavior and that of others. We may even collect data (i.e., any information collected through formal observation or measurement) to aid us in this undertaking. It has been argued that people are " everyday scientists‖ who conduct research projects to answer questions about behaviour

(Nisbett & Ross, 1980). When we perform poorly on an important test, we try to understand what caused our failure to remember or understand the material and what might help us do better the next time. When our good friends Monisha and Charlie break up, despite the fact that they appeared to have a relationship made in heaven, we try to determine what happened. When we contemplate the rise of terrorist acts around the world, we try to investigate the causes of this problem by looking at the terrorists themselves, the situation around them, and others' responses to them.

The results of these " everyday‖ research projects can teach us many principles of human behavior. We learn through experience that if we give someone bad news, he or she may blame us even though the news was not our fault. We learn that people may become depressed after they fail at an important task. We see that aggressive behavior occurs frequently in our society, and we develop theories to explain why this is so. These insights are part of everyday social life. In fact, much research

in psychology involves the scientific study of everyday behavior (Heider, 1958; Kelley, 1967).

The problem, however, with the way people collect and interpret data in their everyday lives is that they are not always particularly thorough. Often, when one explanation for an event seems "right," we adopt that explanation as the truth even when other explanations are possible and potentially more accurate. For example, eyewitnesses to violent crimes are often extremely confident in their identifications of the perpetrators of these crimes. But research finds that eyewitnesses are no less confident in their identifications when they are incorrect than when they are correct (Cutler & Wells, 2009; Wells & Hasel, 2008). People may also become convinced of the existence of extrasensory perception (ESP), or the predictive value of astrology, when there is no evidence for either (Gilovich, 1993). Furthermore, psychologists have also found that there are a variety of cognitive and motivational biases that frequently influence our perceptions and lead us to draw erroneous conclusions (Fiske & Taylor, 2007; Hsee & Hastie,
2006).] In summary, accepting explanations for events without testing them thoroughly may lead us to think that we know the causes of things when we really do not.

Once we learn about the outcome of a given event (e.g., when we read about the results of a research project), we frequently believe that we would have been able to predict the outcome ahead of time. For instance, if half of a class of students is told that research concerning attraction between people has demonstrated that " opposites attract" and the other half is told that research has demonstrated that " birds of a feather flock together," most of the students will report believing that the outcome that they just read about is true, and that they would have predicted the outcome before they had read about it. Of course, both of these contradictory outcomes cannot be true. (In fact, psychological research finds that "birds of a feather flock together" is generally the case.) The problem is that just reading a description of research findings leads us to think of the many cases we know that support the findings, and thus makes them seem believable. The tendency to think that we could have predicted something that has already occurred that we probably would not have been able to predict is called the hindsight bias.

Why Psychologists Rely on Empirical Methods

All scientists, whether they are physicists, chemists, biologists, sociologists, or psychologists, use empirical methods to study the topics that interest them. Empirical methods include the processes of collecting and organizing data and drawing conclusions about those data. The empirical methods used by scientists have developed over many years and provide a basis for collecting, analyzing, and interpreting data within a common framework in which information can be shared. We can label the scientific method as the set of assumptions, rules, and procedures that scientists use to conduct empirical research.

Although scientific research is an important method of studying human behavior, not all questions can be answered using scientific approaches. Statements that cannot be objectively measured or objectively determined to be true or false are not within the domain of scientific

inquiry. Scientists therefore draw a distinction between values and facts. Values are personal statements such as “Abortion should not be permitted in this country,‖ “I will go to heaven when I die,‖ or “It is important to study psychology.‖ Facts are objective statements determined to be accurate through empirical study. Examples are “There were more than 21,000 homicides in the United States in 2009, or “ Research demonstrates that individuals who are exposed to highly stressful situations over long periods of time develop more health problems than those who are not.‖

Because values cannot be considered to be either true or false, science cannot prove or disprove them. Nevertheless, as shown in Table 1.1 "Examples of Values and Facts in Scientific Research", research can sometimes provide facts that can help people develop their values. For instance, science may be able to objectively measure the impact of unwanted children on a society or the psychological trauma suffered by women who have abortions. The effect of capital punishment on the crime rate in the United States may also be determinable. This factual information can and should be made available to help people formulate their values about abortion and capital punishment, as well as to enable governments to articulate appropriate policies. Values also frequently come into play in determining what research is appropriate or important to conduct. For instance, the U.S. government has recently supported and provided funding for research on HIV, AIDS, and terrorism, while denying funding for research using human stem cells.

Table 1.1 Examples of Values and Facts in Scientific Research

Personal value	Scientific fact
Welfare payments should be reduced for unmarried parents.	The U.S. government paid more than $21 billion in unemployment insurance in 2010.
Handguns should be outlawed.	There were more than 30,000 deaths caused by handguns in the United States in 2009.
Blue is my favorite color.	More than 35% of college students indicate that blue is their favorite color.
It is important to quit smoking.	Smoking increases the incidence of cancer and heart disease.

Although scientists use research to help establish facts, the distinction between values and facts is not always clear-cut. Sometimes statements that scientists consider to be factual later, on the basis of further research, turn out to be partially or even entirely incorrect. Although scientific procedures do not necessarily guarantee that the answers to questions will be objective and unbiased, science is still the best method for drawing objective conclusions about the world around us. When old facts are discarded, they are replaced with new facts based on newer and more correct data. Although science is not perfect, the requirements of empiricism and objectivity result in a much greater chance of producing an accurate understanding of human behavior than is available through other approaches.

Levels of Explanation in Psychology

The study of psychology spans many different topics at many different levels of explanation, which are the perspectives that are used to understand behavior. Lower levels of explanation are more closely tied

to biological influences, such as genes, neurons, neurotransmitters, and hormones, whereas the middle levels of explanation refer to the abilities and characteristics of individual people, and the highest levels of explanation relate to social groups, organizations, and cultures (Cacioppo, Berntson, Sheridan, & McClintock, 2000).

Level of explanation	Underlying process	Examples
Lower	Biological	Depression is in part genetically influenced. Depression is influenced by the action of neurotransmitters in the brain.
Middle	Interpersonal	People who are depressed may interpret the events that occur to them too negatively. Psychotherapy can be used to help people talk about and combat depression.
Higher	Cultural and social	Women experience more depression than do men. The prevalence of depression varies across cultures and historical time periods.

The Challenges of Studying Psychology

Understanding and attempting to alleviate the costs of psychological disorders such as depression is not easy, because psychological experiences are extremely complex. The questions psychologists pose are as difficult as those posed by doctors, biologists, chemists, physicists, and other scientists, if not more so (Wilson, 1998).

A major goal of psychology is to predict behavior by understanding its causes. Making predictions is difficult in part because people vary and respond differently in different situations. Individual differences are the variations among people on physical or psychological dimensions. For instance, although many people experience at least some symptoms of depression at some times in their lives, the experience varies dramatically among people. Some people experience major negative events, such as severe physical injuries or the loss of significant others, without experiencing much depression, whereas other people experience severe depression for no apparent reason. Other important individual differences that we will discuss in the Units to come include differences in extraversion, intelligence, self-esteem, anxiety, aggression, and conformity.

Because of the many individual difference variables that influence behavior, we cannot always predict who will become aggressive or who will perform best in graduate school or on the job. The predictions made by psychologists (and most other scientists) are only probabilistic. We can say, for instance, that people who score higher on an intelligence test will, on average, do better than people who score lower on the same test, but we cannot make very accurate predictions about exactly how any one person will perform.

Another reason that it is difficult to predict behavior is that almost all behavior is multiply determined, or produced by many factors. And these factors occur at different levels of explanation. We have seen, for

instance, that depression is caused by lower-level genetic factors, by medium-level personal factors, and by higher-level social and cultural factors. You should always be skeptical about people who attempt to explain important human behaviors, such as violence, child abuse, poverty, anxiety, or depression, in terms of a single cause.

Furthermore, these multiple causes are not independent of one another; they are associated such that when one cause is present other causes tend to be present as well. This overlap makes it difficult to pinpoint which cause or causes are operating. For instance, some people may be depressed because of biological imbalances in neurotransmitters in their brain. The resulting depression may lead them to act more negatively toward other people around them, which then leads those other people to respond more negatively to them, which then increases their depression. As a result, the biological determinants of depression become intertwined with the social responses of other people, making it difficult to disentangle the effects of each cause.

Another difficulty in studying psychology is that much human behavior is caused by factors that are outside our conscious awareness, making it impossible for us, as individuals, to really understand them. The role of unconscious processes was emphasized in the theorizing of the Austrian neurologist Sigmund Freud (1856–1939), who argued that many psychological disorders were caused by memories that we have repressed and thus remain outside our consciousness. Unconscious processes will be an important part of our study of psychology, and we will see that current research has supported many of Freud‘s ideas about the importance of the unconscious in guiding behavior.

The Evolution of Psychology: History, Approaches, and Questions

In this section we will review the history of psychology with a focus on the important questions that psychologists ask and the major approaches (or schools) of psychological inquiry. The schools of psychology that we will review are summarized in Table 1.2 "The Most Important Approaches (Schools) of Psychology", and Figure 1.5 "Timeline Showing Some of the Most Important Psychologists" presents a timeline of some of the most important psychologists, beginning with the early Greek philosophers and extending to the present day. Table 1.2 "The Most Important Approaches (Schools) of Psychology" and Figure 1.5 "Timeline Showing Some of the Most Important Psychologists" both represent a selection of the most important schools and people; to mention all the approaches and all the psychologists who have contributed to the field is not possible in one Unit.

The approaches that psychologists have used to assess the issues that interest them have changed dramatically over the history of psychology. Perhaps most importantly, the field has moved steadily from speculation about behavior toward a more objective and scientific approach as the technology available to study human behavior has improved (Benjamin & Baker, 2004). There has also been an increasing influx of women into the field. Although most early psychologists were men, now most psychologists, including the presidents of the most important psychological organizations, are women.

School of psychology	Description	Important contributors
Structuralism	Uses the method of introspection to identify the basic elements or "structures" of psychological experience	Wilhelm Wundt, Edward B. Titchener
Functionalism	Attempts to understand why animals and humans have developed the particular psychological aspects that they currently possess	William James
Psychodynamic	Focuses on the role of our unconscious thoughts, feelings, and memories and our early childhood experiences in determining behavior	Sigmund Freud, Carl Jung, Alfred Adler, Erik Erickson
Behaviorism	Based on the premise that it is not possible to objectively study the mind, and therefore that psychologists should limit their attention to the study of behavior itself	John B. Watson, B. F. Skinner
Cognitive	The study of mental processes, including perception, thinking, memory, and judgments	Hermann Ebbinghaus, Sir Frederic Bartlett, Jean Piaget
Social-cultural	The study of how the social situations and the cultures in which people find themselves influence thinking and behavior	Fritz Heider, Leon Festinger, Stanley Schachter

Social-

Although it cannot capture every important psychologist, this timeline shows some of the most important contributors to the history of psychology.

Although psychology has changed dramatically over its history, the most important questions that psychologists address have remained constant. Some of these questions follow, and we will discuss them both in this Unit and in the Units to come:

Nature versus nurture. Are genes or environment most influential in determining the behavior of individuals and in accounting for differences among people? Most scientists now agree that both genes and environment play crucial roles in most human behaviors, and yet we still have much to learn about how nature (our biological makeup) and nurture (the experiences that we have during our lives) work together (Harris, 1998; Pinker, 2002). The proportion of the observed differences on characteristics among people (e.g., in terms of their height, intelligence, or optimism) that is due to genetics is known as the heritability of the characteristic, and we will make much use of this term in the Units to come. We will see, for example, that the heritability of intelligence is very high (about .85 out of 1.0) and that the heritability of extraversion is about .50. But we will also see that nature and nurture interact in complex ways, making the question of "Is it nature or is it nurture?‖ very difficult to answer.

 Free will versus determinism. This question concerns the extent to which people have control over their own actions. Are we the products of our environment, guided by forces out of our control, or are we able to choose the behaviors we engage in? Most of us like to believe in free will, that we are able to do what we want—for instance, that we could get up right now and go fishing. And our legal system is premised on the concept of free will; we punish criminals because we believe that they have choice over their behaviors and freely choose to disobey the law. But as we will discuss later in the research focus in this section, recent research has suggested that we may have less control over our own behavior than we think we do (Wegner, 2002).

Notes

 Accuracy versus inaccuracy. To what extent are humans good information processors? Although it appears that people are " good enough‖ to make sense of the world around them and to make decent decisions (Fiske, 2003), they are far from perfect. Human judgment is sometimes compromised by inaccuracies in our thinking styles and by our motivations and emotions. For instance, our judgment may be affected by our desires to gain material wealth and to see ourselves positively and by emotional responses to the events that happen to us.

 Conscious versus unconscious processing. To what extent are we conscious of our own actions and the causes of them, and to what extent are our behaviors caused by influences that we are not aware of? Many of the major theories of psychology, ranging from the Freudian psychodynamic theories to contemporary work in cognitive psychology, argue that much of our behavior is determined by variables that we are not aware of.

 Differences versus similarities. To what extent are we all similar, and to what extent are we different? For instance, are there basic psychological and personality differences between men and women, or are men and women by and large similar? And what about people from different ethnicities and cultures? Are people around the world generally the same, or are they influenced by their backgrounds and environments in different ways? Personality, social, and cross-cultural psychologists attempt to answer these classic questions. Early Psychologists

Structuralism: Introspection and the Awareness of Subjective Experience

Wundt's research in his laboratory in Liepzig focused on the nature of consciousness itself. Wundt and his students believed that it was possible to analyze the basic elements of the mind and to classify our conscious experiences scientifically. Wundt began the field known as structuralism, a school of psychology whose goal was to identify the basic elements or "structures‖ of psychological experience. Its goal was to create a " periodic table‖ of the "elements of sensations,‖ similar to the periodic table of elements that had recently been created in chemistry.

Perhaps the best known of the structuralists was Edward Bradford Titchener (1867–1927). Titchener was a student of Wundt who came to the United States in the late 1800s and founded a laboratory at Cornell University. In his research using introspection, Titchener and his students claimed to have identified more than 40,000 sensations, including those relating to vision, hearing, and taste.

An important aspect of the structuralist approach was that it was rigorous and scientific. The research marked the beginning of psychology as a science, because it demonstrated that mental events could be quantified. But the structuralists also discovered the limitations of introspection. Even highly trained research participants were often unable to report on their subjective experiences. When the participants were asked to do simple math problems, they could easily do them, but they could not easily answer how they did them. Thus the structuralists were the first to realize the importance of unconscious processes—that many important aspects of human psychology occur outside our conscious awareness,

and that psychologists cannot expect research participants to be able to accurately report on all of their experiences.

Functionalism and Evolutionary Psychology

In contrast to Wundt, who attempted to understand the nature of consciousness, the goal of William James and the other members of the school of functionalism was to understand why animals and humans have developed the particular psychological aspects that they currently possess(Hunt, 1993).] For James, one's thinking was relevant only to one's behavior. As he put it in his psychology textbook, "M y thinking is first and last and always for the sake of my doing‖ (James, 1890).

James and the other members of the functionalist school were influenced by Charles Darwin's (1809–1882) theory of natural selection, which proposed that the physical characteristics of animals and humans evolved because they were useful, or functional. The functionalists believed that Darwin's theory applied to psychological characteristics too. Just as some animals have developed strong muscles to allow them to run fast, the human brain, so functionalists thought, must have adapted to serve a particular function in human experience.

Although functionalism no longer exists as a school of psychology, its basic principles have been absorbed into psychology and continue to influence it in many ways. The work of the functionalists has developed into the field ofevolutionary psychology, a branch of psychology that applies the Darwinian theory of natural selection to human and animal behavior(Dennett, 1995; Tooby & Cosmides, 1992). Evolutionary psychology accepts the functionalists' basic assumption, namely that many human psychological systems, including memory, emotion, and personality, serve key adaptive functions. As we will see in the Units to come, evolutionary psychologists use evolutionary theory to understand many different behaviors including romantic attraction, stereotypes and prejudice, and even the causes of many psychological disorders.

A key component of the ideas of evolutionary psychology is fitness. Fitness refers to the extent to which having a given characteristic helps the individual organism survive and reproduce at a higher rate than do other members of the species who do not have the characteristic. Fitter organisms pass on their genes more successfully to later generations, making the characteristics that produce fitness more likely to become part of the organism's nature than characteristics that do not produce fitness. For example, it has been argued that the emotion of jealousy has survived over time in men because men who experience jealousy are more fit than men who do not.

According to this idea, the experience of jealously leads men to be more likely to protect their mates and guard against rivals, which increases their reproductive success (Buss, 2000).

Despite its importance in psychological theorizing, evolutionary psychology also has some limitations. One problem is that many of its predictions are extremely difficult to test. Unlike the fossils that are used to learn about the physical evolution of species, we cannot know which psychological characteristics our ancestors possessed or did not possess; we can only make guesses about this. Because it is difficult to directly test evolutionary theories, it is always possible that the explanations we

apply are made up after the fact to account for observed data (Gould & Lewontin, 1979). Nevertheless, the evolutionary approach is important to psychology because it provides logical explanations for why we have many psychological characteristics.

Psychodynamic Psychology

Perhaps the school of psychology that is most familiar to the general public is the psychodynamic approach to understanding behavior, which was championed by Sigmund Freud (1856–1939) and his followers. Psychodynamic psychology is an approach to understanding human behavior that focuses on the role of unconscious thoughts, feelings, and memories. Freud developed his theories about behavior through extensive analysis of the patients that he treated in his private clinical practice. Freud believed that many of the problems that his patients experienced, including anxiety, depression, and sexual dysfunction, were the result of the effects of painful childhood experiences that the person could no longer remember.

Freud's ideas were extended by other psychologists whom he influenced, including Carl Jung (1875–1961), Alfred Adler (1870–1937), Karen Horney (1855–1952), and Erik Erikson (1902–1994). These and others who follow the psychodynamic approach believe that it is possible to help the patient if the unconscious drives can be remembered, particularly through a deep and thorough exploration of the person‘s early sexual experiences and current sexual desires. These explorations are revealed through talk therapy and dream analysis, in a process called psychoanalysis.

The founders of the school of psychodynamics were primarily practitioners who worked with individuals to help them understand and confront their psychological symptoms. Although they did not conduct much research on their ideas, and although later, more sophisticated tests of their theories have not always supported their proposals, psychodynamics has nevertheless had substantial impact on the field of psychology, and indeed on thinking about human behavior more generally (Moore & Fine, 1995). The importance of the unconscious in human behavior, the idea that early childhood experiences are critical, and the concept of therapy as a way of improving human lives are all ideas that are derived from the psychodynamic approach and that remain central to psychology.

Behaviorism and the Question of Free Will

Although they differed in approach, both structuralism and functionalism were essentially studies of the mind. The psychologists associated with the school of behaviorism, on the other hand, were reacting in part to the difficulties psychologists encountered when they tried to use introspection to understand behavior. Behaviorism is a school of psychology that is based on the premise that it is not possible to objectively study the mind, and therefore that psychologists should limit their attention to the study of behavior itself. Behaviorists believe that the human mind is a " black box‖ into which stimuli are sent and from which responses are received. They argue that there is no point in trying to determine what happens in the box because we can successfully predict behavior without knowing what happens inside the mind.

Furthermore, behaviorists believe that it is possible to develop laws of learning that can explain all behaviors.

The first behaviorist was the American psychologist John B. Watson (1878–1958). Watson was influenced in large part by the work of the Russian physiologist Ivan Pavlov (1849–1936), who had discovered that dogs would salivate at the sound of a tone that had previously been associated with the presentation of food. Watson and the other behaviorists began to use these ideas to explain how events that people and other organisms experienced in their environment (stimuli) could produce specific behaviors (responses). For instance, in Pavlov's research the stimulus (either the food or, after learning, the tone) would produce the response of salivation in the dogs.

The Cognitive Approach and Cognitive Neuroscience

Science is always influenced by the technology that surrounds it, and psychology is no exception. Thus it is no surprise that beginning in the 1960s, growing numbers of psychologists began to think about the brain and about human behavior in terms of the computer, which was being developed and becoming publicly available at that time. The analogy between the brain and the computer, although by no means perfect, provided part of the impetus for a new school of psychology called cognitive psychology. Cognitive psychology is a field of psychology that studies mental processes, including perception, thinking, memory, and judgment. These actions correspond well to the processes that computers perform.

Social-Cultural Psychology

A final school, which takes a higher level of analysis and which has had substantial impact on psychology, can be broadly referred to as the social-cultural approach. The field of social-cultural psychology is the study of how the social situations and the cultures in which people find themselves influence thinking and behavior. Social-cultural psychologists are particularly concerned with how people perceive themselves and others, and how people influence each other's behavior. For instance, social psychologists have found that we are attracted to others who are similar to us in terms of attitudes and interests (Byrne, 1969), that we develop our own beliefs and attitudes by comparing our opinions to those of others (Festinger, 1954), and that we frequently change our beliefs and behaviors to be similar to those of the people we care about—a process known as conformity.

An important aspect of social-cultural psychology are social norms—the ways of thinking, feeling, or behaving that are shared by group members and perceived by them as appropriate (Asch, 1952; Cialdini, 1993). Norms include customs, traditions, standards, and rules, as well as the general values of the group. Many of the most important social norms are determined by theculture in which we live, and these cultures are studied by cross-cultural psychologists. A culture represents the common set of social norms, including religious and family values and other moral beliefs, shared by the people who live in a geographical region (Fiske, Kitayama, Markus, & Nisbett, 1998; Markus, Kitayama, & Heiman, 1996; Matsumoto, 2001). Cultures influence every aspect of our lives,

and it is not inappropriate to say that our culture defines our lives just as much as does our evolutionary experience (Mesoudi, 2009).

The Many Disciplines of Psychology

Notes

Psychology is not one discipline but rather a collection of many subdisciplines that all share at least some common approaches and that work together and exchange knowledge to form a coherent discipline (Yang & Chiu, 2009). Because the field of psychology is so broad, students may wonder which areas are most suitable for their interests and which types of careers might be available to them. Table 1.3 "Some Career Paths in Psychology" will help you consider the answers to these questions.

Psychology field	Description	Career opportunities
psychology	on the cognitive, emotional, and social changes that occur across the lifespan.	schools and community agencies to help improve and evaluate the effectiveness of intervention programs such as Head Start.
Forensic psychology	Forensic psychologists apply psychological principles to understand the behavior of judges, attorneys, courtroom juries, and others in the criminal justice system.	Forensic psychologists work in the criminal justice system. They may testify in court and may provide information about the reliability of eyewitness testimony and jury selection.
Health psychology	Health psychologists are concerned with understanding how biology, behavior, and the social situation influence health and illness.	Health psychologists work with medical professionals in clinical settings to promote better health, conduct research, and teach at universities.
Industrial-organizational and environmental psychology	Industrial-organizational psychology applies psychology to the workplace with the goal of improving the performance and well-being of employees.	There are a wide variety of career opportunities in these fields, generally working in businesses. These psychologists help select employees, evaluate employee performance, and examine the effects of different working conditions on behavior. They may also work to design equipment and environments that improve employee performance and reduce accidents.
Personality psychology	These psychologists study people and the differences among them. The goal is to develop theories that explain the psychological processes of individuals, and to focus on individual differences.	Most work in academic settings, but the skills of personality psychologists are also in demand in business—for instance, in advertising and marketing. PhD programs in personality psychology are often connected with programs in social psychology.
School and educational psychology	This field studies how people learn in school, the effectiveness of school programs, and the psychology of teaching.	School psychologists work in elementary and secondary schools or school district offices with students, teachers, parents, and administrators. They may assess children's psychological and learning problems and develop programs to minimize the impact of these problems.
Social and cross-cultural psychology	This field examines people's interactions with other people. Topics	Many social psychologists work in marketing, advertising, organizational, systems design, and other applied

Psychology field	Description	Career opportunities
	of study include conformity, group behavior, leadership, attitudes, and person perception.	psychology fields.
Sports psychology	This field studies the psychological aspects of sports behavior. The goal is to understand the psychological factors that influence performance in sports, including the role of exercise and team interactions.	Sports psychologists work in gyms, schools, professional sports teams, and other areas where sports are practiced.

REVIEW QUESTIONS

1. Describe psychology as a science. Why psychologists rely on empirical methods?
2. What are levels of explanation in psychology?
3. Describe the challenges of studying psychology.
4. Discuss about the evolution of psychology.
5. What is functionalism and evolutionary psychology? Describe Psychodynamic psychology.
6. Discuss about Behaviourism and the question of free will?
7. What are the many disciplines of psychology?

FURTHER READINGS

1. A textbook of general psychology- Walter F. Daves
2. General Psychology- Abraham
3. Advanced general psychology-Russell W. Levanway
4. General Psychological Theory-Sigmund Freud
5. General Psychology-S K Mangal

IMPORTANT NOTES

UNIT 2 PSYCHOLOGICAL SCIENCE

Notes

CONTENTS

INTRODUCTION

Psychologists study the behavior of both humans and animals, and the main purpose of this research is to help us understand people and to improve the quality of human lives. The results of psychological research are relevant to problems such as learning and memory, homelessness, psychological disorders, family instability, and aggressive behavior and violence. Psychological research is used in a range of important areas, from public policy to driver safety. It guides court rulings with respect to racism and sexism (Brown v. Board of Education, 1954; Fiske, Bersoff, Borgida, Deaux, & Heilman, 1991), as well as court procedure, in the use of lie detectors during criminal trials, for example (Saxe, Dougherty, & Cross, 1985). Psychological research helps us understand how driver behavior affects safety (Fajen & Warren, 2003), which methods of educating children are most effective (Alexander & Winne, 2006; Woolfolk-Hoy, 2005), how to best detect deception (DePaulo et al., 2003),] and the causes of terrorism (Borum, 2004).

Some psychological research is basic research. Basic research is research that answers fundamental questions about behavior. For instance, biopsychologists study how nerves conduct impulses from the receptors in the skin to the brain, and cognitive psychologists investigate how different types of studying influence memory for pictures and words. There is no particular reason to examine such things except to acquire a better knowledge of how these processes occur. Applied research is research that investigates issues that have implications for everyday life and provides solutions to everyday problems. Applied research has been conducted to study, among many other things, the most effective methods for reducing depression, the types of advertising campaigns that serve to reduce drug and alcohol abuse, the key predictors of managerial success in business, and the indicators of effective government programs, such as Head Start.

Basic research and applied research inform each other, and advances in science occur more rapidly when each type of research is conducted (Lewin, 1999). For instance, although research concerning the role of practice on memory for lists of words is basic in orientation, the results could potentially be applied to help children learn to read. Correspondingly, psychologist-practitioners who wish to reduce the spread of AIDS or to promote volunteering frequently base their programs on the results of basic research. This basic AIDS or volunteering research is then applied to help change people's attitudes and behaviors.

The results of psychological research are reported primarily in research articles published in scientific journals, and your instructor may require you to read some of these. The research reported in scientific journals has been evaluated, critiqued, and improved by scientists in the field through the process of peer review. In this book there are many citations to original research articles, and I encourage you to read those reports when you find a topic interesting. Most of these papers are readily available online through your college or university library. It is only by reading the original reports that you will really see how the research process works. Some of the most important journals in psychology are provided here for your information.

Psychologists Use the Scientific Method to Guide Their Research

Psychologists aren't the only people who seek to understand human behavior and solve social problems. Philosophers, religious leaders, and politicians, among others, also strive to provide explanations for human behavior. But psychologists believe that research is the best tool for understanding human beings and their relationships with others. Rather than accepting the claim of a philosopher that people do (or do not) have free will, a psychologist would collect data to empirically test whether or not people are able to actively control their own behavior. Rather than accepting a politician's contention that creating (or abandoning) a new center for mental health will improve the lives of individuals in the inner city, a psychologist would empirically assess the effects of receiving mental health treatment on the quality of life of the recipients. The statements made by psychologists are empirical, which means they are based on systematic collection and analysis of data.

The Scientific Method

All scientists (whether they are physicists, chemists, biologists, sociologists, or psychologists) are engaged in the basic processes of collecting data and drawing conclusions about those data. The methods used by scientists have developed over many years and provide a common framework for developing, organizing, and sharing information. The scientific method is the set of assumptions, rules, and procedures scientists use to conduct research.

In addition to requiring that science be empirical, the scientific method demands that the procedures used be objective, or free from the personal bias or emotions of the scientist. The scientific method proscribes how scientists collect and analyze data, how they draw conclusions from data,

and how they share data with others. These rules increase objectivity by placing data under the scrutiny of other scientists and even the public at large. Because data are reported objectively, other scientists know exactly how the scientist collected and analyzed the data. This means that they do not have to rely only on the scientist's own interpretation of the data; they may draw their own, potentially different, conclusions.

Most new research is designed to replicate—that is, to repeat, add to, or modify—previous research findings. The scientific method therefore results in an accumulation of scientific knowledge through the reporting of research and the addition to and modifications of these reported findings by other scientists.

Laws and Theories as Organizing Principles

One goal of research is to organize information into meaningful statements that can be applied in many situations. Principles that are so general as to apply to all situations in a given domain of inquiry are known as laws. There are well-known laws in the physical sciences, such as the law of gravity and the laws of thermodynamics, and there are some universally accepted laws in psychology, such as the law of effect and Weber's law. But because laws are very general principles and their validity has already been well established, they are themselves rarely directly subjected to scientific test.

The next step down from laws in the hierarchy of organizing principles is theory. A theory is an integrated set of principles that explains and predicts many, but not all, observed relationships within a given domain of inquiry. One example of an important theory in psychology is the stage theory of cognitive development proposed by the Swiss psychologist Jean Piaget. The theory states that children pass through a series of cognitive stages as they grow, each of which must be mastered in succession before movement to the next cognitive stage can occur. This is an extremely useful theory in human development because it can be applied to many different content areas and can be tested in many different ways.

Good theories have four important characteristics. First, good theories are general, meaning they summarize many different outcomes. Second, they are parsimonious, meaning they provide the simplest possible account of those outcomes. The stage theory of cognitive development meets both of these requirements. It can account for developmental changes in behavior across a wide variety of domains, and yet it does so parsimoniously—by hypothesizing a simple set of cognitive stages. Third, good theories provide ideas for future research. The stage theory of cognitive development has been applied not only to learning about cognitive skills, but also to the study of children's moral (Kohlberg, 1966) and gender (Ruble & Martin, 1998) development.

Finally, good theories are falsifiable (Popper, 1959), which means the variables of interest can be adequately measured and the relationships between the variables that are predicted by the theory can be shown through research to be incorrect. The stage theory of cognitive development is falsifiable because the stages of cognitive reasoning can be measured and because if research discovers, for instance, that children learn new tasks before they have reached the cognitive stage

hypothesized to be required for that task, then the theory will be shown to be incorrect.

No single theory is able to account for all behavior in all cases. Rather, theories are each limited in that they make accurate predictions in some situations or for some people but not in other situations or for other people. As a result, there is a constant exchange between theory and data: Existing theories are modified on the basis of collected data, and the new modified theories then make new predictions that are tested by new data, and so forth. When a better theory is found, it will replace the old one. This is part of the accumulation of scientific knowledge.

The Research Hypothesis

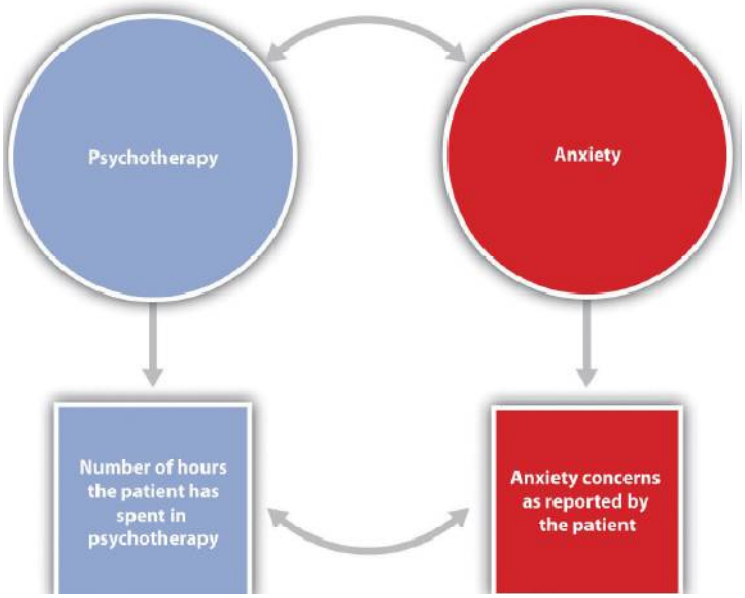
Theories are usually framed too broadly to be tested in a single experiment. Therefore, scientists use a more precise statement of the presumed relationship among specific parts of a theory—a research hypothesis—as the basis for their research. A research hypothesis is a specific and falsifiable prediction about the relationship between or among two or more variables, where a variable is any attribute that can assume different values among different people or across different times or places. The research hypothesis states the existence of a relationship between the variables of interest and the specific direction of that relationship. For instance, the research hypothesis “U sing marijuana will reduce learning‖ predicts that there is a relationship between a variable “ using marijuana‖ and another variable called “ learning.‖ Similarly, in the research hypothesis “Participating in psychotherapy will reduce anxiety,‖ the variables that are expected to be related are “ participating in psychotherapy‖ and “ level of anxiety.‖

When stated in an abstract manner, the ideas that form the basis of a research hypothesis are known as conceptual variables. Conceptual variables are abstract ideas that form the basis of research hypotheses. Sometimes the conceptual variables are rather simple—for instance, “ age,‖ “gender,‖ or “ weight.‖ In other cases the conceptual variables represent more complex ideas, such as “a nxiety,‖ “ cognitive development,‖ ―learning,‖ self-esteem,‖ or “ sexism.‖

The first step in testing a research hypothesis involves turning the conceptual variables into measured variables, which are variables consisting of numbers that represent the conceptual variables. For instance, the conceptual variable “ participating in psychotherapy‖ could be represented as the measured variable “ number of psychotherapy hours the patient has accrued‖ and the conceptual variable “ using marijuana‖ could be assessed by having the research participants rate, on a scale from 1 to 10, how often they use marijuana or by administering a blood test that measures the presence of the chemicals in marijuana.

Psychologists use the term operational definition to refer to a precise statement of how a conceptual variable is turned into a measured variable. The relationship between conceptual and measured variables in a research hypothesis is diagrammed in Figure 2.1 "Diagram of a Research Hypothesis". The conceptual variables are represented within circles at the top of the figure, and the measured variables are represented within squares at the bottom. The two vertical arrows, which lead from the conceptual variables to the measured variables, represent

the operational definitions of the two variables. The arrows indicate the expectation that changes in the conceptual variables (psychotherapy and anxiety in this example) will cause changes in the corresponding measured variables. The measured variables are then used to draw inferences about the conceptual variables.



In this research hypothesis, the conceptual variable of attending psychotherapy is operationalized using the number of hours of psychotherapy the client has completed, and the conceptual variable of anxiety is operationalized using self-reported levels of anxiety. The research hypothesis is that more psychotherapy will be related to less reported anxiety.

Table 2.1 "Examples of the Operational Definitions of Conceptual Variables That Have Been Used in Psychological Research" lists some potential operational definitions of conceptual variables that have been used in psychological research. As you read through this list, note that in contrast to the abstract conceptual variables, the measured variables are very specific. This specificity is important for two reasons. First, more specific definitions mean that there is less danger that the collected data will be misunderstood by others. Second, specific definitions will enable future researchers to replicate the research.

Conceptual variable	Operational definitions
Aggression	Number of presses of a button that administers shock to another student Number of seconds taken to honk the horn at the car ahead after a stoplight turns green
Interpersonal attraction	Number of inches that an individual places his or her chair away from another person Number of millimeters of pupil dilation when one person looks at another
Employee satisfaction	Number of days per month an employee shows up to work on time Rating of job satisfaction from 1 (*not at all satisfied*) to 9 (*extremely satisfied*)
Decision-making skills	Number of groups able to correctly solve a group performance task Number of seconds in which a person solves a problem
Depression	Number of negative words used in a creative story Number of appointments made with a psychotherapist

One of the questions that all scientists must address concerns the ethics of their research. Physicists are concerned about the potentially harmful outcomes of their experiments with nuclear materials. Biologists worry about the potential outcomes of creating genetically engineered human babies. Medical researchers agonize over the ethics of withholding potentially beneficial drugs from control groups in clinical trials. Likewise, psychologists are continually considering the ethics of their

Research in psychology may cause some stress, harm, or inconvenience for the people who participate in that research. For instance, researchers may require introductory psychology students to participate in research projects and then deceive these students, at least temporarily, about the nature of the research. Psychologists may induce stress, anxiety, or negative moods in their participants, expose them to weak electrical shocks, or convince them to behave in ways that violate their moral standards. And researchers may sometimes use animals in their research, potentially harming them in the process.

Decisions about whether research is ethical are made using established ethical codes developed by scientific organizations, such as the American Psychological Association, and federal governments. In the United States, the Department of Health and Human Services provides the guidelines for ethical standards in research. Some research, such as the research conducted by the Nazis on prisoners during World War II, is perceived as immoral by almost everyone. Other procedures, such as the use of animals in research testing the effectiveness of drugs, are more controversial.

Scientific research has provided information that has improved the lives of many people. Therefore, it is unreasonable to argue that because scientific research has costs, no research should be conducted. This argument fails to consider the fact that there are significant costs to not doing research and that these costs may be greater than the potential costs of conducting the research (Rosenthal, 1994). In each case, before beginning to conduct the research, scientists have attempted to determine

the potential risks and benefits of the research and have come to the conclusion that the potential benefits of conducting the research outweigh the potential costs to the research participants.

Characteristics of an Ethical Research Project Using Human Participants

- Trust and positive rapport are created between the researcher and the participant.
- The rights of both the experimenter and participant are considered, and the relationship between them is mutually beneficial.
- The experimenter treats the participant with concern and respect and attempts to make the research experience a pleasant and informative one.
- Before the research begins, the participant is given all information relevant to his or her decision to participate, including any possibilities of physical danger or psychological stress.
- The participant is given a chance to have questions about the procedure answered, thus guaranteeing his or her free choice about participating.
- After the experiment is over, any deception that has been used is made public, and the necessity for it is explained.
- The experimenter carefully debriefs the participant, explaining the underlying research hypothesis and the purpose of the experimental procedure in detail and answering any questions.
- The experimenter provides information about how he or she can be contacted and offers to provide information about the results of the research if the participant is interested in receiving it.

This list presents some of the most important factors that psychologists take into consideration when designing their research. The most direct ethical concern of the scientist is to prevent harm to the research participants. One example is the well-known research of Stanley Milgram (1974) investigating obedience to authority. In these studies, participants were induced by an experimenter to administer electric shocks to another person so that Milgram could study the extent to which they would obey the demands of an authority figure. Most participants evidenced high levels of stress resulting from the psychological conflict they experienced between engaging in aggressive and dangerous behavior and following the instructions of the experimenter. Studies such as those by Milgram are no longer conducted because the scientific community is now much more sensitized to the potential of such procedures to create emotional discomfort or harm.

Another goal of ethical research is to guarantee that participants have free choice regarding whether they wish to participate in research. Students in psychology classes may be allowed, or even required, to participate in research, but they are also always given an option to choose a different study to be in, or to perform other activities instead. And once an experiment begins, the research participant is always free to leave the experiment if he or she wishes to. Concerns with free choice

also occur in institutional settings, such as in schools, hospitals, corporations, and prisons, when individuals are required by the institutions to take certain tests, or when employees are told or asked to participate in research.

Researchers must also protect the privacy of the research participants. In some cases data can be kept anonymous by not having the respondents put any identifying information on their questionnaires. In other cases the data cannot be anonymous because the researcher needs to keep track of which respondent contributed the data. In this case one technique is to have each participant use a unique code number to identify his or her data, such as the last four digits of the student ID number. In this way the researcher can keep track of which person completed which questionnaire, but no one will be able to connect the data with the individual who contributed them.

Perhaps the most widespread ethical concern to the participants in behavioral research is the extent to which researchers employ deception. Deception occurs whenever research participants are not completely and fully informed about the nature of the research project before participating in it. Deception may occur in an active way, such as when the researcher tells the participants that he or she is studying learning when in fact the experiment really concerns obedience to authority. In other cases the deception is more passive, such as when participants are not told about the hypothesis being studied or the potential use of the data being collected.

Some researchers have argued that no deception should ever be used in any research (Baumrind, 1985). They argue that participants should always be told the complete truth about the nature of the research they are in, and that when participants are deceived there will be negative consequences, such as the possibility that participants may arrive at other studies already expecting to be deceived. Other psychologists defend the use of deception on the grounds that it is needed to get participants to act naturally and to enable the study of psychological phenomena that might not otherwise get investigated. They argue that it would be impossible to study topics such as altruism, aggression, obedience, and stereotyping without using deception because if participants were informed ahead of time what the study involved, this knowledge would certainly change their behavior. The codes of ethics of the American Psychological Association and other organizations allow researchers to use deception, but these codes also require them to explicitly consider how their research might be conducted without the use of deception.

Ensuring That Research Is Ethical

Making decisions about the ethics of research involves weighing the costs and benefits of conducting versus not conducting a given research project. The costs involve potential harm to the research participants and to the field, whereas the benefits include the potential for advancing knowledge about human behavior and offering various advantages, some educational, to the individual participants. Most generally, the ethics of a given research project are determined through a cost-benefit analysis, in which the costs are compared to the benefits. If the potential costs of the

research appear to outweigh any potential benefits that might come from it, then the research should not proceed.

Arriving at a cost-benefit ratio is not simple. For one thing, there is no way to know ahead of time what the effects of a given procedure will be on every person or animal who participates or what benefit to society the research is likely to produce. In addition, what is ethical is defined by the current state of thinking within society, and thus perceived costs and benefits change over time. The U.S. Department of Health and Human Services regulations require that all universities receiving funds from the department set up an Institutional Review Board (IRB) to determine whether proposed research meets department regulations.

The Institutional Review Board (IRB) is a committee of at least five members whose goal it is to determine the cost-benefit ratio of research conducted within an institution. The IRB approves the procedures of all the research conducted at the institution before the research can begin. The board may suggest modifications to the procedures, or (in rare cases) it may inform the scientist that the research violates Department of Health and Human Services guidelines and thus cannot be conducted at all.

One important tool for ensuring that research is ethical is the use of informed consent. A sample informed consent form is shown in Figure 2.2 "Sample Consent Form". Informed consent, conducted before a participant begins a research session, is designed to explain the research procedures and inform the participant of his or her rights during the investigation. The informed consent explains as much as possible about the true nature of the study, particularly everything that might be expected to influence willingness to participate, but it may in some cases withhold some information that

Psychologists Use Descriptive, Correlational, and Experimental Research Designs to Understand Behavior

Psychologists agree that if their ideas and theories about human behavior are to be taken seriously, they must be backed up by data. However, the research of different psychologists is designed with different goals in mind, and the different goals require different approaches. These varying approaches, summarized in Table 2.2 "Characteristics of the Three Research Designs", are known as research designs. A research design is the specific method a researcher uses to collect, analyze, and interpret data. Psychologists use three major types of research designs in their research, and each provides an essential avenue for scientific investigation. Descriptive research is research designed to provide a snapshot of the current state of affairs. Correlational research is research designed to discover relationships among variables and to allow the prediction of future events from present knowledge. Experimental research is research in which initial equivalence among research participants in more than one group is created, followed by a manipulation of a given experience for these groups and a measurement of the influence of the manipulation. Each of the three research designs

varies according to its strengths and limitations, and it is important to understand how each differs.

Research design	Goal	Advantages	Disadvantages
Descriptive	To create a snapshot of the current state of affairs	Provides a relatively complete picture of what is occurring at a given time. Allows the development of questions for further study.	Does not assess relationships among variables. May be unethical if participants do not know they are being observed.
Correlational	To assess the relationships between and among two or more variables	Allows testing of expected relationships between and among variables and the making of predictions. Can assess these relationships in everyday life events.	Cannot be used to draw inferences about the causal relationships between and among the variables.
Experimental	To assess the causal impact of one or more experimental manipulations on a dependent variable	Allows drawing of conclusions about the causal relationships among variables.	Cannot experimentally manipulate many important variables. May be expensive and time consuming.
There are three major research designs used by psychologists, and each has its own advantages and disadvantages.			

Descriptive Research: Assessing the Current State of Affairs

Descriptive research is designed to create a snapshot of the current thoughts, feelings, or behavior of individuals. This section reviews three types of descriptive research: case studies, surveys, and naturalistic observation.

Sometimes the data in a descriptive research project are based on only a small set of individuals, often only one person or a single small group. These research designs are known as case studies—descriptive records of one or more individual's experiences and behavior. Sometimes case studies involve ordinary individuals, as when developmental psychologist Jean Piaget used his observation of his own children to develop his stage theory of cognitive development. More frequently, case studies are conducted on individuals who have unusual or abnormal experiences or characteristics or who find themselves in particularly difficult or stressful situations. The assumption is that by carefully studying individuals who are socially marginal, who are experiencing unusual situations, or who are going through a difficult phase in their lives, we can learn something about human nature.

Correlational Research: Seeking Relationships Among Variables

In contrast to descriptive research, which is designed primarily to provide static pictures, correlational research involves the measurement of two or more relevant variables and an assessment of the relationship between or among those variables. For instance, the variables of height and weight are systematically related (correlated) because taller people generally weigh more than shorter people. In the same way, study time and memory errors are also related, because the more time a person is given to study a list of words, the fewer errors he or she will make. When there are two variables in the research design, one of them is called the predictor variable and the other the outcome variable. One way of

organizing the data from a correlational study with two variables is to graph the values of each of the measured variables using a scatter plot. As you can see in Figure 2.10 "Examples of Scatter Plots", a scatter plot is a visual image of the relationship between two variables. A point is plotted for each individual at the intersection of his or her scores for the two variables. When the association between the variables on the scatter plot can be easily approximated with a straight line, as in parts (a) and (b) of Figure 2.10 "Examples of Scatter Plots", the variables are said to have a linear relationship.

Experimental Research: Understanding the Causes of Behavior

The goal of experimental research design is to provide more definitive conclusions about the causal relationships among the variables in the research hypothesis than is available from correlational designs. In an experimental research design, the variables of interest are called the independent variable(or variables) and the dependent variable. The independent variable in an experiment is the causing variable that is created (manipulated) by the experimenter. The dependent variable in an experiment is a measured variable that is expected to be influenced by the experimental manipulation. The research hypothesis suggests that the manipulated independent variable or variables will cause changes in the measured dependent variables. We can diagram the research hypothesis by using an arrow that points in one direction.

You Can Be an Informed Consumer of Psychological Research

Good research is valid research. When research is valid, the conclusions drawn by the researcher are legitimate. For instance, if a researcher concludes that participating in psychotherapy reduces anxiety, or that taller people are smarter than shorter people, the research is valid only if the therapy really works or if taller people really are smarter. Unfortunately, there are many threats to the validity of research, and these threats may sometimes lead to unwarranted conclusions. Often, and despite researchers' best intentions, some of the research reported on websites as well as in newspapers, magazines, and even scientific journals is invalid. Validity is not an all-or-nothing proposition, which means that some research is more valid than other research. Only by understanding the potential threats to validity will you be able to make knowledgeable decisions about the conclusions that can or cannot be drawn from a research project. There are four major types of threats to the validity of research, and informed consumers of research are aware of each type.

One threat to valid research occurs when there is a threat to construct validity. Construct validity refers to the extent to which the variables used in the research adequately assess the conceptual variables they were designed to measure. One requirement for construct validity is that the measure be reliable, where reliability refers to the consistency of a measured variable. A bathroom scale is usually reliable, because if we step on and off it a couple of times the scale will consistently measure

the same weight every time. Other measures, including some psychological tests, may be less reliable, and thus less useful.

Normally, we can assume that the researchers have done their best to assure the construct validity of their measures, but it is not inappropriate for you, as an informed consumer of research, to question this. It is always important to remember that the ability to learn about the relationship between the conceptual variables in a research hypothesis is dependent on the operational definitions of the measured variables. If the measures do not really measure the conceptual variables that they are designed to assess (e.g., if a supposed IQ test does not really measure intelligence), then they cannot be used to draw inferences about the relationship between the conceptual variables (Nunnally, 1978).

REVIEW QUESTIONS

1. Why psychologists use the scientific method to guide their research.
2. Describe the scientific method. What are the laws and theories as organizing principles?
3. What is the research hypothesis? How to ensure that research is ethical.
4. Why Psychologists use descriptive, co-relational, and Experimental research designs to understand Behavior ?
5. Describe co-relational research. What is the process of seeking relationships among Variables?
6. Describe Experimental research. What are its characteristics?

FURTHER READINGS

6. A textbook of general psychology- Walter F. Daves
7. General Psychology- Abraham
8. Advanced general psychology-Russell W. Levanway
9. General Psychological Theory-Sigmund Freud
10. General Psychology-S K Mangal

UNIT-3 BRAINS, BODIES, AND BEHAVIOUR

Notes

CONTENTS

INTRODUCTION

Every behavior begins with biology. Our behaviors, as well as our thoughts and feelings, are produced by the actions of our brains, nerves, muscles, and glands. In this Unit we will begin our journey into the world of psychology by considering the biological makeup of the human being, including the most remarkable of human organs—the brain. We'll consider the structure of the brain and also the methods that psychologists use to study the brain and to understand how it works.

We will see that the body is controlled by an information highway known as the nervous system, a collection of hundreds of billions of specialized and interconnected cells through which messages are sent between the brain and the rest of the body. The nervous system consists of the central nervous system (CNS), made up of the brain and the spinal cord, and the peripheral nervous system (PNS), the neurons that link the CNS to our skin, muscles, and glands. And we will see that our behavior is also influenced in large part by the endocrine system, the chemical regulator of the body that consists of glands that secrete hormones.

The Neuron Is the Building Block of the Nervous System

The nervous system is composed of more than 100 billion cells known as neurons. A neuron is a cell in the nervous system whose function it is to receive and transmit information. As you can see in Figure 3.2 "Components of the Neuron", neurons are made up of three major parts: a cell body, or soma, which contains the nucleus of the cell and keeps the cell alive; a branching treelike fiber known as the dendrite, which collects information from other cells and sends the information to the soma; and a long, segmented fiber known as the axon, which transmits

information away from the cell body toward other neurons or to the muscles and glands

Some neurons have hundreds or even thousands of dendrites, and these dendrites may themselves be branched to allow the cell to receive information from thousands of other cells. The axons are also specialized, and some, such as those that send messages from the spinal cord to the muscles in the hands or feet, may be very long—even up to several feet in length. To improve the speed of their communication, and to keep their electrical charges from shorting out with other neurons, axons are often surrounded by a myelin sheath. The myelin sheath is a layer of fatty tissue surrounding the axon of a neuron that both acts as an insulator and allows faster transmission of the electrical signal. Axons branch out toward their ends, and at the tip of each branch is a terminal button.

Neurons Communicate Using Electricity and Chemicals

The nervous system operates using an electrochemical process (see Note 3.12 "Video Clip: The Electrochemical Action of the Neuron"). An electrical charge moves through the neuron itself and chemicals are used to transmit information between neurons. Within the neuron, when a signal is received by the dendrites, is it transmitted to the soma in the form of an electrical signal, and, if the signal is strong enough, it may then be passed on to the axon and then to the terminal buttons. If the signal reaches the terminal buttons, they are signaled to emit chemicals known as neurotransmitters, which communicate with other neurons across the spaces between the cells, known as synapses.

An important aspect of the action potential is that it operates in an all or nothing manner. What this means is that the neuron either fires completely, such that the action potential moves all the way down the axon, or it does not fire at all. Thus neurons can provide more energy to the neurons down the line by firing faster but not by firing more strongly. Furthermore, the neuron is prevented from repeated firing by the presence of a refractory period—a brief time after the firing of the axon in which the axon cannot fire again because the neuron has not yet returned to its resting potential.

Neurotransmitters: the Body’s Chemical Messengers

Not only do the neural signals travel via electrical charges within the neuron, but they also travel via chemical transmission between the neurons. Neurons are separated by junction areas known as synapses, areas where the terminal buttons at the end of the axon of one neuron nearly, but don’t quite, touch the dendrites of another. The synapses provide a remarkable function because they allow each axon to communicate with many dendrites in neighboring cells. Because a neuron may have synaptic connections with thousands of other neurons, the communication links among the neurons in the nervous system allow for a highly sophisticated communication system.

When the electrical impulse from the action potential reaches the end of the axon, it signals the terminal buttons to release neurotransmitters into the synapse. A neurotransmitter is a chemical that relays signals across

the synapses between neurons. Neurotransmitters travel across the synaptic space between the terminal button of one neuron and the dendrites of other neurons, where they bind to the dendrites in the neighboring neurons. Furthermore, different terminal buttons release different neurotransmitters, and different dendrites are particularly sensitive to different neurotransmitters. The dendrites will admit the neurotransmitters only if they are the right shape to fit in the receptor sites on the receiving neuron.

Our Brains Control Our Thoughts, Feelings, and Behavior

If you were someone who understood brain anatomy and were to look at the brain of an animal that you had never seen before, you would nevertheless be able to deduce the likely capacities of the animal. This is because the brains of all animals are very similar in overall form. In each animal the brain is layered, and the basic structures of the brain are similar (see Figure 3.6 "The Major Structures in the Human Brain"). The innermost structures of the brain—the parts nearest the spinal cord—are the oldest part of the brain, and these areas carry out the same the functions they did for our distant ancestors. The " old brain‖ regulates basic survival functions, such as breathing, moving, resting, and feeding, and creates our experiences of emotion. Mammals, including humans, have developed further brain layers that provide more advanced functions—for instance, better memory, more sophisticated social interactions, and the ability to experience emotions. Humans have a very large and highly developed outer layer known as the cerebral cortex (see Figure 3.7 "Cerebral Cortex"), which makes us particularly adept at these processes.

Humans have a very large and highly developed outer brain layer known as the cerebral cortex. The cortex provides humans with excellent memory, outstanding cognitive skills, and the ability to experience complex emotions.

The Old Brain: Wired for Survival

The brain stem is the oldest and innermost region of the brain. It's designed to control the most basic functions of life, including breathing, attention, and motor responses (Figure 3.8 "The Brain Stem and the Thalamus"). The brain stem begins where the spinal cord enters the skull and forms the medulla, the area of the brain stem that controls heart rate and breathing. In many cases the medulla alone is sufficient to maintain life—animals that have the remainder of their brains above the medulla severed are still able to eat, breathe, and even move. The spherical shape above the medulla is the pons, a structure in the brain stem that helps control the movements of the body, playing a particularly important role in balance and walking.

Running through the medulla and the pons is a long, narrow network of neurons known as the reticular formation. The job of the reticular formation is to filter out some of the stimuli that are coming into the brain from the spinal cord and to relay the remainder of the signals to other areas of the brain. The reticular formation also plays important roles in walking, eating, sexual activity, and sleeping. When electrical

stimulation is applied to the reticular formation of an animal, it immediately becomes fully awake, and when the reticular formation is severed from the higher brain regions, the animal falls into a deep coma.

The brain stem is an extension of the spinal cord, including the medulla, the pons, the thalamus, and the reticular formation. Above the brain stem are other parts of the old brain that also are involved in the processing of behavior and emotions (see Figure 3.9 "The Limbic System"). The thalamus is the egg-shaped structure above the brain stem that applies still more filtering to the sensory information that is coming up from the spinal cord and through the reticular formation, and it relays some of these remaining signals to the higher brain levels (Guillery & Sherman, 2002). The thalamus also receives some of the higher brain‘s replies, forwarding them to the medulla and the cerebellum.

The thalamus is also important in sleep because it shuts off incoming signals from the senses, allowing us to rest.

People who have damage to the cerebellum have difficulty walking, keeping their balance, and holding their hands steady. Consuming alcohol influences the cerebellum, which is why people who are drunk have more difficulty walking in a straight line. Also, the cerebellum contributes to emotional responses, helps us discriminate between different sounds and textures, and is important in learning

Whereas the primary function of the brain stem is to regulate the most basic aspects of life, including motor functions, the limbic system is largely responsible for memory and emotions, including our responses to reward and punishment. The limbic system is a brain area, located between the brain stem and the two cerebral hemispheres, that governs emotion and memory. It includes the amygdala, the hypothalamus, and the hippocampus.

The amygdala consists of two□□ □almond-shaped‖ clusters (amygdala comes from the Latin word for “almond‖) and is primarily responsible for regulating our perceptions of, and reactions to, aggression and fear. The amygdala has connections to other bodily systems related to fear, including the sympathetic nervous system (which we will see later is important in fear responses), facial responses (which perceive and express emotions), the processing of smells, and the release of neurotransmitters related to stress and aggression (Best, 2009). In one early study, Klüver and Bucy (1939) damaged the amygdala of an aggressive rhesus monkey. They found that the once angry animal immediately became passive and no longer responded to fearful situations with aggressive behavior. Electrical stimulation of the amygdala in other animals also influences aggression. In addition to helping us experience fear, the amygdala also helps us learn from situations that create fear. When we experience events that are dangerous, the amygdala stimulates the brain to remember the details of the situation so that we learn to avoid it in the future.

Located just under the thalamus (hence its name) the hypothalamus is a brain structure that contains a number of small areas that perform a variety of functions, including the important role of linking the nervous system to the endocrine system via the pituitary gland. Through its many interactions with other parts of the brain, the hypothalamus helps

regulate body temperature, hunger, thirst, and sex, and responds to the satisfaction of these needs by creating feelings of pleasure. Olds and Milner (1954) discovered these reward centers accidentally after they had momentarily stimulated the hypothalamus of a rat. The researchers noticed that after being stimulated, the rat continued to move to the exact spot in its cage where the stimulation had occurred, as if it were trying to re-create the circumstances surrounding its original experience. Upon further research into these reward centers, Olds (1958) discovered that animals would do almost anything to re-create enjoyable stimulation, including crossing a painful electrified grid to receive it. In one experiment a rat was given the opportunity to electrically stimulate its own hypothalamus by pressing a pedal. The rat enjoyed the experience so much that it pressed the pedal more than 7,000 times per hour until it collapsed from sheer exhaustion.

The hippocampus consists of two "horns‖ that curve back from the amygdala. The hippocampus is important in storing information in long-term memory. If the hippocampus is damaged, a person cannot build new memories, living instead in a strange world where everything he or she experiences just fades away, even while older memories from the time before the damage are untouched.

The Cerebral Cortex Creates Consciousness and Thinking

All animals have adapted to their environments by developing abilities that help them survive. Some animals have hard shells, others run extremely fast, and some have acute hearing. Human beings do not have any of these particular characteristics, but we do have one big advantage over other animals—we are very, very smart.

You might think that we should be able to determine the intelligence of an animal by looking at the ratio of the animal's brain weight to the weight of its entire body. But this does not really work. The elephant's brain is one thousandth of its weight, but the whale's brain is only one ten-thousandth of its body weight. On the other hand, although the human brain is one 60th of its body weight, the mouse's brain represents one fortieth of its body weight. Despite these comparisons, elephants do not seem 10 times smarter than whales, and humans definitely seem smarter than mice.

When the German physicists Gustav Fritsch and Eduard Hitzig (1870/2009) applied mild electric stimulation to different parts of a dog's cortex, they discovered that they could make different parts of the dog's body move. Furthermore, they discovered an important and unexpected principle of brain activity. They found that stimulating the right side of the brain produced movement in the left side of the dog's body, and vice versa. This finding follows from a general principle about how the brain is structured, called contralateral control. The brain is wired such that in most cases the left hemisphere receives sensations from and controls the right side of the body, and vice versa.

Fritsch and Hitzig also found that the movement that followed the brain stimulation only occurred when they stimulated a specific arch-shaped region that runs across the top of the brain from ear to ear, just at the front of the parietal lobe (see Figure 3.11 "The Sensory Cortex and the

Motor Cortex"). Fritsch and Hitzig had discovered the motor cortex, the part of the cortex that controls and executes movements of the body by sending signals to the cerebellum and the spinal cord. More recent research has mapped the motor cortex even more fully, by providing mild electronic stimulation to different areas of the motor cortex in fully conscious patients while observing their bodily responses (because the brain has no sensory receptors, these patients feel no pain). As you can see in Figure 3.11 "The Sensory Cortex and the Motor Cortex", this research has revealed that the motor cortex is specialized for providing control over the body, in the sense that the parts of the body that require more precise and finer movements, such as the face and the hands, also are allotted the greatest amount of cortical space.

Other areas of the cortex process other types of sensory information. Thevisual cortex is the area located in the occipital lobe (at the very back of the brain) that processes visual information. If you were stimulated in the visual cortex, you would see flashes of light or color, and perhaps you remember having had the experience of " seeing stars‖ when you were hit in, or fell on, the back of your head. The temporal lobe, located on the lower side of each hemisphere, contains the auditory cortex, which is responsible for hearing and language. The temporal lobe also processes some visual information, providing us with the ability to name the objects around us .

The Brain Is Flexible: Neuroplasticity

The control of some specific bodily functions, such as movement, vision, and hearing, is performed in specified areas of the cortex, and if these areas are damaged, the individual will likely lose the ability to perform the corresponding function. For instance, if an infant suffers damage to facial recognition areas in the temporal lobe, it is likely that he or she will never be able to recognize faces (Farah, Rabinowitz, Quinn, & Liu, 2000). On the other hand, the brain is not divided up in an entirely rigid way. The brain's neurons have a remarkable capacity to reorganize and extend themselves to carry out particular functions in response to the needs of the organism, and to repair damage. As a result, the brain constantly creates new neural communication routes and rewires existing ones. Neuroplasticity refers to the brain's ability to change its structure and function in response to experience or damage. Neuroplasticity enables us to learn and remember new things and adjust to new experiences.

Psychologists Study the Brain Using Many Different Methods

One problem in understanding the brain is that it is difficult to get a good picture of what is going on inside it. But there are a variety of empirical methods that allow scientists to look at brains in action, and the number of possibilities has increased dramatically in recent years with the introduction of new neuroimaging techniques. In this section we will consider the various techniques that psychologists use to learn about the brain. Each of the different techniques has some advantages, and when we put them together, we begin to get a relatively good picture of how the brain functions and which brain structures control which activities.

Perhaps the most immediate approach to visualizing and understanding the structure of the brain is to directly analyze the brains of human cadavers. When Albert Einstein died in 1955, his brain was removed and stored for later analysis. Researcher Marian Diamond (1999) later analyzed a section of the Einstein's cortex to investigate its characteristics. Diamond was interested in the role of glia, and she hypothesized that the ratio of glial cells to neurons was an important determinant of intelligence. To test this hypothesis, she compared the ratio of glia to neurons in Einstein's brain with the ratio in the preserved brains of 11 other more " ordinary‖ men. However, Diamond was able to find support for only part of her research hypothesis. Although she found that Einstein's brain had relatively more glia in all the areas that she studied than did the control group, the difference was only statistically significant in one of the areas she tested. Diamond admits a limitation in her study is that she had only one Einstein to compare with 11 ordinary men.

Lesions Provide a Picture of What Is Missing

An advantage of the cadaver approach is that the brains can be fully studied, but an obvious disadvantage is that the brains are no longer active. In other cases, however, we can study living brains. The brains of living human beings may be damaged, for instance, as a result of strokes, falls, automobile accidents, gunshots, or tumors. These damages are called lesions. In rare occasions, brain lesions may be created intentionally through surgery, such as that designed to remove brain tumors or (as in split-brain patients) to reduce the effects of epilepsy. Psychologists also sometimes intentionally create lesions in animals to study the effects on their behavior. In so doing, they hope to be able to draw inferences about the likely functions of human brains from the effects of the lesions in animals.

Lesions allow the scientist to observe any loss of brain function that may occur. For instance, when an individual suffers a stroke, a blood clot deprives part of the brain of oxygen, killing the neurons in the area and rendering that area unable to process information. In some cases, the result of the stroke is a specific lack of ability. For instance, if the stroke influences the occipital lobe, then vision may suffer, and if the stroke influences the areas associated with language or speech, these functions will suffer. In fact, our earliest understanding of the specific areas involved in speech and language were gained by studying patients who had experienced strokes.

It is now known that a good part of our moral reasoning abilities are located in the frontal lobe, and at least some of this understanding comes from lesion studies. For instance, consider the well-known case of Phineas Gage, a 25-year-old railroad worker who, as a result of an explosion, had an iron rod driven into his cheek and out through the top of his skull, causing major damage to his frontal lobe (Macmillan, 2000). Although remarkably Gage was able to return to work after the wounds healed, he no longer seemed to be the same person to those who knew him. The amiable, soft-spoken Gage had become irritable, rude, irresponsible, and dishonest. Although there are questions about the interpretation of this case study (Kotowicz, 2007), it did provide early

evidence that the frontal lobe is involved in emotion and morality (Damasio et al., 2005).

Recording Electrical Activity in the Brain

In addition to lesion approaches, it is also possible to learn about the brain by studying the electrical activity created by the firing of its neurons. One approach, primarily used with animals, is to place detectors in the brain to study the responses of specific neurons. Research using these techniques has found, for instance, that there are specific neurons, known as feature detectors, in the visual cortex that detect movement, lines and edges, and even faces (Kanwisher, 2000).

A less invasive approach, and one that can be used on living humans, is electroencephalography (EEG). The EEG is a technique that records the electrical activity produced by the brain's neurons through the use of electrodes that are placed around the research participant's head. An EEG can show if a person is asleep, awake, or anesthetized because the brain wave patterns are known to differ during each state. EEGs can also track the waves that are produced when a person is reading, writing, and speaking, and are useful for understanding brain abnormalities, such as epilepsy. A particular advantage of EEG is that the participant can move around while the recordings are being taken, which is useful when measuring brain activity in children who often have difficulty keeping still. Furthermore, by following electrical impulses across the surface of the brain, researchers can observe changes over very fast time periods.

Peeking Inside the Brain: Neuroimaging

Although the EEG can provide information about the general patterns of electrical activity within the brain, and although the EEG allows the researcher to see these changes quickly as they occur in real time, the electrodes must be placed on the surface of the skull and each electrode measures brain waves from large areas of the brain. As a result, EEGs do not provide a very clear picture of the structure of the brain.

But techniques exist to provide more specific brain images. Functional magnetic resonance imaging (fMRI) is a type of brain scan that uses a magnetic field to create images of brain activity in each brain area. The patient lies on a bed within a large cylindrical structure containing a very strong magnet. Neurons that are firing use more oxygen, and the need for oxygen increases blood flow to the area. The fMRI detects the amount of blood flow in each brain region, and thus is an indicator of neural activity.

Putting It All Together: The Nervous System and the Endocrine System

Now that we have considered how individual neurons operate and the roles of the different brain areas, it is time to ask how the body manages to " put it all together.‖ How do the complex activities in the various parts of the brain, the simple all-or-nothing firings of billions of interconnected neurons, and the various chemical systems within the body, work together to allow the body to respond to the social environment and engage in everyday behaviors? In this section we will see that the complexities of human behavior are accomplished through

the joint actions of electrical and chemical processes in the nervous system and the endocrine system.

Electrical Control of Behavior: The Nervous System

The nervous system (see Figure 3.17 "The Functional Divisions of the Nervous System"), the electrical information highway of the body, is made up ofnerves—bundles of interconnected neurons that fire in synchrony to carry messages. The central nervous system (CNS), made up of the brain and spinal cord, is the major controller of the body's functions, charged with interpreting sensory information and responding to it with its own directives. The CNS interprets information coming in from the senses, formulates an appropriate reaction, and sends responses to the appropriate system to respond accordingly. Everything that we see, hear, smell, touch, and taste is conveyed to us from our sensory organs as neural impulses, and each of the commands that the brain sends to the body, both consciously and unconsciously, travels through this system as well.

Nerves are differentiated according to their function. A sensory (or afferent) neuron carries information from the sensory receptors, whereas a motor (or efferent) neuron transmits information to the muscles and glands. An interneuron, which is by far the most common type of neuron, is located primarily within the CNS and is responsible for communicating among the neurons. Interneurons allow the brain to combine the multiple sources of available information to create a coherent picture of the sensory information being conveyed.

The spinal cord is the long, thin, tubular bundle of nerves and supporting cells that extends down from the brain. It is the central throughway of information for the body. Within the spinal cord, ascending tracts of sensory neurons relay sensory information from the sense organs to the brain

while descending tracts of motor neurons relay motor commands back to the body. When a quicker-than-usual response is required, the spinal cord can do its own processing, bypassing the brain altogether. A reflex is an involuntary and nearly instantaneous movement in response to a stimulus. Reflexes are triggered when sensory information is powerful enough to reach a given threshold and the interneurons in the spinal cord act to send a message back through the motor neurons without relaying the information to the brain (see Figure 3.18 "The Reflex"). When you touch a hot stove and immediately pull your hand back, or when you fumble your cell phone and instinctively reach to catch it before it falls, reflexes in your spinal cord order the appropriate responses before your brain even knows what is happening.

The nervous system is designed to protect us from danger through its interpretation of and reactions to stimuli. But a primary function of the sympathetic and parasympathetic nervous systems is to interact with the endocrine system to elicit chemicals that provide another system for influencing our feelings and behaviors.

A gland in the endocrine system is made up of groups of cells that function to secrete hormones. A hormone is a chemical that moves throughout the body to help regulate emotions and behaviors. When the hormones released by one gland arrive at receptor tissues or other glands,

these receiving receptors may trigger the release of other hormones, resulting in a series of complex chemical chain reactions. The endocrine system works together with the nervous system to influence many aspects of human behavior, including growth, reproduction, and metabolism. And the endocrine system plays a vital role in emotions. Because the glands in men and women differ, hormones also help explain some of the observed behavioral differences between men and women. The major glands in the endocrine system are shown in Figure 3.20 "The Major Glands of the Endocrine System".

REVIEW QUESTIONS

1. Describe how our brains control our thoughts, feelings, and behavior.
2. Discuss about psychologists study about the brain using many different methods.
3. What is the process of recording electrical activity in the brain?
4. How to peeking inside the brain?
5. Discuss about the nervous system and the endocrine system
6. Describe about the electrical control of behavior and the nervous system.

FURTHER READINGS

1. A textbook of general psychology- Walter F. Daves
2. General Psychology- Abraham
3. Advanced general psychology-Russell W. Levanway
4. General Psychological Theory-Sigmund Freud
5. General Psychology-S K Mangal

IMPORTANT NOTES

UNIT 4 SENSING AND PERCEIVING

Notes

CONTENTS

INTRODUCTION

The ability to detect and interpret the events that are occurring around us allows us to respond to these stimuli appropriately (Gibson & Pick, 2000). In most cases the system is successful, but as you can see from the above example, it is not perfect. In this Unit we will discuss the strengths and limitations of these capacities, focusing on both sensation—awareness resulting from the stimulation of a sense organ, and perception—the organization and interpretation of sensations. Sensation and perception work seamlessly together to allow us to experience the world through our eyes, ears, nose, tongue, and skin, but also to combine what we are currently learning from the environment with what we already know about it to make judgments and to choose appropriate behaviors.

The study of sensation and perception is exceedingly important for our everyday lives because the knowledge generated by psychologists is used in so many ways to help so many people.

After we have reviewed the basic processes of sensation, we will turn to the topic of perception, focusing on how the brain's processing of sensory experience can not only help us make quick and accurate judgments, but also mislead us into making perceptual and judgmental errors, such as those that allowed the Chaser group to breach security at the APEC meeting.

We Experience Our World through Sensation

Humans possess powerful sensory capacities that allow us to sense the kaleidoscope of sights, sounds, smells, and tastes that surround us. Our eyes detect light energy and our ears pick up sound waves. Our skin senses touch, pressure, hot, and cold. Our tongues react to the molecules of the foods we eat, and our noses detect scents in the air. The human perceptual system is wired for accuracy, and people are exceedingly good at making use of the wide variety of information available to them (Stoffregen & Bardy, 2001).

In many ways our senses are quite remarkable. The human eye can detect the equivalent of a single candle flame burning 30 miles away and can distinguish among more than 300,000 different colors. The human ear can detect sounds as low as 20 hertz (vibrations per second) and as high as 20,000 hertz, and it can hear the tick of a clock about 20 feet away in a quiet room. We can taste a teaspoon of sugar dissolved in 2 gallons of water, and we are able to smell one drop of perfume diffused in a three-room apartment. We can feel the wing of a bee on our cheek dropped from 1 centimeter above (Galanter, 1962).

Although there is much that we do sense, there is even more that we do not. Dogs, bats, whales, and some rodents all have much better hearing than we do, and many animals have a far richer sense of smell. Birds are able to see the ultraviolet light that we cannot (see Figure 4.3 "Ultraviolet Light and Bird Vision") and can also sense the pull of the earth's magnetic field. Cats have an extremely sensitive and sophisticated sense of touch, and they are able to navigate in complete darkness using their whiskers. The fact that different organisms have different sensations is part of their evolutionary adaptation. Each species is adapted to sensing the things that are most important to them, while being blissfully unaware of the things that don't matter.

Psychophysics is the branch of psychology that studies the effects of physical stimuli on sensory perceptions and mental states. The field of psychophysics was founded by the German psychologist Gustav Fechner (1801–1887), who was the first to study the relationship between the strength of a stimulus and a person's ability to detect the stimulus.

The measurement techniques developed by Fechner and his colleagues are designed in part to help determine the limits of human sensation. One important criterion is the ability to detect very faint stimuli. The absolute threshold of a sensation is defined as the intensity of a stimulus that allows an organism to just barely detect it.

In a typical psychophysics experiment, an individual is presented with a series of trials in which a signal is sometimes presented and sometimes not, or in which two stimuli are presented that are either the same or different. Imagine, for instance, that you were asked to take a hearing test. On each of the trials your task is to indicate either " yes‖ if you heard a sound or " no‖ if you did not. The signals are purposefully made to be very faint, making accurate judgments difficult.

The problem for you is that the very faint signals create uncertainty. Because our ears are constantly sending background information to the brain, you will sometimes think that you heard a sound when none was there, and you will sometimes fail to detect a sound that is there. Your task is to determine whether the neural activity that you are experiencing is due to the background noise alone or is a result of a signal within the noise.

The responses that you give on the hearing test can be analyzed using signal detection analysis. Signal detection analysis is a technique used to determine the ability of the perceiver to separate true signals from background noise (Macmillan & Creelman, 2005; Wickens, 2002). As you can see in Figure 4.4 "Outcomes of a Signal Detection Analysis", each judgment trial creates four possible outcomes: A hit occurs when

you, as the listener, correctly say " yes‖ when there was a sound. A false alarm occurs when you respond " yes‖ to no signal. In the other two cases you respond "no‖—either a miss (saying "no‖ when there was a signal) or a correct rejection (saying " no‖ when there was in fact no signal).

Our ability to accurately detect stimuli is measured using a signal detection analysis. Two of the possible decisions (hits and correct rejections) are accurate; the other two (misses and false alarms) are errors.

The analysis of the data from a psychophysics experiment creates two measures. One measure, known as sensitivity, refers to the true ability of the individual to detect the presence or absence of signals. People who have better hearing will have higher sensitivity than will those with poorer hearing. The other measure, response bias, refers to a behavioral tendency to respond "yes‖ to the trials, which is independent of sensitivity.

Imagine for instance that rather than taking a hearing test, you are a soldier on guard duty, and your job is to detect the very faint sound of the breaking of a branch that indicates that an enemy is nearby. You can see that in this case making a false alarm by alerting the other soldiers to the sound might not be as costly as a miss (a failure to report the sound), which could be deadly. Therefore, you might well adopt a very lenient response bias in which whenever you are at all unsure, you send a warning signal. In this case your responses may not be very accurate (your sensitivity may be low because you are making a lot of false alarms) and yet the extreme response bias can save lives.

A variety of research programs have found that subliminal stimuli can influence our judgments and behavior, at least in the short term (Dijksterhuis, 2010). But whether the presentation of subliminal stimuli can influence the products that we buy has been a more controversial topic in psychology. In one relevant experiment, Karremans, Stroebe, and Claus (2006)] had Dutch college students view a series of computer trials in which a string of letters such as BBBBBBBBB or BBBbBBBBB were presented on the screen. To be sure they paid attention to the display, the students were asked to note whether the strings contained a small b. However, immediately before each of the letter strings, the researchers presented either the name of a drink that is popular in Holland (Lipton Ice) or a control string containing the same letters as Lipton Ice (NpeicTol). These words were presented so quickly (for only about one fiftieth of a second) that the participants could not see them.

Then the students were asked to indicate their intention to drink Lipton Ice by answering questions such as " If you would sit on a terrace now, how likely is it that you would order Lipton Ice,‖ and also to indicate how thirsty they were at the time. The researchers found that the students who had been exposed to the " Lipton Ice‖ words (and particularly those who indicated that they were already thirsty) were significantly more likely to say that they would drink Lipton Ice than were those who had been exposed to the control words.

If it were effective, procedures such as this (we can call the technique " subliminal advertising‖ because it advertises a product outside awareness) would have some major advantages for advertisers, because it

would allow them to promote their products without directly interrupting the consumers' activity and without the consumers'knowing they are being persuaded. People cannot counter argue with, or attempt to avoid being influenced by, messages received outside awareness. Due to fears that people may be influenced without their knowing, subliminal advertising has been legally banned in many countries, including Australia, Great Britain, and the United States.

Seeing

Whereas other animals rely primarily on hearing, smell, or touch to understand the world around them, human beings rely in large part on vision. A large part of our cerebral cortex is devoted to seeing, and we have substantial visual skills. Seeing begins when light falls on the eyes, initiating the process of transduction. Once this visual information reaches the visual cortex, it is processed by a variety of neurons that detect colors, shapes, and motion, and that create meaningful perceptions out of the incoming stimuli.

The air around us is filled with a sea of electromagnetic energy; pulses of energy waves that can carry information from place to place. As you can see in Figure 4.6 "The Electromagnetic Spectrum", electromagnetic waves vary in their wavelength—the distance between one wave peak and the next wave peak, with the shortest gamma waves being only a fraction of a millimeter in length and the longest radio waves being hundreds of kilometers long. Humans are blind to almost all of this energy—our eyes detect only the range from about 400 to 700 billionths of a meter, the part of the electromagnetic spectrum known as the visible spectrum. Figure 4.6 The Electromagnetic Spectrum Only a small fraction of the electromagnetic energy that surrounds us (the visible spectrum) is detectable by the human eye.

The Sensing Eye and the Perceiving Visual Cortex

As you can see in Figure 4.7 "Anatomy of the Human Eye", light enters the eye through the cornea, a clear covering that protects the eye and begins to focus the incoming light. The light then passes through the pupil, a small opening in the center of the eye. The pupil is surrounded by the iris, the colored part of the eye that controls the size of the pupil by constricting or dilating in response to light intensity. When we enter a dark movie theater on a sunny day, for instance, muscles in the iris open the pupil and allow more light to enter. Complete adaptation to the dark may take up to 20 minutes.

Behind the pupil is the lens, a structure that focuses the incoming light on the retina, the layer of tissue at the back of the eye that contains photoreceptor cells. As our eyes move from near objects to distant objects, a process known as visual accommodation occurs. Visual accommodation is the process of changing the curvature of the lens to keep the light entering the eye focused on the retina. Rays from the top of the image strike the bottom of the retina and vice versa, and rays from the left side of the image strike the right part of the retina and vice versa, causing the image on the retina to be upside down and backward. Furthermore, the image projected on the retina is flat, and yet our final perception of the image will be three dimensional. Figure 4.7 Anatomy of the Human Eye Light enters the eye through the transparent cornea,

passing through the pupil at the center of the iris. The lens adjusts to focus the light on the retina, where it appears upside down and backward. Receptor cells on the retina send information via the optic nerve to the visual cortex.

Accommodation is not always perfect, and in some cases the light that is hitting the retina is a bit out of focus. As you can see in Figure 4.8 "Normal, Nearsighted, and Farsighted Eyes", if the focus is in front of the retina, we say that the person is nearsighted, and when the focus is behind the retina we say that the person is farsighted. Eyeglasses and contact lenses correct this problem by adding another lens in front of the eye, and laser eye surgery corrects the problem by reshaping the eye's own lens. Figure 4.8 Normal, Nearsighted, and Farsighted Eyes For people with normal vision (left), the lens properly focuses incoming light on the retina. For people who are nearsighted (center), images from far objects focus too far in front of the retina, whereas for people who are farsighted (right), images from near objects focus too far behind the retina. Eyeglasses solve the problem by adding a secondary, corrective, lens.

Perceiving Form

One of the important processes required in vision is the perception of form. German psychologists in the 1930s and 1940s, including Max Wertheimer (1880–1943), Kurt Koffka (1886–1941), and Wolfgang Köhler (1887–1967), argued that we create forms out of their component sensations based on the idea of the gestalt, a meaningfully organized whole. The idea of the gestalt is that the " whole is more than the sum of its parts.‖

Perceiving Depth

Depth perception is the ability to perceive three-dimensional space and to accurately judge distance. Without depth perception, we would be unable to drive a car, thread a needle, or simply navigate our way around the supermarket (Howard & Rogers, 2001). Research has found that depth perception is in part based on innate capacities and in part learned through experience (Witherington, 2005).

Psychologists Eleanor Gibson and Richard Walk (1960) tested the ability to perceive depth in 6- to 14-month-old infants by placing them on a visual cliff,a mechanism that gives the perception of a dangerous drop-off, in which infants can be safely tested for their perception of depth (Figure 4.22 "Visual Cliff"). The infants were placed on one side of the " cliff,‖ while their mothers called to them from the other side. Gibson and Walk found that most infants either crawled away from the cliff or remained on the board and cried because they wanted to go to their mothers, but the infants perceived a chasm that they instinctively could not cross. Further research has found that even very young children who cannot yet crawl are fearful of heights (Campos, Langer, & Krowitz, 1970). On the other hand, studies have also found that infants improve their hand-eye coordination as they learn to better grasp objects and as they gain more experience in crawling, indicating that depth perception is also learned (Adolph, 2000).

Depth perception is the result of our use of depth cues, messages from our bodies and the external environment that supply us with information

about space and distance. Binocular depth cues are depth cues that are created by retinal image disparity—that is, the space between our eyes, and thus which require the coordination of both eyes. One outcome of retinal disparity is that the images projected on each eye are slightly different from each other. The visual cortex automatically merges the two images into one, enabling us to perceive depth. Three-dimensional movies make use of retinal disparity by using 3-D glasses that the viewer wears to create a different image on each eye. The perceptual system quickly, easily, and unconsciously turns the disparity into 3-D.

An important binocular depth cue is convergence, the inward turning of our eyes that is required to focus on objects that are less than about 50 feet away from us. The visual cortex uses the size of the convergence angle between the eyes to judge the object's distance. You will be able to feel your eyes converging if you slowly bring a finger closer to your nose while continuing to focus on it. When you close one eye, you no longer feel the tension—convergence is a binocular depth cue that requires both eyes to work.

The visual system also uses accommodation to help determine depth. As the lens changes its curvature to focus on distant or close objects, information relayed from the muscles attached to the lens helps us determine an object's distance. Accommodation is only effective at short viewing distances, however, so while it comes in handy when threading a needle or tying shoelaces, it is far less effective when driving or playing sports.

Although the best cues to depth occur when both eyes work together, we are able to see depth even with one eye closed. Monocular depth cues are depth cues that help us perceive depth using only one eye (Sekuler & Blake, 2006). Some of the most important are summarized in Table 4.2 "Monocular Depth Cues That Help Us Judge Depth at a Distance". The fence posts at right appear farther away not only because they become smaller but also because they appear higher up in the picture.

Perceiving Motion

Many animals, including human beings, have very sophisticated perceptual skills that allow them to coordinate their own motion with the motion of moving objects in order to create a collision with that object. Bats and birds use this mechanism to catch up with prey, dogs use it to catch a Frisbee, and humans use it to catch a moving football. The brain detects motion partly from the changing size of an image on the retina (objects that look bigger are usually closer to us) and in part from the relative brightness of objects.

We also experience motion when objects near each other change their appearance. The beta effect refers to the perception of motion that occurs when different images are presented next to each other in succession (see Note 4.43 "Beta Effect and Phi Phenomenon"). The visual cortex fills in the missing part of the motion and we see the object moving. The beta effect is used in movies to create the experience of motion. A related effect is thephi phenomenon, in which we perceive a sensation of motion caused by the appearance and disappearance of objects that are near each other. The phi phenomenon looks like a moving zone or cloud of background color surrounding the flashing objects. The beta effect and

the phi phenomenon are other examples of the importance of the gestalt—our tendency to “see more than the sum of the parts.‖

Hearing

Like vision and all the other senses, hearing begins with transduction. Sound waves that are collected by our ears are converted into neural impulses, which are sent to the brain where they are integrated with past experience and interpreted as the sounds we experience. The human ear is sensitive to a wide range of sounds, ranging from the faint tick of a clock in a nearby room to the roar of a rock band at a nightclub, and we have the ability to detect very small variations in sound. But the ear is particularly sensitive to sounds in the same frequency as the human voice. A mother can pick out her child’s voice from a host of others, and when we pick up the phone we quickly recognize a familiar voice. In a fraction of a second, our auditory system receives the sound waves, transmits them to the auditory cortex, compares them to stored knowledge of other voices, and identifies the identity of the caller. The Ear Just as the eye detects light waves, the ear detects sound waves. Vibrating objects (such as the human vocal chords or guitar strings) cause air molecules to bump into each other and produce sound waves, which travel from their source as peaks and valleys much like the ripples that expand outward when a stone is tossed into a pond. Unlike light waves, which can travel in a vacuum, sound waves are carried within mediums such as air, water, or metal, and it is the changes in pressure associated with these mediums that the ear detects.

As with light waves, we detect both the wavelength and the amplitude of sound waves. The wavelength of the sound wave (known as frequency) is measured in terms of the number of waves that arrive per second and determines our perception of pitch, the perceived frequency of a sound. Longer sound waves have lower frequency and produce a lower pitch, whereas shorter waves have higher frequency and a higher pitch.

The amplitude, or height of the sound wave, determines how much energy it contains and is perceived as loudness (the degree of sound volume). Larger waves are perceived as louder. Loudness is measured using the unit of relative loudness known as the decibel. Zero decibels represent the absolute threshold for human hearing, below which we cannot hear a sound. Each increase in 10 decibels represents a tenfold increase in the loudness of the sound (see Figure 4.29 "Sounds in Everyday Life"). The sound of a typical conversation (about 60 decibels) is 1,000 times louder than the sound of a faint whisper (30 decibels), whereas the sound of a jackhammer (130 decibels) is 10 billion times louder than the whisper.

The human ear can comfortably hear sounds up to 80 decibels. Prolonged exposure to sounds above 80 decibels can cause hearing loss.

Audition begins in the pinna, the external and visible part of the ear, which is shaped like a funnel to draw in sound waves and guide them into the auditory canal. At the end of the canal, the sound waves strike the tightly stretched, highly sensitive membrane known as thetympanic membrane (or eardrum), which vibrates with the waves. The resulting vibrations are relayed into the middle ear through three tiny bones, known as the ossicles—the hammer (or malleus), anvil (or incus), and

stirrup (or stapes)—to the cochlea, a snail-shaped liquid-filled tube in the inner ear. The vibrations cause the oval window, the membrane covering the opening of the cochlea, to vibrate, disturbing the fluid inside the cochlea.

The movements of the fluid in the cochlea bend the hair cells of the inner ear, much in the same way that a gust of wind bends over wheat stalks in a field. The movements of the hair cells trigger nerve impulses in the attached neurons, which are sent to the auditory nerve and then to the auditory cortex in the brain. The cochlea contains about 16,000 hair cells, each of which holds a bundle of fibers known as cilia on its tip. The cilia are so sensitive that they can detect a movement that pushes them the width of a single atom. To put things in perspective, cilia swaying at the width of an atom is equivalent to the tip of the Eiffel Tower swaying by half an inch.

Not only is frequency important, but location is critical as well. The cochlea relays information about the specific area, or place, in the cochlea that is most activated by the incoming sound. The place theory of hearing proposes that different areas of the cochlea respond to different frequencies. Higher tones excite areas closest to the opening of the cochlea (near the oval window). Lower tones excite areas near the narrow tip of the cochlea, at the opposite end. Pitch is therefore determined in part by the area of the cochlea firing the most frequently.

Just as having two eyes in slightly different positions allows us to perceive depth, so the fact that the ears are placed on either side of the head enables us to benefit from stereophonic, or three-dimensional, hearing. If a sound occurs on your left side, the left ear will receive the sound slightly sooner than the right ear, and the sound it receives will be more intense, allowing you to quickly determine the location of the sound. Although the distance between our two ears is only about 6 inches, and sound waves travel at 750 miles an hour, the time and intensity differences are easily detected (Middlebrooks & Green, 1991). When a sound is equidistant from both ears, such as when it is directly in front, behind, beneath or overhead, we have more difficulty pinpointing its location. It is for this reason that dogs (and people, too) tend to cock their heads when trying to pinpoint a sound, so that the ears receive slightly different signals. Hearing Loss

Tasting, Smelling, and Touching

Although vision and hearing are by far the most important, human sensation is rounded out by four other senses, each of which provides an essential avenue to a better understanding of and response to the world around us. These other senses are touch, taste, smell, and our sense of body position and movement (proprioception). Tasting

Taste is important not only because it allows us to enjoy the food we eat, but even more crucial, because it leads us toward foods that provide energy (sugar, for instance) and away from foods that could be harmful. Many children are picky eaters for a reason—they are biologically predisposed to be very careful about what they eat. Together with the sense of smell, taste helps us maintain appetite, assess potential dangers (such as the odor of a gas leak or a burning house), and avoid eating poisonous or spoiled food.

Our ability to taste begins at the taste receptors on the tongue. The tongue detects six different taste sensations, known respectively as sweet, salty, sour, bitter, piquancy (spicy), and umami (savory). Umami is a meaty taste associated with meats, cheeses, soy, seaweed, and mushrooms, and particularly found in monosodium glutamate (MSG), a popular flavor enhancer (Ikeda, 1909/2002; Sugimoto & Ninomiya, 2005).

Our tongues are covered with taste buds, which are designed to sense chemicals in the mouth. Most taste buds are located in the top outer edges of the tongue, but there are also receptors at the back of the tongue as well as on the walls of the mouth and at the back of the throat. As we chew food, it dissolves and enters the taste buds, triggering nerve impulses that are transmitted to the brain (Northcutt, 2004). Human tongues are covered with 2,000 to 10,000 taste buds, and each bud contains between 50 and 100 taste receptor cells. Taste buds are activated very quickly; a salty or sweet taste that touches a taste bud for even one tenth of a second will trigger a neural impulse (Kelling & Halpern, 1983). On average, taste buds live for about 5 days, after which new taste buds are created to replace them. As we get older, however, the rate of creation decreases making us less sensitive to taste. This change helps explain why some foods that seem so unpleasant in childhood are more enjoyable in adulthood.

The area of the sensory cortex that responds to taste is in a very similar location to the area that responds to smell, a fact that helps explain why the sense of smell also contributes to our experience of the things we eat. You may remember having had difficulty tasting food when you had a bad cold, and if you block your nose and taste slices of raw potato, apple, and parsnip, you will not be able to taste the differences between them. Our experience of texture in a food (the way we feel it on our tongues) also influences how we taste it. Smelling

As we breathe in air through our nostrils, we inhale airborne chemical molecules, which are detected by the 10 million to 20 million receptor cells embedded in the olfactory membrane of the upper nasal passage. The olfactory receptor cells are topped with tentacle-like protrusions that contain receptor proteins. When an odor receptor is stimulated, the membrane sends neural messages up the olfactory nerve to the brain (see Figure 4.31 "Smell Receptors"). Figure 4.31 Smell Receptors

There are more than 1,000 types of odor receptor cells in the olfactory membrane.

Touching

The sense of touch is essential to human development. Infants thrive when they are cuddled and attended to, but not if they are deprived of human contact (Baysinger, Plubell, & Harlow, 1973;

The skin, the largest organ in the body, is the sensory organ for touch. The skin contains a variety of nerve endings, combinations of which respond to particular types of pressures and temperatures. When you touch different parts of the body, you will find that some areas are more ticklish, whereas other areas respond more to pain, cold, or heat.

The thousands of nerve endings in the skin respond to four basic sensations:Pressure, hot, cold, and pain, but only the sensation of

pressure has its own specialized receptors. Other sensations are created by a combination of the other four.

The skin is important not only in providing information about touch and temperature but also in proprioception—the ability to sense the position and movement of our body parts. Proprioception is accomplished by specialized neurons located in the skin, joints, bones, ears, and tendons, which send messages about the compression and the contraction of muscles throughout the body. Without this feedback from our bones and muscles, we would be unable to play sports, walk, or even stand upright.

The ability to keep track of where the body is moving is also provided by thevestibular system, a set of liquid-filled areas in the inner ear that monitors the head's position and movement, maintaining the body's balance. As you can see in Figure 4.33 "The Vestibular System", the vestibular system includes the semicircular canals and the vestibular sacs. These sacs connect the canals with the cochlea. The semicircular canals sense the rotational movements of the body and the vestibular sacs sense linear accelerations. The vestibular system sends signals to the neural structures that control eye movement and to the muscles that keep the body upright. Figure 4.33 The Vestibular System The vestibular system includes the semicircular canals (brown) that transduce the rotational movements of the body and the vestibular sacs (blue) that sense linear accelerations.

Experiencing Pain

We do not enjoy it, but the experience of pain is how the body informs us that we are in danger. The burn when we touch a hot radiator and the sharp stab when we step on a nail lead us to change our behavior, preventing further damage to our bodies. People who cannot experience pain are in serious danger of damage from wounds that others with pain would quickly notice and attend to.

The gate control theory of pain proposes that pain is determined by the operation of two types of nerve fibers in the spinal cord. One set of smaller nerve fibers carries pain from the body to the brain, whereas a second set of larger fibers is designed to stop or start (as a gate would) the flow of pain (Melzack & Wall, 1996). It is for this reason that massaging an area where you feel pain may help alleviate it—the massage activates the large nerve fibers that block the pain signals of the small nerve fibers (Wall, 2000).

Experiencing pain is a lot more complicated than simply responding to neural messages, however. It is also a matter of perception. We feel pain less when we are busy focusing on a challenging activity (Bantick, Wise, Ploghaus, Clare, Smith, & Tracey, 2002), which can help explain why sports players may feel their injuries only after the game. We also feel less pain when we are distracted by humor (Zweyer, Velker, & Ruch, 2004). And pain is soothed by the brain's release of endorphins, natural hormonal pain killers. The release of endorphins can explain the euphoria experienced in the running of a marathon

The eyes, ears, nose, tongue, and skin sense the world around us, and in some cases perform preliminary information processing on the incoming data. But by and large, we do not experience sensation—we experience the outcome of perception—the total package that the brain puts together

from the pieces it receives through our senses and that the brain creates for us to experience. When we look out the window at a view of the countryside, or when we look at the face of a good friend, we don't just see a jumble of colors and shapes—we see, instead, an image of a country side or an image of a friend.

How the Perceptual System Interprets the Environment

This meaning-making involves the automatic operation of a variety of essential perceptual processes. One of these is sensory interaction—the working together of different senses to create experience. Sensory interaction is involved when taste, smell, and texture combine to create the flavor we experience in food. It is also involved when we enjoy a movie because of the way the images and the music work together.

Although you might think that we understand speech only through our sense of hearing, it turns out that the visual aspect of speech is also important. One example of sensory interaction is shown in the McGurk effect—an error in perception that occurs when we misperceive sounds because the audio and visual parts of the speech are mismatched.

Illusions

Although our perception is very accurate, it is not perfect. Illusions occur when the perceptual processes that normally help us correctly perceive the world around us are fooled by a particular situation so that we see something that does not exist or that is incorrect. Figure 4.34 "Optical Illusions as a Result of Brightness Constancy (Left) and Color Constancy (Right)" presents two situations in which our normally accurate perceptions of visual constancy have been fooled. Figure 4.34 Optical Illusions as a Result of Brightness Constancy (Left) and Color Constancy (Right) Look carefully at the snakelike pattern on the left. Are the green strips really brighter than the background? Cover the white curves and you'll see they are not. Square A in the right-hand image looks very different from square B, even though they are exactly the same.

Another well-known illusion is the Mueller-Lyer illusion (see Figure 4.35 "The Mueller-Lyre Illusion"). The line segment in the bottom arrow looks longer to us than the one on the top, even though they are both actually the same length. It is likely that the illusion is, in part, the result of the failure of monocular depth cues—the bottom line looks like an edge that is normally farther away from us, whereas the top one looks like an edge that is normally closer. Figure 4.35 The Mueller-Lyre Illusion The Mueller-Lyre illusion makes the line segment at the top of the left picture appear shorter than the one at the bottom. The illusion is caused, in part, by the monocular distance cue of depth—the bottom line looks like an edge that is normally farther away from us, whereas the top one looks like an edge that is normally closer.

The moon illusion refers to the fact that the moon is perceived to be about 50% larger when it is near the horizon than when it is seen overhead, despite the fact that both moons are the same size and cast the same size retinal image. The monocular depth cues of position and aerial perspective (see Figure 4.36 "The Moon Illusion") create the illusion that things that are lower and more hazy are farther away. The skyline of the

horizon (trees, clouds, outlines of buildings) also gives a cue that the moon is far away, compared to a moon at its zenith. If we look at a horizon moon through a tube of rolled up paper, taking away the surrounding horizon cues, the moon will immediately appear smaller.

Our emotions, mind-set, expectations, and the contexts in which our sensations occur all have a profound influence on perception. People who are warned that they are about to taste something bad rate what they do taste more negatively than people who are told that the taste won't be so bad (Nitschke et al., 2006), and people perceive a child and adult pair as looking more alike when they are told that they are parent and child (Bressan & Dal Martello, 2002). Similarly, participants who see images of the same baby rate it as stronger and bigger when they are told it is a boy as opposed to when they are told it is a girl (Stern & Karraker, 1989), and research participants who learn that a child is from a lower-class background perceive the child's scores on an intelligence test as lower than people who see the same test taken by a child they are told is from an upper-class background (Darley & Gross, 1983). Plassmann, O'Doherty, Shiv, and Rangel (2008) found that wines were rated more positively and caused greater brain activity in brain areas associated with pleasure when they were said to cost more than when they were said to cost less. And even experts can be fooled: Professional referees tended to assign more penalty cards to soccer teams for videotaped fouls when they were told that the team had a history of aggressive behavior than when they had no such expectation (Jones, Paull, & Erskine, 2002).

REVIEW QUESTIONS

1. How do we experience our world through sensation seeing?
2. Discuss about the sensing eye and the perceiving visual cortex.
3. Explain about perceiving form and perceiving motion
4. Write a short note of sensing through hearing.
5. Discuss about the sensing through tasting, smelling, and touching
6. What are illusions? Describe its causes and effects.

FURTHER READINGS

1. A textbook of general psychology- Walter F. Daves
2. General Psychology- Abraham
3. Advanced general psychology-Russell W. Levanway
4. General Psychological Theory-Sigmund Freud
5. General Psychology-S K Mangal

UNIT-5 STATES OF CONSCIOUSNESS

Notes

CONTENTS

Introduction

Consciousness is defined as our subjective awareness of ourselves and our environment (Koch, 2004). The experience of consciousness is fundamental to human nature. We all know what it means to be conscious, and we assume (although we can never be sure) that other human beings experience their consciousness similarly to how we experience ours.

The study of consciousness has long been important to psychologists and plays a role in many important psychological theories. For instance, Sigmund Freud's personality theories differentiated between the unconscious and the conscious aspects of behavior, and present-day psychologists distinguish between automatic (unconscious) and controlled (conscious) behaviors and between implicit (unconscious) and explicit (conscious) memory (Petty, Wegener, Chaiken, & Trope, 1999; Shanks, 2005).]

Some philosophers and religious practices argue that the mind (or soul) and the body are separate entities. For instance, the French philosopher René Descartes (1596–1650) was a proponent of dualism, the idea that the mind, a nonmaterial entity, is separate from (although connected to) the physical body. In contrast to the dualists, psychologists believe that consciousness (and thus the mind) exists in the brain, not separate from it. In fact, psychologists believe that consciousness is the result of the activity of the many neural connections in the brain, and that we experience different states of consciousness depending on what our brain is currently doing (Dennett, 1991; Koch & Greenfield, 2007).

The study of consciousness is also important to the fundamental psychological question regarding the presence of free will. Although we may understand and believe that some of our behaviors are caused by

forces that are outside our awareness (i.e., unconscious), we nevertheless believe that we have control over, and are aware that we are engaging in, most of our behaviors. To discover that we, or even someone else, has engaged in a complex behavior, such as driving in a car and causing severe harm to others, without being at all conscious of one's actions, is so unusual as to be shocking. And yet psychologists are increasingly certain that a great deal of our behavior is caused by processes of which we are unaware and over which we have little or no control (Libet, 1999; Wegner, 2003).

Sleeping and Dreaming Revitalize Us for Action

The lives of all organisms, including humans, are influenced by regularly occurring cycles of behaviors known as biological rhythms. One important biological rhythm is the annual cycle that guides the migration of birds and the hibernation of bears. Women also experience a 28-day cycle that guides their fertility and menstruation. But perhaps the strongest and most important biorhythm is the daily circadian rhythm (from the Latin circa, meaning " about or "approximately,‖ and dian, meaning " daily‖) that guides the daily waking and sleeping cycle in many animals.

Many biological rhythms are coordinated by changes in the level and duration of ambient light, for instance, as winter turns into summer and as night turns into day. In some animals, such as birds, the pineal gland in the brain is directly sensitive to light and its activation influences behavior, such as mating and annual migrations. Light also has a profound effect on humans. We are more likely to experience depression during the dark winter months than during the lighter summer months, an experience known as seasonal affective disorder (SAD), and exposure to bright lights can help reduce this depression (McGinnis, 2007).

Sleep is also influenced by ambient light. The ganglion cells in the retina send signals to a brain area above the thalamus called the suprachiasmatic nucleus, which is the body's primary circadian " pacemaker.‖ The suprachiasmatic nucleus analyzes the strength and duration of the light stimulus and sends signals to the pineal gland when the ambient light level is low or its duration is short. In response, the pineal gland secretes melatonin, a powerful hormone that facilitates the onset of sleep.

Although we lose consciousness as we sleep, the brain nevertheless remains active. The patterns of sleep have been tracked in thousands of research participants who have spent nights sleeping in research labs while their brain waves were recorded by monitors, such as an electroencephalogram, or EEG(Figure 5.3 "Sleep Labs").

Sleep researchers have found that sleeping people undergo a fairly consistent pattern of sleep stages, each lasting about 90 minutes. As you can see in Figure 5.4 "Stages of Sleep", these stages are of two major types: Rapid eye movement (REM) sleep is a sleep stage characterized by the presence of quick fast eye movements and dreaming. REM sleep accounts for about 25% of our total sleep time. During REM sleep, our awareness of external events is dramatically reduced, and consciousness is dominated primarily by internally generated images and a lack of overt thinking (Hobson, 2004). During this sleep stage our muscles shut down,

and this is probably a good thing as it protects us from hurting ourselves or trying to act out the scenes that are playing in our dreams. The second major sleep type, non-rapid eye movement (non-REM) sleep is a deep sleep, characterized by very slow brain waves, that is further subdivided into three stages: N1, N2, and N3. Each of the sleep stages has its own distinct pattern of brain activity.

During a typical night, our sleep cycles move between REM and non-REM sleep, with each cycle repeating at about 90-minute intervals. The deeper non-REM sleep stages usually occur earlier in the night.

As you can see in Figure 5.5 "EEG Recordings of Brain Patterns During Sleep", the brain waves that are recorded by an EEG as we sleep show that the brain‘s activity changes during each stage of sleeping. When we are awake, our brain activity is characterized by the presence of very fast beta waves. When we first begin to fall asleep, the waves get longer (alpha waves), and as we move into stage N1 sleep, which is characterized by the experience of drowsiness, the brain begins to produce even slower theta waves. During stage N1 sleep, some muscle tone is lost, as well as most awareness of the environment. Some people may experience sudden jerks or twitches and even vivid hallucinations during this initial stage of sleep.

Each stage of sleep has its own distinct pattern of brain activity.

Normally, if we are allowed to keep sleeping, we will move from stage N1 to stage N2 sleep. During stage N2, muscular activity is further decreased and conscious awareness of the environment is lost. This stage typically represents about half of the total sleep time in normal adults. Stage N2 sleep is characterized by theta waves interspersed with bursts of rapid brain activity known as sleep spindles.

Stage N3, also known as slow wave sleep, is the deepest level of sleep, characterized by an increased proportion of very slow delta waves. This is the stage in which most sleep abnormalities, such as sleepwalking, sleep talking, nightmares, and bed-wetting occur. The sleepwalking murders committed by Mr. Parks would have occurred in this stage. Some skeletal muscle tone remains, making it possible for affected individuals to rise from their beds and engage in sometimes very complex behaviors, but consciousness is distant. Even in the deepest sleep, however, we are still aware of the external world. If smoke enters the room or if we hear the cry of a baby we are likely to react, even though we are sound asleep. These occurrences again demonstrate the extent to which we process information outside consciousness.

After falling initially into a very deep sleep, the brain begins to become more active again, and we normally move into the first period of REM sleep about 90 minutes after falling asleep. REM sleep is accompanied by an increase in heart rate, facial twitches, and the repeated rapid eye movements that give this stage its name. People who are awakened during REM sleep almost always report that they were dreaming, while those awakened in other stages of sleep report dreams much less often. REM sleep is also emotional sleep. Activity in the limbic system, including the amygdala, is increased during REM sleep, and the genitals become aroused, even if the content of the dreams we are having is not sexual. A typical 25-year-old man may have an erection nearly half of

the night, and the common “morning erection‖ is left over from the last REM period before waking.

Normally we will go through several cycles of REM and non-REM sleep each night (Figure 5.5 "EEG Recordings of Brain Patterns During Sleep"). The length of the REM portion of the cycle tends to increase through the night, from about 5 to 10 minutes early in the night to 15 to 20 minutes shortly before awakening in the morning. Dreams also tend to become more elaborate and vivid as the night goes on. Eventually, as the sleep cycle finishes, the brain resumes its faster alpha and beta waves and we awake, normally refreshed. Sleep Disorders:

Problems in Sleeping

According to a recent poll (National Sleep Foundation, 2009),] about one-fourth of American adults say they get a good night‘s sleep only a few nights a month or less. These people are suffering from a sleep disorder known asinsomnia, defined as persistent difficulty falling or staying asleep. Most cases of insomnia are temporary, lasting from a few days to several weeks, but in some cases insomnia can last for years.

Insomnia can result from physical disorders such as pain due to injury or illness, or from psychological problems such as stress, financial worries, or relationship difficulties. Changes in sleep patterns, such as jet lag, changes in work shift, or even the movement to or from daylight savings time can produce insomnia. Sometimes the sleep that the insomniac does get is disturbed and non-restorative, and the lack of quality sleep produces impairment of functioning during the day. Ironically, the problem may be compounded by people’s anxiety over insomnia itself: Their fear of being unable to sleep may wind up keeping them awake. Some people may also develop a conditioned anxiety to the bedroom or the bed.

People who have difficulty sleeping may turn to drugs to help them sleep. Barbiturates, benzodiazepines, and other sedatives are frequently marketed and prescribed as sleep aids, but they may interrupt the natural stages of the sleep cycle, and in the end are likely to do more harm than good. In some cases they may also promote dependence. Most practitioners of sleep medicine today recommend making environmental and scheduling changes first, followed by therapy for underlying problems, with pharmacological remedies used only as a last resort.

According to the National Sleep Foundation, some steps that can be used to combat insomnia include the following:

- Use the bed and bedroom for sleep and sex only. Do not spend time in bed during the day.
- Establish a regular bedtime routine and a regular sleep-wake schedule.
- Think positively about your sleeping—try not to get anxious just because you are losing a little sleep.
- Do not eat or drink too much close to bedtime.
- Create a sleep-promoting environment that is dark, cool, and comfortable.
- Avoid disturbing noises—consider a bedside fan or white-noise machine to block out disturbing sounds.

- Consume less or no caffeine, particularly late in the day.
- Avoid alcohol and nicotine, especially close to bedtime.
- Exercise, but not within 3 hours before bedtime.
- Avoid naps, particularly in the late afternoon or evening.
- Keep a sleep diary to identify your sleep habits and patterns that you can share with your doctor.

Another common sleep problem is sleep apnea, a sleep disorder characterized by pauses in breathing that last at least 10 seconds during sleep (Morgenthaler, Kagramanov, Hanak, & Decker, 2006). In addition to preventing restorative sleep, sleep apnea can also cause high blood pressure and may raise the risk of stroke and heart attack (Yaggi et al., 2005).

Most sleep apnea is caused by an obstruction of the walls of the throat that occurs when we fall asleep. It is most common in obese or older individuals who have lost muscle tone and is particularly common in men. Sleep apnea caused by obstructions is usually treated with an air machine that uses a mask to create a continuous pressure that prevents the airway from collapsing, or with mouthpieces that keep the airway open. If all other treatments have failed, sleep apnea may be treated with surgery to open the airway.

Narcolepsy is a disorder characterized by extreme daytime sleepiness with frequent episodes of "nodding off.‖ The syndrome may also be accompanied by attacks of cataplexy, in which the individual loses muscle tone, resulting in a partial or complete collapse. It is estimated that at least 200,000 Americans suffer from narcolepsy, although only about a quarter of these people have been diagnosed (National Heart, Lung, and Blood Institute, 2008).

Narcolepsy is in part the result of genetics—people who suffer from the disease lack neurotransmitters that are important in keeping us alert (Taheri, Zeitzer, & Mignot, 2002) —and is also the result of a lack of deep sleep. While most people descend through the sequence of sleep stages, then move back up to REM sleep soon after falling asleep, narcolepsy sufferers move directly into REM and undergo numerous awakenings during the night, often preventing them from getting good sleep.

Narcolepsy can be treated with stimulants, such as amphetamines, to counteract the daytime sleepiness, or with antidepressants to treat a presumed underlying depression. However, since these drugs further disrupt already-abnormal sleep cycles, these approaches may, in the long run, make the problem worse. Many sufferers find relief by taking a number of planned short naps during the day, and some individuals may find it easier to work in jobs that allow them to sleep during the day and work at night.

Other sleep disorders occur when cognitive or motor processes that should be turned off or reduced in magnitude during sleep operate at higher than normal levels .

Sleep terrors is a disruptive sleep disorder, most frequently experienced in childhood, that may involve loud screams and intense panic. The sufferer cannot wake from sleep even though he or she is trying to. In extreme cases, sleep terrors may result in bodily harm or property

damage as the sufferer moves about abruptly. Up to 3% of adults suffer from sleep terrors, which typically occur in sleep stage N3 (Mahowald & Schenck, 2000).

Other sleep disorders include bruxism, in which the sufferer grinds his teeth during sleep; restless legs syndrome, in which the sufferer reports an itching, burning, or otherwise uncomfortable feeling in his legs, usually exacerbated when resting or asleep; and periodic limb movement disorder, which involves sudden involuntary movement of limbs. The latter can cause sleep disruption and injury for both the sufferer and bed partner.

Although many sleep disorders occur during non-REM sleep, REM sleep behavior disorder (Mahowald & Schenck, 2005) is a condition in which people (usually middle-aged or older men) engage in vigorous and bizarre physical activities during REM sleep in response to intense, violent dreams. As their actions may injure themselves or their sleeping partners, this disorder, thought to be neurological in nature, is normally treated with hypnosis and medications.

The Heavy Costs of Not Sleeping

Our preferred sleep times and our sleep requirements vary throughout our life cycle. Newborns tend to sleep between 16 and 18 hours per day, preschoolers tend to sleep between 10 and 12 hours per day, school-aged children and teenagers usually prefer at least 9 hours of sleep per night, and most adults say that they require 7 to 8 hours per night (Mercer, Merritt, & Cowell, 1998; National Sleep Foundation, 2008). There are also individual differences in need for sleep. Some people do quite well with fewer than 6 hours of sleep per night, whereas others need 9 hours or more. The most recent study by the National Sleep Foundation suggests that adults should get between 7 and 9 hours of sleep per night (Figure 5.8 "Average Hours of Required Sleep per Night"), and yet Americans now average fewer than 7 hours.

Good sleep is also important to our health and longevity. It is no surprise that we sleep more when we are sick, because sleep works to fight infection. Sleep deprivation suppresses immune responses that fight off infection, and can lead to obesity, hypertension, and memory impairment (Ferrie et al., 2007; Kushida, 2005). Sleeping well can even save our lives. Dew et al. (2003) found that older adults who had better sleep patterns also lived longer.

Dreams are the succession of images, thoughts, sounds, and emotions that passes through our minds while sleeping. When people are awakened from REM sleep, they normally report that they have been dreaming, suggesting that people normally dream several times a night but that most dreams are forgotten on awakening (Dement, 1997). The content of our dreams generally relates to our everyday experiences and concerns, and frequently our fears and failures (Cartwright, Agargun, Kirkby, & Friedman, 2006; Domhoff, Meyer-Gomes, & Schredl, 2005).

Although Freud and others have focused on the meaning of dreams, other theories about the causes of dreams are less concerned with their content. One possibility is that we dream primarily to help with consolidation, or the moving of information into long-term memory .

The activation-synthesis theory of dreaming (Hobson & McCarley, 1977; Hobson, 2004) proposes still another explanation for dreaming—namely, that dreams are our brain's interpretation of the random firing of neurons in the brain stem. According to this approach, the signals from the brain stem are sent to the cortex, just as they are when we are awake, but because the pathways from the cortex to skeletal muscles are disconnected during REM sleep, the cortex does not know how to interpret the signals. As a result, the cortex strings the messages together into the coherent stories we experience as dreams.

Although researchers are still trying to determine the exact causes of dreaming, one thing remains clear—we need to dream. If we are deprived of REM sleep, we quickly become less able to engage in the important tasks of everyday life, until we are finally able to dream again.

Altering Consciousness with Psychoactive Drugs

A psychoactive drug is a chemical that changes our states of consciousness, and particularly our perceptions and moods. These drugs are commonly found in everyday foods and beverages, including chocolate, coffee, and soft drinks, as well as in alcohol and in over-the-counter drugs, such as aspirin, Tylenol, and cold and cough medication. Psychoactive drugs are also frequently prescribed as sleeping pills, tranquilizers, and antianxiety medications and they may be taken, illegally, for recreational purposes. Psychoactive drugs affect consciousness by influencing how neurotransmitters operate at the synapses of the central nervous system (CNS). Some psychoactive drugs are agonists, which mimic the operation of a neurotransmitter; some are antagonists, which block the action of a neurotransmitter; and some work by blocking the reuptake of neurotransmitters at the synapse.

In some cases the effects of psychoactive drugs mimic other naturally occurring states of consciousness. For instance, sleeping pills are prescribed to create drowsiness, and benzodiazepines are prescribed to create a state of relaxation. In other cases psychoactive drugs are taken for recreational purposes with the goal of creating states of consciousness that are pleasurable or that help us escape our normal consciousness.

The use of psychoactive drugs, and especially those that are used illegally, has the potential to create very negative side effects (Table 5.1 "Psychoactive Drugs by Class"). This does not mean that all drugs are dangerous, but rather that all drugs can be dangerous, particularly if they are used regularly over long periods of time. Psychoactive drugs create negative effects not so much through their initial use but through the continued use, accompanied by increasing doses, that ultimately may lead to drug abuse.

The problem is that many drugs create tolerance: an increase in the dose required to produce the same effect, which makes it necessary for the user to increase the dosage or the number of times per day that the drug is taken. As the use of the drug increases, the user may develop a dependence, defined as a need to use a drug or other substance regularly. Dependence can be psychological, in which the drug is desired and has become part of the everyday life of the user, but no serious physical effects result if the drug is not obtained; or physical, in which serious

physical and mental effects appear when the drug is withdrawn. Cigarette smokers who try to quit, for example, experience physical withdrawal symptoms, such as becoming tired and irritable, as well as extreme psychological cravings to enjoy a cigarette in particular situations, such as after a meal or when they are with friends.

Users may wish to stop using the drug, but when they reduce their dosage they experience withdrawal—negative experiences that accompany reducing or stopping drug use, including physical pain and other symptoms. When the user powerfully craves the drug and is driven to seek it out, over and over again, no matter what the physical, social, financial, and legal cost, we say that he or she has developed an addiction to the drug.

It is a common belief that addiction is an overwhelming, irresistibly powerful force, and that withdrawal from drugs is always an unbearably painful experience. But the reality is more complicated and in many cases less extreme. For one, even drugs that we do not generally think of as being addictive, such as caffeine, nicotine, and alcohol, can be very difficult to quit using, at least for some people. On the other hand, drugs that are normally associated with addiction, including amphetamines, cocaine, and heroin, do not immediately create addiction in their users. Even for a highly addictive drug like cocaine, only about 15% of users become addicted (Robinson & Berridge, 2003; Wagner & Anthony, 2002). Furthermore, the rate of addiction is lower for those who are taking drugs for medical reasons than for those who are using drugs recreationally. Patients who have become physically dependent on morphine administered during the course of medical treatment for a painful injury or disease are able to be rapidly weaned off the drug afterward, without becoming addicts. Robins, Davis, and Goodwin (1974) found that the majority of soldiers who had become addicted to morphine while overseas were quickly able to stop using after returning home.

This does not mean that using recreational drugs is not dangerous. For people who do become addicted to drugs, the success rate of recovery is low. These drugs are generally illegal and carry with them potential criminal consequences if one is caught and arrested. Drugs that are smoked may produce throat and lung cancers and other problems. Snorting (“ sniffing‖) drugs can lead to a loss of the sense of smell, nosebleeds, difficulty in swallowing, hoarseness, and chronic runny nose. Injecting drugs intravenously carries with it the risk of contracting infections such as hepatitis and HIV. Furthermore, the quality and contents of illegal drugs are generally unknown, and the doses can vary substantially from purchase to purchase. The drugs may also contain toxic chemicals.

Another problem is the unintended consequences of combining drugs, which can produce serious side effects. Combining drugs is dangerous because their combined effects on the CNS can increase dramatically and can lead to accidental or even deliberate overdoses. For instance, ingesting alcohol or benzodiazepines along with the usual dose of heroin is a frequent cause of overdose deaths in opiate addicts, and combining

alcohol and cocaine can have a dangerous impact on the cardiovascular system (McCance-Katz, Kosten, & Jatlow, 1998).

Although all recreational drugs are dangerous, some can be more deadly than others. One way to determine how dangerous recreational drugs are is to calculate a safety ratio, based on the dose that is likely to be fatal divided by the normal dose needed to feel the effects of the drug. Drugs with lower ratios are more dangerous because the difference between the normal and the lethal dose is small. For instance, heroin has a safety ratio of 6 because the average fatal dose is only 6 times greater than the average effective dose. On the other hand, marijuana has a safety ratio of 1,000. This is not to say that smoking marijuana cannot be deadly, but it is much less likely to be deadly than is heroin. The safety ratios of common recreational drugs are shown in Table 5.2 "Popular Recreational Drugs and Their Safety Ratios".

A stimulant is a psychoactive drug that operates by blocking the reuptake of dopamine, norepinephrine, and serotonin in the synapses of the CNS. Because more of these neurotransmitters remain active in the brain, the result is an increase in the activity of the sympathetic division of the autonomic nervous system (ANS). Effects of stimulants include increased heart and breathing rates, pupil dilation, and increases in blood sugar accompanied by decreases in appetite. For these reasons, stimulants are frequently used to help people stay awake and to control weight.

Used in moderation, some stimulants may increase alertness, but used in an irresponsible fashion they can quickly create dependency. A major problem is the " crash‖ that results when the drug loses its effectiveness and the activity of the neurotransmitters returns to normal. The withdrawal from stimulants can create profound depression and lead to an intense desire to repeat the high.

Caffeine is a bitter psychoactive drug found in the beans, leaves, and fruits of plants, where it acts as a natural pesticide. It is found in a wide variety of products, including coffee, tea, soft drinks, candy, and desserts. In North America, more than 80% of adults consume caffeine daily (Lovett, 2005). Caffeine acts as a mood enhancer and provides energy. Although the U.S. Food and Drug Administration lists caffeine as a safe food substance, it has at least some characteristics of dependence. People who reduce their caffeine intake often report being irritable, restless, and drowsy, as well as experiencing strong headaches, and these withdrawal symptoms may last up to a week. Most experts feel that using small amounts of caffeine during pregnancy is safe, but larger amounts of caffeine can be harmful to the fetus (U.S. Food and Drug Administration, 2007).]

Nicotine is a psychoactive drug found in the nightshade family of plants, where it acts as a natural pesticide. Nicotine is the main cause for the dependence-forming properties of tobacco use, and tobacco use is a major health threat. Nicotine creates both psychological and physical addiction, and it is one of the hardest addictions to break. Nicotine content in cigarettes has slowly increased over the years, making quitting smoking more and more difficult. Nicotine is also found in smokeless (chewing) tobacco.

People who want to quit smoking sometimes use other drugs to help them. For instance, the prescription drug Chantix acts as an antagonist, binding to nicotine receptors in the synapse, which prevents users from receiving the normal stimulant effect when they smoke. At the same time, the drug also releases dopamine, the reward neurotransmitter. In this way Chantix dampens nicotine withdrawal symptoms and cravings. In many cases people are able to get past the physical dependence, allowing them to quit smoking at least temporarily. In the long run, however, the psychological enjoyment of smoking may lead to relapse.

Cocaine is an addictive drug obtained from the leaves of the coca plant. In the late 19th and early 20th centuries, it was a primary constituent in many popular tonics and elixirs and, although it was removed in 1905, was one of the original ingredients in Coca-Cola. Today cocaine is taken illegally as recreational drug.

Cocaine has a variety of adverse effects on the body. It constricts blood vessels, dilates pupils, and increases body temperature, heart rate, and blood pressure. It can cause headaches, abdominal pain, and nausea. Since cocaine also tends to decrease appetite, chronic users may also become malnourished. The intensity and duration of cocaine‘s effects, which include increased energy and reduced fatigue, depend on how the drug is taken. The faster the drug is absorbed into the bloodstream and delivered to the brain, the more intense the high. Injecting or smoking cocaine produces a faster, stronger high than snorting it. However, the faster the drug is absorbed, the faster the effects subside. The high from snorting cocaine may last 30 minutes, whereas the high from smoking crack‖ cocaine may last only 10 minutes. In order to sustain the high, the user must administer the drug again, which may lead to frequent use, often in higher doses, over a short period of time (National Institute on Drug Abuse, 2009). Cocaine has a safety ratio of 15, making it a very dangerous recreational drug.

Amphetamine is a stimulant that produces increased wakefulness and focus, along with decreased fatigue and appetite. Amphetamine is used in prescription medications to treat attention deficit disorder (ADD) and narcolepsy, and to control appetite. Some brand names of amphetamines are Adderall, Benzedrine, Dexedrine, and Vyvanse. But amphetamine (“ speed‖) is also used illegally as a recreational drug. The methylated version of amphetamine, methamphetamine (meth‖ or crank‖), is currently favored by users, partly because it is available in ampoules ready for use by injection (Csaky & Barnes, 1984). Meth is a highly dangerous drug with a safety ratio of only 10.

Amphetamines may produce a very high level of tolerance, leading users to increase their intake, often in jolts‖ taken every half hour or so. Although the level of physical dependency is small, amphetamines may produce very strong psychological dependence, effectively amounting to addiction. Continued use of stimulants may result in severe psychological depression. The effects of the stimulant methylene dioxymethamphetamine (MDMA), also known as cstasy,‖ provide a good example. MDMA is a very strong stimulant that very successfully prevents the reuptake of serotonin, dopamine, and norepinephrine. It is so effective that when used repeatedly it can seriously deplete the

amount of neurotransmitters available in the brain, producing a catastrophic mental and physical crash‖ resulting in serious, long-lasting depression. MDMA also affects the temperature-regulating mechanisms of the brain, so in high doses, and especially when combined with vigorous physical activity like dancing, it can cause the body to become so drastically overheated that users can literally burn up‖ and die from hyperthermia and dehydration. Slowing Down the Brain With Depressants: Alcohol, Barbiturates and Benzodiazepines, and Toxic Inhalants

In contrast to stimulants, which work to increase neural activity, a depressantacts to slow down consciousness. A depressant is a psychoactive drug that reduces the activity of the CNS. Depressants are widely used as prescription medicines to relieve pain, to lower heart rate and respiration, and as anticonvulsants. Depressants change consciousness by increasing the production of the neurotransmitter GABA and decreasing the production of the neurotransmitter acetylcholine, usually at the level of the thalamus and the reticular formation. The outcome of depressant use (similar to the effects of sleep) is a reduction in the transmission of impulses from the lower brain to the cortex (Csaky & Barnes, 1984). "

The most commonly used of the depressants is alcohol, a colorless liquid, produced by the fermentation of sugar or starch, that is the intoxicating agent in fermented drinks. Alcohol is the oldest and most widely used drug of abuse in the world. In low to moderate doses, alcohol first acts to remove social inhibitions by slowing activity in the sympathetic nervous system. In higher doses, alcohol acts on the cerebellum to interfere with coordination and balance, producing the staggering gait of drunkenness. At high blood levels, further CNS depression leads to dizziness, nausea, and eventually a loss of consciousness. High enough blood levels such as those produced by guzzling‖ large amounts of hard liquor at parties can be fatal. Alcohol is not a safe‖ drug by any means—its safety ratio is only 10.

Alcohol use is highly costly to societies because so many people abuse alcohol and because judgment after drinking can be substantially impaired. It is estimated that almost half of automobile fatalities are caused by alcohol use, and excessive alcohol consumption is involved in a majority of violent crimes, including rape and murder (Abbey, Ross, McDuffie, & McAuslan, 1996). Alcohol increases the likelihood that people will respond aggressively to provocations (Bushman, 1993, 1997; Graham, Osgood, Wells, & Stockwell, 2006). Even people who are not normally aggressive may react with aggression when they are intoxicated. Alcohol use also leads to rioting, unprotected sex, and other negative outcomes.

Alcohol increases aggression in part because it reduces the ability of the person who has consumed it to inhibit his or her aggression (Steele & Southwick, 1985). When people are intoxicated, they become more self-focused and less aware of the social situation. As a result, they become less likely to notice the social constraints that normally prevent them from engaging aggressively, and are less likely to use those social constraints to guide them. For instance, we might normally notice the

presence of a police officer or other people around us, which would remind us that being aggressive is not appropriate. But when we are drunk, we are less likely to be so aware. The narrowing of attention that occurs when we are intoxicated also prevents us from being cognizant of the negative outcomes of our aggression. When we are sober, we realize that being aggressive may produce retaliation, as well as cause a host of other problems, but we are less likely to realize these potential consequences when we have been drinking (Bushman & " Cooper, 1990). Alcohol also influences aggression through expectations. If we expect that alcohol will make us more aggressive, then we tend to become more aggressive when we drink.

Barbiturates are depressants that are commonly prescribed as sleeping pills and painkillers. Brand names include Luminal (Phenobarbital), Mebaraland, Nembutal, Seconal, and Sombulex. In small to moderate doses, barbiturates produce relaxation and sleepiness, but in higher doses symptoms may include sluggishness, difficulty in thinking, slowness of speech, drowsiness, faulty judgment, and eventually coma or even death (Medline Plus, 2008).

Related to barbiturates, benzodiazepines are a family of depressants used to treat anxiety, insomnia, seizures, and muscle spasms. In low doses, they produce mild sedation and relieve anxiety; in high doses, they induce sleep. In the United States, benzodiazepines are among the most widely prescribed medications that affect the CNS. Brand names include Centrax, Dalmane, Doral, Halcion, Librium, ProSom, Restoril, Xanax, and Valium.

Toxic inhalants are also frequently abused as depressants. These drugs are easily accessible as the vapors of glue, gasoline, propane, hair spray, and spray paint, and are inhaled to create a change in consciousness. Related drugs are the nitrites (amyl and butyl nitrite; poppers,‖ rush,‖ locker room‖) and anesthetics such as nitrous oxide (laughing gas) and ether. Inhalants are some of the most dangerous recreational drugs, with a safety index below 10, and their continued use may lead to permanent brain damage.

Opioids: Opium, Morphine, Heroin, and Codeine

Opium is the dried juice of the unripe seed capsule of the opium poppy. It may be the oldest drug on record, known to the Sumerians before 4000 BC.Morphine and heroin are stronger, more addictive drugs derived from opium, while codeine is a weaker analgesic and less addictive member of the opiate family. When morphine was first refined from opium in the early 19th century, it was touted as a cure for opium addiction, but it didn‘t take long to discover that it was actually more addicting than raw opium. When heroin was produced a few decades later, it was also initially thought to be a more potent, less addictive painkiller but was soon found to be much more addictive than morphine. Heroin is about twice as addictive as morphine, and creates severe tolerance, moderate physical dependence, and severe psychological dependence. The danger of heroin is demonstrated in the fact that it has the lowest safety ratio (6) of all the drugs listed in Table 5.1 "Psychoactive Drugs by Class".

The opioids activate the sympathetic division of the ANS, causing blood pressure and heart rate to increase, often to dangerous levels that can lead

to heart attack or stroke. At the same time the drugs also influence the parasympathetic division, leading to constipation and other negative side effects. Symptoms of opioid withdrawal include diarrhea, insomnia, restlessness, irritability, and vomiting, all accompanied by a strong craving for the drug. The powerful psychological dependence of the opioids and the severe effects of withdrawal make it very difficult for morphine and heroin abusers to quit using. In addition, because many users take these drugs intravenously and share contaminated needles, they run a very high risk of being infected with diseases. Opioid addicts suffer a high rate of infections such as HIV, pericarditis (an infection of the membrane around the heart), and hepatitis B, any of which can be fatal.

Hallucinogens: Cannabis, Mescaline, and LSD

The drugs that produce the most extreme alteration of consciousness are the hallucinogens,psychoactive drugs that alter sensation and perception and that may create hallucinations. The hallucinogens are frequently known as psychedelics.‖ Drugs in this class include lysergic acid diethylamide (LSD, or Acid‖), mescaline, and phencyclidine (PCP), as well as a number of natural plants including cannabis (marijuana), peyote, and psilocybin. The chemical compositions of the hallucinogens are similar to the neurotransmitters serotonin and epinephrine, and they act primarily as agonists by mimicking the action of serotonin at the synapses. The hallucinogens may produce striking changes in perception through one or more of the senses. The precise effects a user experiences are a function not only of the drug itself, but also of the user‘s preexisting mental state and expectations of the drug experience. In large part, the user tends to get out of the experience what he or she brings to it.The hallucinations that may be experienced when taking these drugs are strikingly different from everyday experience and frequently are more similar to dreams than to everyday consciousness.

Cannabis (marijuana) is the most widely used hallucinogen. Until it was banned in the United States under the Marijuana Tax Act of 1938, it was widely used for medical purposes. In recent years, cannabis has again been frequently prescribed for the treatment of pain and nausea, particularly in cancer sufferers, as well as for a wide variety of other physical and psychological disorders (Ben Amar, 2006). While medical marijuana is now legal in several American states, it is still banned under federal law, putting those states in conflict with the federal government. Marijuana also acts as a stimulant, producing giggling, laughing, and mild intoxication. It acts to enhance perception of sights, sounds, and smells, and may produce a sensation of time slowing down. It is much less likely to lead to antisocial acts than that other popular intoxicant, alcohol, and it is also the one psychedelic drug whose use has not declined in recent years (National Institute on Drug Abuse, 2009).

Although the hallucinogens are powerful drugs that produce striking mind-altering‖ effects, they do not produce physiological or psychological tolerance or dependence. While they are not addictive and pose little physical threat to the body, their use is not advisable in any situation in which the user needs to be alert and attentive, exercise focused awareness or good judgment, or demonstrate normal mental

functioning, such as driving a car, studying, or operating machinery. Why We Use Psychoactive Drugs "

Altering Consciousness without Drugs

Although the use of psychoactive drugs can easily and profoundly change our experience of consciousness, we can also—and often more safely—alter our consciousness without drugs. These altered states of consciousness are sometimes the result of simple and safe activities, such as sleeping, watching television, exercising, or working on a task that intrigues us. In this section we consider the changes in consciousness that occur through hypnosis, sensory deprivation, and meditation, as well as through other non-drug-induced mechanisms.

Changing Behavior through Suggestion: The Power of Hypnosis

Although subsequent research testing the effectiveness of Mesmer's techniques did not find any long-lasting improvements in his patients, the idea that people's experiences and behaviors could be changed through the power of suggestion has remained important in psychology. James Braid, a Scottish physician, coined the term hypnosis in 1843, basing it on the Greek word for sleep(Callahan, 1997).

Hypnosis is a trance-like state of consciousness, usually induced by a procedure known as hypnotic induction, which consists of heightened suggestibility, deep relaxation, and intense focus(Nash & Barnier, 2008). Hypnosis became famous in part through its use by Sigmund Freud in an attempt to make unconscious desires and emotions conscious and thus able to be considered and confronted (Baker & Nash, 2008).

Because hypnosis is based on the power of suggestion, and because some people are more suggestible than others, these people are more easily hypnotized. Hilgard (1965)] found that about 20% of the participants he tested were entirely unsusceptible to hypnosis, whereas about 15% were highly responsive to it. The best participants for hypnosis are people who are willing or eager to be hypnotized, who are able to focus their attention and block out peripheral awareness, who are open to new experiences, and who are capable of fantasy (Spiegel, Greenleaf, & Spiegel, 2005).

One common misconception about hypnosis is that the hypnotist is able to take control of hypnotized patients and thus can command them to engage in behaviors against their will. Although hypnotized people are suggestible (Jamieson & Hasegawa, 2007), they nevertheless retain awareness and control of their behavior and are able to refuse to comply with the hypnotist's suggestions if they so choose (Kirsch & Braffman, 2001). In fact, people who have not been hypnotized are often just as suggestible as those who have been (Orne & Evans, 1965).

Another common belief is that hypnotists can lead people to forget the things that happened to them while they were hypnotized. Hilgard and Cooper (1965) investigated this question and found that they could lead people who were very highly susceptible through hypnosis to show at least some signs of posthypnotic amnesia (e.g., forgetting where they had learned information that had been told to them while they were under hypnosis), but that this effect was not strong or common.

Some hypnotists have tried to use hypnosis to help people remember events, such as childhood experiences or details of crime scenes, that they have forgotten or repressed. The idea is that some memories have been stored but can no longer be retrieved, and that hypnosis can aid in the retrieval process. But research finds that this is not successful: People who are hypnotized and then asked to relive their childhood act like children, but they do not accurately recall the things that occurred to them in their own childhood (Silverman & Retzlaff, 1986). Furthermore, the suggestibility they did not have (Newman & Baumeister, 1996). Many states and jurisdictions have therefore banned the use of hypnosis in criminal trials because the evidence‖ recovered through hypnosis is likely to be fabricated and inaccurate.

Hypnosis is also frequently used to attempt to change unwanted behaviors, such as to reduce smoking, overeating, and alcohol abuse. The effectiveness of hypnosis in these areas is controversial, although at least some successes have been reported. Kirsch, Montgomery, and Sapirstein (1995) found that that adding hypnosis to other forms of therapies increased the effectiveness of the treatment, and Elkins and Perfect (2008) reported that hypnosis was useful in helping people stop smoking. Hypnosis is also effective in improving the experiences of patients who are experiencing anxiety disorders, such as PTSD (Cardena, 2000; Montgomery, David, Winkel, Silverstein, & Bovbjerg, 2002), and for reducing pain (Montgomery, DuHamel, & Redd, 2000; Paterson & Jensen, 2003).

Reducing Sensation to Alter Consciousness: Sensory Deprivation

Sensory deprivation is the intentional reduction of stimuli affecting one or more of the five senses, with the possibility of resulting changes in consciousness. Sensory deprivation is used for relaxation or meditation purposes, and in physical and mental health-care programs to produce enjoyable changes in consciousness. But when deprivation is prolonged, it is unpleasant and can be used as a means of torture.

Although the simplest forms of sensory deprivation require nothing more than a blindfold to block the person‘s sense of sight or earmuffs to block the sense of sound, more complex devices have also been devised to temporarily cut off the senses of smell, taste, touch, heat, and gravity. In 1954 John Lilly, a neurophysiologist at the National Institute of Mental Health, developed the sensory deprivation tank. The tank is filled with water that is the same temperature as the human body, and salts are added to the water so that the body floats, thus reducing the sense of gravity. The tank is dark and soundproof, and the person‘s sense of smell is blocked by the use of chemicals in the water, such as chlorine. “

Meditation

Meditation refers to techniques in which the individual focuses on something specific, such as an object, a word, or one’s breathing, with the goal of ignoring external distractions, focusing on one’s internal state, and achieving a state of relaxation and well-being. Followers of various Eastern religions (Hinduism, Buddhism, and Taoism) use meditation to achieve a higher spiritual state, and popular forms of

meditation in the West, such as yoga, Zen, and Transcendental Meditation, have originated from these practices. Many meditative techniques are very simple. You simply need to sit in a comfortable position with your eyes closed and practice deep breathing. You might want to try it out for yourself.

Here is a simple meditation exercise you can do in your own home.

Brain imaging studies have indicated that meditation is not only relaxing but can also induce an altered state of consciousness. Cahn and Polich (2006) found that experienced meditators in a meditative state had more prominent alpha and theta waves, and other studies have shown declines in heart rate, skin conductance, oxygen consumption, and carbon dioxide elimination during meditation (Dillbeck, Glenn, & Orme-Johnson, 1987; Fenwick, 1987). These studies suggest that the action of the sympathetic division of the autonomic nervous system (ANS) is suppressed during meditation, creating a more relaxed physiological state as the meditator moves into deeper states of relaxation and consciousness.

Research has found that regular meditation can mediate the effects of stress and depression, and promote well-being (Grossman, Niemann, Schmidt, & Walach, 2004; Reibel, Greeson, Brainard, & Rosenzweig, 2001; Salmon et al., 2004). Meditation has also been shown to assist in controlling blood pressure (Barnes, Treiber, & Davis, 2001; Walton et al., 2004). A study by Lyubimov (1992) showed that during meditation, a larger area of the brain was responsive to sensory stimuli, suggesting that there is greater coordination between the two brain hemispheres as a result of meditation. Lutz and others (2004) demonstrated that those who meditate regularly (as opposed to those who do not) tend to utilize a greater part of their brain and that their gamma waves are faster and more powerful. And a study of Tibetan Buddhist monks who meditate daily found that several areas of the brain can be permanently altered by the long-term practice of meditation (Lutz, Greischar, Rawlings, Ricard, & Davidson, 2004).

It is possible that the positive effects of meditation could also be found by using other methods of relaxation. Although advocates of meditation claim that meditation enables people to attain a higher and purer consciousness, perhaps any kind of activity that calms and relaxes the mind, such as working on crossword puzzles, watching television or movies, or engaging in other enjoyed behaviors, might be equally effective in creating positive outcomes. Regardless of the debate, the fact remains that meditation is, at the very least, a worthwhile relaxation strategy. Psychology in Everyday Life: The Need to Escape Everyday Consciousness We may use recreational drugs, drink alcohol, overeat, have sex, and gamble for fun, but in some cases these normally pleasurable behaviors are abused, leading to exceedingly negative consequences for us. We frequently refer to the abuse of any type of pleasurable behavior as an ―addiction,‖ just as we refer to drug or alcohol addiction.

REVIEW QUESTIONS

1. Describe how sleeping and dreaming revitalize us for action.
2. What are problems in sleeping? What should be the heavy costs of not sleeping?
3. What should be done for altering consciousness without drugs?
4. How to reduce sensation to alter consciousness?
5. Describe meditation and its benifits

FURTHER READINGS

1. A textbook of general psychology- Walter F. Daves
2. General Psychology- Abraham
3. Advanced general psychology-Russell W. Levanway
4. General Psychological Theory-Sigmund Freud
5. General Psychology-S K Mangal

IMPORTANT NOTES

UNIT-6 GROWING AND DEVELOPING

CONTENTS

INTRODUCTIONS

The goal of this Unit is to investigate the fundamental, complex, and essential process of human development. Development refers to the physiological, behavioral, cognitive, and social changes that occur throughout human life, which are guided by both genetic predispositions (nature) and by environmental influences (nurture). We will begin our study of development at the moment of conception, when the father‘s sperm unites with the mother‘s egg, and then consider prenatal development in the womb. Next we will focus on infancy, the developmental stage that begins at birth and continues to one year of age, and childhood, the period between infancy and the onset of puberty. Finally, we will consider the developmental changes that occur during adolescence—the years between the onset of puberty and the beginning of adulthood; the stages of adulthood itself, including emerging, early, middle, and older adulthood; and finally, the preparations for and eventual facing of death.

Each of the stages of development has its unique physical, cognitive, and emotional changes that define the stage and that make each stage unique, one from the other. The psychologist and psychoanalyst Erik Erikson (1963, p. 202)] proposed a model of life-span development that provides a useful guideline for thinking about the changes we experience throughout life. As you can see inTable 6.1 "Challenges of Development as Proposed by Erik Erikson", Erikson believed that each life stage has a

unique challenge that the person who reaches it must face. And according to Erikson, successful development involves dealing with and resolving the goals and demands of each of the life stages in a positive way.

Notes

As we progress through this Unit, we will see that Robert Klark Graham was in part right—nature does play a substantial role in development (it has been found, for instance, that identical twins, who share all of their genetic code, usually begin sitting up and walking on the exact same days). But nurture is also important—we begin to be influenced by our environments even while still in the womb, and these influences remain with us throughout our development. Furthermore, we will see that we play an active role in shaping our own lives. Our own behavior influences how and what we learn, how people respond to us, and how we develop as individuals. As you read the Unit, you will no doubt get a broader view of how we each pass through our own lives. You will see how we learn and adapt to life‘s changes, and this new knowledge may help you better understand and better guide your own personal life journey.

Conception and Prenatal Development

Conception occurs when an egg from the mother is fertilized by a sperm from the father. In humans, the conception process begins with ovulation, when an ovum, or egg (the largest cell in the human body), which has been stored in one of the mother’s two ovaries, matures and is released into the fallopian tube. Ovulation occurs about halfway through the woman‘s menstrual cycle and is aided by the release of a complex combination of hormones. In addition to helping the egg mature, the hormones also cause the lining of the uterus to grow thicker and more suitable for implantation of a fertilized egg.

If the woman has had sexual intercourse within 1 or 2 days of the egg‘s maturation, one of the up to 500 million sperm deposited by the man‘s ejaculation, which are traveling up the fallopian tube, may fertilize the egg. Although few of the sperm are able to make the long journey, some of the strongest swimmers succeed in meeting the egg. As the sperm reach the egg in the fallopian tube, they release enzymes that attack the outer jellylike protective coating of the egg, each trying to be the first to enter. As soon as one of the millions of sperm enters the egg‘s coating, the egg immediately responds by both blocking out all other challengers and at the same time pulling in the single successful sperm.

The Zygote

Within several hours, half of the 23 chromosomes from the egg and half of the 23 chromosomes from the sperm fuse together, creating a zygote—a fertilized ovum. The zygote continues to travel down the fallopian tube to the uterus. Although the uterus is only about 4 inches away in the woman‘s body, this is nevertheless a substantial journey for a microscopic organism, and fewer than half of zygotes survive beyond this earliest stage of life. If the zygote is still viable when it completes the journey, it will attach itself to the wall of the uterus, but if it is not, it will be flushed out in the woman‘s menstrual flow. During this time, the cells in the zygote continue to divide: The original two cells become four, those four become eight, and so on, until there are thousands (and

eventually trillions) of cells. Soon the cells begin to differentiate, each taking on a separate function. The earliest differentiation is between the cells on the inside of the zygote, which will begin to form the developing human being, and the cells on the outside, which will form the protective environment that will provide support for the new life throughout the pregnancy.

The Embryo

Once the zygote attaches to the wall of the uterus, it is known as the embryo. During the embryonic phase, which will last for the next 6 weeks, the major internal and external organs are formed, each beginning at the microscopic level, with only a few cells. The changes in the embryo‘s appearance will continue rapidly from this point until birth. While the inner layer of embryonic cells is busy forming the embryo itself, the outer layer is forming the surrounding protective environment that will help the embryo survive the pregnancy. This environment consists of three major structures: The amniotic sac is the fluid-filled reservoir in which the embryo (soon to be known as a fetus) will live until birth, and which acts as both a cushion against outside pressure and as a temperature regulator. Theplacenta is an organ that allows the exchange of nutrients between the embryo and the mother, while at the same time filtering out harmful material. The filtering occurs through a thin membrane that separates the mother‘s blood from the blood of the fetus, allowing them to share only the material that is able to pass through the filter. Finally, the umbilical cord links the embryo directly to the placenta and transfers all material to the fetus. Thus the placenta and the umbilical cord protect the fetus from many foreign agents in the mother‘s system that might otherwise pose a threat.

The Fetus

Beginning in the 9th week after conception, the embryo becomes a fetus. The defining characteristic of the fetal stage is growth. All the major aspects of the growing organism have been formed in the embryonic phase, and now the fetus has approximately six months to go from weighing less than an ounce to weighing an average of 6 to 8 pounds. That‘s quite a growth spurt.

The fetus begins to take on many of the characteristics of a human being, including moving (by the 3rd month the fetus is able to curl and open its fingers, form fists, and wiggle its toes), sleeping, as well as early forms of swallowing and breathing. The fetus begins to develop its senses, becoming able to distinguish tastes and respond to sounds. Research has found that the fetus even develops some initial preferences. A newborn prefers the mother‘s voice to that of a stranger, the languages heard in the womb over other languages and even the kinds of foods that the mother ate during the pregnancy (Mennella, Jagnow, & Beauchamp, 2001). By the end of the 3rd month of pregnancy, the sexual organs are visible.

How the Environment Can Affect the Vulnerable Fetus

Prenatal development is a complicated process and may not always go as planned. About 45% of pregnancies result in a miscarriage, often without the mother ever being aware it has occurred (Moore & Persaud, 1993).

Although the amniotic sac and the placenta are designed to protect the embryo, substances that can harm the fetus, known as teratogens, may nevertheless cause problems. Teratogens include general environmental factors, such as air pollution and radiation, but also the cigarettes, alcohol, and drugs that the mother may use. Teratogens do not always harm the fetus, but they are more likely to do so when they occur in larger amounts, for longer time periods, and during the more sensitive phases, as when the fetus is growing most rapidly. The most vulnerable period for many of the fetal organs is very early in the pregnancy—before the mother even knows she is pregnant.

Harmful substances that the mother ingests may harm the child. Cigarette smoking, for example, reduces the blood oxygen for both the mother and child and can cause a fetus to be born severely underweight. Another serious threat is fetal alcohol syndrome (FAS), a condition caused by maternal alcohol drinking that can lead to numerous detrimental developmental effects, including limb and facial abnormalities, genital anomalies, and mental retardation. One in about every 500 babies in the United States is born with fetal alcohol syndrome, and it is considered one of the leading causes of retardation in the world today (Niccols, 1994). Because there is no known safe level of alcohol consumption for a pregnant woman, the U.S. Centers for Disease Control and Prevention indicates that a pregnant woman should not drink alcohol‖ (Centers for Disease Control and Prevention, 2005). Therefore, the best approach for expectant mothers is to avoid alcohol completely. Maternal drug abuse is also of major concern and is considered one of the greatest risk factors facing unborn children. “

The environment in which the mother is living also has a major impact on infant development (Duncan & Brooks-Gunn, 2000; Haber & Toro, 2004). Children born into homelessness or poverty are more likely to have mothers who are malnourished, who suffer from domestic violence, stress, and other psychological problems, and who smoke or abuse drugs. And children born into poverty are also more likely to be exposed to teratogens. Poverty‘s impact may also amplify other issues, creating substantial problems for healthy child development (Evans & English, 2002; Gunnar & Quevedo, 2007).

Infancy and Childhood:

If all has gone well, a baby is born sometime around the 38th week of pregnancy. The fetus is responsible, at least in part, for its own birth because chemicals released by the developing fetal brain trigger the muscles in the mother‘s uterus to start the rhythmic contractions of childbirth. The contractions are initially spaced at about 15-minute intervals but come more rapidly with time. When the contractions reach an interval of 2 to 3 minutes, the mother is requested to assist in the labor and help push the baby out. The Newborn Arrives With Many Behaviors Intact

Newborns are already prepared to face the new world they are about to experience. As you can see in Table 6.2 "Survival Reflexes in Newborns", babies are equipped with a variety of reflexes, each providing an ability that will help them survive their first few months of

life as they continue to learn new routines to help them survive in and manipulate their environments.

In addition to reflexes, newborns have preferences—they like sweet tasting foods at first, while becoming more open to salty items by 4 months of age (Beauchamp, Cowart, Menellia, & Marsh, 1994; Blass & Smith, 1992). Newborns also prefer the smell of their mothers. An infant only 6 days old is significantly more likely to turn toward its own mother‘s breast pad than to the breast pad of another baby‘s mother (Porter, Makin, Davis, & Christensen, 1992), and a newborn also shows a preference for the face of its own mother (Bushnell, Sai, & Mullin, 1989).

Although infants are born ready to engage in some activities, they also contribute to their own development through their own behaviors. The child‘s knowledge and abilities increase as it babbles, talks, crawls, tastes, grasps, plays, and interacts with the objects in the environment (Gibson, Rosenzweig, & Porter, 1988; Gibson & Pick, 2000; Smith & Thelen, 2003). Parents may help in this process by providing a variety of activities and experiences for the child.

Cognitive Development During Childhood

Childhood is a time in which changes occur quickly. The child is growing physically, and cognitive abilities are also developing. During this time the child learns to actively manipulate and control the environment, and is first exposed to the requirements of society, particularly the need to control the bladder and bowels. According to Erik Erikson, the challenges that the child must attain in childhood relate to the development of initiative, competence, and independence. Children need to learn to explore the world, to become self-reliant, and to make their own way in the environment.

These skills do not come overnight. Neurological changes during childhood provide children the ability to do some things at certain ages, and yet make it impossible for them to do other things. This fact was made apparent through the groundbreaking work of the Swiss psychologist Jean Piaget. During the 1920s, Piaget was administering intelligence tests to children in an attempt to determine the kinds of logical thinking that children were capable of. In the process of testing the children, Piaget became intrigued, not so much by the answers that the children got right, but more by the answers they got wrong. Piaget believed that the incorrect answers that the children gave were not mere shots in the dark but rather represented specific ways of thinking unique to the children‘s developmental stage. Just as almost all babies learn to roll over before they learn to sit up by themselves, and learn to crawl before they learn to walk, Piaget believed that children gain their cognitive ability in a developmental order. These insights—that children at different ages think in fundamentally different ways—led to Piaget‘s stage model of cognitive development.

Piaget argued that children do not just passively learn but also actively try to make sense of their worlds. He argued that, as they learn and mature, children develop schemas—patterns of knowledge in long-term memory—that help them remember, organize, and respond to information. Furthermore, Piaget thought that when children experience

new things, they attempt to reconcile the new knowledge with existing schemas. Piaget believed that the children use two distinct methods in doing so, methods that he called assimilation and accommodation.

When children employ assimilation, they use already developed schemas to understand new information. If children have learned a schema for horses, then they may call the striped animal they see at the zoo a horse rather than a zebra. In this case, children fit the existing schema to the new information and label the new information with the existing knowledge. Accommodation, on the other hand, involves learning new information, and thus changing the schema. When a mother says, ― No, honey, that's a zebra, not a horse,‖ the child may adapt the schema to fit the new stimulus, learning that there are different types of four-legged animals, only one of which is a horse.

Abstract logic

The first developmental stage for Piaget was the sensorimotor stage, the cognitive stage that begins at birth and lasts until around the age of 2. It is defined by the direct physical interactions that babies have with the objects around them. During this stage, babies form their first schemas by using their primary senses—they stare at, listen to, reach for, hold, shake, and taste the things in their environments. "

During the sensorimotor stage, babies'use of their senses to perceive the world is so central to their understanding that whenever babies do not directly perceive objects, as far as they are concerned, the objects do not exist. Piaget found, for instance, that if he first interested babies in a toy and then covered the toy with a blanket, children who were younger than 6 months of age would act as if the toy had disappeared completely—they never tried to find it under the blanket but would nevertheless smile and reach for it when the blanket was removed. Piaget found that it was not until about 8 months that the children realized that the object was merely covered and not gone. Piaget used the term object permanence to refer to the child's ability to know that an object exists even when the object cannot be perceived. At about 2 years of age, and until about 7 years of age, children move into the preoperational stage. During this stage, children begin to use language and to think more abstractly about objects, but their understanding is more intuitive and without much ability to deduce or reason. The thinking is preoperational, meaning that the child lacks the ability to operate on or transform objects mentally. In one study that showed the extent of this inability, Judy DeLoache (1987) showed children a room within a small dollhouse. Inside the room, a small toy was visible behind a small couch. The researchers took the children to another lab room, which was an exact replica of the dollhouse room, but full-sized. When children who were 2.5 years old were asked to find the toy, they did not know where to look—they were simply unable to make the transition across the changes in room size. Three-year-old children, on the other hand, immediately looked for the toy behind the couch, demonstrating that they were improving their operational skills.

The inability of young children to view transitions also leads them to be egocentric—unable to readily see and understand other people's viewpoints. Developmental psychologists define the theory of mind as

the ability to take another person's viewpoint, and the ability to do so increases rapidly during the preoperational stage. In one demonstration of the development of theory of mind, a researcher shows a child a video of another child (let's call her Anna) putting a ball in a red box. Then Anna leaves the room, and the video shows that while she is gone, a researcher moves the ball from the red box into a blue box. As the video continues, Anna comes back into the room. The child is then asked to point to the box where Anna will probably look to find her ball. Children who are younger than 4 years of age typically are unable to understand that Anna does not know that the ball has been moved, and they predict that she will look for it in the blue box. After 4 years of age, however, children have developed a theory of mind—they realize that different people can have different viewpoints, and that (although she will be wrong) Anna will nevertheless think that the ball is still in the red box.

After about 7 years of age, the child moves into the concrete operational stage, which is marked by more frequent and more accurate use of transitions, operations, and abstract concepts, including those of time, space, and numbers. An important milestone during the concrete operational stage is the development of conservation—the understanding that changes in the form of an object do not necessarily mean changes in the quantity of the object. Children younger than 7 years generally think that a glass of milk that is tall holds more milk than a glass of milk that is shorter and wider, and they continue to believe this even when they see the same milk poured back and forth between the glasses. It appears that these children focus only on one dimension (in this case, the height of the glass) and ignore the other dimension (width). However, when children reach the concrete operational stage, their abilities to understand such transformations make them aware that, although the milk looks different in the different glasses, the amount must be the same. Children younger than about 7 years of age do not understand the principles of conservation. At about 11 years of age, children enter the formal operational stage, which is marked by the ability to think in abstract terms and to use scientific and philosophical lines of thought. Children in the formal operational stage are better able to systematically test alternative ideas to determine their influences on outcomes. For instance, rather than haphazardly changing different aspects of a situation that allows no clear conclusions to be drawn, they systematically make changes in one thing at a time and observe what difference that particular change makes. They learn to use deductive reasoning, such as ― if this, then that,‖ and they become capable of imagining situations that might be,‖ rather than just those that actually exist.

Piaget's theories have made a substantial and lasting contribution to developmental psychology. His contributions include the idea that children are not merely passive receptacles of information but rather actively engage in acquiring new knowledge and making sense of the world around them. This general idea has generated many other theories of cognitive development, each designed to help us better understand the development of the child's information-processing skills (Klahr & McWinney, 1998; Shrager & Siegler, 1998). Furthermore, the extensive research that Piaget's theory has stimulated has generally supported his

beliefs about the order in which cognition develops. Piaget‘s work has also been applied in many domains—for instance, many teachers make use of Piaget‘s stages to develop educational approaches aimed at the level children are developmentally prepared for (Driscoll, 1994; Levin, Siegler, & Druyan, 1990).

Over the years, Piagetian ideas have been refined. For instance, it is now believed that object permanence develops gradually, rather than more immediately, as a true stage model would predict, and that it can sometimes develop much earlier than Piaget expected. Renée Baillargeon and her colleagues (Baillargeon, 2004; Wang, Baillargeon, & Brueckner, 2004) placed babies in a habituation setup, having them watch as an object was placed behind a screen, entirely hidden from view. The researchers then arranged for the object to reappear from behind another screen in a different place. Babies who saw this pattern of events looked longer at the display than did babies who witnessed the same object physically being moved between the screens. These data suggest that the babies were aware that the object still existed even though it was hidden behind the screen, and thus that they were displaying object permanence as early as 3 months of age, rather than the 8 months that Piaget predicted. “Another factor that might have surprised Piaget is the extent to which a child‘s social surroundings influence learning. In some cases, children progress to new ways of thinking and retreat to old ones depending on the type of task they are performing, the circumstances they find themselves in, and the nature of the language used to instruct them (Courage & Howe, 2002). And children in different cultures show somewhat different patterns of cognitive development. Dasen (1972) found that children in non-Western cultures moved to the next developmental stage about a year later than did children from Western cultures, and that level of schooling also influenced cognitive development. In short, Piaget‘s theory probably understated the contribution of environmental factors to social development.

More recent theories (Cole, 1996; Rogoff, 1990; Tomasello, 1999), based in large part on the sociocultural theory of the Russian scholar Lev Vygotsky (1962, 1978), argue that cognitive development is not isolated entirely within the child but occurs at least in part through social interactions. These scholars argue that children‘s thinking develops through constant interactions with more competent others, including parents, peers, and teachers.

An extension of Vygotsky‘s sociocultural theory is the idea of community learning, in which children serve as both teachers and learners. This approach is frequently used in classrooms to improve learning as well as to increase responsibility and respect for others. When children work cooperatively together in groups to learn material, they can help and support each other‘s learning as well as learn about each other as individuals, thereby reducing prejudice (Aronson, Blaney, Stephan, Sikes, & Snapp, 1978; Brown, 1997). Social Development During Childhood

It is through the remarkable increases in cognitive ability that children learn to interact with and understand their environments. But these cognitive skills are only part of the changes that are occurring during

childhood. Equally crucial is the development of the child‘s social skills—the ability to understand, predict, and create bonds with the other people in their environments.

One of the important milestones in a child‘s social development is learning about his or her own self-existence. This self-awareness is known asconsciousness, and the content of consciousness is known as the self-concept. The self-concept is a knowledge representation or schema that contains knowledge about us, including our beliefs about our personality traits, physical characteristics, abilities, values, goals, and roles, as well as the knowledge that we exist as individuals (Kagan, 1991). Some animals, including chimpanzees, orangutans, and perhaps dolphins, have at least a primitive sense of self (Boysen & Himes, 1999). In one study (Gallup, 1970), researchers painted a red dot on the foreheads of anesthetized chimpanzees and then placed each animal in a cage with a mirror. When the chimps woke up and looked in the mirror, they touched the dot on their faces, not the dot on the faces in the mirror. These actions suggest that the chimps understood that they were looking at themselves and not at other animals, and thus we can assume that they are able to realize that they exist as individuals. On the other hand, most other animals, including, for instance dogs, cats, and monkeys, never realize that it is they themselves in the mirror.

Infants who have a similar red dot painted on their foreheads recognize themselves in a mirror in the same way that the chimps do, and they do this by about 18 months of age (Povinelli, Landau, & Perilloux, 1996). The child‘s knowledge about the self continues to develop as the child grows. By age 2, the infant becomes aware of his or her sex, as a boy or a girl. By age 4, self-descriptions are likely to be based on physical features, such as hair color and possessions, and by about age 6, the child is able to understand basic emotions and the concepts of traits, being able to make statements such as, I am a nice person‖ (Harter, 1998).

Soon after children enter grade school (at about age 5 or 6), they begin to make comparisons with other children, a process known as social comparison. For example, a child might describe himself as being faster than one boy but slower than another.

Successfully Relating to Others: Attachment

One of the most important behaviors a child must learn is how to be accepted by others—the development of close and meaningful social relationships. The emotional bonds that we develop with those with whom we feel closest, and particularly the bonds that an infant develops with the mother or primary caregiver, are referred to as attachment (Cassidy & Shaver, 1999).

As late as the 1930s, psychologists believed that children who were raised in institutions such as orphanages, and who received good physical care and proper nourishment, would develop normally, even if they had little interaction with their caretakers. But studies by the developmental psychologist John Bowlby (1953) and others showed that these children did not develop normally—they were usually sickly, emotionally slow, and generally unmotivated. These observations helped make it clear that normal infant development requires successful attachment with a caretaker.

In one classic study showing the importance of attachment, Wisconsin University psychologists Harry and Margaret Harlow investigated the responses of young monkeys, separated from their biological mothers, to two surrogate mothers introduced to their cages. One—the wire mother—consisted of a round wooden head, a mesh of cold metal wires, and a bottle of milk from which the baby monkey could drink. The second mother was a foam-rubber form wrapped in a heated terry-cloth blanket. The Harlows found that, although the infant monkeys went to the wire mother for food, they overwhelmingly preferred and spent significantly more time with the warm terry-cloth mother that provided no food but did provide comfort (Harlow, 1958).

a secure attachment style usually explores freely while the mother is present and engages with the stranger. The child may be upset when the mother departs but is also happy to see the mother return. A child with an ambivalent (sometimes called insecure-resistant) attachment style is wary about the situation in general, particularly the stranger, and stays close or even clings to the mother rather than exploring the toys. When the mother leaves, the child is extremely distressed and is ambivalent when she returns. The child may rush to the mother but then fail to cling to her when she picks up the child. A child with an avoidant (sometimes called insecure-avoidant) attachment style will avoid or ignore the mother, showing little emotion when the mother departs or returns. The child may run away from the mother when she approaches. The child will not explore very much, regardless of who is there, and the stranger will not be treated much differently from the mother.

Finally, a child with a disorganized attachment style seems to have no consistent way of coping with the stress of the strange situation—the child may cry during the separation but avoid the mother when she returns, or the child may approach the mother but then freeze or fall to the floor. Although some cultural differences in attachment styles have been found (Rothbaum, Weisz, Pott, Miyake, & Morelli, 2000), research has also found that the proportion of children who fall into each of the attachment categories is relatively constant across cultures (see Figure 6.8 "Proportion of Children With Different Attachment Styles"). Figure 6.8 Proportion of Children With Different Attachment Styles

The graph shows the approximate proportion of children who have each of the four attachment styles. These proportions are fairly constant across cultures.

You might wonder whether differences in attachment style are determined more by the child (nature) or more by the parents (nurture). Most developmental psychologists believe that socialization is primary, arguing that a child becomes securely attached when the mother is available and able to meet the needs of the child in a responsive and appropriate manner, but that the insecure styles occur when the mother is insensitive and responds inconsistently to the child‘s needs. In a direct test of this idea, Dutch researcher Dymphna van den Boom (1994) randomly assigned some babies‘ mothers to a training session in which they learned to better respond to their children‘s needs. The research found that these mothers‘ babies were more likely to show a secure

attachment style in comparison to the mothers in a control group that did not receive training.

But the attachment behavior of the child is also likely influenced, at least in part, by temperament, the innate personality characteristics of the infant. Some children are warm, friendly, and responsive, whereas others tend to be more irritable, less manageable, and difficult to console. These differences may also play a role in attachment (Gillath, Shaver, Baek, & Chun, 2008; Seifer, Schiller, Sameroff, Resnick, & Riordan, 1996). Taken together, it seems safe to say that attachment, like most other developmental processes, is affected by an interplay of genetic and socialization influences.

Adolescence: Developing Independence and Identity

Adolescence is defined as the years between the onset of puberty and the beginning of adulthood. In the past, when people were likely to marry in their early 20s or younger, this period might have lasted only 10 years or less—starting roughly between ages 12 and 13 and ending by age 20, at which time the child got a job or went to work on the family farm, married, and started his or her own family. Today, children mature more slowly, move away from home at later ages, and maintain ties with their parents longer. For instance, children may go away to college but still receive financial support from parents, and they may come home on weekends or even to live for extended time periods. Thus the period between puberty and adulthood may well last into the late 20s, merging into adulthood itself. In fact, it is appropriate now to consider the period of adolescence and that of emerging adulthood (the ages between 18 and the middle or late 20s) together.

During adolescence, the child continues to grow physically, cognitively, and emotionally, changing from a child into an adult. The body grows rapidly in size and the sexual and reproductive organs become fully functional. At the same time, as adolescents develop more advanced patterns of reasoning and a stronger sense of self, they seek to forge their own identities, developing important attachments with people other than their parents. Particularly in Western societies, where the need to forge a new independence is critical (Baumeister & Tice, 1986; Twenge, 2006), this period can be stressful for many children, as it involves new emotions, the need to develop new social relationships, and an increasing sense of responsibility and independence.

Although adolescence can be a time of stress for many teenagers, most of them weather the trials and tribulations successfully. For example, the majority of adolescents experiment with alcohol sometime before high school graduation. Although many will have been drunk at least once, relatively few teenagers will develop long-lasting drinking problems or permit alcohol to adversely affect their school or personal relationships. Similarly, a great many teenagers break the law during adolescence, but very few young people develop criminal careers (Farrington, 1995). These facts do not, however, mean that using drugs or alcohol is a good idea. The use of recreational drugs can have substantial negative consequences, and the likelihood of these problems (including dependence, addiction, and even brain damage) is significantly greater for young adults who begin using drugs at an early age.

Physical Changes in Adolescence

Adolescence begins with the onset of puberty, a developmental period in which hormonal changes cause rapid physical alterations in the body, culminating in sexual maturity. Although the timing varies to some degree across cultures, the average age range for reaching puberty is between 9 and 14 years for girls and between 10 and 17 years for boys (Marshall & Tanner, 1986).

Puberty begins when the pituitary gland begins to stimulate the production of the male sex hormone testosterone in boys and the female sex hormonesestrogen and progesterone in girls. The release of these sex hormones triggers the development of the primary sex characteristics, the sex organs concerned with reproduction (Figure 6.9 "Sex Characteristics"). These changes include the enlargement of the testicles and the penis in boys and the development of the ovaries, uterus, and vagina in girls. In addition, secondary sex characteristics (features that distinguish the two sexes from each other but are not involved in reproduction) are also developing, such as an enlarged Adam‘s apple, a deeper voice, and pubic and underarm hair in boys and enlargement of the breasts, hips, and the appearance of pubic and underarm hair in girls (Figure 6.9 "Sex Characteristics"). The enlargement of breasts is usually the first sign of puberty in girls and, on average, occurs between ages 10 and 12 (Marshall & Tanner, 1986). Boys typically begin to grow facial hair between ages 14 and 16, and both boys and girls experience a rapid growth spurt during this stage. The growth spurt for girls usually occurs earlier than that for boys, with some boys continuing to grow into their 20s.

A major milestone in puberty for girls is menarche, the first menstrual period, typically experienced at around 12 or 13 years of age (Anderson, Dannal, & Must, 2003).] The age of menarche varies substantially and is determined by genetics, as well as by diet and lifestyle, since a certain amount of body fat is needed to attain menarche. Girls who are very slim, who engage in strenuous athletic activities, or who are malnourished may begin to menstruate later. Even after menstruation begins, girls whose level of body fat drops below the critical level may stop having their periods. The sequence of events for puberty is more predictable than the age at which they occur. Some girls may begin to grow pubic hair at age 10 but not attain menarche until age 15. In boys, facial hair may not appear until 10 years after the initial onset of puberty.

The timing of puberty in both boys and girls can have significant psychological consequences. Boys who mature earlier attain some social advantages because they are taller and stronger and, therefore, often more popular (Lynne, Graber, Nichols, Brooks-Gunn, & Botvin, 2007). At the same time, however, early-maturing boys are at greater risk for delinquency and are more likely than their peers to engage in antisocial behaviors, including drug and alcohol use, truancy, and precocious sexual activity. Girls who mature early may find their maturity stressful, particularly if they experience teasing or sexual harassment (Mendle, Turkheimer, & Emery, 2007; Pescovitz & Walvoord, 2007). Early-maturing girls are also more likely to have emotional problems, a lower

self-image, and higher rates of depression, anxiety, and disordered eating than their peers (Ge, Conger, & Elder, 1996).

Cognitive Development in Adolescence

Although the most rapid cognitive changes occur during childhood, the brain continues to develop throughout adolescence, and even into the 20s (Weinberger, Elvevåg, & Giedd, 2005). During adolescence, the brain continues to form new neural connections, but also casts off unused neurons and connections (Blakemore, 2008). As teenagers mature, the prefrontal cortex, the area of the brain responsible for reasoning, planning, and problem solving, also continues to develop (Goldberg, 2001). And myelin, the fatty tissue that forms around axons and neurons and helps speed transmissions between different regions of the brain, also continues to grow (Rapoport et al., 1999). Adolescents often seem to act impulsively, rather than thoughtfully, and this may be in part because the development of the prefrontal cortex is, in general, slower than the development of the emotional parts of the brain, including the limbic system (Blakemore, 2008). Furthermore, the hormonal surge that is associated with puberty, which primarily influences emotional responses, may create strong emotions and lead to impulsive behavior. It has been hypothesized that adolescents may engage in risky behavior, such as smoking, drug use, dangerous driving, and unprotected sex in part because they have not yet fully acquired the mental ability to curb impulsive behavior or to make entirely rational judgments (Steinberg, 2007).

The new cognitive abilities that are attained during adolescence may also give rise to new feelings of egocentrism, in which adolescents believe that they can do anything and that they know better than anyone else, including their parents (Elkind, 1978, p. 199). Teenagers are likely to be highly self-conscious, often creating an imaginary audience in which they feel that everyone is constantly watching them (Goossens, Beyers, Emmen, & van Aken, 2002). Because teens think so much about themselves, they mistakenly believe that others must be thinking about them, too (Rycek, Stuhr, McDermott, Benker, & Swartz, 1998). It is no wonder that everything a teen‘s parents do suddenly feels embarrassing to them when they are in public. Social Development in Adolescence

Some of the most important changes that occur during adolescence involve the further development of the self-concept and the development of new attachments. Whereas young children are most strongly attached to their parents, the important attachments of adolescents move increasingly away from parents and increasingly toward peers (Harris, 1998). As a result, parents‘ influence diminishes at this stage.

According to Erikson (Table 6.1 "Challenges of Development as Proposed by Erik Erikson"), the main social task of the adolescent is the search for a unique identity—the ability to answer the question, Who am I?‖ In the search for identity, the adolescent may experience role confusion in which he or she is balancing or choosing among identities, taking on negative or undesirable identities, or temporarily giving up looking for an identity altogether if things are not going well.

One approach to assessing identity development was proposed by James Marcia (1980). In his approach, adolescents are asked questions

Notes

regarding their exploration of and commitment to issues related to occupation, politics, religion, and sexual behavior. The responses to the questions allow the researchers to classify the adolescent into one of four identity categories (seeTable 6.4 "James Marcia‘s Stages of Identity Development"). “

The individual has attained a coherent and committed identity based on personal decisions. Source: Adapted from Marcia, J. (1980). Identity in adolescence. Handbook of adolescent psychology, 5, 145–160. Studies assessing how teens pass through Marcia‘s stages show that, although most teens eventually succeed in developing a stable identity, the path to it is not always easy and there are many routes that can be taken. Some teens may simply adopt the beliefs of their parents or the first role that is offered to them, perhaps at the expense of searching for other, more promising possibilities (foreclosure status). Other teens may spend years trying on different possible identities (moratorium status) before finally choosing one.

To help them work through the process of developing an identity, teenagers may well try out different identities in different social situations. They may maintain one identity at home and a different type of persona when they are with their peers. Eventually, most teenagers do integrate the different possibilities into a single self-concept and a comfortable sense of identity (identity-achievement status).

For teenagers, the peer group provides valuable information about the self-concept. For instance, in response to the question What were you like as a teenager? (e.g., cool, nerdy, awkward?),‖ posed on the website Answerbag, one teenager replied in this way:

I’m still a teenager now, but from 8th–9th grade I didn’t really know what I wanted at all. I was smart, so I hung out with the nerdy kids. I still do; my friends mean the world to me. But in the “ middle of 8th I started hanging out with whom you may call the cool‖ kids…and I also hung out with some stoners, just for variety. I pierced various parts of my body and kept my grades up. Now, I’m just trying to find who I am. I’m even doing my sophomore year in China so I can get a better view of what I want. (Answerbag, 2007) Responses like this one demonstrate the extent to which adolescents are developing their self-concepts and self-identities and how they rely on peers to help them do that. The writer here is trying out several (perhaps conflicting) identities, and the identities any teen experiments with are defined by the group the person chooses to be a part of. The friendship groups (cliques, crowds, or gangs) that are such an important part of the adolescent experience allow the young adult to try out different identities, and these groups provide a sense of belonging and acceptance (Rubin, Bukowski, & Parker, 2006). A big part of what the adolescent is learning is social identity, the part of the self-concept that is derived from one’s group memberships. Adolescents define their social identities according to how they are similar to and differ from others, finding meaning in the sports, religious, school, gender, and ethnic categories they belong to.

Developing Moral Reasoning: Kohlberg’s Theory

The independence that comes with adolescence requires independent thinking as well as the development of morality—standards of behavior

that are generally agreed on within a culture to be right or proper. Just as Piaget believed that children‘s cognitive development follows specific patterns, Lawrence Kohlberg (1984) argued that children learn their moral values through active thinking and reasoning, and that moral development follows a series of stages. To study moral development, Kohlberg posed moral dilemmas to children, teenagers, and adults, such as the following:

A man’s wife is dying of cancer and there is only one drug that can save her. The only place to get the drug is at the store of a pharmacist who is known to overcharge people for drugs. The man can only pay $1,000, but the pharmacist wants $2,000, and refuses to sell it to him for less, “

or to let him pay later. Desperate, the man later breaks into the pharmacy and steals the medicine. Should he have done that? Was it right or wrong? Why? (Kohlberg, 1984) Video Clip: People Being Interviewed About Kohlberg’s Stages

As you can see in Table 6.5 "Lawrence Kohlberg‘s Stages of Moral Reasoning", Kohlberg concluded, on the basis of their responses to the moral questions, that, as children develop intellectually, they pass through three stages of moral thinking: the preconventional level, the conventional level, and the post conventional level. Until about the age of 9, children, focus on self-interest. At this stage, punishment is avoided and rewards are sought. A person at this level will argue, T he man shouldn‘t steal the drug, as he may get caught and go to jail.‖

Conventional morality

By early adolescence, the child begins to care about how situational outcomes impact others and wants to please and be accepted. At this developmental phase, people are able to value the good that can be derived from holding to social norms in the form of laws or less formalized rules. For example, a person at this level may say, He should not steal the drug, as everyone will see him as a thief, and his wife, who needs the drug, wouldn‘t want to be cured because of thievery,‖ or, No matter what, he should obey the law because stealing is a crime.‖

Many adults Postconventional morality

At this stage, individuals employ abstract reasoning to justify behaviors. Moral behavior is based on self-chosen ethical principles that are generally comprehensive and universal, such as justice, dignity, and equality. Someone with self-chosen principles may say, The man should steal the drug to cure his wife and then tell the authorities that he has done so. He may have to pay a penalty, but at least he has saved a human life.‖

Although research has supported Kohlberg‘s idea that moral reasoning changes from an early emphasis on punishment and social rules and regulations to an emphasis on more general ethical principles, as with Piaget‘s approach, Kohlberg‘s stage model is probably too simple. For one, children may use higher levels of reasoning for some types of problems, but revert to lower levels in situations where doing so is more consistent with their goals or beliefs (Rest, 1979). Second, it has been argued that the stage model is particularly appropriate for Western, rather than non-Western, samples in which allegiance to social norms (such as respect for authority) may be particularly important (Haidt, 2001). And

there is frequently little correlation between how children score on the moral stages and how they behave in real life.

Perhaps the most important critique of Kohlberg‘s theory is that it may describe the moral development of boys better than it describes that of girls. Carol Gilligan (1982) has argued that, because of differences in their socialization, males tend to value principles of justice and rights, whereas females value caring for and helping others. Although there is little evidence that boys and girls score differently on Kohlberg‘s stages of moral development (Turiel, 1998), it is true that girls and women tend to focus more on issues of caring, helping, and connecting with others than do boys and men (Jaffee & Hyde, 2000). If you don‘t believe this, ask yourself when you last got a thank-you note from a man.

Early and Middle Adulthood:

Until the 1970s, psychologists tended to treat adulthood as a single developmental stage, with few or no distinctions made among the various periods that we pass through between adolescence and death. Present-day psychologists realize, however, that physical, cognitive, and emotional responses continue to develop throughout life, with corresponding changes in our social needs and desires. Thus the three stages of early adulthood, middle adulthood, and late adulthood each has its own physical, cognitive, and social challenges.

In this section, we will consider the development of our cognitive and physical aspects that occur during early adulthood and middle adulthood—roughly the ages between 25 and 45 and between 45 and 65, respectively. These stages represent a long period of time—longer, in fact, than any of the other developmental stages—and the bulk of our lives is spent in them. These are also the periods in which most of us make our most substantial contributions to society, by meeting two of Erik Erikson‘s life challenges: We learn to give and receive love in a close, long-term relationship, and we develop an interest in guiding the development of the next generation, often by becoming parents.

Physical and Cognitive Changes in Early and Middle Adulthood

Compared with the other stages, the physical and cognitive changes that occur in the stages of early and middle adulthood are less dramatic. As individuals pass into their 30s and 40s, their recovery from muscular strain becomes more prolonged, and their sensory abilities may become somewhat diminished, at least when compared with their prime years, during the teens and early 20s (Panno, 2004). Visual acuity diminishes somewhat, and many people in their late 30s and early 40s begin to notice that their eyes are changing and they need eyeglasses. Adults in their 30s and 40s may also begin to suffer some hearing loss because of damage to the hair cells (cilia) in the inner ear (Lacher-Fougëre & Demany, 2005). And it is during middle adulthood that many people first begin to suffer from ailments such as high cholesterol and high blood pressure as well as low bone density (Shelton, 2006). Corresponding to changes in our physical abilities, our cognitive and sensory abilities also seem to show some, but not dramatic, decline during this stage. 1

Menopause

The stages of both early and middle adulthood bring about a gradual decline in fertility, particularly for women. Eventually, women experience menopause,the cessation of the menstrual cycle, which usually occurs at around age 50. Menopause occurs because of the gradual decrease in the production of the female sex hormones estrogen and progesterone, which slows the production and release of eggs into the uterus. Women whose menstrual cycles have stopped for 12 consecutive months are considered to have entered menopause (Minkin & Wright, 2004).

Researchers have found that women‘s responses to menopause are both social as well as physical, and that they vary substantially across both individuals and cultures. Within individuals, some women may react more negatively to menopause, worrying that they have lost their femininity and that their final chance to bear children is over, whereas other women may regard menopause more positively, focusing on the new freedom from menstrual discomfort and unwanted pregnancy. In Western cultures such as in the United States, women are likely to see menopause as a challenging and potentially negative event, whereas in India, where olderwomen enjoy more social privileges than do younger ones, menopause is more positively regarded (Avis & Crawford, 2008).

Menopause may have evolutionary benefits. Infants have better chances of survival when their mothers are younger and have more energy to care for them, and the presence of older women who do not have children of their own to care for (but who can help out with raising grandchildren) can be beneficial to the family group. Also consistent with the idea of an evolutionary benefit of menopause is that the decline in fertility occurs primarily for women, who do most of the child care and who need the energy of youth to accomplish it. If older women were able to have children they might not be as able to effectively care for them. Most men never completely lose their fertility, but they do experience a gradual decrease in testosterone levels, sperm count, and speed of erection and ejaculation.

Perhaps the major marker of adulthood is the ability to create an effective and independent life. Whereas children and adolescents are generally supported by parents, adults must make their own living and must start their own families. Furthermore, the needs of adults are different from those of younger persons.

Although the timing of the major life events that occur in early and middle adulthood vary substantially across individuals, they nevertheless tend to follow a general sequence, known as a social clock. The social clock refers tothe culturally preferred right time‖ for major life events, such as moving out of the childhood house, getting married, and having children. People who do not appear to be following the social clock (e.g., young adults who still live with their parents, individuals who never marry, and couples who choose not to have children) may be seen as unusual or deviant, and they may be stigmatized by others (DePaulo, 2006; Rook, Catalano, & Dooley, 1989). “

Although they are doing it later, on average, than they did even 20 or 30 years ago, most people do eventually marry. Marriage is beneficial to the

partners, both in terms of mental health and physical health. People who are married report greater life satisfaction than those who are not married and also suffer fewer health problems (Gallagher & Waite, 2001; Liu & Umberson, 2008).

Divorce is more common now than it was 50 years ago. In 2003 almost half of marriages in the United States ended in divorce (Bureau of the Census, 2007), although about three quarters of people who divorce will remarry. Most divorces occur for couples in their 20s, because younger people are frequently not mature enough to make good marriage choices or to make marriages last. Marriages are more successful for older adults and for those with more education (Goodwin, Mosher, & Chandra, 2010).

Parenthood also involves a major and long-lasting commitment, and one that can cause substantial stress on the parents. The time and finances invested in children create stress, which frequently results in decreased marital satisfaction (Twenge, Campbell, & Foster, 2003). This decline is especially true for women, who bear the larger part of the burden of raising the children and taking care of the house, despite the fact they increasingly also work and have careers.

Despite the challenges of early and middle adulthood, the majority of middle-aged adults are not unhappy. These years are often very satisfying, as families have been established, careers have been entered into, and some percentage of life goals has been realized (Eid & Larsen, 2008).

Late Adulthood: Aging, Retiring, and Bereavement

We have seen that, over the course of their lives, most individuals are able to develop secure attachments; reason cognitively, socially and morally; and create families and find appropriate careers. Eventually, however, as people enter into their 60s and beyond, the aging process leads to faster changes in our physical, cognitive, and social capabilities and needs, and life begins to come to its natural conclusion, resulting in the final life stage, beginning in the 60s, known as late adulthood.

Despite the fact that the body and mind are slowing, most older adults nevertheless maintain an active lifestyle, remain as happy or are happier than when they were younger, and increasingly value their social connections with family and friends (Angner, Ray, Saag, & Allison, 2009). Kennedy, Mather, and Carstensen (2004) found that people‘s memories of their lives became more positive with age, and Myers and Diener (1996) found that older adults tended to speak more positively about events in their lives, particularly their relationships with friends and family, than did younger adults.

Cognitive Changes During Aging

The changes associated with aging do not affect everyone in the same way, and they do not necessarily interfere with a healthy life. Former Beatles drummer Ringo Starr celebrated his 70th birthday in 2010 by playing at Radio City Music Hall, and Rolling Stones singer Mick Jagger (who once supposedly said, I‘d rather be dead than singing Satisfaction‘ at 45‖) continues to perform as he pushes 70. The golfer Tom Watson almost won the 2010 British Open golf tournament at the age of 59, playing against competitors in their 20s and 30s. And people such as the

financier Warren Buffet, U.S. Senator Frank Lautenberg, and actress Betty White, each in their 80s, all enjoy highly productive and energetic lives. “

Researchers are beginning to better understand the factors that allow some people to age better than others. For one, research has found that the people who are best able to adjust well to changing situations early in life are also able to better adjust later in life (Rubin, 2007; Sroufe, Collins, Egeland, & Carlson, 2009). Perceptions also matter. People who believe that the elderly are sick, vulnerable, and grumpy often act according to such beliefs (Nemmers, 2005),] and Levy, Slade, Kunkel, and Kasl (2002) found that the elderly who had more positive perceptions about aging also lived longer.

In one important study concerning the role of expectations on memory, Becca Levy and Ellen Langer (1994) found that, although young American and Chinese students performed equally well on cognitive tasks, older Americans performed significantly more poorly on those tasks than did their Chinese counterparts. Furthermore, this difference was explained by beliefs about aging—in both cultures, the older adults who believed that memory declined with age also showed more actual memory declines than did the older adults who believed that memory did not decline with age. In addition, more older Americans than older Chinese believed that memory declined with age, and as you can see in Figure 6.13, older Americans performed more poorly on the memory tasks.

Is Memory Influenced by Cultural Stereotypes? Levy and Langer (1994) found that although younger samples did not differ, older Americans performed significantly more poorly on memory tasks than did older Chinese, and that these differences were due to different expectations about memory in the two cultures. Source: Adapted from Levy, B., & Langer, E. (1994). Aging free from negative stereotypes. Whereas it was once believed that almost all older adults suffered from a generalized memory loss, research now indicates that healthy older adults actually experience only some particular types of memory deficits, while other types of memory remain relatively intact or may even improve with age. Older adults do seem to process information more slowly—it may take them longer to evaluate information and to understand language, and it takes them longer, on average, than it does younger people, to recall a word that they know, even though they are perfectly able to recognize the word once they see it (Burke, Shafto, Craik, & Salthouse, 2008). Older adults also have more difficulty inhibiting and controlling their attention (Persad, Abeles, Zacks, & Denburg, 2002), making them, for example, more likely to talk about topics that are not relevant to the topic at hand when conversing (Pushkar et al., 2000).

But slower processing and less accurate executive control does not always mean worse memory, or even worse intelligence. Perhaps the elderly are slower in part because they simply have more knowledge. Indeed, older adults have more crystallized intelligence—that is, general knowledge about the world, as reflected in semantic knowledge, vocabulary, and language. As a result, adults generally outperform younger people on measures of history, geography, and even on

crossword puzzles, where this information is useful (Salthouse, 2004). It is this superior knowledge combined with a slower and more complete processing style, along with a more sophisticated understanding of the workings of the world around them, that gives the elderly the advantage of wisdom‖ over the advantages of fluid intelligence—the ability to think and acquire information quickly and abstractly—which favor the young (Baltes, Staudinger, & Lindenberger, 1999; Scheibe, Kunzmann, & Baltes, 2009). " The differential changes in crystallized versus fluid intelligence help explain why the elderly do not necessarily show poorer performance on tasks that also require experience (i.e., crystallized intelligence), although they show poorer memory overall. A young chess player may think more quickly, for instance, but a more experienced chess player has more knowledge to draw on. Older adults are also more effective at understanding the nuances of social interactions than younger adults are, in part because they have more experience in relationships

Some older adults suffer from biologically based cognitive impairments in which the brain is so adversely affected by aging that it becomes very difficult for the person to continue to function effectively. Dementia is defined as a progressive neurological disease that includes loss of cognitive abilities significant enough to interfere with everyday behaviors, and Alzheimer's disease is a form of dementia that, over a period of years, leads to a loss of emotions, cognitions, and physical functioning, and which is ultimately fatal. Dementia and Alzheimer's disease are most likely to be observed in individuals who are 65 and older, and the likelihood of developing Alzheimer's doubles about every 5 years after age 65. After age 85, the risk reaches nearly 8% per year (Hebert et al., 1995). Dementia and Alzheimer's disease both produce a gradual decline in functioning of the brain cells that produce the neurotransmitter acetylcholine. Without this neurotransmitter, the neurons are unable to communicate, leaving the brain less and less functional. Dementia and Alzheimer's are in part heritable, but there is increasing evidence that the environment also plays a role. And current research is helping us understand the things that older adults can do to help them slow down or prevent the negative cognitive outcomes of aging, including dementia and Alzheimer's (Pushkar, Bukowski, Schwartzman, Stack, & White, 2007). Older adults who continue to keep their minds active by engaging in cognitive activities, such as reading, playing musical instruments, attending lectures, or doing crossword puzzles, who maintain social interactions with others, and who keep themselves physically fit have a greater chance of maintaining their mental acuity than those who do not (Cherkas et al., 2008; Verghese et al., 2003). In short, although physical illnesses may occur to anyone, the more people keep their brains active and the more they maintain a healthy and active lifestyle, the more healthy their brains will remain (Ertel, Glymour, & Berkman, 2008).

Social Changes During Aging: Retiring Effectively

Because of increased life expectancy in the 21st century, elderly people can expect to spend approximately a quarter of their lives in retirement. Leaving one's career is a major life change and can be a time when people experience anxiety, depression, and other negative changes in the

self-concept and in self-identity. On the other hand, retirement may also serve as an opportunity for a positive transition from work and career roles to stronger family and community member roles, and the latter may have a variety of positive outcomes for the individual. Retirement may be a relief for people who have worked in boring or physically demanding jobs, particularly if they have other outlets for stimulation and expressing self-identity.

Psychologist Mo Wang (2007) observed the well-being of 2,060 people between the ages of 51 and 61 over an 8-year period, and made the following recommendations to make the retirement phase a positive one: Continue to work part time past retirement, in order to ease into retirement status slowly.

Plan for retirement—this is a good idea financially, but also making plans to incorporate other kinds of work or hobbies into postemployment life makes sense.

Retire with someone—if the retiree is still married, it is a good idea to retire at the same time as a spouse, so that people can continue to work part time and follow a retirement plan together.

Have a happy marriage—people with marital problems tend to find retirement more stressful because they do not have a positive home life to return to and can no longer seek refuge in long working hours. Couples that work on their marriages can make their retirements a lot easier. Take care of physical and financial health—a sound financial plan and good physical health can ensure a healthy, peaceful retirement.

Retire early from a stressful job—people who stay in stressful jobs for fear that they will lose their pensions or won‘t be able to find work somewhere else feel trapped. Toxic environments can take a severe emotional toll on an employee. Leaving early from an unsatisfying job may make retirement a relief.

Retire on time‖—retiring too early or too late can cause people to feel out of sync‖ or to feel they have not achieved their goals. “ “

Whereas these seven tips are helpful for a smooth transition to retirement, Wang also notes that people tend to be adaptable, and that no matter how they do it, retirees will eventually adjust to their new lifestyles.

Death, Dying, and Bereavement

Living includes dealing with our own and our loved ones‘ mortality. In her book, On Death and Dying (1997), Elizabeth Kübler-Ross describes five phases of grief through which people pass in grappling with the knowledge that they or someone close to them is dying:

Denial: I feel fine.‖ This can‘t be happening; not to me.‖

Anger: Why me? It‘s not fair!‖ How can this happen to me?‖ Who is to blame?

Bargaining: Just let me live to see my children graduate. I‘d do anything for a few more years.‖ I‘d give my life savings if…

Depression: I‘m so sad, why bother with anything? I‘m going to die. What‘s the point?‖ I miss my loved ones—why go on?

Acceptance: I know my time has come; it‘s almost my time.

Despite Ross‘s popularity, there are a growing number of critics of her theory who argue that her five-stage sequence is too constraining

because attitudes toward death and dying have been found to vary greatly across cultures and religions, and these variations make the process of dying different according to culture (Bonanno, 2009). As an example, Japanese Americans restrain their grief (Corr, Nabe, & Corr, 2009) so as not to burden other people with their pain. By contrast, Jews observe a 7-day, publicly announced mourning period. In some cultures the elderly are more likely to be living and coping alone, or perhaps only with their spouse, whereas in other cultures, such as the Hispanic culture, the elderly are more likely to be living with their sons and daughters and other relatives, and this social support may create a better quality of life for them Margaret Stroebe and her colleagues (2008) found that although most people adjusted to the loss of a loved one without seeking professional treatment, many had an increased risk of mortality, particularly within the early weeks and months after the loss. These researchers also found that people going through the grieving process suffered more physical and psychological symptoms and illnesses and used more medical services.

The health of survivors during the end of life is influenced by factors such as circumstances surrounding the loved one‘s death, individual personalities, and ways of coping. People serving as caretakers to partners or other family members who are ill frequently experience a great deal of stress themselves, making the dying process even more stressful. Despite the trauma of the loss of a loved one, people do recover and are able to continue with effective lives. Grief intervention programs can go a long way in helping people cope during the bereavement period

REVIEW QUESTIONS

1. How the environment can affect the vulnerable fetus?
2. What are cognitive development during childhood?
3. Discuss the developing of independence and identity in adolescence.
4. What are cognitive development and physical changes in adolescence?
5. What are physical and cognitive changes in early and middle adulthood?
6. What are physical and cognitive changes in late adulthood.

FURTHER READINGS

1. A textbook of general psychology- Walter F. Daves
2. General Psychology- Abraham
3. Advanced general psychology-Russell W. Levanway
4. General Psychological Theory-Sigmund Freud
5. General Psychology-S K Mangal

UNIT-7 LEARNING

CONTENTS

INTRODUCTIONS

The topic of this Unit is learning—the relatively permanent change in knowledge or behavior that is the result of experience. Although you might think of learning in terms of what you need to do before an upcoming exam, the knowledge that you take away from your classes, or new skills that you acquire through practice, these changes represent only one component of learning. In fact, learning is a broad topic that is used to explain not only how we acquire new knowledge and behavior but also a wide variety of other psychological processes including the development of both appropriate and inappropriate social behaviors, and even how a person may acquire a debilitating psychological disorder such as PTSD.

Learning is perhaps the most important human capacity. Learning allows us to create effective lives by being able to respond to changes. We learn to avoid touching hot stoves, to find our way home from school, and to remember which people have helped us in the past and which people have been unkind. Without the ability to learn from our experiences, our lives would be remarkably dangerous and inefficient. The principles of learning can also be used to explain a wide variety of social interactions, including social dilemmas in which people make important, and often selfish, decisions about how to behave by calculating the costs and benefits of different outcomes.

The study of learning is closely associated with the behaviorist school of psychology, in which it was seen as an alternative scientific perspective to the failure of introspection. The behaviorists, including John B. Watson and B. F. Skinner, focused their research entirely on behavior, to the exclusion of any kinds of mental processes. For behaviorists, the fundamental aspect of learning is the process ofconditioning—the ability to connect stimuli (the changes that occur in the environment) with responses (behaviors or other actions).

But conditioning is just one type of learning. We will also consider other types, including learning through insight, as well as observational

learning (also known as modeling). In each case we will see not only what psychologists have learned about the topics but also the important influence that learning has on many aspects of our everyday lives. And we will see that in some cases learning can be maladaptive—for instance, when a person like P. K. Philips continually experiences disruptive memories and emotional responses to a negative event.

In the early part of the 20th century, Russian physiologist Ivan Pavlov (1849–1936) was studying the digestive system of dogs when he noticed an interesting behavioral phenomenon: The dogs began to salivate when the lab technicians who normally fed them entered the room, even though the dogs had not yet received any food. Pavlov realized that the dogs were salivating because they knew that they were about to be fed; the dogs had begun to associate the arrival of the technicians with the food that soon followed their appearance in the room.

With his team of researchers, Pavlov began studying this process in more detail. He conducted a series of experiments in which, over a number of trials, dogs were exposed to a sound immediately before receiving food. He systematically controlled the onset of the sound and the timing of the delivery of the food, and recorded the amount of the dogs‘ salivation. Initially the dogs salivated only when they saw or smelled the food, but after several pairings of the sound and the food, the dogs began to salivate as soon as they heard the sound. The animals had learned to associate the sound with the food that followed.

Pavlov had identified a fundamental associative learning process called classical conditioning. Classical conditioning refers to learning that occurs when a neutral stimulus (e.g., a tone) becomes associated with a stimulus (e.g., food) that naturally produces a behavior. After the association is learned, the previously neutral stimulus is sufficient to produce the behavior.

As you can see in Figure 7.3 "4-Panel Image of Whistle and Dog", psychologists use specific terms to identify the stimuli and the responses in classical conditioning. The unconditioned stimulus (US) is something (such as food) that triggers a natural occurring response, and the unconditioned response (UR) is the naturally occurring response (such as salivation) that follows the unconditioned stimulus. The conditioned stimulus (CS) is a neutral stimulus that, after being repeatedly presented prior to the unconditioned stimulus, evokes a similar response as the unconditioned stimulus. In Pavlov‘s experiment, the sound of the tone served as the conditioned stimulus that, after learning, produced the conditioned response (CR), which is the acquired response to the formerly neutral stimulus. Note that the UR and the CR are the same behavior—in this case salivation—but they are given different names because they are produced by different stimuli (the US and the CS, respectively).

Top left: Before conditioning, the unconditioned stimulus (US) naturally produces the unconditioned response (UR). Top right: Before conditioning, the neutral stimulus (the whistle) does not produce the salivation response. Bottom left: The unconditioned stimulus (US), in this case the food, is repeatedly presented immediately after the neutral stimulus. Bottom right: After learning, the neutral stimulus (now known

as the conditioned stimulus or CS), is sufficient to produce the conditioned responses (CR). Conditioning is evolutionarily beneficial because it allows organisms to develop expectations that help them prepare for both good and bad events. Imagine, for instance, that an animal first smells a new food, eats it, and then gets sick. If the animal can learn to associate the smell (CS) with the food (US), then it will quickly learn that the food creates the negative outcome, and not eat it the next time.

The Persistence and Extinction of Conditioning

After he had demonstrated that learning could occur through association, Pavlov moved on to study the variables that influenced the strength and the persistence of conditioning. In some studies, after the conditioning had taken place, Pavlov presented the sound repeatedly but without presenting the food afterward. Figure 7.4 "Acquisition, Extinction, and Spontaneous Recovery"shows what happened. As you can see, after the intial acquisition (learning) phase in which the conditioning occurred, when the CS was then presented alone, the behavior rapidly decreased—the dogs salivated less and less to the sound, and eventually the sound did not elicit salivation at all. Extinctionrefers to the reduction in responding that occurs when the conditioned stimulus is presented repeatedly without the unconditioned stimulus. Figure 7.4 Acquisition, Extinction, and Spontaneous Recovery Acquisition: The CS and the US are repeatedly paired together and behavior increases. Extinction: The CS is repeatedly presented alone, and the behavior slowly decreases. Spontaneous recovery: After a pause, when the CS is again presented alone, the behavior may again occur and then again show extinction.

Although at the end of the first extinction period the CS was no longer producing salivation, the effects of conditioning had not entirely disappeared. Pavlov found that, after a pause, sounding the tone again elicited salivation, although to a lesser extent than before extinction took place. The increase in responding to the CS following a pause after extinction is known as spontaneous recovery. When Pavlov again presented the CS alone, the behavior again showed extinction until it disappeared again.

Although the behavior has disappeared, extinction is never complete. If conditioning is again attempted, the animal will learn the new associations much faster than it did the first time.

Pavlov also experimented with presenting new stimuli that were similar, but not identical to, the original conditioned stimulus. For instance, if the dog had been conditioned to being scratched before the food arrived, the stimulus would be changed to being rubbed rather than scratched. He found that the dogs also salivated upon experiencing the similar stimulus, a process known as generalization. Generalization refers to the tendency to respond to stimuli that resemble the original conditioned stimulus. The ability to generalize has important evolutionary significance. If we eat some red berries and they make us sick, it would be a good idea to think twice before we eat some purple berries. Although the berries are not exactly the same, they nevertheless are similar and may have the same negative properties.

Lewicki (1985) conducted research that demonstrated the influence of stimulus generalization and how quickly and easily it can happen. In his experiment, high school students first had a brief interaction with a female experimenter who had short hair and glasses. The study was set up so that the students had to ask the experimenter a question, and (according to random assignment) the experimenter responded either in a negative way or a neutral way toward the students. Then the students were told to go into a second room in which two experimenters were present, and to approach either one of them. However, the researchers arranged it so that one of the two experimenters looked a lot like the original experimenter, while the other one did not (she had longer hair and no glasses). The students were significantly more likely to avoid the experimenter who looked like the earlier experimenter when that experimenter had been negative to them than when she had treated them more neutrally. The participants showed stimulus generalization such that the new, similar-looking experimenter created the same negative response in the participants as had the experimenter in the prior session.

The flip side of generalization is discrimination—the tendency to respond differently to stimuli that are similar but not identical. Pavlov‘s dogs quickly learned, for example, to salivate when they heard the specific tone that had preceded food, but not upon hearing similar tones that had never been associated with food. Discrimination is also useful—if we do try the purple berries, and if they do not make us sick, we will be able to make the distinction in the future. And we can learn that although the two people in our class, Courtney and Sarah, may look a lot alike, they are nevertheless different people with different personalities.

In some cases, an existing conditioned stimulus can serve as an unconditioned stimulus for a pairing with a new conditioned stimulus—a process known as second-order conditioning. In one of Pavlov‘s studies, for instance, he first conditioned the dogs to salivate to a sound, and then repeatedly paired a new CS, a black square, with the sound. Eventually he found that the dogs would salivate at the sight of the black square alone, even though it had never been directly associated with the food. Secondary conditioners in everyday life include our attractions to things that stand for or remind us of something else, such as when we feel good on a Friday because it has become associated with the paycheck that we receive on that day, which itself is a conditioned stimulus for the pleasures that the paycheck buys us.

The Role of Nature in Classical Conditioning

As we have seen in Unit 1 "Introducing Psychology", scientists associated with the behavioralist school argued that all learning is driven by experience, and that nature plays no role. Classical conditioning, which is based on learning through experience, represents an example of the importance of the environment. But classical conditioning cannot be understood entirely in terms of experience. Nature also plays a part, as our evolutionary history has made us better able to learn some associations than others. Clinical psychologists make use of classical conditioning to explain the learning of a phobia—a strong and irrational fear of a specific object, activity, or situation. For example, driving a car is a neutral event that would not normally elicit a fear response in most

people. But if a person were to experience a panic attack in which he suddenly experienced strong negative emotions while driving, he may learn to associate driving with the panic response. The driving has become the CS that now creates the fear response.

Psychologists have also discovered that people do not develop phobias to just anything. Although people may in some cases develop a driving phobia, they are more likely to develop phobias toward objects (such as snakes, spiders, heights, and open spaces) that have been dangerous to people in the past. In modern life, it is rare for humans to be bitten by spiders or snakes, to fall from trees or buildings, or to be attacked by a predator in an open area. Being injured while riding in a car or being cut by a knife are much more likely. But in our evolutionary past, the potential of being bitten by snakes or spiders, falling out of a tree, or being trapped in an open space were important evolutionary concerns, and therefore humans are still evolutionarily prepared to learn these associations over others (Öhman & Mineka, 2001; LoBue & DeLoache, 2010).

Another evolutionarily important type of conditioning is conditioning related to food. In his important research on food conditioning, John Garcia and his colleagues (Garcia, Kimeldorf, & Koelling, 1955; Garcia, Ervin, & Koelling, 1966) attempted to condition rats by presenting either a taste, a sight, or a sound as a neutral stimulus before the rats were given drugs (the US) that made them nauseous. Garcia discovered that taste conditioning was extremely powerful—the rat learned to avoid the taste associated with illness, even if the illness occurred several hours later. But conditioning the behavioral response of nausea to a sight or a sound was much more difficult. These results contradicted the idea that conditioning occurs entirely as a result of environmental events, such that it would occur equally for any kind of unconditioned stimulus that followed any kind of conditioned stimulus. Rather, Garcia‘s research showed that genetics matters—organisms are evolutionarily prepared to learn some associations more easily than others. You can see that the ability to associate smells with illness is an important survival mechanism, allowing the organism to quickly learn to avoid foods that are poisonous.

Classical conditioning has also been used to help explain the experience of posttraumatic stress disorder (PTSD), as in the case of P. K. Philips described in the Unit opener. PTSD is a severe anxiety disorder that can develop after exposure to a fearful event, such as the threat of death (American Psychiatric Association, 1994). PTSD occurs when the individual develops a strong association between the situational factors that surrounded the traumatic event (e.g., military uniforms or the sounds or smells of war) and the US (the fearful trauma itself). As a result of the conditioning, being exposed to, or even thinking about the situation in which the trauma occurred (the CS), becomes sufficient to produce the CR of severe .

PTSD develops because the emotions experienced during the event have produced neural activity in the amygdala and created strong conditioned learning. In addition to the strong conditioning that people with PTSD experience, they also show slower extinction in classical conditioning

tasks (Milad et al., 2009). In short, people with PTSD have developed very strong associations with the events surrounding the trauma and are also slow to show extinction to the conditioned stimulus.

As a result of this association, the previously neutral stimulus comes to elicit the same response (the conditioned response, or CR). Extinction occurs when the CS is repeatedly presented without the US, and the CR eventually disappears, although it may reappear later in a process known as spontaneous recovery. Stimulus generalization occurs when a stimulus that is similar to an already-conditioned stimulus begins to produce the same response as the original stimulus does. Stimulus discrimination occurs when the organism learns to differentiate between the CS and other similar stimuli. In second-order conditioning, a neutral stimulus becomes a CS after being paired with a previously established CS. Some stimuli—response pairs, such as those between smell and food—are more easily conditioned than others because they have been particularly important in our evolutionary past.

Changing Behavior through Reinforcement and Punishment: Operant Conditioning

In classical conditioning the organism learns to associate new stimuli with natural, biological responses such as salivation or fear. The organism does not learn something new but rather begins to perform in an existing behavior in the presence of a new signal. Operant conditioning, on the other hand, is learning that occurs based on the consequences of behavior and can involve the learning of new actions. Operant conditioning occurs when a dog rolls over on command because it has been praised for doing so in the past, when a schoolroom bully threatens his classmates because doing so allows him to get his way, and when a child gets good grades because her parents threaten to punish her if she doesn‘t. In operant conditioning the organism learns from the consequences of its own actions.

How Reinforcement and Punishment Influence Behavior: The Research of Thorndike and Skinner

Psychologist Edward L. Thorndike (1874–1949) was the first scientist to systematically study operant conditioning. In his research Thorndike (1898) observed cats who had been placed in a “puzzle box‖ from which they tried to escape (Note 7.21 "Video Clip: Thorndike‘s Puzzle Box"). At first the cats scratched, bit, and swatted haphazardly, without any idea of how to get out. But eventually, and accidentally, they pressed the lever that opened the door and exited to their prize, a scrap of fish. The next time the cat was constrained within the box it attempted fewer of the ineffective responses before carrying out the successful escape, and after several trials the cat learned to almost immediately make the correct response. Observing these changes in the cats‘ behavior led Thorndike to develop hislaw of effect, the principle that responses that create a typically pleasant outcome in a particular situation are more likely to occur again in a similar situation, whereas responses that produce a typically unpleasant outcome are less likely to occur again in the situation (Thorndike, 1911). The essence of the law of effect is that successful responses, because they are pleasurable, are stamped in‖ by

experience and thus occur more frequently. Unsuccessful responses, which produce unpleasant experiences, are stamped out‖ and subsequently occur less frequently. When Thorndike placed his cats in a puzzle box, he found that they learned to engage in the important escape behavior faster after each trial. Thorndike described the learning that follows reinforcement in terms of the law of effect.

The influential behavioral psychologist B. F. Skinner (1904–1990) expanded on Thorndike‘s ideas to develop a more complete set of principles to explain operant conditioning. Skinner created specially designed environments known as operant chambers (usually called Skinner boxes) to systemically study learning. A Skinner box (operant chamber) is a structure that is big enough to fit a rodent or bird and that contains a bar or key that the organism can press or peck to release food or water. It also contains a device to record the animal’s responses.

The most basic of Skinner‘s experiments was quite similar to Thorndike‘s research with cats. A rat placed in the chamber reacted as one might expect, scurrying about the box and sniffing and clawing at the floor and walls. Eventually the rat chanced upon a lever, which it pressed to release pellets of food. The next time around, the rat took a little less time to press the lever, and on successive trials, the time it took to press the lever became shorter and shorter. Soon the rat was pressing the lever as fast as it could eat the food that appeared. As predicted by the law of effect, the rat had learned to repeat the action that brought about the food and cease the actions that did not.

Skinner studied, in detail, how animals changed their behavior through reinforcement and punishment, and he developed terms that explained the processes of operant learning (Table 7.1 "How Positive and Negative Reinforcement and Punishment Influence Behavior"). Skinner used the termreinforcer to refer to any event that strengthens or increases the likelihood of a behavior and the term punisher to refer to any event that weakens or decreases the likelihood of a behavior. And he used the terms positive and negative to refer to whether a reinforcement was presented or removed, respectively. Thus positive reinforcement strengthens a response by presenting something pleasant after the response and negative reinforcement strengthens a response by reducing or removing something unpleasant. For example, giving a child praise for completing his homework represents positive reinforcement, whereas taking aspirin to reduced the pain of a headache represents negative reinforcement. In both cases, the reinforcement makes it more likely that behavior will occur again in the future.

Reinforcement, either positive or negative, works by increasing the likelihood of a behavior. Punishment, on the other hand, refers to any event that weakens or reduces the likelihood of a behavior. Positive punishment weakens a response by presenting something unpleasant after the response, whereasnegative punishment weakens a response by reducing or removing something pleasant. A child who is grounded after fighting with a sibling (positive punishment) or who loses out on the opportunity to go to recess after getting a poor grade (negative punishment) is less likely to repeat these behaviors.

Although the distinction between reinforcement (which increases behavior) and punishment (which decreases it) is usually clear, in some cases it is difficult to determine whether a reinforcer is positive or negative. On a hot day a cool breeze could be seen as a positive reinforcer (because it brings in cool air) or a negative reinforcer (because it removes hot air). In other cases, reinforcement can be both positive and negative. One may smoke a cigarette both because it brings pleasure (positive reinforcement) and because it eliminates the craving for nicotine (negative reinforcement).

It is also important to note that reinforcement and punishment are not simply opposites. The use of positive reinforcement in changing behavior is almost always more effective than using punishment. This is because positive reinforcement makes the person or animal feel better, helping create a positive relationship with the person providing the reinforcement. Types of positive reinforcement that are effective in everyday life include verbal praise or approval, the awarding of status or prestige, and direct financial payment. Punishment, on the other hand, is more likely to create only temporary changes in behavior because it is based on coercion and typically creates a negative and adversarial relationship with the person providing the reinforcement. When the person who provides the punishment leaves the situation, the unwanted behavior is likely to return.

Creating Complex Behaviors Through Operant Conditioning

Perhaps you remember watching a movie or being at a show in which an animal—maybe a dog, a horse, or a dolphin—did some pretty amazing things. The trainer gave a command and the dolphin swam to the bottom of the pool, picked up a ring on its nose, jumped out of the water through a hoop in the air, dived again to the bottom of the pool, picked up another ring, and then took both of the rings to the trainer at the edge of the pool. The animal was trained to do the trick, and the principles of operant conditioning were used to train it. But these complex behaviors are a far cry from the simple stimulus-response relationships that we have considered thus far. How can reinforcement be used to create complex behaviors such as these?

One way to expand the use of operant learning is to modify the schedule on which the reinforcement is applied. To this point we have only discussed a continuous reinforcement schedule, in which the desired response is reinforced every time it occurs; whenever the dog rolls over, for instance, it gets a biscuit. Continuous reinforcement results in relatively fast learning but also rapid extinction of the desired behavior once the reinforcer disappears. The problem is that because the organism is used to receiving the reinforcement after every behavior, the responder may give up quickly when it doesn‘t appear.

Most real-world reinforcers are not continuous; they occur on a partial (or intermittent) reinforcement schedule—a schedule in which the responses are sometimes reinforced, and sometimes not. In comparison to continuous reinforcement, partial reinforcement schedules lead to slower initial learning, but they also lead to greater resistance to extinction. Because the reinforcement does not appear after every

behavior, it takes longer for the learner to determine that the reward is no longer coming, and thus extinction is slower.

Partial reinforcement schedules are determined by whether the reinforcement is presented on the basis of the time that elapses between reinforcement (interval) or on the basis of the number of responses that the organism engages in (ratio), and by whether the reinforcement occurs on a regular (fixed) or unpredictable (variable) schedule. In a fixed-interval schedule, reinforcement occurs for the first response made after a specific amount of time has passed. For instance, on a one-minute fixed-interval schedule the animal receives a reinforcement every minute, assuming it engages in the behavior at least once during the minute. As you can see in Figure 7.7 "Examples of Response Patterns by Animals Trained Under Different Partial Reinforcement Schedules", animals under fixed-interval schedules tend to slow down their responding immediately after the reinforcement but then increase the behavior again as the time of the next reinforcement gets closer. (Most students study for exams the same way.) In a variable-interval schedule,the reinforcers appear on an interval schedule, but the timing is varied around the average interval, making the actual appearance of the reinforcer unpredictable. An example might be checking your e-mail: You are reinforced by receiving messages that come, on average, say every 30 minutes, but the reinforcement occurs only at random times. Interval reinforcement schedules tend to produce slow and steady rates of responding. Schedules based on the number of responses (ratio types) induce greater response rate than do schedules based on elapsed time (interval types). Also, unpredictable schedules (variable types) produce stronger responses than do predictable schedules (fixed types). In a fixed-ratio schedule, a behavior is reinforced after a specific number of responses. For instance, a rat‘s behavior may be reinforced after it has pressed a key 20 times, or a salesperson may receive a bonus after she has sold 10 products. As you can see in Figure 7.7 "Examples of Response Patterns by Animals Trained Under Different Partial Reinforcement Schedules", once the organism has learned to act in accordance with the fixed-reinforcement schedule, it will pause only briefly when reinforcement occurs before returning to a high level of responsiveness. A variable-ratio schedule provides reinforcers after a specific but average number of responses. Winning money from slot machines or on a lottery ticket are examples of reinforcement that occur on a variable-ratio schedule. For instance, a slot machine may be programmed to provide a win every 20 times the user pulls the handle, on average. As you can see in Figure 7.8 "Slot Machine", ratio schedules tend to produce high rates of responding because reinforcement increases as the number of responses increase. Complex behaviors are also created through shaping, the process of guiding an organism’s behavior to the desired outcome through the use of successive approximation to a final desired behavior. Skinner made extensive use of this procedure in his boxes. For instance, he could train a rat to press a bar two times to receive food, by first providing food when the animal moved near the bar. Then when that behavior had been learned he would begin to provide food only when the rat touched the bar. Further shaping limited

Notes

the reinforcement to only when the rat pressed the bar, to when it pressed the bar and touched it a second time, and finally, to only when it pressed the bar twice. Although it can take a long time, in this way operant conditioning can create chains of behaviors that are reinforced only when they are completed.

Reinforcing animals if they correctly discriminate between similar stimuli allows scientists to test the animals‘ ability to learn, and the discriminations that they can make are sometimes quite remarkable. Pigeons have been trained to distinguish between images of Charlie Brown and the other Peanuts characters (Cerella, 1980), and between different styles of music and art (Porter & Neuringer, 1984; Watanabe, Sakamoto & Wakita, 1995).

Behaviors can also be trained through the use of secondary reinforcers. Whereas a primary reinforcer includes stimuli that are naturally preferred or enjoyed by the organism, such as food, water, and relief from pain, a secondary reinforcer (sometimes called conditioned reinforcer) is a neutral event that has become associated with a primary reinforcer through classical conditioning. An example of a secondary reinforcer would be the whistle given by an animal trainer, which has been associated over time with the primary reinforcer, food. An example of an everyday secondary reinforcer is money. We enjoy having money, not so much for the stimulus itself, but rather for the primary reinforcers (the things that money can buy) with which it is associated.

One type of learning that is not determined only by conditioning occurs when we suddenly find the solution to a problem, as if the idea just popped into our head. This type of learning is known as insight, the sudden understanding of a solution to a problem. The German psychologist Wolfgang Köhler (1925) carefully observed what happened when he presented chimpanzees with a problem that was not easy for them to solve, such as placing food in an area that was too high in the cage to be reached. He found that the chimps first engaged in trial-and-error attempts at solving the problem, but when these failed they seemed to stop and contemplate for a while. Then, after this period of contemplation, they would suddenly seem to know how to solve the problem, for instance by using a stick to knock the food down or by standing on a chair to reach it. Köhler argued that it was this flash of insight, not the prior trial-and-error approaches, which were so important for conditioning theories, that allowed the animals to solve the problem.

Edward Tolman studied the behavior of three groups of rats that were learning to navigate through mazes. The first group always received a reward of food at the end of the maze. The second group never received any reward, and the third group received a reward, but only beginning on the 11th day of the experimental period. As you might expect when considering the principles of conditioning, the rats in the first group quickly learned to negotiate the maze, while the rats of the second group seemed to wander aimlessly through it. The rats in the third group, however, although they wandered aimlessly for the first 10 days, quickly learned to navigate to the end of the maze as soon as they received food on day 11. By the next day, the rats in the third group had caught up in their learning to the rats that had been rewarded from the beginning.

It was clear to Tolman that the rats that had been allowed to experience the maze, even without any reinforcement, had nevertheless learned something, and Tolman called this latent learning. Latent learning refers to learning that is not reinforced and not demonstrated until there is motivation to do so. Tolman argued that the rats had formed a " cognitive map‖ of the maze but did not demonstrate this knowledge until they received reinforcement.

Observational Learning: Learning by Watching

The idea of latent learning suggests that animals, and people, may learn simply by experiencing or watching. Observational learning (modeling) is learning by observing the behavior of others. To demonstrate the importance of observational learning in children, Bandura, Ross, and Ross (1963) showed children a live image of either a man or a woman interacting with a Bobo doll, a filmed version of the same events, or a cartoon version of the events. As you can see in Note 7.44 "Video Clip: Bandura Discussing Clips From His Modeling Studies" the Bobo doll is an inflatable balloon with a weight in the bottom that makes it bob back up when you knock it down. In all three conditions, the model violently punched the clown, kicked the doll, sat on it, and hit it with a hammer. Video Clip: Bandura Discussing Clips From His Modeling Studies Take a moment to see how Albert Bandura explains his research into the modeling of aggression in children.

The researchers first let the children view one of the three types of modeling, and then let them play in a room in which there were some really fun toys. To create some frustration in the children, Bandura let the children play with the fun toys for only a couple of minutes before taking them away. Then Bandura gave the children a chance to play with the Bobo doll.

If you guessed that most of the children imitated the model, you would be correct. Regardless of which type of modeling the children had seen, and regardless of the sex of the model or the child, the children who had seen the model behaved aggressively—just as the model had done. They also punched, kicked, sat on the doll, and hit it with the hammer. Bandura and his colleagues had demonstrated that these children had learned new behaviors, simply by observing and imitating others.

Observational learning is useful for animals and for people because it allows us to learn without having to actually engage in what might be a risky behavior. Monkeys that see other monkeys respond with fear to the sight of a snake learn to fear the snake themselves, even if they have been raised in a laboratory and have never actually seen a snake (Cook & Mineka, 1990). As Bandura put it, the prospects for [human] survival would be slim indeed if one could learn only by suffering the consequences of trial and error. For this reason, one does not teach children to swim, adolescents to drive automobiles, and novice medical students to perform surgery by having them discover the appropriate behavior through the consequences of their successes and failures. The more costly and hazardous the possible mistakes, the heavier is the reliance on observational learning from competent learners.

Although modeling is normally adaptive, it can be problematic for children who grow up in violent families. These children are not only the

victims of aggression, but they also see it happening to their parents and siblings. Because children learn how to be parents in large part by modeling the actions of their own parents, it is no surprise that there is a strong correlation between family violence in childhood and violence as an adult. Children who witness their parents being violent or who are themselves abused are more likely as adults to inflict abuse on intimate partners or their children, and to be victims of intimate violence (Heyman & Slep, 2002). In turn, their children are more likely to interact violently with each other and to aggress against their parents (Patterson, Dishion, & Bank, 1984).

Using the Principles of Learning to Understand Everyday Behavior

The principles of learning are some of the most general and most powerful in all of psychology. It would be fair to say that these principles account for more behavior using fewer principles than any other set of psychological theories. The principles of learning are applied in numerous ways in everyday settings. For example, operant conditioning has been used to motivate employees, to improve athletic performance, to increase the functioning of those suffering from developmental disabilities, and to help parents successfully toilet train their children (Simek & O'Brien, 1981; Pedalino & Gamboa, 1974; Azrin & Foxx, 1974; McGlynn, 1990). In this section we will consider how learning theories are used in advertising, in education, and in understanding competitive relationships between individuals and groups. Using Classical Conditioning in Advertising

Classical conditioning has long been, and continues to be, an effective tool in marketing and advertising (Hawkins, Best, & Coney, 1998). The general idea is to create an advertisement that has positive features such that the ad creates enjoyment in the person exposed to it. The enjoyable ad serves as the unconditioned stimulus (US), and the enjoyment is the unconditioned response (UR). Because the product being advertised is mentioned in the ad, it becomes associated with the US, and then becomes the conditioned stimulus (CS). In the end, if everything has gone well, seeing the product online or in the store will then create a positive response in the buyer, leading him or her to be more likely to purchase the product. Video Clip: Television Ads Can you determine how classical conditioning is being used in these commercials?

A similar strategy is used by corporations that sponsor teams or events. For instance, if people enjoy watching a college basketball team playing basketball, and if that team is sponsored by a product, such as Pepsi, then people may end up experiencing positive feelings when they view a can of Pepsi. Of course, the sponsor wants to sponsor only good teams and good athletes because these create more pleasurable responses.

Advertisers use a variety of techniques to create positive advertisements, including enjoyable music, cute babies, attractive models, and funny spokespeople. In one study, Gorn (1982) showed research participants pictures of different writing pens of different colors, but paired one of the pens with pleasant music and the other with unpleasant music. When given a choice as a free gift, more people chose the pen color associated with the pleasant music. And Schemer, Matthes, Wirth, and Textor

(2008) found that people were more interested in products that had been embedded in music videos of artists that they liked and less likely to be interested when the products were in videos featuring artists that they did not like.

Another type of ad that is based on principles of classical conditioning is one that associates fear with the use of a product or behavior, such as those that show pictures of deadly automobile accidents to encourage seatbelt use or images of lung cancer surgery to discourage smoking. These ads have also been found to be effective (Das, de Wit, & Stroebe, 2003; Perloff, 2003; Witte & Allen, 2000),] due in large part to conditioning. When we see a cigarette and the fear of dying has been associated with it, we are hopefully less likely to light up.

Taken together then, there is ample evidence of the utility of classical conditioning, using both positive as well as negative stimuli, in advertising. This does not, however, mean that we are always influenced by these ads. The likelihood of conditioning being successful is greater for products that we do not know much about, where the differences between products are relatively minor, and when we do not think too carefully about the choices (Schemer et al., 2008).

Reinforcement in Social Dilemmas

The basic principles of reinforcement, reward, and punishment have been used to help understand a variety of human behaviors (Rotter, 1945; Bandura, 1977; Miller & Dollard, 1941). The general idea is that, as predicted by principles of operant learning and the law of effect, people act in ways that maximize theiroutcomes, where outcomes are defined as the presence of reinforcers and the absence of punishers.

Consider, for example, a situation known as the commons dilemma, as proposed by the ecologist Garrett Hardin (1968). Hardin noted that in many European towns there was at one time a centrally located pasture, known as the commons, which was shared by the inhabitants of the village to graze their livestock. But the commons was not always used wisely. The problem was that each individual who owned livestock wanted to be able to use the commons to graze his or her own animals. However, when each group member took advantage of the commons by grazing many animals, the commons became overgrazed, the pasture died, and the commons was destroyed.

Although Hardin focused on the particular example of the commons, the basic dilemma of individual desires versus the benefit of the group as whole can also be found in many contemporary public goods issues, including the use of limited natural resources, air pollution, and public land. In large cities most people may prefer the convenience of driving their own car to work each day rather than taking public transportation. Yet this behavior uses up public goods (the space on limited roadways, crude oil reserves, and clean air). People are lured into the dilemma by short-term rewards, seemingly without considering the potential long-term costs of the behavior, such as air pollution and the necessity of building even more highways.

A social dilemma such as the commons dilemma is a situation in which the behavior that creates the most positive outcomes for the individual may in the long term lead to negative consequences for the group as a

Notes

whole. The dilemmas are arranged in a way that it is easy to be selfish, because the personally beneficial choice (such as using water during a water shortage or driving to work alone in one‘s own car) produces reinforcements for the individual. Furthermore, social dilemmas tend to work on a type of time delay.‖ The problem is that, because the long-term negative outcome (the extinction of fish species or dramatic changes in the earth‘s climate) is far away in the future and the individual benefits are occurring right now, it is difficult for an individual to see how many costs there really are. The paradox, of course, is that if everyone takes the personally selfish choice in an attempt to maximize his or her own outcomes, the long-term result is poorer outcomes for every individual in the group. Each individual prefers to make use of the public goods for himself or herself, whereas the best outcome for the group as a whole is to use the resources more slowly and wisely.

One method of understanding how individuals and groups behave in social dilemmas is to create such situations in the laboratory and observe how people react to them. The best known of these laboratory simulations is called the prisoner‘s dilemma game (Poundstone, 1992). This game represents a social dilemma in which the goals of the individual compete with the goals of another individual (or sometimes with a group of other individuals). Like all social dilemmas, the prisoner‘s dilemma assumes that individuals will generally try to maximize their own outcomes in their interactions with others.

In the prisoner‘s dilemma game, the participants are shown a payoff matrix in which numbers are used to express the potential outcomes for each of the players in the game, given the decisions each player makes. The payoffs are chosen beforehand by the experimenter to create a situation that models some real-world outcome. Furthermore, in the prisoner‘s dilemma game, the payoffs are normally arranged as they would be in a typical social dilemma, such that each individual is " better off acting in his or her immediate self-interest, and yet if all individuals act according to their self-interests, then everyone will be worse off.

In its original form, the prisoner‘s dilemma game involves a situation in which two prisoners (we‘ll call them Frank and Malik) have been accused of committing a crime. The police believe that the two worked together on the crime, but they have only been able to gather enough evidence to convict each of them of a more minor offense. In an attempt to gain more evidence, and thus to be able to convict the prisoners of the larger crime, each of the prisoners is interrogated individually, with the hope that he will confess to having been involved in the more major crime, in return for a promise of a reduced sentence if he confesses first. Each prisoner can make either the cooperative choice(which is to not confess) or the competitive choice (which is to confess).

The incentives for either confessing or not confessing are expressed in a payoff matrix such as the one shown in Figure 7.11 "The Prisoner‘s Dilemma". The top of the matrix represents the two choices that Malik might make (to either confess that he did the crime or not confess), and the side of the matrix represents the two choices that Frank might make (also to either confess or not confess). The payoffs that each prisoner

receives, given the choices of each of the two prisoners, are shown in each of the four squares.

In the prisoner's dilemma game, two suspected criminals are interrogated separately. The matrix indicates the outcomes for each prisoner, measured as the number of years each is sentenced to prison, as a result of each combination of cooperative (don't confess) and competitive (confess) decisions. Outcomes for Malik are in black and outcomes for Frank are in grey.

If both prisoners take the cooperative choice by not confessing (the situation represented in the upper left square of the matrix), there will be a trial, the limited available information will be used to convict each prisoner, and they each will be sentenced to a relatively short prison term of three years. However, if either of the prisoners confesses, turning state's evidence‖ against the other prisoner, then there will be enough information to convict the other prisoner of the larger crime, and that prisoner will receive a sentence of 30 years, whereas the prisoner who confesses will get off free. These outcomes are represented in the lower left and upper right squares of the matrix. Finally, it is possible that both players confess at the same time. In this case there is no need for a trial, and in return the prosecutors offer a somewhat reduced sentence (of 10 years) to each of the prisoners.

The prisoner's dilemma has two interesting characteristics that make it a useful model of a social dilemma. For one, the prisoner's dilemma is arranged such that a positive outcome for one player does not necessarily mean a negative outcome for the other player. If you consider again the matrix in Figure 7.11 "The Prisoner's Dilemma", you can see that if one player takes the cooperative choice (to not confess) and the other takes the competitive choice (to confess), then the prisoner who cooperates loses, whereas the other prisoner wins. However, if both prisoners make the cooperative choice, each remaining quiet, then neither gains more than the other, and both prisoners receive a relatively light sentence. In this sense both players can win at the same time.

Second, the prisoner's dilemma matrix is arranged such that each individual player is motivated to take the competitive choice, because this choice leads to a higher payoff regardless of what the other player does. Imagine for a moment that you are Malik, and you are trying to decide whether to cooperate (don't confess) or to compete (confess). And imagine that you are not really sure what Frank is going to do. Remember the goal of the individual is to maximize outcomes. The values in the matrix make it clear that if you think that Frank is going to confess, you should confess yourself (to get 10 rather than 30 years in prison). And, it is also clear that if you think Frank is not going to confess, you should still confess (to get 0 rather than 3 years in prison). So the matrix is arranged such that the best‖ alternative for each player, at least in the sense of pure reward and self-interest, is to make the competitive choice, even though in the end both players would prefer the combination in which both players cooperate to the one in which they both compete.

Although initially specified in terms of the two prisoners, similar payoff matrices can be used to predict behavior in many different types of

dilemmas involving two or more parties and including choices of helping and not helping, working and loafing, and paying and not paying debts. For instance, we can use the prisoner‘s dilemma to help us understand roommates living together in a house who might not want to contribute to the housework. Each of them would be better off if they relied on the other to clean the house. Yet if neither of them makes an effort to clean the house (the cooperative choice), the house becomes a mess and they will both be worse off. “

REVIEW QUESTIONS

1. Describe the persistence and extinction of conditioning.
2. What is the role of nature in classical conditioning?
3. Describe the changing behavior through reinforcement and punishment.
4. How reinforcement and punishment influence behavior?
5. Describe observational learning.
6. Describe reinforcement in social dilemmas.

FURTHER READINGS

1. A textbook of general psychology- Walter F. Daves
2. General Psychology- Abraham
3. Advanced general psychology-Russell W. Levanway
4. General Psychological Theory-Sigmund Freud
5. General Psychology-S K Mangal

IMPORTANT NOTES

UNIT-8 REMEMBERING AND JUDGING

CONTENTS

INTRODUCTION

The two subjects of this Unit are memory, defined as the ability to store and retrieve information over time, and cognition, defined as the processes of acquiring and using knowledge. It is useful to consider memory and cognition in the same Unit because they work together to help us interpret and understand our environments.

Memory and cognition represent the two major interests of cognitive psychologists. The cognitive approach became the most important school of psychology during the 1960s, and the field of psychology has remained in large part cognitive since that time. The cognitive school was influenced in large part by the development of the electronic computer, and although the differences between computers and the human mind are vast, cognitive psychologists have used the computer as a model for understanding the workings of the mind.

Differences between Brains and Computers

- In computers, information can be accessed only if one knows the exact location of the memory. In the brain, information can be accessed through spreading activation from closely related concepts. The brain operates primarily in parallel, meaning that it is multitasking on many different actions at

the same time. Although this is changing as new computers are developed, most computers are primarily serial—they finish one task before they start another.

- In computers, short-term (random-access) memory is a subset of long-term (read-only) memory. In the brain, the processes of short-term memory and long-term memory are distinct.
- In the brain, there is no difference between hardware (the mechanical aspects of the computer) and software (the programs that run on the hardware).
- In the brain, synapses, which operate using an electrochemical process, are much slower but also vastly more complex and useful than the transistors used by computers.
- Computers differentiate memory (e.g., the hard drive) from processing (the central processing unit), but in brains there is no such distinction. In the brain (but not in computers) existing memory is used to interpret and store incoming information, and retrieving information from memory changes the memory itself.
- The brain is self-organizing and self-repairing, but computers are not. If a person suffers a stroke, neural plasticity will help him or her recover. If we drop our laptop and it breaks, it cannot fix itself.
- The brain is significantly bigger than any current computer. The brain is estimated to have 25,000,000,000,000,000 (25 million billion) interactions among axons, dendrites, neurons, and neurotransmitters, and that doesn‘t include the approximately 1 trillion glial cells that may also be important for information processing and memory. Although cognitive psychology began in earnest at about the same time that the electronic computer was first being developed, and although cognitive psychologists have frequently used the computer as a model for understanding how the brain operates, research in cognitive neuroscience has revealed many important differences between brains and computers.

We will begin the Unit with the study of memory. Our memories allow us to do relatively simple things, such as remembering where we parked our car or the name of the current president of the United States, but also allow us to form complex memories, such as how to ride a bicycle or to write a computer program. Moreover, our memories define us as individuals—they are our experiences, our relationships, our successes, and our failures. Without our memories, we would not have a life.

At least for some things, our memory is very good (Bahrick, 2000). Once we learn a face, we can recognize that face many years later. We know the lyrics of many songs by heart, and we can give definitions for tens of thousands of words. Mitchell (2006)] contacted participants 17 years after they had been briefly exposed to some line drawings in a lab and found that they still could identify the images significantly better than participants who had never seen them.

In the last section of the Unit we will focus primarily on cognition, with a particular consideration for cases in which cognitive processes lead us to distort our judgments or misremember information. We will see that our prior knowledge can influence our memory. People who read the words dream,sheets, rest, snore, blanket, tired, and bed‖ and then are asked to remember the words often think that they saw the word sleep even though that word was not in the list (Roediger & McDermott, 1995). And we will see that in other cases we are influenced by the ease with which we can retrieve information from memory or by the information that we are exposed to after we first learn something.

Although much research in the area of memory and cognition is basic in orientation, the work also has profound influence on our everyday experiences. Our cognitive processes influence the accuracy and inaccuracy of our memories and our judgments, and they lead us to be vulnerable to the types of errors that eyewitnesses such as Jennifer Thompson may make. Understanding these potential errors is the first step in learning to avoid them.

As you can see in Table 8.1 "Memory Conceptualized in Terms of Types, Stages, and Processes", psychologists conceptualize memory in terms of types, in terms of stages, and in terms of processes. In this section we will consider the two types of memory, explicit memory and implicit memory, and then the three major memory stages: sensory, short-term, and long-term (Atkinson & Shiffrin, 1968). Then, in the next section, we will consider the nature of long-term memory, with a particular emphasis on the cognitive techniques we can use to improve our memories. Our discussion will focus on the three processes that are central to long-term memory: encoding, storage, and retrieval.

Explicit Memory

When we assess memory by asking a person to consciously remember things, we are measuring explicit memory. Explicit memory refers to knowledge or experiences that can be consciously remembered. As you can see in Figure 8.2 "Types of Memory", there are two types of explicit memory: episodic andsemantic. Episodic memory refers to the firsthand experiences that we have had (e.g., recollections of our high school graduation day or of the fantastic dinner we had in New York last year). Semantic memory refers to our knowledge of facts and concepts about the world (e.g., that the absolute value of −90 is greater than the absolute value of 9 and that one definition of the word affect‖ is ―the experience of feeling or emotion‖). Figure 8.2 Types of Memory

Explicit memory is assessed using measures in which the individual being tested must consciously attempt to remember the information. Arecall memory test is a measure of explicit memory that involves bringing from memory information that has previously been remembered. We rely on our recall memory when we take an essay test, because the test requires us to generate previously remembered information. A multiple-choice test is an example of a recognition memory test, a measure of explicit memory that involves determining whether information has been seen or learned before. " Your own experiences taking tests will probably lead you to agree with the

scientific research finding that recall is more difficult than recognition. Recall, such as required on essay tests, involves two steps: first generating an answer and then determining whether it seems to be the correct one. Recognition, as on multiple-choice test, only involves determining which item from a list seems most correct (Haist, Shimamura, & Squire, 1992). Although they involve different processes, recall and recognition memory measures tend to be correlated. Students who do better on a multiple-choice exam will also, by and large, do better on an essay exam (Bridgeman & Morgan, 1996).

A third way of measuring memory is known as relearning (Nelson, 1985). Measures of relearning (or savings) assess how much more quickly information is processed or learned when it is studied again after it has already been learned but then forgotten. If you have taken some French courses in the past, for instance, you might have forgotten most of the vocabulary you learned. But if you were to work on your French again, you'd learn the vocabulary much faster the second time around. Relearning can be a more sensitive measure of memory than either recall or recognition because it allows assessing memory in terms of how much‖ or how fast‖ rather than simply correct‖ versus incorrect‖ responses. Relearning also allows us to measure memory for procedures like driving a car or playing a piano piece, as well as memory for facts and figures.

Implicit Memory

While explicit memory consists of the things that we can consciously report that we know, implicit memory refers to knowledge that we cannot consciously access. However, implicit memory is nevertheless exceedingly important to us because it has a direct effect on our behavior. Implicit memory refers to the influence of experience on behavior, even if the individual is not aware of those influences. Procedural memory refers to our often unexplainable knowledge of how to do things. When we walk from one place to another, speak to another person in English, dial a cell phone, or play a video game, we are using procedural memory. Procedural memory allows us to perform complex tasks, even though we may not be able to explain to others how we do them. There is no way to tell someone how to ride a bicycle; a person has to learn by doing it. The idea of implicit memory helps explain how infants are able to learn. The ability to crawl, walk, and talk are procedures, and these skills are easily and efficiently developed while we are children despite the fact that as adults we have no conscious memory of having learned them. A second type of implicit memory is classical conditioning effects, in which we learn, often without effort or awareness, to associate neutral stimuli (such as a sound or a light) with another stimulus (such as food), which creates a naturally occurring response, such as enjoyment or salivation. The memory for the association is demonstrated when the conditioned stimulus (the sound) begins to create the same response as the unconditioned stimulus (the food) did before the learning.

The final type of implicit memory is known as priming, or changes in behavior as a result of experiences that have happened frequently or recently. Priming refers both to the activation of knowledge (e.g., we can

prime the concept of kindness‖ by presenting people with words related to kindness) and to the influence of that activation on behavior (people who are primed with the concept of kindness may act more kindly). One measure of the influence of priming on implicit memory is the word fragment test, in which a person is asked to fill in missing letters to make words. You can try this yourself: First, try to complete the following word fragments, but work on each one for only three or four seconds. Do any words pop into mind quickly?

Sensory, Short-Term, and Long-Term Memory

Another way of understanding memory is to think about it in terms of stages that describe the length of time that information remains available to us. According to this approach (see Figure 8.4 "Memory Duration"), information begins in sensory memory, moves to short-term memory, and eventually moves to long-term memory. But not all information makes it through all three stages; most of it is forgotten. Whether the information moves from shorter-duration memory into longer-duration memory or whether it is lost from memory entirely depends on how the information is attended to and processed. Figure 8.4 Memory Duration Memory can characterized in terms of stages—the length of time that information remains available to us.

Sensory memory refers to the brief storage of sensory information. Sensory memory is a memory buffer that lasts only very briefly and then, unless it is attended to and passed on for more processing, is forgotten. The purpose of sensory memory is to give the brain some time to process the incoming sensations, and to allow us to see the world as an unbroken stream of events rather than as individual pieces.

Visual sensory memory is known as iconic memory. Iconic memory was first studied by the psychologist George Sperling (1960). In his research, Sperling showed participants a display of letters in rows, similar to that shown in Figure 8.5 "Measuring Iconic Memory". However, the display lasted only about 50 milliseconds (1/20 of a second). Then, Sperling gave his participants a recall test in which they were asked to name all the letters that they could remember. On average, the participants could remember only about one-quarter of the letters that they had seen. Auditory sensory memory is known as echoic memory. In contrast to iconic memories, which decay very rapidly, echoic memories can last as long as 4 seconds (Cowan, Lichty, & Grove, 1990). This is convenient as it allows you—among other things—to remember the words that you said at the beginning of a long sentence when you get to the end of it, and to take notes on your psychology professor‘s most recent statement even after he or she has finished saying it.

In some people iconic memory seems to last longer, a phenomenon known as eidetic imagery (or photographic memory‖) in which people can report details of an image over long periods of time. These people, who often suffer from psychological disorders such as autism, claim that they can “ see‖ an image long after it has been presented, and can often report accurately on that image. There is also some evidence for eidetic memories in hearing; some people report that their echoic memories persist for unusually long periods of time. The composer Wolfgang Amadeus Mozart may have possessed eidetic memory for music,

because even when he was very young and had not yet had a great deal of musical training, he could listen to long compositions and then play them back almost perfectly (Solomon, 1995).

Most of the information that gets into sensory memory is forgotten, but information that we turn our attention to, with the goal of remembering it, may pass into short-term memory. Short-term memory (STM) is the place where small amounts of information can be temporarily kept for more than a few seconds but usually for less than one minute (Baddeley, Vallar, & Shallice, 1990). Information in short-term memory is not stored permanently but rather becomes available for us to process, and the processes that we use to make sense of, modify, interpret, and store information in STM are known as working memory. Although it is called memory,‖ working memory is not a store of memory like STM but rather a set of memory procedures or operations. Imagine, for instance, that you are asked to participate in a task such as this one, which is a measure of working memory (Unsworth & Engle,2007). Each of the following questions appears individually on a computer screen and then disappears after you answer the question:

Is 10 × 2 − 5 = 15? (Answer YES OR NO) Then remember S ‖
Is 12 ’ 6 − 2 = 1? (Answer YES OR NO) Then remember —R‖
Is 10 × 2 = 5? (Answer YES OR NO) Then remember P ‖
Is 8 ’ 2 − 1 = 1? (Answer YES OR NO) Then remember T‖
Is 6 × 2 − 1 = 8? (Answer YES OR NO) Then remember —U‖
Is 2 × 3 − 3 = 0? (Answer YES OR NO) Then remember —Q‖

To successfully accomplish the task, you have to answer each of the math problems correctly and at the same time remember the letter that follows the task. Then, after the six questions, you must list the letters that appeared in each of the trials in the correct order (in this case S, R, P, T, U, Q).

To accomplish this difficult task you need to use a variety of skills. You clearly need to use STM, as you must keep the letters in storage until you are asked to list them. But you also need a way to make the best use of your available attention and processing. For instance, you might decide to use a strategy of repeat the letters twice, then quickly solve the next problem, and then repeat the letters twice again including the new one.‖ Keeping this strategy (or others like it) going is the role of working memory‘s central executive—the part of working memory that directs attention and processing. The central executive will make use of whatever strategies seem to be best for the given task. For instance, the central executive will direct the rehearsal process, and at the same time direct the visual cortex to form an image of the list of letters in memory. You can see that although STM is involved, the processes that we use to operate on the material in memory are also critical.

Short-term memory is limited in both the length and the amount of information it can hold. Peterson and Peterson (1959) found that when

people were asked to remember a list of three-letter strings and then were immediately asked to perform a distracting task (counting backward by threes), the material was quickly forgotten (see Figure 8.6 "STM Decay"), such that by 18 seconds it was virtually gone. Figure 8.6 STM Decay Peterson and Peterson (1959) found that information that was not rehearsed decayed quickly from memory. Source: Adapted from Peterson, L., & Peterson, M. J. (1959). Short-term retention of individual verbal items. Journal of Experimental Psychology, 58(3), 193–198. One way to prevent the decay of information from short-term memory is to use working memory to rehearse it. Maintenance rehearsal is the process of repeating information mentally or out loud with the goal of keeping it in memory. We engage in maintenance rehearsal to keep a something that we want to remember (e.g., a person‘s name, e-mail address, or phone number) in mind long enough to write it down, use it, or potentially transfer it to long-term memory. If we continue to rehearse information it will stay in STM until we stop rehearsing it, but there is also a capacity limit to STM. Try reading each of the following rows of numbers, one row at a time, at a rate of about one number each second. Then when you have finished each row, close your eyes and write down as many of the numbers as you can remember.

019
3586
10295
861059
1029384
75674834
657874104
6550423897

If you are like the average person, you will have found that on this test of working memory, known as a digit span test, you did pretty well up to about the fourth line, and then you started having trouble. I bet you missed some of the numbers in the last three rows, and did pretty poorly on the last one.

The digit span of most adults is between five and nine digits, with an average of about seven. The cognitive psychologist George Miller (1956) referred to s even plus or minus two‖ pieces of information as the magic number‖ in short-term memory. But if we can only hold a maximum of about nine digits in short-term memory, then how can we remember larger amounts of information than this? For instance, how can we ever remember a 10-digit phone number long enough to dial it?

One way we are able to expand our ability to remember things in STM is by using a memory technique called chunking. Chunking is the process of organizing information into smaller groupings (chunks), thereby increasing the number of items that can be held in STM. For instance, try to remember this string of 12 letters:

XOFCBANNCVTM

You probably won‘t do that well because the number of letters is more than the magic number of seven.

Now try again with this one:

MTVCNNABCFOX

Would it help you if I pointed out that the material in this string could be chunked into four sets of three letters each? I think it would, because then rather than remembering 12 letters, you would only have to remember the names of four television stations. In this case, chunking changes the number of items you have to remember from 12 to only four. "

Experts rely on chunking to help them process complex information. Herbert Simon and William Chase (1973) showed chess masters and chess novices various positions of pieces on a chessboard for a few seconds each. The experts did a lot better than the novices in remembering the positions because they were able to see the big picture.‖ They didn't have to remember the position of each of the pieces individually, but chunked the pieces into several larger layouts. But when the researchers showed both groups random chess positions—positions that would be very unlikely to occur in real games—both groups did equally poorly, because in this situation the experts lost their ability to organize the layouts (see Figure 8.7 "Possible and Impossible Chess Positions"). The same occurs for basketball. Basketball players recall actual basketball positions much better than do nonplayers, but only when the positions make sense in terms of what is happening on the court, or what is likely to happen in the near future, and thus can be chunked into bigger units (Didierjean & Marmèche, 2005). Figure 8.7 Possible and Impossible Chess Positions Experience matters: Experienced chess players are able to recall the positions of the game on the right much better than are those who are chess novices. But the experts do no better than the novices in remembering the positions on the left, which cannot occur in a real game. "

If information makes it past short term-memory it may enter long-term memory (LTM), memory storage that can hold information for days, months, and years. The capacity of long-term memory is large, and there is no known limit to what we can remember (Wang, Liu, & Wang, 2003). Although we may forget at least some information after we learn it, other things will stay with us forever. In the next section we will discuss the principles of long-term memory.

Although it is useful to hold information in sensory and short-term memory, we also rely on our long-term memory (LTM). We want to remember the name of the new boy in the class, the name of the movie we saw last week, and the material for our upcoming psychology test. Psychological research has produced a great deal of knowledge about long-term memory, and this research can be useful as you try to learn and remember new material (see Table 8.2 "Helpful Memory Techniques Based on Psychological Research"). In this section we will consider this question in terms of the types of processing that we do on the information we want to remember. To be successful, the information that we want to remember must be encoded and stored, and then retrieved.

Encoding and Storage: How Our Perceptions Become Memories

Encoding is the process by which we place the things that we experience into memory. Unless information is encoded, it cannot be remembered. I'm sure you've been to a party where you've been introduced to

someone and then—maybe only seconds later—you realize that you do not remember the person‘s name. Of course it‘s not really surprising that you can‘t remember the name, because you probably were distracted and you never encoded the name to begin with.

Not everything we experience can or should be encoded. We tend to encode things that we need to remember and not bother to encode things that are irrelevant. Look at Figure 8.8 "Pennies in Different Styles", which shows different images of U.S. pennies. Can you tell which one is the real one? Nickerson and Adams (1979) found that very few of the U.S. participants they tested could identify the right one. We see pennies a lot, but we don‘t bother to encode their features.

Can you identify the ―real‖ penny? We tend to have poor memory for things that don’t matter, even if we see them frequently.

One way to improve our memory is to use better encoding strategies. Some ways of studying are more effective than others. Research has found that we are better able to remember information if we encode it in a meaningful way. When we engage in elaborative encoding we process new information in ways that make it more relevant or meaningful (Craik & Lockhart, 1972; Harris & Qualls, 2000).

Imagine that you are trying to remember the characteristics of the different schools of psychology we discussed in Unit 1 "Introducing Psychology". Rather than simply trying to remember the schools and their characteristics, you might try to relate the information to things you already know. For instance, you might try to remember the fundamentals of the cognitive school of psychology by linking the characteristics to the computer model.

The cognitive school focuses on how information is input, processed, and retrieved, and you might think about how computers do pretty much the same thing. You might also try to organize the information into meaningful units. For instance, you might link the cognitive school to structuralism because both were concerned with mental processes. You also might try to use visual cues to help you remember the information. You might look at the image of Freud and imagine what he looked like as a child. That image might help you remember that childhood experiences were an important part of Freudian theory. Each person has his or her unique way of elaborating on information; the important thing is to try to develop unique and meaningful associations among the materials. Research Focus: Elaboration and Memory In an important study showing the effectiveness of elaborative encoding, Rogers, Kuiper, and Kirker (1977) studied how people recalled information that they had learned under different processing conditions. All the participants were presented with the same list of 40 adjectives to learn, but through the use of random assignment, the participants were given one of four different sets of instructions about how to process the adjectives. Participants assigned to the structural task condition were asked to judge whether the word was printed in uppercase or lowercase letters. Participants in the phonemic task condition were asked whether or not the word rhymed with another given word. In the semantic task condition, the participants were asked if the word was a synonym of another word. And in the self-reference task condition, participants were asked to indicate whether or

not the given adjective was or was not true of themselves. After completing the specified task, each participant was asked to recall as many adjectives as he or she could remember. Rogers and his colleagues hypothesized that different types of processing would have different effects on memory. As you can see in Figure 8.9 "Self-Reference Effect Results", the students in the self-reference task condition recalled significantly more adjectives than did students in any other condition. This finding, known as the self-reference effect, is powerful evidence that the self-concept helps us organize and remember information. The next time you are studying for an exam, you might try relating the material to your own experiences. The self-reference effect suggests that doing so will help you better remember the information (Symons & Johnson, 1997).

Participants recalled the same words significantly better when they were processed in relation to the self than when they were processed in other ways. Source: Adapted from Rogers, T. B., Kuiper, N. A., & Kirker, W. S. (1977). Self-reference and the encoding of personal information. Journal of Personality & Social Psychology, 35(9), 677–688.

Using the Contributions of Hermann Ebbinghaus to Improve Your Memory

Hermann Ebbinghaus (1850–1909) was a pioneer of the study of memory. In this section we consider three of his most important findings, each of which can help you improve your memory. In his research, in which he was the only research participant, Ebbinghaus practiced memorizing lists of nonsense syllables, such as the following:

DIF, LAJ, LEQ, MUV, WYC, DAL, SEN, KEP, NUD

You can imagine that because the material that he was trying to learn was not at all meaningful, it was not easy to do. Ebbinghaus plotted how many of the syllables he could remember against the time that had elapsed since he had studied them. He discovered an important principle of memory: Memory decays rapidly at first, but the amount of decay levels off with time (Figure 8.10 "Ebbinghaus Forgetting Curve"). Although Ebbinghaus looked at forgetting after days had elapsed, the same effect occurs on longer and shorter time scales. Bahrick (1984)] found that students who took a Spanish language course forgot about one half of the vocabulary that they had learned within three years, but that after that time their memory remained pretty much constant. Forgetting also drops off quickly on a shorter time frame. This suggests that you should try to review the material that you have already studied right before you take an exam; that way, you will be more likely to remember the material during the exam. Figure 8.10 Ebbinghaus Forgetting Curve Hermann Ebbinghaus found that memory for information drops off rapidly at first but then levels off after time.

Ebbinghaus also discovered another important principle of learning, known as the spacing effect. The spacing effect refers to the fact that learning is better when the same amount of study is spread out over periods of time than it is when it occurs closer together or at the same time. This means that even if you have only a limited amount of time to study, you‘ll learn more if you study continually throughout the semester (a little bit every day is best) than if you wait to cram at the last minute

before your exam (Figure 8.11 "Effects of Massed Versus Distributed Practice on Learning"). Another good strategy is to study and then wait as long as you can before you forget the material. Then review the information and again wait as long as you can before you forget it. (This probably will be a longer period of time than the first time.) Repeat and repeat again. The spacing effect is usually considered in terms of the difference between distributed practice (practice that is spread out over time) and massed practice (practice that comes in one block), with the former approach producing better memory.

Figure 8.11 Effects of Massed Versus Distributed Practice on Learning The spacing effect refers to the fact that memory is better when it is distributed rather than massed. Leslie, Lee Ann, and Nora all studied for four hours total, but the students who spread out their learning into smaller study sessions did better on the exam.

Ebbinghaus also considered the role of overlearning—that is, continuing to practice and study even when we think that we have mastered the material. Ebbinghaus and other researchers have found that overlearning helps encoding (Driskell, Willis, & Copper, 1992). Students frequently think that they have already mastered the material but then discover when they get to the exam that they have not. The point is clear: Try to keep studying and reviewing, even if you think you already know all the material.

Retrieval

Even when information has been adequately encoded and stored, it does not do us any good if we cannot retrieve it. Retrieval refers to the process of reactivating information that has been stored in memory. You can get an idea of the difficulty posed by retrieval by simply reading each of the words (but not the categories) in the sidebar below to someone. Tell the person that after you have read all the words, you will ask her to recall the words. After you read the list to your friend, give her enough time to write down all the words that she can recall. Make sure that she cannot recall any more and then, for the words that were not listed, prompt your friend with some of the category names: Do you remember any words that were furniture? Do you remember any words that were tools?‖ I think you will find that the category names, which serve as retrieval cues, will help your friend remember information that she could not retrieve otherwise. Retrieval Demonstration Try this test of the ability to retrieve information with a classmate. The instructions are in the text.

We‘ve all experienced retrieval failure in the form of the frustrating tip-of-the-tongue phenomenon, in which we are certain that we know something that we are trying to recall but cannot quite come up with it. You can try this one on your friends as well. Read your friend the names of the 10 states listed in the sidebar below, and ask him to name the capital city of each state. Now, for the capital cities that your friend can‘t name, give him just the first letter of the capital city. You‘ll probably find that having the first letters of the cities helps with retrieval. The tip-of-the-tongue experience is a very good example of the inability to retrieve information that is actually stored in memory. States and Capital Cities Try this demonstration of the tip-of-the-tongue phenomenon with a classmate. Instructions are in the text.

We are more likely to be able to retrieve items from memory when conditions at retrieval are similar to the conditions under which we encoded them. Context-dependent learning refers to an increase in retrieval when the external situation in which information is learned matches the situation in which it is remembered. Godden and Baddeley (1975) conducted a study to test this idea using scuba divers. They asked the divers to learn a list of words either when they were on land or when they were underwater. Then they tested the divers on their memory, either in the same or the opposite situation. As you can see in Figure 8.12 "Results From Godden and Baddeley, 1975", the divers‘ memory was better when they were tested in the same context in which they had learned the words than when they were tested in the other context. Figure 8.12 Results From Godden and Baddeley, 1975 Godden and Baddeley (1975) tested the memory of scuba divers to learn and retrieve information in different contexts and found strong evidence for context-dependent learning. Source: Adapted from Godden, D. R., & Baddeley, A. D. (1975). Context-dependent memory in two natural environments: On land and underwater.British Journal of Psychology, 66(3), 325–331.

You can see that context-dependent learning might also be important in improving your memory. For instance, you might want to try to study for an exam in a situation that is similar to the one in which you are going to take the exam.

Whereas context-dependent learning refers to a match in the external situation between learning and remembering, state-dependent learning refers to superior retrieval of memories when the individual is in the same physiological or psychological state as during encoding. Research has found, for instance, that animals that learn a maze while under the influence of one drug tend to remember their learning better when they are tested under the influence of the same drug than when they are tested without the drug (Jackson, Koek, & Colpaert, 1992). And research with humans finds that bilinguals remember better when tested in the same language in which they learned the material (Marian & Kaushanskaya, 2007). Mood states may also produce state-dependent learning. People who learn information when they are in a bad (rather than a good) mood find it easier to recall these memories when they are tested while they are in a bad mood, and vice versa. It is easier to recall unpleasant memories than pleasant ones when we‘re sad, and easier to recall pleasant memories than unpleasant ones when we‘re happy (Bower, 1981; Eich, 2008).

Variations in the ability to retrieve information are also seen in the serial position curve. When we give people a list of words one at a time (e.g., on flashcards) and then ask them to recall them, the results look something like those in Figure 8.13 "The Serial Position Curve". People are able to retrieve more words that were presented to them at the beginning and the end of the list than they are words that were presented in the middle of the list. This pattern, known as the serial position curve, is caused by two retrieval phenomenon: The primacy effect refers to a tendency to better remember stimuli that are presented early in a list. The recency effect refers to the tendency to better remember stimuli that are

presented later in a list. The serial position curve is the result of both primacy effects and recency effects.

There are a number of explanations for primacy and recency effects, but one of them is in terms of the effects of rehearsal on short-term and long-term memory (Baddeley, Eysenck, & Anderson, 2009). Because we can keep the last words that we learned in the presented list in short-term memory by rehearsing them before the memory test begins, they are relatively easily remembered. So the recency effect can be explained in terms of maintenance rehearsal in short-term memory. And the primacy effect may also be due to rehearsal—when we hear the first word in the list we start to rehearse it, making it more likely that it will be moved from short-term to long-term memory. And the same is true for the other words that come early in the list. But for the words in the middle of the list, this rehearsal becomes much harder, making them less likely to be moved to LTM.

In some cases our existing memories influence our new learning. This may occur either in a backward way or a forward way. Retroactive interferenceoccurs when learning something new impairs our ability to retrieve information that was learned earlier. For example, if you have learned to program in one computer language, and then you learn to program in another similar one, you may start to make mistakes programming the first language that you never would have made before you learned the new one. In this case the new memories work backward (retroactively) to influence retrieval from memory that is already in place.

In contrast to retroactive interference, proactive interference works in a forward direction. Proactive interference occurs when earlier learning impairs our ability to encode information that we try to learn later. For example, if we have learned French as a second language, this knowledge may make it more difficult, at least in some respects, to learn a third language (say Spanish), which involves similar but not identical vocabulary.

Retroactive and proactive interference can both influence memory. The Structure of LTM: Categories, Prototypes, and Schemas

Memories that are stored in LTM are not isolated but rather are linked together into categories—networks of associated memories that have features in common with each other. Forming categories, and using categories to guide behavior, is a fundamental part of human nature. Associated concepts within a category are connected through spreading activation, which occurs when activating one element of a category activates other associated elements. For instance, because tools are associated in a category, reminding people of the word screwdriver‖ will help them remember the word wrench.‖ And, when people have learned lists of words that come from different categories (e.g., as in Note 8.33 "Retrieval Demonstration"), they do not recall the information haphazardly. If they have just remembered the word wrench,‖ they are more likely to remember the word screwdriver‖ next than they are to remember the word dahlia,‖ because the words are organized in memory by category and because dahlia‖ is activated by spreading activation from w rench‖

Some categories have defining features that must be true of all members of the category. For instance, all members of the category triangles‖ have three sides, and all members of the category birds‖ lay eggs. But most categories are not so well-defined; the members of the category share some common features, but it is impossible to define which are or are not members of the category. For instance, there is no clear definition of the category tool.‖ Some examples of the category, such as a hammer and a wrench, are clearly and easily identified as category members, whereas other members are not so obvious. Is an ironing board a tool? What about a car?

Members of categories (even those with defining features) can be compared to the category prototype, which is the member of the category that is most average or typical of the category. Some category members are more prototypical of, or similar to, the category than others. For instance, some category members (robins and sparrows) are highly prototypical of the category birds,‖ whereas other category members (penguins and ostriches) are less prototypical. We retrieve information that is prototypical of a category faster than we retrieve information that is less prototypical (Rosch, 1975).

Schemas are important in part because they help us remember new information by providing an organizational structure for it. Read the following paragraph (Bransford & Johnson, 1972) and then try to write down everything you can remember.

The procedure is actually quite simple. First you arrange things into different groups. Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to lack of facilities, that is the next step; otherwise you are pretty well set. It is important not to overdo things. That is, it is better to do too few things at once than too many. In the short run this may not seem important, but complications can easily arise. A mistake can be expensive as well. At first the whole procedure will seem complicated. Soon, however, it will become just another facet of life. It is difficult to foresee any end to the necessity for this task in the immediate future, but then one never can tell. After the procedure is completed, one arranges the materials into different groups again. Then they can be put into their appropriate places. Eventually they will be used once more and the whole cycle will then have to be repeated. However, that is part of life.

It turns out that people‘s memory for this information is quite poor, unless they have been told ahead of time that the information describes doing the laundry,‖ in which case their memory for the material is much better. This demonstration of the role of schemas in memory shows how our existing knowledge can help us organize new information, and how this organization can improve encoding, storage, and retrieval.

Just as information is stored on digital media such as DVDs and flash drives, the information in LTM must be stored in the brain. The ability to maintain information in LTM involves a gradual strengthening of the connections among the neurons in the brain. When pathways in these neural networks are frequently and repeatedly fired, the synapses become more efficient in communicating with each other, and these changes

create memory. This process, known as long-term potentiation (LTP), refers to the strengthening of the synaptic connections between neurons " as result of frequent stimulation (Lynch, 2002). Drugs that block LTP reduce learning, whereas drugs that enhance LTP increase learning (Lynch et al., 1991). Because the new patterns of activation in the synapses take time to develop, LTP happens gradually. The period of time in which LTP occurs and in which memories are stored is known as the period of consolidation.

Memory is not confined to the cortex; it occurs through sophisticated interactions between new and old brain structures (Figure 8.17 "Schematic Image of Brain With Hippocampus, Amygdala, and Cerebellum Highlighted"). One of the most important brain regions in explicit memory is the hippocampus, which serves as a preprocessor and elaborator of information (Squire, 1992). The hippocampus helps us encode information about spatial relationships, the context in which events were experienced, and the associations among memories (Eichenbaum, 1999). The hippocampus also serves in part as a switching point that holds the memory for a short time and then directs the information to other parts of the brain, such as the cortex, to actually do the rehearsing, elaboration, and long-term storage (Jonides, Lacey, & Nee, 2005). Without the hippocampus, which might be described as the brain‘s librarian,‖ our explicit memories would be inefficient and disorganized. Figure 8.17 Schematic Image of Brain With Hippocampus, Amygdala, and Cerebellum Highlighted "

Different brain structures help us remember different types of information. The hippocampus is particularly important in explicit memories, the cerebellum is particularly important in implicit memories, and the amygdala is particularly important in emotional memories.

While the hippocampus is handling explicit memory, the cerebellum and the amygdala are concentrating on implicit and emotional memories, respectively. Research shows that the cerebellum is more active when we are learning associations and in priming tasks, and animals and humans with damage to the cerebellum have more difficulty in classical conditioning studies (Krupa, Thompson, & Thompson, 1993; Woodruff-Pak, Goldenberg, Downey-Lamb, Boyko, & Lemieux, 2000). The storage of many of our most important emotional memories, and particularly those related to fear, is initiated and controlled by the amygdala (Sigurdsson, Doyère, Cain, & LeDoux, 2007).

Evidence for the role of different brain structures in different types of memories comes in part from case studies of patients who suffer from amnesia, a memory disorder that involves the inability to remember information. As with memory interference effects, amnesia can work in either a forward or a backward direction, affecting retrieval or encoding. For people who suffer damage to the brain, for instance, as a result of a stroke or other trauma, the amnesia may work backward. The outcome is retrograde amnesia, a memory disorder that produces an inability to retrieve events that occurred before a given time. Demonstrating the fact that LTP takes time (the process of consolidation), retrograde amnesia is usually more severe for memories that occurred just prior to the trauma than it is for older memories, and events that occurred just before the

event that caused memory loss may never be recovered because they were never completely encoded.

Organisms with damage to the hippocampus develop a type of amnesia that works in a forward direction to affect encoding, known as anterograde amnesia. Anterograde amnesia is the inability to transfer information from short-term into long-term memory, making it impossible to form new memories. One well-known case study was a man named Henry Gustav Molaison (before he died in 2008, he was referred to only as H. M.) who had parts of his hippocampus removed to reduce severe seizures (Corkin, Amaral, González, Johnson, & Hyman, 1997). Following the operation, Molaison developed virtually complete anterograde amnesia. Although he could remember most of what had happened before the operation, and particularly what had occurred early in his life, he could no longer create new memories. Molaison was said to have read the same magazines over and over again without any awareness of having seen them before.

Cases of anterograde amnesia also provide information about the brain structures involved in different types of memory (Bayley & Squire, 2005; Helmuth, 1999; Paller, 2004). Although Molaison‘s explicit memory was compromised because his hippocampus was damaged, his implicit memory was not (because his cerebellum was intact). He could learn to trace shapes in a mirror, a task that requires procedural memory, but he never had any explicit recollection of having performed this task or of the people who administered the test to him.

Although some brain structures are particularly important in memory, this does not mean that all memories are stored in one place. The American psychologist Karl Lashley (1929) attempted to determine where memories were stored in the brain by teaching rats how to run mazes, and then lesioning different brain structures to see if they were still able to complete the maze. This idea seemed straightforward, and Lashley expected to find that memory was stored in certain parts of the brain. But he discovered that no matter where he removed brain tissue, the rats retained at least some memory of the maze, leading him to conclude that memory isn‘t located in a single place in the brain, but rather is distributed around it.

Long-term potentiation occurs as a result of changes in the synapses, which suggests that chemicals, particularly neurotransmitters and hormones, must be involved in memory. There is quite a bit of evidence that this is true.Glutamate, a neurotransmitter and a form of the amino acid glutamic acid, is perhaps the most important neurotransmitter in memory (McEntee & Crook, 1993). When animals, including people, are under stress, more glutamate is secreted, and this glutamate can help them remember (McGaugh, 2003). The neurotransmitter serotonin is also secreted when animals learn, andepinephrine may also increase memory, particularly for stressful events (Maki & Resnick, 2000; Sherwin, 1998). Estrogen, a female sex hormone, also seems critical, because women who are experiencing menopause, along with a reduction in estrogen, frequently report memory difficulties (Chester, 2001).

Accuracy and Inaccuracy in Memory and Cognition

As we have seen, our memories are not perfect. They fail in part due to our inadequate encoding and storage, and in part due to our inability to accurately retrieve stored information. But memory is also influenced by the setting in which it occurs, by the events that occur to us after we have experienced an event, and by the cognitive processes that we use to help us remember. Although our cognition allows us to attend to, rehearse, and organize information, cognition may also lead to distortions and errors in our judgments and our behaviors.

In this section we consider some of the cognitive biases that are known to influence humans. Cognitive biases are errors in memory or judgment that are caused by the inappropriate use of cognitive processes (Table 8.3 "Cognitive Processes That Pose Threats to Accuracy"). The study of cognitive biases is important both because it relates to the important psychological theme of accuracy versus inaccuracy in perception, and because being aware of the types of errors that we may make can help us avoid them and therefore improve our decision-making skills.

In other cases we may be sure that we remembered the information from real life but be uncertain about exactly where we heard it. Imagine that you read a news story in a tabloid magazine such as the National Enquirer. Probably you would have discounted the information because you know that its source is unreliable. But what if later you were to remember the story but forget the source of the information? If this happens, you might become convinced that the news story is true because you forget to discount it. The sleeper effectrefers to attitude change that occurs over time when we forget the source of information (Pratkanis, Greenwald, Leippe, & Baumgardner, 1988).

In still other cases we may forget where we learned information and mistakenly assume that we created the memory ourselves. Kaavya Viswanathan, the author of the book How Opal Mehta Got Kissed, Got Wild, and Got a Life, was accused of plagiarism when it was revealed that many parts of her book were very similar to passages from other material. Viswanathan argued that she had simply forgotten that she had read the other works, mistakenly assuming she had made up the material herself. And the musician George Harrison claimed that he was unaware that the melody of his song My Sweet Lord‖ was almost identical to an earlier song by another composer. The judge in the copyright suit that followed ruled that Harrison didn‘t intentionally commit the plagiarism. (Please use this knowledge to become extra vigilant about source attributions in your written work, not to try to excuse yourself if you are accused of plagiarism.)

Schematic Processing: Distortions Based on Expectations

We have seen that schemas help us remember information by organizing material into coherent representations. However, although schemas can improve our memories, they may also lead to cognitive biases. Using schemas may lead us to falsely remember things that never happened to us and to distort or misremember things that did. For one, schemas lead to the confirmation bias, which is the tendency to verify and confirm our

existing memories rather than to challenge and disconfirm them. The confirmation bias occurs because once we have schemas, they influence how we seek out and interpret new information. The confirmation bias leads us to remember information that fits our schemas better than we remember information that disconfirms them (Stangor & McMillan, 1992),] a process that makes our stereotypes very difficult to change. And we ask questions in ways that confirm our schemas (Trope & Thompson, 1997). If we think that a person is an extrovert, we might ask her about ways that she likes to have fun, thereby making it more likely that we will confirm our beliefs. In short, once we begin to believe in something—for instance, a stereotype about a group of people—it becomes very difficult to later convince us that these beliefs are not true; the beliefs become self-confirming.

Darley and Gross (1983) demonstrated how schemas about social class could influence memory. In their research they gave participants a picture and some information about a fourth-grade girl named Hannah. To activate a schema about her social class, Hannah was pictured sitting in front of a nice suburban house for one-half of the participants and pictured in front of an impoverished house in an urban area for the other half. Then the participants watched a video that showed Hannah taking an intelligence test. As the test went on, Hannah got some of the questions right and some of them wrong, but the number of correct and incorrect answers was the same in both conditions. Then the participants were asked to remember how many questions Hannah got right and wrong. Demonstrating that stereotypes had influenced memory, the participants who thought that Hannah had come from an upper-class background remembered that she had gotten more correct answers than those who thought she was from a lower-class background.

Functional fixedness occurs when people's schemas prevent them from using an object in new and nontraditional ways. Duncker (1945) gave participants a candle, a box of thumbtacks, and a book of matches, and asked them to attach the candle to the wall so that it did not drip onto the table below (Figure 8.19 "Functional Fixedness"). Few of the participants realized that the box could be tacked to the wall and used as a platform to hold the candle. The problem again is that our existing memories are powerful, and they bias the way we think about new information. Because the participants were " fixated‖ on the box's normal function of holding thumbtacks, they could not see its alternative use. In the candle-tack-box problem, functional fixedness may lead us to see the box only as a box and not as a potential candleholder.

Misinformation Effects: How Information That Comes Later Can Distort Memory

A particular problem for eyewitnesses such as Jennifer Thompson is that our memories are often influenced by the things that occur to us after we have learned the information (Erdmann, Volbert, & Böhm, 2004; Loftus, 1979; Zaragoza, Belli, & Payment, 2007). This new information can distort our original memories such that the we are no longer sure what is the real information and what was provided later. The misinformation effect refers to errors in memory that occur when new information influences existing memories.

In an experiment by Loftus and Palmer (1974), participants viewed a film of a traffic accident and then, according to random assignment to experimental conditions, answered one of three questions:

"Ab out how fast were the cars going when they hit each other?‖

"Ab out how fast were the cars going when they smashed each other?‖

"Ab out how fast were the cars going when they contacted each other?‖

As you can see in Figure 8.20 "Misinformation Effect", although all the participants saw the same accident, their estimates of the cars' speed varied by condition. Participants who had been asked about the cars " smashing‖ each other estimated the highest average speed, and those who had been asked the " contacted‖ question estimated the lowest average speed.

Participants viewed a film of a traffic accident and then answered a question about the accident. According to random assignment, the verb in the question was filled by either ―hit,‖ ―smashed,‖ or ―contacted‖ each other. The wording of the question influenced the participants' memory of the accident. Source: Adapted from Loftus, E. F., & Palmer, J. C. (1974). Reconstruction of automobile destruction: An example of the interaction between language and memory. Journal of Verbal Learning & Verbal Behavior, 13(5), 585–589.

The ease with which memories can be created or implanted is particularly problematic when the events to be recalled have important consequences. Therapists often argue that patients may repress memories of traumatic events they experienced as children, such as childhood sexual abuse, and then recover the events years later as the therapist leads them to recall the information—for instance, by using dream interpretation and hypnosis (Brown, Scheflin, & Hammond, 1998).

But other researchers argue that painful memories such as sexual abuse are usually very well remembered, that few memories are actually repressed, and that even if they are it is virtually impossible for patients to accurately retrieve them years later (McNally, Bryant, & Ehlers, 2003; Pope, Poliakoff, Parker, Boynes, & Hudson, 2007). These researchers have argued that the procedures used by the therapists to "r etrieve‖ the memories are more likely to actually implant false memories, leading the patients to erroneously recall events that did not actually occur. Because hundreds of people have been accused, and even imprisoned, on the basis of claims about "r ecovered memory‖ of child sexual abuse, the accuracy of these memories has important societal implications. Many psychologists now believe that most of these claims of recovered memories are due to implanted, rather than real, memories (Loftus & Ketcham, 1994).

Overconfidence

One of the most remarkable aspects of Jennifer Thompson's mistaken identity of Ronald Cotton was her certainty. But research reveals a pervasive cognitive bias toward overconfidence, which is the tendency for people to be too certain about their ability to accurately remember events and to make judgments. David Dunning and his colleagues (Dunning, Griffin, Milojkovic, & Ross, 1990) asked college students to predict how another student would react in various situations. Some participants made predictions about a fellow student whom they had just

met and interviewed, and others made predictions about their roommates whom they knew very well. In both cases, participants reported their confidence in each prediction, and accuracy was determined by the responses of the people themselves. The results were clear: Regardless of whether they judged a stranger or a roommate, the participants consistently overestimated the accuracy of their own predictions.

Eyewitnesses to crimes are also frequently overconfident in their memories, and there is only a small correlation between how accurate and how confident an eyewitness is. The witness who claims to be absolutely certain about his or her identification (e.g., Jennifer Thompson) is not much more likely to be accurate than one who appears much less sure, making it almost impossible to determine whether a particular witness is accurate or not (Wells & Olson, 2003).

I am sure that you have a clear memory of when you first heard about the 9/11 attacks in 2001, and perhaps also when you heard that Princess Diana was killed in 1997 or when the verdict of the O. J. Simpson trial was announced in 1995. This type of memory, which we experience along with a great deal of emotion, is known as a flashbulb memory—a vivid and emotional memory of an unusual event that people believe they remember very well. (Brown & Kulik, 1977).

People are very certain of their memories of these important events, and frequently overconfident. Talarico and Rubin (2003) tested the accuracy of flashbulb memories by asking students to write down their memory of how they had heard the news about either the September 11, 2001, terrorist attacks or about an everyday event that had occurred to them during the same time frame. These recordings were made on September 12, 2001. Then the participants were asked again, either 1, 6, or 32 weeks later, to recall their memories. The participants became less accurate in their recollections of both the emotional event and the everyday events over time. But the participants‘ confidence in the accuracy of their memory of learning about the attacks did not decline over time. After 32 weeks the participants were overconfident; they were much more certain about the accuracy of their flashbulb memories than they should have been. Schmolck, Buffalo, and Squire (2000) found similar distortions in memories of news about the verdict in the O. J. Simpson trial.

.Heuristic Processing: Availability and Representativeness

Another way that our information processing may be biased occurs when we use heuristics, which are information-processing strategies that are useful in many cases but may lead to errors when misapplied. Let‘s consider two of the most frequently applied (and misapplied) heuristics: the representativeness heuristic and the availability heuristic.

In many cases we base our judgments on information that seems to represent, or match, what we expect will happen, while ignoring other potentially more relevant statistical information. When we do so, we are using the representativeness heuristic. Consider, for instance, the puzzle presented in Table 8.4 "The Representativeness Heuristic". Let‘s say that you went to a hospital, and you checked the records of the babies that

were born today. Which pattern of births do you think you are most likely to find?

Most people think that list B is more likely, probably because list B looks more random, and thus matches (is " representative of‖) our ideas about randomness. But statisticians know that any pattern of four girls and four boys is mathematically equally likely. The problem is that we have a schema of what randomness should be like, which doesn't always match what is mathematically the case. Similarly, people who see a flipped coin come up " heads‖ five times in a row will frequently predict, and perhaps even wager money, that " tails‖ will be next. This behavior is known as the gambler's fallacy. But mathematically, the gambler's fallacy is an error: The likelihood of any single coin flip being " tails‖ is always 50%, regardless of how many times it has come up " heads‖ in the past.

Our judgments can also be influenced by how easy it is to retrieve a memory. The tendency to make judgments of the frequency or likelihood that an event occurs on the basis of the ease with which it can be retrieved from memory is known as the availability heuristic (MacLeod & Campbell, 1992; Tversky & Kahneman, 1973). Imagine, for instance, that I asked you to indicate whether there are more words in the English language that begin with the letter " R‖ or that have the letter " R‖ as the third letter. You would probably answer this question by trying to think of words that have each of the characteristics, thinking of all the words you know that begin with " R‖ and all that have " R‖ in the third position. Because it is much easier to retrieve words by their first letter than by their third, we may incorrectly guess that there are more words that begin with " R,‖ even though there are in fact more words that have " R‖ as the third letter.

The availability heuristic may also operate on episodic memory. We may think that our friends are nice people, because we see and remember them primarily when they are around us (their friends, who they are, of course, nice to). And the traffic might seem worse in our own neighborhood than we think it is in other places, in part because nearby traffic jams are more easily retrieved than are traffic jams that occur somewhere else.

Salience and Cognitive Accessibility

Still another potential for bias in memory occurs because we are more likely to attend to, and thus make use of and remember, some information more than other information. For one, we tend to attend to and remember things that are highly salient, meaning that they attract our attention. Things that are unique, colorful, bright, moving, and unexpected are more salient (McArthur & Post, 1977; Taylor & Fiske, 1978). In one relevant study, Loftus, Loftus, and Messo (1987) showed people images of a customer walking up to a bank teller and pulling out either a pistol or a checkbook. By tracking eye movements, the researchers determined that people were more likely to look at the gun than at the checkbook, and that this reduced their ability to accurately identify the criminal in a lineup that was given later. The salience of the gun drew people's attention away from the face of the criminal.

The salience of the stimuli in our social worlds has a big influence on our judgment, and in some cases may lead us to behave in ways that we might better not have. Imagine, for instance, that you wanted to buy a new music player for yourself. You've been trying to decide whether to get the iPod or the Zune. You checked Consumer Reports online and found that, although the players differed on many dimensions, including price, battery life, ability to share music, and so forth, the Zune was nevertheless rated significantly higher by owners than was the iPod. As a result, you decide to purchase the Zune the next day. That night, however, you go to a party, and a friend shows you her iPod. You check it out, and it seems really cool. You tell her that you were thinking of buying a Zune, and she tells you that you are crazy. She says she knows someone who had one and it had a lot of problems—it didn't download music correctly, the battery died right after the warranty expired, and so forth—and that she would never buy one. Would you still buy the Zune, or would you switch your plans?

If you think about this question logically, the information that you just got from your friend isn't really all that important. You now know the opinion of one more person, but that can't change the overall rating of the two machines very much. On the other hand, the information your friend gives you, and the chance to use her iPod, are highly salient. The information is right there in front of you, in your hand, whereas the statistical information from Consumer Reports is only in the form of a table that you saw on your computer. The outcome in cases such as this is that people frequently ignore the less salient but more important information, such as the likelihood that events occur across a large population (these statistics are known as base rates), in favor of the less important but nevertheless more salient information.

People also vary in the schemas that they find important to use when judging others and when thinking about themselves. Cognitive accessibility refers tothe extent to which knowledge is activated in memory, and thus likely to be used in cognition and behavior. For instance, you probably know a person who is a golf nut (or fanatic of another sport). All he can talk about is golf. For him, we would say that golf is a highly accessible construct. Because he loves golf, it is important to his self-concept, he sets many of his goals in terms of the sport, and he tends to think about things and people in terms of it (" if he plays golf, he must be a good person!‖). Other people have highly accessible schemas about environmental issues, eating healthy food, or drinking really good coffee. When schemas are highly accessible, we are likely to use them to make judgments of ourselves and others, and this overuse may inappropriately color our judgments.

Counterfactual Thinking

In addition to influencing our judgments about ourselves and others, the ease with which we can retrieve potential experiences from memory can have an important effect on our own emotions. If we can easily imagine an outcome that is better than what actually happened, then we may experience sadness and disappointment; on the other hand, if we can easily imagine that a result might have been worse than what actually happened, we may be more likely to experience happiness and

satisfaction. The tendency to think about and experience events according to "what might have been‖ is known as counter factual thinking (Kahneman & Miller, 1986; Roese, 2005).

Imagine, for instance, that you were participating in an important contest, and you won the silver (second-place) medal. How would you feel? Certainly you would be happy that you won the silver medal, but wouldn't you also be thinking about what might have happened if you had been just a little bit better—you might have won the gold medal! On the other hand, how might you feel if you won the bronze (third-place) medal? If you were thinking about the counterfactuals (the " what might have beens‖) perhaps the idea of not getting any medal at all would have been highly accessible; you'd be happy that you got the medal that you did get, rather than coming in fourth.

You might have experienced counterfactual thinking in other situations. Once I was driving across country, and my car was having some engine trouble. I really wanted to make it home when I got near the end of my journey; I would have been extremely disappointed if the car broke down only a few miles from my home. Perhaps you have noticed that once you get close to finishing something, you feel like you really need to get it done. Counterfactual thinking has even been observed in juries. Jurors who were asked to award monetary damages to others who had been in an accident offered them substantially more in compensation if they barely avoided injury than they offered if the accident seemed inevitable (Miller, Turnbull, & McFarland, 1988). Psychology in Everyday Life: Cognitive Biases in the Real World Perhaps you are thinking that the kinds of errors that we have been talking about don't seem that important. After all, who really cares if we think there are more words that begin with the letter ―R‖ than there actually are, or if bronze medal winners are happier than the silver medalists? These aren't big problems in the overall scheme of things. But it turns out that what seem to be relatively small cognitive biases on the surface can have profound consequences for people. Why would so many people continue to purchase lottery tickets, buy risky investments in the stock market, or gamble their money in casinos when the likelihood of them ever winning is so low? One possibility is that they are victims of salience; they focus their attention on the salient likelihood of a big win, forgetting that the base rate of the event occurring is very low. The belief in astrology, which all scientific evidence suggests is not accurate, is probably driven in part by the salience of the occasions when the predictions are correct. When a horoscope comes true (which will, of course, happen sometimes), the correct prediction is highly salient and may allow people to maintain the overall false belief. People may also take more care to prepare for unlikely events than for more likely ones, because the unlikely ones are more salient. For instance, people may think that they are more likely to die from a terrorist attack or a homicide than they are from diabetes, stroke, or tuberculosis. But the odds are much greater of dying from the latter than the former. And people are frequently more afraid of flying than driving, although the likelihood of dying in a car crash is hundreds of times greater than dying in a plane crash (more than 50,000 people are killed on U.S. highways every year). Because people

don‘t accurately calibrate their behaviors to match the true potential risks (e.g., they drink and drive or don‘t wear their seatbelts), the individual and societal level costs are often quite large (Slovic, 2000). Salience and accessibility also color how we perceive our social worlds, which may have a big influence on our behavior. For instance, people who watch a lot of violent television shows also view the world as more dangerous (Doob & Macdonald, 1979), probably because violence becomes more cognitively accessible for them. We also unfairly overestimate our contribution to joint projects (Ross & Sicoly, 1979), perhaps in part because our own contributions are highly accessible, whereas the contributions of others are much less so. Even people who should know better, and who need to know better, are subject to cognitive biases. Economists, stock traders, managers, lawyers, and even doctors make the same kinds of mistakes in their professional activities that people make in their everyday lives (Gilovich, Griffin, & Kahneman, 2002). Just like us, these people are victims of overconfidence, heuristics, and other biases. Furthermore, every year thousands of individuals, such as Ronald Cotton, are charged with and often convicted of crimes based largely on eyewitness evidence. When eyewitnesses testify in courtrooms regarding their memories of a crime, they often are completely sure that they are identifying the right person. But the most common cause of innocent people being falsely convicted is erroneous eyewitness testimony (Wells, Wright, & Bradfield, 1999). The many people who were convicted by mistaken eyewitnesses prior to the advent of forensic DNA and who have now been exonerated by DNA tests have certainly paid for all-too-common memory errors (Wells, Memon, & Penrod, 2006). Although cognitive biases are common, they are not impossible to control, and psychologists and other scientists are working to help people make better decisions. One possibility is to provide people with better feedback about their judgments. Weather forecasters, for instance, learn to be quite accurate in their judgments because they have clear feedback about the accuracy of their predictions. Other research has found that accessibility biases can be reduced by leading people to consider multiple alternatives rather than focus only on the most obvious ones, and particularly by leading people to think about opposite possible outcomes than the ones they are expecting (Lilienfeld, Ammirtai, & Landfield, 2009). Forensic psychologists are also working to reduce the incidence of false identification by helping police develop better procedures for interviewing both suspects and eyewitnesses.

REVIEW QUESTIONS

1. What are the differences between brains and computers explicit memory
2. What is implicit memory? Explain its chrematistics.
3. Discuss about encoding and storage. How our perceptions become memories?
4. Describe about using the contributions of hermann ebbinghaus to improve memory.
5. What are misinformation effects? How information that comes later can distort memory

FURTHER READINGS

1. A textbook of general psychology- Walter F. Daves
2. General Psychology- Abraham
3. Advanced general psychology-Russell W. Levanway
4. General Psychological Theory-Sigmund Freud
5. General Psychology-S K Mangal

IMPORTANT NOTES

UNIT-9 INTELLIGENCE AND LANGUAGE

CONTENTS

INTRODUCTIONS

The characteristic that is most defining of human beings as a species is that our large cerebral cortexes make us very, very smart. In this Unit we consider how psychologists conceptualize and measure human intelligence—the ability to think, to learn from experience, to solve problems, and to adapt to new situations. We'll consider whether intelligence involves a single ability or many different abilities, how we measure intelligence, what intelligence predicts, and how cultures and societies think about it. We'll also consider intelligence in terms of nature versus nurture and in terms of similarities versus differences among people.

Intelligence is important because it has an impact on many human behaviors. Intelligence is more strongly related than any other individual difference variable to successful educational, occupational, economic, and social outcomes. Scores on intelligence tests predict academic and military performance, as well as success in a wide variety of jobs (Ones, Viswesvaran, & Dilchert, 2005; Schmidt & Hunter, 1998). Intelligence is also negatively correlated with criminal behaviors—the average intelligence quotient (IQ) of delinquent adolescents is about 7 points lower than that of other adolescents (Wilson & Herrnstein, 1985) —and positively correlated with health-related outcomes, including longevity (Gottfredson, 2004; Gottfredson & Deary, 2004). At least some of this latter relationship may be due to the fact that people who are more intelligent are better able to predict and avoid accidents and to understand and follow instructions from doctors or on drug labels. Simonton (2006)] also found that among U.S. presidents, the ability to effectively lead was well predicted by ratings of the president's intelligence.

The advantages of having a higher IQ increase as life settings become more complex. The correlation between IQ and job performance is

higher in more mentally demanding occupations, such as physician or lawyer, than in less mentally demanding occupations, like clerk or newspaper delivery person (Salgado et al., 2003). Although some specific personality traits, talents, and physical abilities are important for success in some jobs, intelligence predicts performance across all types of jobs.

Our vast intelligence also allows us to have language, a system of communication that uses symbols in a regular way to create meaning. Language gives us the ability communicate our intelligence to others by talking, reading, and writing. As the psychologist Steven Pinker put it, language is the " the jewel in the crown of cognition‖ (Pinker, 1994). Although other species have at least some ability to communicate, none of them have language. In the last section of this Unit we will consider the structure and development of language, as well as its vital importance to human beings. Psychologists have long debated how to best conceptualize and measure intelligence (Sternberg, 2003). These questions include how many types of intelligence there are, the role of nature versus nurture in intelligence, how intelligence is represented in the brain, and the meaning of group differences in intelligence. General (g) Versus Specific (s)

Intelligences

In the early 1900s, the French psychologist Alfred Binet (1857–1914) and his colleague Henri Simon (1872–1961) began working in Paris to develop a measure that would differentiate students who were expected to be better learners from students who were expected to be slower learners. The goal was to help teachers better educate these two groups of students. Binet and Simon developed what most psychologists today regard as the first intelligence test, which consisted of a wide variety of questions that included the ability to name objects, define words, draw pictures, complete sentences, compare items, and construct sentences.

Binet and Simon (Binet, Simon, & Town, 1915; Siegler, 1992) believed that the questions they asked their students, even though they were on the surface dissimilar, all assessed the basic abilities to understand, reason, and make judgments. And it turned out that the correlations among these different types of measures were in fact all positive; students who got one item correct were more likely to also get other items correct, even though the questions themselves were very different.

On the basis of these results, the psychologist Charles Spearman (1863–1945) hypothesized that there must be a single underlying construct that all of these items measure. He called the construct that the different abilities and skills measured on intelligence tests have in common thegeneral intelligence factor (g). Virtually all psychologists now believe that there is a generalized intelligence factor, g, that relates to abstract thinking and that includes the abilities to acquire knowledge, to reason abstractly, to adapt to novel situations, and to benefit from instruction and experience (Gottfredson, 1997; Sternberg, 2003). People with higher general intelligence learn faster.

Soon after Binet and Simon introduced their test, the American psychologist Lewis Terman (1877–1956) developed an American version of Binet's test that became known as the Stanford-Binet

Intelligence Test. The Stanford-Binet is a measure of general intelligence made up of a wide variety of tasks including vocabulary, memory for pictures, naming of familiar objects, repeating sentences, and following commands.

Notes

Although there is general agreement among psychologists that g exists, there is also evidence for specific intelligence (s), a measure of specific skills in narrow domains. One empirical result in support of the idea of s comes from intelligence tests themselves. Although the different types of questions do correlate with each other, some items correlate more highly with each other than do other items; they form clusters or clumps of intelligences.

One distinction is between fluid intelligence, which refers to the capacity to learn new ways of solving problems and performing activities, and crystallized intelligence, which refers to the accumulated knowledge of the world we have acquired throughout our lives (Salthouse, 2004). These intelligences must be different because crystallized intelligence increases with age—older adults are as good as or better than young people in solving crossword puzzles—whereas fluid intelligence tends to decrease with age (Horn, Donaldson, & Engstrom, 1981; Salthouse, 2004).]

Other researchers have proposed even more types of intelligences. L. L. Thurstone (1938) proposed that there were seven clusters of primary mental abilities, made up of word fluency, verbal comprehension, spatial ability, perceptual speed, numerical ability, inductive reasoning, and memory. But even these dimensions tend to be at least somewhat correlated, showing again the importance of g.

One advocate of the idea of multiple intelligences is the psychologist Robert Sternberg. Sternberg has proposed a triarchic (three-part) theory of intelligence that proposes that people may display more or less analytical intelligence, creative intelligence, and practical intelligence. Sternberg (1985, 2003) argued that traditional intelligence tests assess analytical intelligence, the ability to answer problems with a single right answer, but that they do not well assess creativity (the ability to adapt to new situations and create new ideas) or practicality (e.g., the ability to write good memos or to effectively delegate responsibility).

As Sternberg proposed, research has found that creativity is not highly correlated with analytical intelligence (Furnham & Bachtiar, 2008), and exceptionally creative scientists, artists, mathematicians, and engineers do not score higher on intelligence than do their less creative peers (Simonton, 2000). Furthermore, the brain areas that are associated with convergent thinking, thinking that is directed toward finding the correct answer to a given problem, are different from those associated with divergent thinking, the ability to generate many different ideas for or solutions to a single problem (Tarasova, Volf, & Razoumnikova, 2010). On the other hand, being creative often takes some of the basic abilities measured by g, including the abilities to learn from experience, to remember information, and to think abstractly (Bink & Marsh, 2000).

Studies of creative people suggest at least five components that are likely to be important for creativity:

Expertise. Creative people have carefully studied and know a lot about the topic that they are working in. Creativity comes with a lot of hard work (Ericsson, 1998; Weisberg, 2006).

Imaginative thinking. Creative people often view a problem in a visual way, allowing them to see it from a new and different point of view.

Risk taking. Creative people are willing to take on new but potentially risky approaches.

Intrinsic interest. Creative people tend to work on projects because they love doing them, not because they are paid for them. In fact, research has found that people who are paid to be creative are often less creative than those who are not (Hennessey & Amabile, 2010).

Working in a creative environment. Creativity is in part a social phenomenon. Simonton (1992) found that the most creative people were supported, aided, and challenged by other people working on similar projects.

The last aspect of the triarchic model, practical intelligence, refers primarily to intelligence that cannot be gained from books or formal learning. Practical intelligence represents a type of " street smarts‖ or " common sense‖ that is learned from life experiences. Although a number of tests have been devised to measure practical intelligence (Sternberg, Wagner, & Okagaki, 1993; Wagner & Sternberg, 1985), research has not found much evidence that practical intelligence is distinct from g or that it is predictive of success at any particular tasks (Gottfredson, 2003). Practical intelligence may include, at least in part, certain abilities that help people perform well at specific jobs, and these abilities may not always be highly correlated with general intelligence (Sternberg, Wagner, & Okagaki, 1993). On the other hand, these abilities or skills are very specific to particular occupations and thus do not seem to represent the broader idea of intelligence.

Another champion of the idea of multiple intelligences is the psychologist Howard Gardner (1983, 1999). Gardner argued that it would be evolutionarily functional for different people to have different talents and skills, and proposed that there are eight intelligences that can be differentiated from each other (Table 9.1 "Howard Gardner‘s Eight Specific Intelligences"). Gardner noted that some evidence for multiple intelligences comes from the abilities ofautistic savants, people who score low on intelligence tests overall but who nevertheless may have exceptional skills in a given domain, such as math, music, art, or in being able to recite statistics in a given sport (Treffert & Wallace, 2004).

The ability to recognize, identify, and understand animals, plants, and other living things Source: Adapted from Gardner, H. (1999). Intelligence reframed: Multiple intelligences for the 21st century. New York, NY: Basic Books.

The idea of multiple intelligences has been influential in the field of education, and teachers have used these ideas to try to teach differently to different students. For instance, to teach math problems to students who have particularly good kinesthetic intelligence, a teacher might encourage the students to move their bodies or hands according to the numbers. On the other hand, some have argued that these " intelligences‖ sometimes seem more like " abilities‖ or "talents‖ rather than real

intelligence. And there is no clear conclusion about how many intelligences there are. Are sense of humor, artistic skills, dramatic skills, and so forth also separate intelligences? Furthermore, and again demonstrating the underlying power of a single intelligence, the many different intelligences are in fact correlated and thus represent, in part, g (Brody, 2003). Measuring Intelligence: Standardization and the Intelligence Quotient

The goal of most intelligence tests is to measure g, the general intelligence factor. Good intelligence tests are reliable, meaning that they are consistent over time, and also demonstrate construct validity, meaning that they actually measure intelligence rather than something else. Because intelligence is such an important individual difference dimension, psychologists have invested substantial effort in creating and improving measures of intelligence, and these tests are now the most accurate of all psychological tests. In fact, the ability to accurately assess intelligence is one of the most important contributions of psychology to everyday public life.

Intelligence changes with age. A 3-year-old who could accurately multiply 183 by 39 would certainly be intelligent, but a 25-year-old who could not do so would be seen as unintelligent. Thus understanding intelligence requires that we know the norms or standards in a given population of people at a given age. Thestandardization of a test involves giving it to a large number of people at different ages and computing the average score on the test at each age level.

It is important that intelligence tests be standardized on a regular basis, because the overall level of intelligence in a population may change over time. The Flynn effect refers to the observation that scores on intelligence tests worldwide have increased substantially over the past decades (Flynn, 1999). Although the increase varies somewhat from country to country, the average increase is about 3 IQ points every 10 years. There are many explanations for the Flynn effect, including better nutrition, increased access to information, and more familiarity with multiple-choice tests (Neisser, 1998). But whether people are actually getting smarter is debatable (Neisser, 1997).

Once the standardization has been accomplished, we have a picture of the average abilities of people at different ages and can calculate a person‘smental age, which is the age at which a person is performing intellectually. If we compare the mental age of a person to the person‘s chronological age, the result is the intelligence quotient (IQ), a measure of intelligence that is adjusted for age. A simple way to calculate IQ is by using the following formula:

IQ = mental age ÷ chronological age × 100.

Thus a 10-year-old child who does as well as the average 10-year-old child has an IQ of 100 (10 ÷ 10 × 100), whereas an 8-year-old child who does as well as the average 10-year-old child would have an IQ of 125 (10 ÷ 8 × 100). Most modern intelligence tests are based the relative position of a person‘s score among people of the same age, rather than on the basis of this formula, but the idea of an intelligence “ ratio‖ or “ quotient‖ provides a good description of the score‘s meaning.

A number of scales are based on the IQ. TheWechsler Adult lntelligence Scale (WAIS) is the most widely used intelligence test for adults (Watkins, Campbell, Nieberding, & Hallmark, 1995). The current version of the WAIS, the WAIS-IV, was standardized on 2,200 people ranging from 16 to 90 years of age. It consists of 15 different tasks, each designed to assess intelligence, including working memory, arithmetic ability, spatial ability, and general knowledge about the world (see Figure 9.4 "Sample Items From the Wechsler Adult Intelligence Scale (WAIS)"). The WAIS-IV yields scores on four domains: verbal, perceptual, working memory, and processing speed. The reliability of the test is high (more than 0.95), and it shows substantial construct validity. The WAIS-IV is correlated highly with other IQ tests such as the Stanford-Binet, as well as with criteria of academic and life success, including college grades, measures of work performance, and occupational level. It also shows significant correlations with measures of everyday functioning among the mentally retarded.

The Wechsler scale has also been adapted for preschool children in the form of the Wechsler Primary and Preschool Scale of Intelligence (WPPSI-III) and for older children and adolescents in the form of the Wechsler Intelligence Scale for Children (WISC-IV). Figure 9.4 Sample Items From the Wechsler Adult Intelligence Scale (WAIS)

The intelligence tests that you may be most familiar with are aptitude tests, which are designed to measure one‘s ability to perform a given task, for instance, to do well in college or in postgraduate training. Most U.S. colleges and universities require students to take the Scholastic Assessment Test (SAT) or the American College Test (ACT), and postgraduate schools require the Graduate Record Examination (GRE), Medical College Admissions Test (MCAT), or the Law School Admission Test (LSAT). These tests are useful for selecting students because they predict success in the programs that they are designed for, particularly in the first year of the program (Kuncel, Hezlett, & Ones, 2010). These aptitude tests also measure, in part, intelligence. Frey and Detterman (2004) found that the SAT correlated highly (between about r = .7 and r = .8) with standard measures of intelligence.

Intelligence tests are also used by industrial and organizational psychologists in the process of personnel selection. Personnel selection is the use of structured tests to select people who are likely to perform well at given jobs(Schmidt & Hunter, 1998). The psychologists begin by conducting a job analysis in which they determine what knowledge, skills, abilities, and personal characteristics (KSAPs) are required for a given job. This is normally accomplished by surveying and/or interviewing current workers and their supervisors. Based on the results of the job analysis, the psychologists choose selection methods that are most likely to be predictive of job performance. Measures include tests of cognitive and physical ability and job knowledge tests, as well as measures of IQ and personality. The Biology of Intelligence

The brain processes underlying intelligence are not completely understood, but current research has focused on four potential factors: brain size, sensory ability, speed and efficience of neural transmission, and working memory capacity.

There is at least some truth to the idea that smarter people have bigger brains. Studies that have measured brain volume using neuroimaging techniques find that larger brain size is correlated with intelligence (McDaniel, 2005), and intelligence has also been found to be correlated with the number of neurons in the brain and with the thickness of the cortex (Haier, 2004; Shaw et al., 2006). It is important to remember that these correlational findings do not mean that having more brain volume causes higher intelligence. It is possible that growing up in a stimulating environment that rewards thinking and learning may lead to greater brain growth (Garlick, 2003), and it is also possible that a third variable, such as better nutrition, causes both brain volume and intelligence.

Another possibility is that the brains of more intelligent people operate faster or more efficiently than the brains of the less intelligent. Some evidence supporting this idea comes from data showing that people who are more intelligent frequently show less brain activity (suggesting that they need to use less capacity) than those with lower intelligence when they work on a task (Haier, Siegel, Tang, & Abel, 1992). And the brains of more intelligent people also seem to run faster than the brains of the less intelligent. Research has found that the speed with which people can perform simple tasks—such as determining which of two lines is longer or pressing, as quickly as possible, one of eight buttons that is lighted—is predictive of intelligence (Deary, Der, & Ford, 2001). Intelligence scores also correlate at about r = .5 with measures of working memory (Ackerman, Beier, & Boyle, 2005), and working memory is now used as a measure of intelligence on many tests.

Although intelligence is not located in a specific part of the brain, it is more prevalent in some brain areas than others. Duncan et al. (2000) administered a variety of intelligence tasks and observed the places in the cortex that were most active. Although different tests created different patterns of activation, as you can see in Figure 9.5 "Where Is Intelligence?", these activated areas were primarily in the outer parts of the cortex, the area of the brain most involved in planning, executive control, and short-term memory.

Intelligence has both genetic and environmental causes, and these have been systematically studied through a large number of twin and adoption studies (Neisser et al., 1996; Plomin, DeFries, Craig, & McGuffin, 2003). These studies have found that between 40% and 80% of the variability in IQ is due to genetics, meaning that overall genetics plays a bigger role than does environment in creating IQ differences among individuals (Plomin & Spinath, 2004). The IQs of identical twins correlate very highly (r = .86), much higher than do the scores of fraternal twins who are less genetically similar (r = .60). And the correlations between the IQs of parents and their biological children (r = .42) is significantly greater than the correlation between parents and adopted children (r = .19). The role of genetics gets stronger as children get older. The intelligence of very young children (less than 3 years old) does not predict adult intelligence, but by age 7 it does, and IQ scores remain very stable in adulthood (Deary, Whiteman, Starr, Whalley, & Fox, 2004).

But there is also evidence for the role of nurture, indicating that individuals are not born with fixed, unchangeable levels of intelligence. Twins raised together in the same home have more similar IQs than do twins who are raised in different homes, and fraternal twins have more similar IQs than do nontwin siblings, which is likely due to the fact that they are treated more similarly than are siblings.

The fact that intelligence becomes more stable as we get older provides evidence that early environmental experiences matter more than later ones. Environmental factors also explain a greater proportion of the variance in intelligence for children from lower-class households than they do for children from upper-class households (Turkheimer, Haley, Waldron, D'Onofrio, & Gottesman, 2003). This is because most upper-class households tend to provide a safe, nutritious, and supporting environment for children, whereas these factors are more variable in lower-class households.

Social and economic deprivation can adversely affect IQ. Children from households in poverty have lower IQs than do children from households with more resources even when other factors such as education, race, and parenting are controlled (Brooks-Gunn & Duncan, 1997). Poverty may lead to diets that are undernourishing or lacking in appropriate vitamins, and poor children may also be more likely to be exposed to toxins such as lead in drinking water, dust, or paint chips (Bellinger & Needleman, 2003). Both of these factors can slow brain development and reduce intelligence.

If impoverished environments can harm intelligence, we might wonder whether enriched environments can improve it. Government-funded after-school programs such as Head Start are designed to help children learn. Research has found that attending such programs may increase intelligence for a short time, but these increases rarely last after the programs end (McLoyd, 1998; Perkins & Grotzer, 1997). But other studies suggest that Head Start and similar programs may improve emotional intelligence and reduce the likelihood that children will drop out of school or be held back a grade (Reynolds, Temple, Robertson, & Mann 2001).

Intelligence is improved by education; the number of years a person has spent in school correlates at about $r = .6$ with IQ (Ceci, 1991). In part this correlation may be due to the fact that people with higher IQ scores enjoy taking classes more than people with low IQ scores, and they thus are more likely to stay in school. But education also has a causal effect on IQ. Comparisons between children who are almost exactly the same age but who just do or just do not make a deadline for entering school in a given school year show that those who enter school a year earlier have higher IQ than those who have to wait until the next year to begin school (Baltes & Reinert, 1969; Ceci & Williams, 1997). Children's IQs tend to drop significantly during summer vacations (Huttenlocher, Levine, & Vevea, 1998), a finding that suggests that a longer school year, as is used in Europe and East Asia, is beneficial.

It is important to remember that the relative roles of nature and nurture can never be completely separated. A child who has higher than average intelligence will be treated differently than a child who has lower than

average intelligence, and these differences in behaviors will likely amplify initial differences. This means that modest genetic differences can be multiplied into big differences over time.

The Social, Cultural, and Political Aspects of Intelligence

Intelligence is defined by the culture in which it exists. Most people in Western cultures tend to agree with the idea that intelligence is an important personality variable that should be admired in those who have it. But people from Eastern cultures tend to place less emphasis on individual intelligence and are more likely to view intelligence as reflecting wisdom and the desire to improve the society as a whole rather than only themselves (Baral & Das, 2004; Sternberg, 2007). And in some cultures, such as the United States, it is seen as unfair and prejudicial to argue, even at a scholarly conference, that men and women might have different abilities in domains such as math and science and that these differences might be caused by genetics (even though, as we have seen, a great deal of intelligence is determined by genetics). In short, although psychological tests accurately measure intelligence, it is cultures that interpret the meanings of those tests and determine how people with differing levels of intelligence are treated.

Extremes of Intelligence: Retardation and Giftedness

The results of studies assessing the measurement of intelligence show that IQ is distributed in the population in the form of anormal distribution (or bell curve), which is the pattern of scores usually observed in a variable that clusters around its average. In a normal distribution, the bulk of the scores fall toward the middle, with many fewer scores falling at the extremes. The normal distribution of intelligence (Figure 9.6 "Distribution of IQ Scores in the General Population") shows that on IQ tests, as well as on most other measures, the majority of people cluster around the average (in this case, where IQ = 100), and fewer are either very smart or very dull. Because the standard deviation of an IQ test is about 15, this means that about 2% of people score above an IQ of 130 (often considered the threshold for giftedness), and about the same percentage score below an IQ of 70 (often being considered the threshold for mental retardation).

Although Figure 9.6 "Distribution of IQ Scores in the General Population"presents a single distribution, the actual IQ distribution varies by sex such that the distribution for men is more spread out than is the distribution for women. These sex differences mean that about 20% more men than women fall in the extreme (very smart or very dull) ends of the distribution (Johnson, Carothers, & Deary, 2009). Boys are about five times more likely to be diagnosed with the reading disability dyslexia than are girls (Halpern, 1992), and are also more likely to be classified as mentally retarded. But boys are also about 20% more highly represented in the upper end of the IQ distribution.

Extremely Low Intelligence

One end of the distribution of intelligence scores is defined by people with very low IQ. Mental retardation is a generalized disorder ascribed to people who have an IQ below 70, who have experienced deficits since

childhood, and who have trouble with basic life skills, such as dressing and feeding oneself and communicating with others (Switzky & Greenspan, 2006). About 1% of the United States population, most of them males, fulfill the criteria for mental retardation, but some children who are diagnosed as mentally retarded lose the classification as they get older and better learn to function in society. A particular vulnerability of people with low IQ is that they may be taken advantage of by others, and this is an important aspect of the definition of mental retardation (Greenspan, Loughlin, & Black, 2001).] Mental retardation is divided into four categories: mild, moderate, severe, and profound. Severe and profound mental retardation is usually caused by genetic mutations or accidents during birth, whereas mild forms have both genetic and environmental influences.

One cause of mental retardation is Down syndrome, a chromosomal disorder leading to mental retardation caused by the presence of all or part of an extra 21st chromosome. The incidence of Down syndrome is estimated at 1 per 800 to 1,000 births, although its prevalence rises sharply in those born to older mothers. People with Down syndrome typically exhibit a distinctive pattern of physical features, including a flat nose, upwardly slanted eyes, a protruding tongue, and a short neck.

Societal attitudes toward individuals with mental retardation have changed over the past decades. We no longer use terms such as "mor on," " idiot," or " imbecile" to describe these people, although these were the official psychological terms used to describe degrees of retardation in the past. Laws such as the Americans with Disabilities Act (ADA) have made it illegal to discriminate on the basis of mental and physical disability, and there has been a trend to bring the mentally retarded out of institutions and into our workplaces and schools. In 2002 the U.S. Supreme Court ruled that the execution of people with mental retardation is "c ruel and unusual punishment," thereby ending this practice (Atkins v. Virginia, 2002).

Extremely High Intelligence

Having extremely high IQ is clearly less of a problem than having extremely low IQ, but there may also be challenges to being particularly smart. It is often assumed that schoolchildren who are labeled as " gifted" may have adjustment problems that make it more difficult for them to create social relationships. To study gifted children, Lewis Terman and his colleagues (Terman & Oden, 1959) selected about 1,500 high school students who scored in the top 1% on the Stanford-Binet and similar IQ tests (i.e., who had IQs of about 135 or higher), and tracked them for more than seven decades (the children became known as the " termites" and are still being studied today). This study found, first, that these students were not unhealthy or poorly adjusted but rather were above average in physical health and were taller and heavier than individuals in the general population. The students also had above average social relationships—for instance, being less likely to divorce than the average person (Seagoe, 1975).

Terman's study also found that many of these students went on to achieve high levels of education and entered prestigious professions, including medicine, law, and science. Of the sample, 7% earned doctoral

degrees, 4% earned medical degrees, and 6% earned law degrees. These numbers are all considerably higher than what would have been expected from a more general population. Another study of young adolescents who had even higher IQs found that these students ended up attending graduate school at a rate more than 50 times higher than that in the general population (Lubinski & Benbow, 2006).

As you might expect based on our discussion of intelligence, kids who are gifted have higher scores on general intelligence (g). But there are also different types of giftedness. Some children are particularly good at math or science, some at automobile repair or carpentry, some at music or art, some at sports or leadership, and so on. There is a lively debate among scholars about whether it is appropriate or beneficial to label some children as " gifted and talented‖ in school and to provide them with accelerated special classes and other programs that are not available to everyone. Although doing so may help the gifted kids (Colangelo & Assouline, 2009), it also may isolate them from their peers and make such provisions unavailable to those who are not classified as " gifted.

Sex Differences in Intelligence

As discussed in the introduction to Unit 9 "Intelligence and Language", Lawrence Summers's claim about the reasons why women might be underrepresented in the hard sciences was based in part on the assumption that environment, such as the presence of gender discrimination or social norms, was important but also in part on the possibility that women may be less genetically capable of performing some tasks than are men. These claims, and the responses they provoked, provide another example of how cultural interpretations of the meanings of IQ can create disagreements and even guide public policy. The fact that women earn many fewer degrees in the hard sciences than do men is not debatable (as shown in Figure 9.9 "Bachelor's Degrees Earned by Women in Selected Fields (2006)"), but the reasons for these differences are.

Differences in degree choice are probably not due to overall intelligence because men and women have almost identical intelligence as measured by standard IQ and aptitude tests (Hyde, 2005). On the other hand, it is possible that the differences are due to variability in intelligence, because more men than women have very high (as well as very low) intelligence. Perhaps success in the mathematical and physical sciences requires very high IQ, and this favors men.

There are also observed sex differences on some particular types of tasks. Women tend to do better than men on some verbal tasks, including spelling, writing, and pronouncing words (Halpern et al., 2007), and they have better emotional intelligence in the sense that they are better at detecting and recognizing the emotions of others (McClure, 2000).

On average, men do better than women on tasks requiring spatial ability, such as the mental rotation tasks shown in Figure 9.10 (Voyer, Voyer, & Bryden, 1995). Boys tend to do better than girls on both geography and geometry tasks (Vogel, 1996). On the math part of the Scholastic Assessment Test (SAT), boys with scores of 700 or above outnumber girls by more than 10 to 1 (Benbow & Stanley, 1983), but there are also more boys in the lowest end of the distribution as well.

Although these differences are real, and can be important, keep in mind that like virtually all sex group differences, the average difference between men and women is small compared to the average differences within each sex. There are many women who are better than the average man on spatial tasks, and many men who score higher than the average women in terms of emotional intelligence. Sex differences in intelligence allow us to make statements only about average differences and do not say much about any individual person.

Although society may not want to hear it, differences between men and women may be in part genetically determined, perhaps by differences in brain lateralization or by hormones (Kimura & Hampson, 1994; Voyer, Voyer, & Bryden, 1995). But nurture is also likely important (Newcombe & Huttenlocker, 2006). As infants, boys and girls show no or few differences in spatial or counting abilities, suggesting that the differences occur at least in part as a result of socialization (Spelke, 2005). Furthermore, the number of women entering the hard sciences has been increasing steadily over the past years, again suggesting that some of the differences may have been due to gender discrimination and societal expectations about the appropriate roles and skills of women.

Racial Differences in Intelligence

Although their bell curves overlap considerably, there are also differences in which members of different racial and ethnic groups cluster along the IQ line. The bell curves for some groups (Jews and East Asians) are centered somewhat higher than for Whites in general (Lynn, 1996; Neisser et al., 1996). Other groups, including Blacks and Hispanics, have averages somewhat lower than those of Whites. The center of the IQ distribution for African Americans is about 85, and that for Hispanics is about 93 (Hunt & Carlson, 2007).

The observed average differences in intelligence between groups has at times led to malicious and misguided attempts to try to correct for them through discriminatory treatment of people from different races, ethnicities, and nationalities (Lewontin, Rose, & Kamin, 1984). One of the most egregious was the spread of eugenics, the proposal that one could improve the human species by encouraging or permitting reproduction of only those people with genetic characteristics judged desirable.

Eugenics became immensely popular in the United States in the early 20th century and was supported by many prominent psychologists, including Sir Francis Galton. Dozens of universities, including those in the Ivy League, offered courses in eugenics, and the topic was presented in most high school and college biology texts (Selden, 1999). Belief in the policies of eugenics led the U.S. Congress to pass laws designed to restrict immigration from other countries supposedly marked by low intelligence, particularly those in eastern and southern Europe. And because more than one-half of the U.S. states passed laws requiring the sterilization of low-IQ individuals, more than 60,000 Americans, mostly African Americans and other poor minorities, underwent forced sterilizations. Fortunately, the practice of sterilization was abandoned between the 1940s and the 1960s, although sterilization laws remained on the books in some states until the 1970s.

One explanation for race differences in IQ is that intelligence tests are biased against some groups and in favor of others. By bias, what psychologists mean is that a test predicts outcomes—such as grades or occupational success—better for one group than it does for another. If IQ is a better predictor of school grade point average for Whites than it is for Asian Americans, for instance, then the test would be biased against Asian Americans, even though the average IQ scores for Asians might be higher. But IQ tests do not seem to be racially biased because the observed correlations between IQ tests and both academic and occupational achievement are about equal across races (Brody, 1992).

Another way that tests might be biased is if questions are framed such that they are easier for people from one culture to understand than for people from other cultures. For example, even a very smart person will not do well on a test if he or she is not fluent in the language in which the test is administered, or does not understand the meaning of the questions being asked. But modern intelligence tests are designed to be culturally neutral, and group differences are found even on tests that only ask about spatial intelligence. Although some researchers still are concerned about the possibility that intelligence tests are culturally biased, it is probably not the case that the tests are creating all of the observed group differences (Suzuki & Valencia, 1997).

Communicating With Others: The Development and Use of Language Human language is the most complex behavior on the planet and, at least as far as we know, in the universe. Language involves both the ability to comprehend spoken and written words and to create communication in real time when we speak or write. Most languages are oral, generated through speaking. Speaking involves a variety of complex cognitive, social, and biological processes including operation of the vocal cords, and the coordination of breath with movements of the throat and mouth, and tongue. Other languages are sign languages, in which the communication is expressed by movements of the hands. The most common sign language is American Sign Language (ASL), currently spoken by more than 500,000 people in the United States alone.

Although language is often used for the transmission of information (“ turn right at the next light and then go straight,‖ ―Place tab A into slot B‖), this is only its most mundane function. Language also allows us to access existing knowledge, to draw conclusions, to set and accomplish goals, and to understand and communicate complex social relationships. Language is fundamental to our ability to think, and without it we would be nowhere near as intelligent as we are.

Language can be conceptualized in terms of sounds, meaning, and the environmental factors that help us understand it. Phonemes are the elementary sounds of our language, morphemes are the smallest units of meaning in a language, syntax is the set of grammatical rules that control how words are put together, and contextual information is the elements of communication that are not part of the content of language but that help us understand its meaning. The Components of Language

A phoneme is the smallest unit of sound that makes a meaningful difference in a language. The word “ bit‖ has three phonemes, /b/, /i/, and

/t/ (in transcription, phonemes are placed between slashes), and the word " pit‖ also has three: /p/, /i/, and /t/. In spoken languages, phonemes are produced by the positions and movements of the vocal tract, including our lips, teeth, tongue, vocal cords, and throat, whereas in sign languages phonemes are defined by the shapes and movement of the hands.

There are hundreds of unique phonemes that can be made by human speakers, but most languages only use a small subset of the possibilities. English contains about 45 phonemes,

whereas other languages have as few as 15 and others more than 60. The Hawaiian language contains only about a dozen phonemes, including 5 vowels (a, e, i, o, and u) and 7 consonants (h, k, l, m, n, p, and w).

In addition to using a different set of phonemes, because the phoneme is actually a category of sounds that are treated alike within the language, speakers of different languages are able to hear the difference only between some phonemes but not others. This is known as the categorical perception of speech sounds. English speakers can differentiate the /r/ phoneme from the /l/ phoneme, and thus " rake‖ and " lake‖ are heard as different words. In Japanese, however, /r/ and /l/ are the same phoneme, and thus speakers of that language cannot tell the difference between the word " rake‖ and the word " lake.‖ Try saying the words " cool‖ and " keep‖ out loud. Can you hear the difference between the two /k/ sounds? To English speakers they both sound the same, but to speakers of Arabic these represent two different phonemes.

Infants are born able to understand all phonemes, but they lose their ability to do so as they get older; by 10 months of age a child's ability to recognize phonemes becomes very similar to that of the adult speakers of the native language. Phonemes that were initially differentiated come to be treated as equivalent (Werker & Tees, 2002). Figure 9.11

When adults hear speech sounds that gradually change from one phoneme to another, they do not hear the continuous change; rather, they hear one sound until they suddenly begin hearing the other. In this case, the change is from /ba/ to /pa/. Source: Adapted from Wood, C. C. (1976). Discriminability, response bias, and phoneme categories in discrimination of voice onset time. Journal of the Acoustical Society of America, 60(6), 1381–1389.

Whereas phonemes are the smallest units of sound in language, a morphemeis a string of one or more phonemes that makes up the smallest units of meaning in a language. Some morphemes, such as one-letter words like " I‖ and " a,‖ are also phonemes, but most morphemes are made up of combinations of phonemes. Some morphemes are prefixes and suffixes used to modify other words. For example, the syllable " re-‖ as in " rewrite‖ or " repay‖ means "to do again,‖ and the suffix " -est‖ as in "ha ppiest‖ or " coolest‖ means " to the maximum.‖

Syntax is the set of rules of a language by which we construct sentences. Each language has a different syntax. The syntax of the English language requires that each sentence have a noun and a verb, each of which may be modified by adjectives and adverbs. Some syntaxes make use of the order in which words appear, while others do not. In English, "T he man bites the dog‖ is different from "T he dog bites the man.‖ In German, however, only the article endings before the noun matter. " Der Hund

beisst den Mann‖ means " The dog bites the man‖ but so does "D en Mann beisst der Hund.‖

Words do not possess fixed meanings but change their interpretation as a function of the context in which they are spoken. We usecontextual information—the information surrounding language—to help us interpret it. Examples of contextual information include the knowledge that we have and that we know that other people have, and nonverbal expressions such as facial expressions, postures, gestures, and tone of voice. Misunderstandings can easily arise if people aren't attentive to contextual information or if some of it is missing, such as it may be in newspaper headlines or in text messages.

Examples in Which Syntax Is Correct but the Interpretation Can Be Ambiguous Grandmother of Eight Makes Hole in One Milk Drinkers Turn to Powder Farmer Bill Dies in House Old School Pillars Are Replaced by Alumni Two Convicts Evade Noose, Jury Hung Include Your Children When Baking Cookies The Biology and Development of Language

Anyone who has tried to master a second language as an adult knows the difficulty of language learning. And yet children learn languages easily and naturally. Children who are not exposed to language early in their lives will likely never learn one. Case studies, including Victor the " Wild Child,‖ who was abandoned as a baby in France and not discovered until he was 12, and Genie, a child whose parents kept her locked in a closet from 18 months until 13 years of age, are (fortunately) two of the only known examples of these deprived children. Both of these children made some progress in socialization after they were rescued, but neither of them ever developed language (Rymer, 1993). This is also why it is important to determine quickly if a child is deaf and to begin immediately to communicate in sign language. Deaf children who are not exposed to sign language during their early years will likely never learn it (Mayberry, Lock, & Kazmi, 2002).

For the 90% of people who are right-handed, language is stored and controlled by the left cerebral cortex, although for some left-handers this pattern is reversed. These differences can easily be seen in the results of neuroimaging studies that show that listening to and producing language creates greater activity in the left hemisphere than in the right. Broca's area, an area in front of the left hemisphere near the motor cortex, is responsible for language production (Figure 9.13 "Drawing of Brain Showing Broca's and Wernicke's Areas"). This area was first localized in the 1860s by the French physician Paul Broca, who studied patients with lesions to various parts of the brain.Wernicke's area, an area of the brain next to the auditory cortex, is responsible for language comprehension. Figure 9.13 Drawing of Brain Showing Broca's and Wernicke's Areas

For most people the left hemisphere is specialized for language. Broca's area, near the motor cortex, is involved in language production, whereasWernicke's area, near the auditory cortex, is specialized for language comprehension.

Evidence for the importance of Broca's and Wernicke's areas in language is seen in patients who experience aphasia, a condition in

which language functions are severely impaired. People with Broca‘s aphasia have difficulty producing speech, whereas people with damage to Wernicke‘s area can produce speech, but what they say makes no sense and they have trouble understanding language.

Learning Language

Language learning begins even before birth, because the fetus can hear muffled versions of speaking from outside the womb. Moon, Cooper, and Fifer (1993) found that infants only two days old sucked harder on a pacifier when they heard their mothers‘ native language being spoken than when they heard a foreign language, even when strangers were speaking the languages. Babies are also aware of the patterns of their native language, showing surprise when they hear speech that has a different patterns of phonemes than those they are used to (Saffran, Aslin, & Newport, 2004).

During the first year or so after birth, and long before they speak their first words, infants are already learning language. One aspect of this learning is practice in producing speech. By the time they are 6 to 8 weeks old, babies start making vowel sounds (“ ooohh,‖ “ aaahh,‖ “ goo‖) as well as a variety of cries and squeals to help them practice.

At about 7 months, infants begin babbling, engaging in intentional vocalizations that lack specific meaning. Children babble as practice in creating specific sounds, and by the time they are 1 year old, the babbling uses primarily the sounds of the language that they are learning (de Boysson-Bardies, Sagart, & Durand, 1984). These vocalizations have a conversational tone that sounds meaningful even though it isn‘t. Babbling also helps children understand the social, communicative function of language. Children who are exposed to sign language babble in sign by making hand movements that represent real language (Petitto & Marentette, 1991).

At the same time that infants are practicing their speaking skills by babbling, they are also learning to better understand sounds and eventually the words of language. One of the first words that children understand is their own name, usually by about 6 months, followed by commonly used words like “ bottle,‖ “ mama,‖ and “ doggie‖ by 10 to 12 months (Mandel, Jusczyk, & Pisoni, 1995).

The infant usually produces his or her first words at about 1 year of age. It is at this point that the child first understands that words are more than sounds—they refer to particular objects and ideas. By the time children are 2 years old, they have a vocabulary of several hundred words, and by kindergarten their vocabularies have increased to several thousand words. By fifth grade most children know about 50,000 words and by the time they are in college, about 200,000.

The early utterances of children contain many errors, for instance, confusing /b/ and /d/, or /c/ and /z/. And the words that children create are often simplified, in part because they are not yet able to make the more complex sounds of the real language (Dobrich & Scarborough, 1992). Children may say “ keekee‖ for kitty, “ nana‖ for banana, and “ veskettі‖ for spaghetti in part because it is easier. Often these early words are accompanied by gestures that may also be easier to produce than the words themselves. Children‘s pronunciations become increasingly

accurate between 1 and 3 years, but some problems may persist until school age.

Most of a child‘s first words are nouns, and early sentences may include only the noun. “ Ma‖ may mean “ more milk please‖ and “ da‖ may mean “ look, there‘s Fido.‖ Eventually the length of the utterances increases to two words (“ mo ma‖ or “ da bark‖), and these primitive sentences begin to follow the appropriate syntax of the native language.

Because language involves the active categorization of sounds and words into higher level units, children make some mistakes in interpreting what words mean and how to use them. In particular, they often make overextensions of concepts, which means they use a given word in a broader context than appropriate. A child might at first call all adult men “ daddy‖ or all animals “doggie.‖

Children also use contextual information, particularly the cues that parents provide, to help them learn language. Infants are frequently more attuned to the tone of voice of the person speaking than to the content of the words themselves, and are aware of the target of speech. Werker, Pegg, and McLeod (1994) found that infants listened longer to a woman who was speaking to a baby than to a woman who was speaking to another adult.

Children learn that people are usually referring to things that they are looking at when they are speaking (Baldwin, 1993), and that that the speaker‘s emotional expressions are related to the content of their speech. Children also use their knowledge of syntax to help them figure out what words mean. If a child hears an adult point to a strange object and say, “ this is a dirb,‖ they will infer that a “ dirb‖ is a thing, but if they hear them say, “ this is a one of those dirb things‖ they will infer that it refers to the color or other characteristic of the object. And if they hear the word “dirbing,‖ they will infer that “ dirbing‖ is something that we do (Waxman, 1990).

How Children Learn Language: Theories of Language Acquisition

Psychological theories of language learning differ in terms of the importance they place on nature versus nurture. Yet it is clear that both matter. Children are not born knowing language; they learn to speak by hearing what happens around them. On the other hand, human brains, unlike those of any other animal, are prewired in a way that leads them, almost effortlessly, to learn language.

Perhaps the most straightforward explanation of language development is that it occurs through principles of learning, including association, reinforcement, and the observation of others (Skinner, 1965). There must be at least some truth to the idea that language is learned, because children learn the language that they hear spoken around them rather than some other language. Also supporting this idea is the gradual improvement of language skills with time. It seems that children modify their language through imitation, reinforcement, and shaping, as would be predicted by learning theories.

But language cannot be entirely learned. For one, children learn words too fast for them to be learned through reinforcement. Between the ages of 18 months and 5 years, children learn up to 10 new words every day

(Anglin, 1993). More importantly, language is more generative than it is imitative.Generativity refers to the fact that speakers of a language can compose sentences to represent new ideas that they have never before been exposed to. Language is not a predefined set of ideas and sentences that we choose when we need them, but rather a system of rules and procedures that allows us to create an infinite number of statements, thoughts, and ideas, including those that have never previously occurred. When a child says that she " swimmed‖ in the pool, for instance, she is showing generativity. No adult speaker of English would ever say "swimmed,‖ yet it is easily generated from the normal system of producing language.

Other evidence that refutes the idea that all language is learned through experience comes from the observation that children may learn languages better than they ever hear them. Deaf children whose parents do not speak ASL very well nevertheless are able to learn it perfectly on their own, and may even make up their own language if they need to (Goldin-Meadow & Mylander, 1998). A group of deaf children in a school in Nicaragua, whose teachers could not sign, invented a way to communicate through made-up signs (Senghas, Senghas, & Pyers, 2005). The development of this new Nicaraguan Sign Language has continued and changed as new generations of students have come to the school and started using the language. Although the original system was not a real language, it is becoming closer and closer every year, showing the development of a new language in modern times.

The linguist Noam Chomsky is a believer in the nature approach to language, arguing that human brains contain a language acquisition device that includes a universal grammar that underlies all human language (Chomsky, 1965, 1972). According to this approach, each of the many languages spoken around the world (there are between 6,000 and 8,000) is an individual example of the same underlying set of procedures that are hardwired into human brains. Chomsky's account proposes that children are born with a knowledge of general rules of syntax that determine how sentences are constructed.

Chomsky differentiates between the deep structure of an idea—how the idea is represented in the fundamental universal grammar that is common to all languages, and the surface structure of the idea—how it is expressed in any one language. Once we hear or express a thought in surface structure, we generally forget exactly how it happened. At the end of a lecture, you will remember a lot of the deep structure (i.e., the ideas expressed by the instructor), but you cannot reproduce the surface structure (the exact words that the instructor used to communicate the ideas).

Although there is general agreement among psychologists that babies are genetically programmed to learn language, there is still debate about Chomsky's idea that there is a universal grammar that can account for all language learning. Evans and Levinson (2009) surveyed the world's languages and found that none of the presumed underlying features of the language acquisition device were entirely universal. In their search they found languages that did not have noun or verb phrases, that did not have tenses (e.g., past, present, future), and even some that did not have

nouns or verbs at all, even though a basic assumption of a universal grammar is that all languages should share these features.

Bilingualism and Cognitive Development

Although it is less common in the United States than in other countries,bilingualism (the ability to speak two languages) is becoming more and more frequent in the modern world. Nearly one-half of the world‘s population, including 18% of U.S. citizens, grows up bilingual.

In recent years many U.S. states have passed laws outlawing bilingual education in schools. These laws are in part based on the idea that students will have a stronger identity with the school, the culture, and the government if they speak only English, and in part based on the idea that speaking two languages may interfere with cognitive development.

Some early psychological research showed that, when compared with monolingual children, bilingual children performed more slowly when processing language, and their verbal scores were lower. But these tests were frequently given in English, even when this was not the child‘s first language, and the children tested were often of lower socioeconomic status than the monolingual children (Andrews, 1982).

More current research that has controlled for these factors has found that, although bilingual children may in some cases learn language somewhat slower than do monolingual children (Oller & Pearson, 2002), bilingual and monolingual children do not significantly differ in the final depth of language learning, nor do they generally confuse the two languages (Nicoladis & Genesee, 1997). In fact, participants who speak two languages have been found to have better cognitive functioning, cognitive flexibility, and analytic skills in comparison to monolinguals (Bialystok, 2009). Research (Figure 9.15 "Gray Matter in Bilinguals") has also found that

learning a second language produces changes in the area of the brain in the left hemisphere that is involved in language, such that this area is denser and contains more neurons (Mechelli et al., 2004). Furthermore, the increased density is stronger in those individuals who are most proficient in their second language and who learned the second language earlier. Thus, rather than slowing language development, learning a second language seems to increase cognitive abilities.

Nonhuman animals have a wide variety of systems of communication. Some species communicate using scents; others use visual displays, such as baring the teeth, puffing up the fur, or flapping the wings; and still others use vocal sounds. Male songbirds, such as canaries and finches, sing songs to attract mates and to protect territory, and chimpanzees use a combination of facial expressions, sounds, and actions, such as slapping the ground, to convey aggression (de Waal, 1989). Honeybees use a “ waggle dance‖ to direct other bees to the location of food sources (von Frisch, 1956). The language of vervet monkeys is relatively advanced in the sense that they use specific sounds to communicate specific meanings. Vervets make different calls to signify that they have seen either a leopard, a snake, or a hawk (Seyfarth & Cheney, 1997).

Despite their wide abilities to communicate, efforts to teach animals to use language have had only limited success. One of the early efforts was made by Catherine and Keith Hayes, who raised a chimpanzee named

Viki in their home along with their own children. But Viki learned little and could never speak (Hayes & Hayes, 1952). Researchers speculated that Viki‘s difficulties might have been in part because the she could not create the words in her vocal cords, and so subsequent attempts were made to teach primates to speak using sign language or by using boards on which they can point to symbols.

Allen and Beatrix Gardner worked for many years to teach a chimpanzee named Washoe to sign using ASL. Washoe, who lived to be 42 years old, could label up to 250 different objects and make simple requests and comments, such as “ple ase tickle‖ and “ me sorry‖ (Fouts, 1997). Washoe‘s adopted daughter Loulis, who was never exposed to human signers, learned more than 70 signs simply by watching her mother sign.

The most proficient nonhuman language speaker is Kanzi, a bonobo who lives at the Language Learning Center at Georgia State University (Savage-Rumbaugh, & Lewin, 1994). As you can see in Note 9.44 "Video Clip: Language Recognition in Bonobos", Kanzi has a propensity for language that is in many ways similar to humans‘. He learned faster when he was younger than when he got older, he learns by observation, and he can use symbols to comment on social interactions, rather than simply for food treats. Kanzi can also create elementary syntax and understand relatively complex commands. Kanzi can make tools and can even play Pac-Man

And yet even Kanzi does not have a true language in the same way that humans do. Human babies learn words faster and faster as they get older, but Kanzi does not. Each new word he learns is almost as difficult as the one before. Kanzi usually requires many trials to learn a new sign, whereas human babies can speak words after only one exposure. Kanzi‘s language is focused primarily on food and pleasure and only rarely on social relationships. Although he can combine words, he generates few new phrases and cannot master syntactic rules beyond the level of about a 2-year-old human child (Greenfield & Savage-Rumbaugh, 1991).

In sum, although many animals communicate, none of them have a true language. With some exceptions, the information that can be communicated in nonhuman species is limited primarily to displays of liking or disliking, and related to basic motivations of aggression and mating. Humans also use this more primitive type of communication, in the form of nonverbal behaviorssuch as eye contact, touch, hand signs, and interpersonal distance, to communicate their like or dislike for others, but they (unlike animals) also supplant this more primitive communication with language. Although other animal brains share similarities to ours, only the human brain is complex enough to create language. What is perhaps most remarkable is that although language never appears in nonhumans, language is universal in humans. All humans, unless they have a profound brain abnormality or are completely isolated from other humans, learn language.

Language and Perception

To this point in the Unit we have considered intelligence and language as if they are separate concepts. But what if language influences our thinking? The idea that language and its structures influence and limit human thought is called linguistic relativity.

The most frequently cited example of this possibility was proposed by Benjamin Whorf (1897–1941), an American linguist who was particularly interested in Native American languages. Whorf argued that the Inuit people of Canada (sometimes known as Eskimos) had many words for snow, whereas English speakers have only one, and that this difference influenced how the different cultures perceived snow. Whorf argued that the Inuit perceived and categorized snow in finer details than English speakers possibly could, because the English language constrained perception.

Although the idea of linguistic relativism seemed reasonable, research has suggested that language has less influence on thinking than might be expected. For one, in terms of perceptions of snow, although it is true that the Inuit do make more distinctions among types of snow than do English speakers, the latter also make some distinctions (think "pow der," " slush," " whiteout," and so forth). And it is also possible that thinking about snow may influence language, rather than the other way around.

In a more direct test of the possibility that language influences thinking, Eleanor Rosch (1973) compared people from the Dani culture of New Guinea, who have only two terms for color (" dark" and " bright"), with English speakers who use many more terms. Rosch hypothesized that if language constrains perception and categorization, then the Dani should have a harder time distinguishing colors than would English speakers. But her research found that when the Dani were asked to categorize colors using new categories, they did so in almost the same way that English speakers did. Similar results were found by Frank, Everett, Fedorenko, and Gibson (2008), who showed that the Amazonian tribe known as the Pirahã, who have no linguistic method for expressing exact quantities (not even the number " one"), were nevertheless able to perform matches with large numbers without problem.

Although these data led researchers to conclude that the language we use to describe color and number does not influence our underlying understanding of the underlying sensation, another more recent study has questioned this assumption. Roberson, Davies, and Davidoff (2000) conducted another study with Dani participants and found that, at least for some colors, the names that they used to describe colors did influence their perceptions of the colors. Other researchers continue to test the possibility that our language influences our perceptions, and perhaps even our thoughts (Levinson, 1998), and yet the evidence for this possibility is, as of now, mixed.

REVIEW QUESTIONS

1. What is Intelligences? What are The Social, Cultural, and Political Aspects of Intelligence?
2. Discuss about the Extremes of Intelligence:
3. What are the difference between Extremely Low Intelligence and Extremely High Intelligence?
4. Discuss about Sex Differences in Intelligence.
5. On the basis of Theories of Language Acquisition describe How Children Learn Language?
6. Describe Bilingualism and Cognitive Development

FURTHER READINGS

1. A textbook of general psychology- Walter F. Daves
2. General Psychology- Abraham
3. Advanced general psychology-Russell W. Levanway
4. General Psychological Theory-Sigmund Freud
5. General Psychology-S K Mangal

IMPORTANT NOTES

UNIT-10 EMOTIONS AND MOTIVATIONS

Notes

CONTENTS

INTRODUCTION

The topic of this Unit is affect, defined as the experience of feeling or emotion. Affect is an essential part of the study of psychology because it plays such an important role in everyday life. As we will see, affect guides behavior, helps us make decisions, and has a major impact on our mental and physical health.

The two fundamental components of affect are emotions and motivation. Both of these words have the same underlying Latin root, meaning " to move.‖ In contrast to cognitive processes that are calm, collected, and frequently rational, emotions and motivations involve arousal, or our experiences of the bodily responses created by the sympathetic division of the autonomic nervous system (ANS). Because they involve arousal, emotions and motivations are " hot‖—they "charge,‖ " drive,‖ or " move‖ our behavior.

When we experience emotions or strong motivations, we feel the experiences. When we become aroused, the sympathetic nervous system provides us with energy to respond to our environment. The liver puts extra sugar into the bloodstream, the heart pumps more blood, our pupils dilate to help us see better, respiration increases, and we begin to perspire to cool the body. The stress hormones epinephrine and norepinephrine are released. We experience these responses as arousal.

An emotion is a mental and physiological feeling state that directs our attention and guides our behavior. Whether it is the thrill of a roller-coaster ride that elicits an unexpected scream, the flush of embarrassment that follows a public mistake, or the horror of a potential plane crash that creates an exceptionally brilliant response in a pilot, emotions move our actions. Emotions normally serve an adaptive role: We care for infants because of the love we feel for them, we avoid

making a left turn onto a crowded highway because we fear that a speeding truck may hit us, and we are particularly nice to Mandy because we are feeling guilty that we didn‘t go to her party. But emotions may also be destructive, such as when a frustrating experience leads us to lash out at others who do not deserve it.

Attributed to Charles Stangor Saylor.org

Saylor URL: http://www.saylor.org/books/ 521

Motivations are closely related to emotions. A motivation is a driving force that initiates and directs behavior. Some motivations are biological, such as the motivation for food, water, and sex. But there are a variety of other personal and social motivations that can influence behavior, including the motivations for social approval and acceptance, the motivation to achieve, and the motivation to take, or to avoid taking, risks (Morsella, Bargh, & Gollwitzer, 2009). In each case we follow our motivations because they are rewarding. As predicted by basic theories of operant learning, motivations lead us to engage in particular behaviors because doing so makes us feel good.

Motivations are often considered in psychology in terms of drives, which are internal states that are activated when the physiological characteristics of the body are out of balance, and goals, which are desired end states that we strive to attain. Motivation can thus be conceptualized as a series of behavioral responses that lead us to attempt to reduce drives and to attain goals by comparing our current state with a desired end state (Lawrence, Carver, & Scheier, 2002). Like a thermostat on an air conditioner, the body tries to maintain homeostasis, the natural state of the body‘s systems, with goals, drives, and arousal in balance. When a drive or goal is aroused—for instance, when we are hungry—the thermostat turns on and we start to behave in a way that attempts to reduce the drive or meet the goal (in this case to seek food). As the body works toward the desired end state, the thermostat continues to check whether or not the end state has been reached. Eventually, the need or goal is satisfied (we eat), and the relevant behaviors are turned off. The body‘s thermostat continues to check for homeostasis and is always ready to react to future needs.

In addition to more basic motivations such as hunger, a variety of other personal and social motivations can also be conceptualized in terms of drives or goals. When the goal of studying for an exam is hindered because we take a day off from our schoolwork, we may work harder on our studying on the next day to move us toward our goal. When we are dieting, we may be more likely to have a big binge on a day when the scale says that we have met our prior day‘s goals. And when we are lonely, the motivation to be around other people is aroused and we try to socialize. In many, if not most cases, our emotions and motivations operate out of our conscious awareness to guide our behavior (Freud, 1922; Hassin, Bargh, & Zimerman, 2009; Williams, Bargh, Nocera, & Gray, 2009).

We begin this Unit by considering the role of affect on behavior, discussing the most important psychological theories of emotions. Then we will consider how emotions influence our mental and physical health. We will discuss how the experience of long-term stress causes illness,

and then turn to research onpositive thinking and what has been learned about the beneficial health effects of more positive emotions. Finally, we will review some of the most important human motivations, including the behaviors of eating and sex. The importance of this Unit is not only in helping you gain an understanding the principles of affect but also in helping you discover the important roles that affect plays in our everyday lives, and particularly in our mental and physical health. The study of the interface between affect and physical health—that principle that "everything that is physiological is also psychological"—is a key focus of the branch of psychology known as health psychology. The importance of this topic has made health psychology one of the fastest growing fields in psychology.

The Experience of Emotion

The most fundamental emotions, known as the basic emotions, are those ofanger, disgust, fear, happiness, sadness, and surprise. The basic emotions have a long history in human evolution, and they have developed in large part to help us make rapid judgments about stimuli and to quickly guide appropriate behavior (LeDoux, 2000). The basic emotions are determined in large part by one of the oldest parts of our brain, the limbic system, including the amygdala, the hypothalamus, and the thalamus. Because they are primarily evolutionarily determined, the basic emotions are experienced and displayed in much the same way across cultures (Ekman, 1992; Elfenbein & Ambady, 2002, 2003; Fridland, Ekman, & Oster, 1987), and people are quite accurate at judging the facial expressions of people from different cultures. View Note 10.8 "Video Clip: The Basic Emotions" to see a demonstration of the basic emotions. Video Clip: The Basic Emotions

Not all of our emotions come from the old parts of our brain; we also interpret our experiences to create a more complex array of emotional experiences. For instance, the amygdala may sense fear when it senses that the body is falling, but that fear may be interpreted completely differently (perhaps even as "excitement") when we are falling on a roller-coaster ride than when we are falling from the sky in an airplane that has lost power. The cognitive interpretations that accompany emotions—known as cognitive appraisal—allow us to experience a much larger and more complex set of secondary emotions, as shown in Figure 10.2 "The Secondary Emotions". Although they are in large part cognitive, our experiences of the secondary emotions are determined in part by arousal (on the vertical axis of Figure 10.2 "The Secondary Emotions") and in part by their valence—that is, whether they are pleasant or unpleasant feelings (on the horizontal axis of Figure 10.2 "The Secondary Emotions") Figure 10.2 The Secondary Emotions The secondary emotions are those that have a major cognitive component. They are determined by both their level of arousal (low to high) and their valence (pleasant to unpleasant). When you succeed in reaching an important goal, you might spend some time enjoying your secondary emotions, perhaps the experience of joy, satisfaction, and contentment. But when your close friend wins a prize that you thought you had deserved, you might also experience a variety of secondary emotions (in this case, the negative ones)—for instance, feeling angry, sad, resentful,

and ashamed. You might mull over the event for weeks or even months, experiencing these negative emotions each time you think about it (Martin & Tesser, 2006).

The distinction between the primary and the secondary emotions is paralleled by two brain pathways: a fast pathway and a slow pathway (Damasio, 2000; LeDoux, 2000; Ochsner, Bunge, Gross, & Gabrielli, 2002). The thalamus acts as the major gatekeeper in this process (Figure 10.3 "Slow and Fast Emotional Pathways"). Our response to the basic emotion of fear, for instance, is primarily determined by the fast pathway through the limbic system. When a car pulls out in front of us on the highway, the thalamus activates and sends an immediate message to the amygdala. We quickly move our foot to the brake pedal. Secondary emotions are more determined by the slow pathway through the frontal lobes in the cortex. When we stew in jealousy over the loss of a partner to a rival or recollect on our win in the big tennis match, the process is more complex. Information moves from the thalamus to the frontal lobes for cognitive analysis and integration, and then from there to the amygdala. We experience the arousal of emotion, but it is accompanied by a more complex cognitive appraisal, producing more refined emotions and behavioral responses. There are two emotional pathways in the brain (one slow and one fast), both of which are controlled by the thalamus.

Although emotions might seem to you to be more frivolous or less important in comparison to our more rational cognitive processes, both emotions and cognitions can help us make effective decisions. In some cases we take action after rationally processing the costs and benefits of different choices, but in other cases we rely on our emotions. Emotions become particularly important in guiding decisions when the alternatives between many complex and conflicting alternatives present us with a high degree of uncertainty and ambiguity, making a complete cognitive analysis difficult. In these cases we often rely on our emotions to make decisions, and these decisions may in many cases be more accurate than those produced by cognitive processing.

The Cannon-Bard and James-Lange Theories of Emotion

Recall for a moment a situation in which you have experienced an intense emotional response. Perhaps you woke up in the middle of the night in a panic because you heard a noise that made you think that someone had broken into your house or apartment. Or maybe you were calmly cruising down a street in your neighborhood when another car suddenly pulled out in front of you, forcing you to slam on your brakes to avoid an accident. I‘m sure that you remember that your emotional reaction was in large part physical. Perhaps you remember being flushed, your heart pounding, feeling sick to your stomach, or having trouble breathing. You were experiencing the physiological part of emotion—arousal—and I‘m sure you have had similar feelings in other situations, perhaps when you were in love, angry, embarrassed, frustrated, or very sad.

If you think back to a strong emotional experience, you might wonder about the order of the events that occurred. Certainly you experienced

arousal, but did the arousal come before, after, or along theories of emotion, which differ in terms of the hypothesized role of arousal in emotion .

The Cannon-Bard theory proposes that emotions and arousal occur at the same time. The James-Lange theory proposes the emotion is the result of arousal. Schachter and Singer's two-factor model proposes that arousal and cognition combine to create emotion. If your experiences are like mine, as you reflected on the arousal that you have experienced in strong emotional situations, you probably thought something like, " I was afraid and my heart started beating like crazy.‖ At least some psychologists agree with this interpretation. According to the theory of emotion proposed by Walter Cannon and Philip Bard, the experience of the emotion (in this case, " I'm afraid‖) occurs alongside our experience of the arousal (" my heart is beating fast‖). According to the Cannon-Bard theory of emotion, the experience of an emotion is accompanied by physiological arousal. Thus, according to this model of emotion, as we become aware of danger, our heart rate also increases.

Although the idea that the experience of an emotion occurs alongside the accompanying arousal seems intuitive to our everyday experiences, the psychologists William James and Carl Lange had another idea about the role of arousal. According to the James-Lange theory of emotion, our experience of an emotion is the result of the arousal that we experience. This approach proposes that the arousal and the emotion are not independent, but rather that the emotion depends on the arousal. The fear does not occur along with the racing heart but occurs because of the racing heart. As William James put it, "W e feel sorry because we cry, angry because we strike, afraid because we tremble‖ (James, 1884, p. 190). A fundamental aspect of the James-Lange theory is that different patterns of arousal may create different emotional experiences.

There is research evidence to support each of these theories. The operation of the fast emotional pathway (Figure 10.3 "Slow and Fast Emotional Pathways") supports the idea that arousal and emotions occur together. The emotional circuits in the limbic system are activated when an emotional stimulus is experienced, and these circuits quickly create corresponding physical reactions (LeDoux, 2000). The process happens so quickly that it may feel to us as if emotion is simultaneous with our physical arousal.

On the other hand, and as predicted by the James-Lange theory, our experiences of emotion are weaker without arousal. Patients who have spinal injuries that reduce their experience of arousal also report decreases in emotional responses (Hohmann, 1966). There is also at least some support for the idea that different emotions are produced by different patterns of arousal. People who view fearful faces show more amygdala activation than those who watch angry or joyful faces **The Two-Factor Theory of Emotion**

Whereas the James-Lange theory proposes that each emotion has a different pattern of arousal, the two-factor theory of emotion takes the opposite approach, arguing that the arousal that we experience is basically the same in every emotion, and that all emotions (including the basic emotions) are differentiated only by our cognitive appraisal of the

source of the arousal. The two-factor theory of emotion asserts that the experience of emotion is determined by the intensity of the arousal we are experiencing, but that the cognitive appraisal of the situation determines what the emotion will be. Because both arousal and appraisal are necessary, we can say that emotions have two factors: an arousal factor and a cognitive factor.

emotion = arousal + cognition

In some cases it may be difficult for a person who is experiencing a high level of arousal to accurately determine which emotion she is experiencing. That is, she may be certain that she is feeling arousal, but the meaning of the arousal (the cognitive factor) may be less clear. Some romantic relationships, for instance, have a very high level of arousal, and the partners alternatively experience extreme highs and lows in the relationship. One day they are madly in love with each other and the next they are in a huge fight. In situations that are accompanied by high arousal, people may be unsure what emotion they are experiencing. In the high arousal relationship, for instance, the partners may be uncertain whether the emotion they are feeling is love, hate, or both at the same time (sound familiar?). The tendency for people to incorrectly label the source of the arousal that they are experiencing is known as the misattribution of arousal.

In one interesting field study by Dutton and Aron (1974), an attractive young woman approached individual young men as they crossed a wobbly, long suspension walkway hanging more than 200 feet above a river in British Columbia, Canada. The woman asked each man to help her fill out a class questionnaire. When he had finished, she wrote her name and phone number on a piece of paper, and invited him to call if he wanted to hear more about the project. More than half of the men who had been interviewed on the bridge later called the woman. In contrast, men approached by the same woman on a low solid bridge, or who were interviewed on the suspension bridge by men, called significantly less frequently. The idea of misattribution of arousal can explain this result—the men were feeling arousal from the height of the bridge, but they misattributed it as romantic or sexual attraction to the woman, making them more likely to call her.

Because it assumes that arousal is constant across emotions, the two-factor theory also predicts that emotions may transfer or " spill over‖ from one highly arousing event to another. My university basketball team recently won the NCAA basketball championship, but after the final victory some students rioted in the streets near the campus, lighting fires and burning cars. This seems to be a very strange reaction to such a positive outcome for the university and the students, but it can be explained through the spillover of the arousal caused by happiness to destructive behaviors. The principle of excitation transfer refers to the phenomenon that occurs when people who are already experiencing arousal from one event tend to also experience unrelated emotions more strongly.

In sum, each of the three theories of emotion has something to support it. In terms of Cannon-Bard, emotions and arousal generally are subjectively experienced together, and the spread is very fast. In support

of the James-Lange theory, there is at least some evidence that arousal is necessary for the experience of emotion, and that the patterns of arousal are different for different emotions. And in line with the two-factor model, there is also evidence that we may interpret the same patterns of arousal differently in different situations.

In addition to experiencing emotions internally, we also express our emotions to others, and we learn about the emotions of others by observing them. This communication process has evolved over time, and is highly adaptive. One way that we perceive the emotions of others is through theirnonverbal communication, that is, communication that does not involve words (Ambady & Weisbuch, 2010; Anderson, 2007). Nonverbal communication includes our tone of voice, gait, posture, touch, and facial expressions, and we can often accurately detect the emotions that other people are experiencing through these channels. Table 10.1 "Some Common Nonverbal Communicators" shows some of the important nonverbal behaviors that we use to express emotion and some other information (particularly liking or disliking, and dominance or submission).

Just as there is no " universal‖ spoken language, there is no universal nonverbal language. For instance, in the United States and many Western cultures we express disrespect by showing the middle finger (the " finger‖ or the " bird‖). But in Britain, Ireland, Australia and New Zealand, the "V‖ sign (made with back of the hand facing the recipient) serves a similar purpose. In countries where Spanish, Portuguese, or French are spoken, a gesture in which a fist is raised and the arm is slapped on the bicep is equivalent to the finger, and in Russia, Indonesia, Turkey, and China a sign in which the hand and fingers are curled and the thumb is thrust between the middle and index fingers is used for the same purpose.

The most important communicator of emotion is the face. The face contains 43 different muscles that allow it to make more than 10,000 unique configurations and to express a wide variety of emotions. For example, happiness is expressed by smiles, which are created by two of the major muscles surrounding the mouth and the eyes, and anger is created by lowered brows and firmly pressed lips.

In addition to helping us express our emotions, the face also helps us feel emotion. The facial feedback hypothesis proposes that the movement of our facial muscles can trigger corresponding emotions. Fritz Strack and his colleagues (1988) asked their research participants to hold a pen in their teeth (mimicking the facial action of a smile) or between their lips (similar to a frown), and then had them rate the funniness of a cartoon. They found that the cartoons were rated as more amusing when the pen was held in the " smiling‖ position—the subjective experience of emotion was intensified by the action of the facial muscles.

These results, and others like them, show that our behaviors, including our facial expressions, are influenced by, but also influence our affect. We may smile because we are happy, but we are also happy because we are smiling. And we may stand up straight because we are proud, but we are proud because we are standing up straight (Stepper & Strack, 1993).

Stress: The Unseen Killer

Emotions matter because they influence our behavior. And there is no emotional experience that has a more powerful influence on us than stress.Stress refers to the physiological responses that occur when an organism fails to respond appropriately to emotional or physical threats (Selye, 1956). Extreme negative events, such as being the victim of a terrorist attack, a natural disaster, or a violent crime, may produce an extreme form of stress known asposttraumatic stress disorder (PTSD), a medical syndrome that includes symptoms of anxiety, sleeplessness, nightmares, and social withdrawal. PTSD is frequently experienced by soldiers who return home from wars, with those who have experienced more extreme events during the war also experiencing more PTSD.

When it is extreme or prolonged, stress can create substantial health problems. Survivors of hurricane Katrina had three times the rate of heart attacks than the national average in the years following the disaster, and this is probably due to the stress that the hurricane created (American Medical Association, 2009). And people in New York City who lived nearer to the site of the 9/11 terrorist attacks reported experiencing more stress in the year following it than those who lived farther away (Pulcino et al., 2003). But stress is not unique to the experience of extremely traumatic events. It can also occur, and have a variety of negative outcomes, in our everyday lives.

The Negative Effects of Stress

The physiologist Hans Seyle (1907–1982) studied stress by examining how rats responded to being exposed to stressors such as extreme cold, infection, shock, or excessive exercise (Seyle, 1936, 1974, 1982). Seyle found that regardless of the source of the stress, the rats experienced the same series of physiological changes as they suffered the prolonged stress. Seyle created the termgeneral adaptation syndrome to refer to the three distinct phases of physiological change that occur in response to long-term stress: alarm, resistance, and exhaustion (Figure 10.8 "General Adaptation Syndrome"). Figure 10.8 General Adaptation Syndrome Hans Seyle’s research on the general adaptation syndrome documented the stages of prolonged exposure to stress.

The experience of stress creates both an increase in general arousal in the sympathetic division of the autonomic nervous system (ANS), as well as another, even more complex, system of physiological changes through the HPA axis ((Reference None not found in Book)). The HPA axis is a physiological response to stress involving interactions among the hypothalamus, the pituitary, and the adrenal glands. The HPA response begins when the hypothalamus secretes releasing hormones that direct the pituitary gland to release the hormone ACTH. ACTH then directs the adrenal glands to secrete more hormones, including epinephrine, norepinephrine, and cortisol, a stress hormone that releases sugars into the blood, helping preparing the body to respond to threat .

Stress activates the HPA axis. The result is the secretion of epinephrine, norepinephrine, and cortisol.

The initial arousal that accompanies stress is normally quite adaptive because it helps us respond to potentially dangerous events. The experience of prolonged stress, however, has a direct negative influence

on our physical health, because at the same time that stress increases activity in the sympathetic division of the ANS, it also suppresses activity in the parasympathetic division of the ANS. When stress is long-term, the HPA axis remains active and the adrenals continue to produce cortisol. This increased cortisol production exhausts the stress mechanism, leading to fatigue and depression.

The HPA reactions to persistent stress lead to a weakening of the immune system, making us more susceptible to a variety of health problems including colds and other diseases (Cohen & Herbert, 1996; Faulkner & Smith, 2009; Miller, Chen, & Cole, 2009; Uchino, Smith, Holt-Lunstad, Campo, & Reblin, 2007). Stress also damages our DNA, making us less likely to be able to repair wounds and respond to the genetic mutations that cause disease (Epel et al., 2006). As a result, wounds heal more slowly when we are under stress, and we are more likely to get cancer (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; Wells, 2006).

Chronic stress is also a major contributor to heart disease. Although heart disease is caused in part by genetic factors, as well as high blood pressure, high cholesterol, and cigarette smoking, it is also caused by stress (Krantz & McCeney, 2002). Long-term stress creates two opposite effects on the coronary system. Stress increases cardiac output (i.e., the heart pumps more blood) at the same time that it reduces the ability of the blood vessels to conduct blood through the arteries, as the increase in levels of cortisol leads to a buildup of plaque on artery walls (Dekker et al., 2008). The combination of increased blood flow and arterial constriction leads to increased blood pressure (hypertension), which can damage the heart muscle, leading to heart attack and death.

Stressors in Our Everyday Lives

The stressors for Seyle‘s rats included electric shock and exposure to cold. Although these are probably not on your top-10 list of most common stressors, the stress that you experience in your everyday life can also be taxing. Thomas Holmes and Richard Rahe (1967) developed a measure of some everyday life events that might lead to stress, and you can assess your own likely stress level by completing the measure in Table 10.2 "The Holmes and Rahe Stress Scale". You might want to pay particular attention to this score, because it can predict the likelihood that you will get sick. Rahe and colleagues (1970) asked 2,500 members of the military to complete the rating scale and then assessed the health records of the soldiers over the following 6 months. The results were clear: The higher the scale score, the more likely the soldier was to end up in the hospital.

You can calculate your score on this scale by adding the total points across each of the events that you have experienced over the past year. Then use Table 10.3 "Interpretation of Holmes and Rahe Stress Scale" to determine your likelihood of getting ill. Table 10.3 Interpretation of Holmes and Rahe Stress Scale

Although some of the items on the Holmes and Rahe scale are more major, you can see that even minor stressors add to the total score. Our everyday interactions with the environment that are essentially negative, known asdaily hassles, can also create stress as well as poorer health

outcomes (Hutchinson & Williams, 2007). Events that may seem rather trivial altogether, such as misplacing our keys, having to reboot our computer because it has frozen, being late for an assignment, or getting cut off by another car in rush-hour traffic, can produce stress (Fiksenbaum, Greenglass, & Eaton, 2006). Glaser (1985) found that medical students who were tested during, rather than several weeks before, their school examination periods showed lower immune system functioning. Other research has found that even more minor stressors, such as having to do math problems during an experimental session, can compromise the immune system (Cacioppo et al., 1998). Responses to Stress Not all people experience and respond to stress in the same way, and these differences can be important. The cardiologists Meyer Friedman and R. H. Rosenman (1974) were among the first to study the link between stress and heart disease. In their research they noticed that even though the partners in married couples often had similar lifestyles, diet, and exercise patterns, the husbands nevertheless generally had more heart disease than did the wives. As they tried to explain the difference, they focused on the personality characteristics of the partners, finding that the husbands were more likely than the wives to respond to stressors with negative emotions and hostility. Recent research has shown that the strongest predictor of a physiological stress response from daily hassles is the amount of negative emotion that they evoke. People who experience strong negative emotions as a result of everyday hassles, and who respond to stress with hostility experience more negative health outcomes than do those who react in a less negative way (McIntyre, Korn, & Matsuo, 2008; Suls & Bunde, 2005). Williams and his colleagues (2001) found that people who scored high on measures of anger were three times more likely to suffer from heart attacks in comparison to those who scored lower on anger. On average, men are more likely than are women to respond to stress by activating the fight-or-flight response, which is an emotional and behavioral reaction to stress that increases the readiness for action. The arousal that men experience when they are stressed leads them to either go on the attack, in an aggressive or revenging way, or else retreat as quickly as they can to safety from the stressor. The fight-or-flight response allows men to control the source of the stress if they think they can do so, or if that is not possible, it allows them to save face by leaving the situation. The fight-or-flight response is triggered in men by the activation of the HPA axis.

Women, on the other hand, are less likely to take a fight-or-flight response to stress. Rather, they are more likely to take a tend-and-befriend response (Taylor et al., 2000). The tend-and-befriend response is a behavioral reaction to stress that involves activities designed to create social networks that provide protection from threats. This approach is also self-protective because it allows the individual to talk to others about her concerns, as well as to exchange resources, such as child care. The tend-and-befriend response is triggered in women by the release of the hormone ocytocin, which promotes affiliation. Overall, the tend-and-befriend response is healthier than the flight-or-flight response because it does not produce the elevated levels of arousal related to the

HPA, including the negative results that accompany increased levels of cortisol. This may help explain why women, on average, have less heart disease and live longer than men.

No matter how healthy and happy we are in our everyday lives, there are going to be times when we experience stress. But we do not need to throw up our hands in despair when things go wrong; rather, we can use our personal and social resources to help us. Perhaps the most common approach to dealing with negative affect is to attempt to suppress, avoid, or deny it. You probably know people who seem to be stressed, depressed, or anxious, but they cannot or will not see it in themselves. Perhaps you tried to talk to them about it, to get them to open up to you, but were rebuffed. They seem to act as if there is no problem at all, simply moving on with life without admitting or even trying to deal with the negative feelings. Or perhaps you have even taken a similar approach yourself. Have you ever had an important test to study for or an important job interview coming up, and rather than planning and preparing for it, you simply tried put it out of your mind entirely?

Research has found that ignoring stress is not a good approach for coping with it. For one, ignoring our problems does not make them go away. If we experience so much stress that we get sick, these events will be detrimental to our life even if we do not or cannot admit that they are occurring. Suppressing our negative emotions is also not a very good option, at least in the long run, because it tends to fail (Gross & Levenson, 1997). For one, if we know that we have that big exam coming up, we have to focus on the exam itself to suppress it. We can‘t really suppress or deny our thoughts, because we actually have to recall and face the event to make the attempt to not think about it. Doing so takes effort, and we get tired when we try to do it. Furthermore, we may continually worry that our attempts to suppress will fail. Suppressing our emotions might work out for a short while, but when we run out of energy the negative emotions may shoot back up into consciousness, causing us to reexperience the negative feelings that we had been trying to avoid.

Daniel Wegner and his colleagues (Wegner, Schneider, Carter, & White, 1987) directly tested whether people would be able to effectively suppress a simple thought. He asked them to not think about a white bear for 5 minutes but to ring a bell in case they did. (Try it yourself; can you do it?) However, participants were unable to suppress the thought as instructed. The white bear kept popping into mind, even when the participants were instructed to avoid thinking about it. You might have had this experience when you were dieting or trying to study rather than party; the chocolate bar in the kitchen cabinet and the fun time you were missing at the party kept popping into mind, disrupting your work.

Suppressing our negative thoughts does not work, and there is evidence that the opposite is true: When we are faced with troubles, it is healthy to let out the negative thoughts and feelings by expressing them, either to ourselves or to others. James Pennebaker and his colleagues (Pennebaker, Colder, & Sharp, 1990; Watson & Pennebaker, 1989) have conducted many correlational and experimental studies that demonstrate the advantages to our mental and physical health of opening up versus

suppressing our feelings. This research team has found that simply talking about or writing about our emotions or our reactions to negative events provides substantial health benefits. For instance, Pennebaker and Beall (1986) randomly assigned students to write about either the most traumatic and stressful event of their lives or trivial topics. Although the students who wrote about the traumas had higher blood pressure and more negative moods immediately after they wrote their essays, they were also less likely to visit the student health center for illnesses during the following six months. Other research studied individuals whose spouses had died in the previous year, finding that the more they talked about the death with others, the less likely they were to become ill during the subsequent year. Daily writing about one's emotional states has also been found to increase immune system functioning (Petrie, Fontanilla, Thomas, Booth, & Pennebaker, 2004).

Opening up probably helps in various ways. For one, expressing our problems to others allows us to gain information, and possibly support, from them (remember the tend-and-befriend response that is so effectively used to reduce stress by women). Writing or thinking about one's experiences also seems to help people make sense of these events and may give them a feeling of control over their lives (Pennebaker & Stone, 2004).

It is easier to respond to stress if we can interpret it in more positive ways. Kelsey et al. (1999) found that some people interpret stress as a challenge (something that they feel that they can, with effort, deal with), whereas others see the same stress as a threat (something that is negative and fearful). People who viewed stress as a challenge had fewer physiological stress responses than those who viewed it as a threat—they were able to frame and react to stress in more positive ways.

Emotional responses such as the stress reaction are useful in warning us about potential danger and in mobilizing our response to it, so it is a good thing that we have them. However, we also need to learn how to control our emotions, to prevent them from letting our behavior get out of control. The ability to successfully control our emotions is known as emotion regulation.

Emotion regulation has some important positive outcomes. Consider, for instance, research by Walter Mischel and his colleagues. In their studies, they had 4- and 5-year-old children sit at a table in front of a yummy snack, such as a chocolate chip cookie or a marshmallow. The children were told that they could eat the snack right away if they wanted. However, they were also told that if they could wait for just a couple of minutes, they'd be able to have two snacks—both the one in front of them and another just like it. However, if they ate the one that was in front of them before the time was up, they would not get a second.

Mischel found that some children were able to override the impulse to seek immediate gratification to obtain a greater reward at a later time. Other children, of course, were not; they just ate the first snack right away. Furthermore, the inability to delay gratification seemed to occur in a spontaneous and emotional manner, without much thought. The children who could not resist simply grabbed the cookie because it

looked so yummy, without being able to stop themselves (Metcalfe & Mischel, 1999; Strack & Deutsch, 2007).

The ability to regulate our emotions has important consequences later in life. When Mischel followed up on the children in his original study, he found that those who had been able to self-regulate grew up to have some highly positive characteristics: They got better SAT scores, were rated by their friends as more socially adept, and were found to cope with frustration and stress better than those children who could not resist the tempting cookie at a young age. Thus effective self-regulation can be recognized as an important key to success in life (Ayduk et al., 2000; Eigsti et al., 2006; Mischel & Ayduk, 2004).

Emotion regulation is influenced by body chemicals, particularly the neurotransmitter serotonin. Preferences for small, immediate rewards over large but later rewards have been linked to low levels of serotonin in animals (Bizot, Le Bihan, Peuch, Hamon, & Thiebot, 1999; Liu, Wilkinson, & Robbins, 2004), and low levels of serotonin are tied to violence and impulsiveness in human suicides (Asberg, Traskman, & Thoren, 1976).

Can we improve our emotion regulation? It turns out that training in self-regulation—just like physical training—can help. Students who practiced doing difficult tasks, such as exercising, avoiding swearing, or maintaining good posture, were later found to perform better in laboratory tests of emotion regulation such as maintaining a diet or completing a puzzle (Baumeister, Gailliot, DeWall, & Oaten, 2006; Baumeister, Schmeichel, & Vohs, 2007; Oaten & Cheng, 2006).

Positive Emotions: The Power of Happiness

Although stress is an emotional response that can kill us, our emotions can also help us cope with and protect ourselves from it. The stress of the Monday through Friday grind can be offset by the fun that we can have on the weekend, and the concerns that we have about our upcoming chemistry exam can be offset by a positive attitude toward school, life, and other people. Put simply, the best antidote for stress is a happy one: Think positively, have fun, and enjoy the company of others.

You have probably heard about the " power of positive thinking‖—the idea that thinking positively helps people meet their goals and keeps them healthy, happy, and able to effectively cope with the negative events that occur to them. It turns out that positive thinking really works. People who think positively about their future, who believe that they can control their outcomes, and who are willing to open up and share with others are healthier people (Seligman, & Csikszentmihalyi, 2000).

The power of positive thinking comes in different forms, but they are all helpful. Some researchers have focused on optimism, a general tendency to expect positive outcomes, finding that optimists are happier and have less stress (Carver & Scheier, 2009). Others have focused self-efficacy, the belief in our ability to carry out actions that produce desired outcomes. People with high self-efficacy respond to environmental and other threats in an active, constructive way—by getting information, talking to friends, and attempting to face and reduce the difficulties they are experiencing. These people too are better able to ward off their

stresses in comparison to people with less self-efficacy (Thompson, 2009).

Self-efficacy helps in part because it leads us to perceive that we can control the potential stressors that may affect us. Workers who have control over their work environment (e.g., by being able to move furniture and control distractions) experience less stress, as do patients in nursing homes who are able to choose their everyday activities (Rodin, 1986). Glass, Reim, and Singer (1971)] found that participants who believed that they could stop a loud noise experienced less stress than those who did not think that they could, even though the people who had the option never actually used it. The ability to control our outcomes may help explain why animals and people who have higher status live longer (Sapolsky, 2005).

Suzanne Kobasa and her colleagues (Kobasa, Maddi, & Kahn, 1982) have argued that the tendency to be less affected by life‘s stressors can be characterized as an individual difference measure that has a relationship to both optimism and self-efficacy known as hardiness. Hardy individuals are those who are more positive overall about potentially stressful life events, who take more direct action to understand the causes of negative events, and who attempt to learn from them what may be of value for the future. Hardy individuals use effective coping strategies, and they take better care of themselves.

Taken together, these various coping skills, including optimism, self-efficacy, and hardiness, have been shown to have a wide variety of positive effects on our health. Optimists make faster recoveries from illnesses and surgeries (Carver et al., 2005). People with high self-efficacy have been found to be better able to quit smoking and lose weight and are more likely to exercise regularly (Cohen & Pressman, 2006). And hardy individuals seem to cope better with stress and other negative life events (Dolbier, Smith, & Steinhardt, 2007). The positive effects of positive thinking are particularly important when stress is high. Baker (2007) found that in periods of low stress, positive thinking made little difference in responses to stress, but that during stressful periods optimists were less likely to smoke on a day-to-day basis and to respond to stress in more productive ways, such as by exercising. It is possible to learn to think more positively, and doing so can be beneficial. Antoni et al. (2001) found that pessimistic cancer patients who were given training in optimism reported more optimistic outlooks after the training and were less fatigued after their treatments. And Maddi, Kahn, and Maddi (1998) found that a “ hardiness training‖ program that included focusing on ways to effectively cope with stress was effective in increasing satisfaction and decreasing self-reported stress.

The benefits of taking positive approaches to stress can last a lifetime. Christopher Peterson and his colleagues (Peterson, Seligman, Yurko, Martin, & Friedman, 1998) found that the level of optimism reported by people who had first been interviewed when they were in college during the years between 1936 and 1940 predicted their health over the next 50 years. Students who had a more positive outlook on life in college were less likely to have died up to 50 years later of all causes, and they were particularly likely to have experienced fewer accidental and violent

deaths, in comparison to students who were less optimistic. Similar findings were found for older adults. After controlling for loneliness, marital status, economic status, and other correlates of health, Levy and Myers found that older adults with positive attitudes and higher self-efficacy had better health and lived on average almost 8 years longer than their more negative peers (Levy & Myers, 2005; Levy, Slade, & Kasl, 2002). And Diener, Nickerson, Lucas, and Sandvik (2002) found that people who had cheerier dispositions earlier in life had higher income levels and less unemployment when they were assessed 19 years later.

Finding Happiness Through Our Connections With Others

Happiness is determined in part by genetic factors, such that some people are naturally happier than others (Braungart, Plomin, DeFries, & Fulker, 1992; Lykken, 2000), but also in part by the situations that we create for ourselves. Psychologists have studied hundreds of variables that influence happiness, but there is one that is by far the most important. People who report that they have positive social relationships with others—the perception ofsocial support—also report being happier than those who report having less social support (Diener, Suh, Lucas, & Smith, 1999; Diener, Tamir, & Scollon, 2006). Married people report being happier than unmarried people (Pew, 2006), and people who are connected with and accepted by others suffer less depression, higher self-esteem, and less social anxiety and jealousy than those who feel more isolated and rejected (Leary, 1990).

Social support also helps us better cope with stressors. Koopman, Hermanson, Diamond, Angell, and Spiegel (1998) found that women who reported higher social support experienced less depression when adjusting to a diagnosis of cancer, and Ashton et al. (2005) found a similar buffering effect of social support for AIDS patients. People with social support are less depressed overall, recover faster from negative events, and are less likely to commit suicide (Au, Lau, & Lee, 2009; Bertera, 2007; Compton, Thompson, & Kaslow, 2005; Skärsäter, Langius, Ågren, Häagström, & Dencker, 2005).

Social support buffers us against stress in several ways. For one, having people we can trust and rely on helps us directly by allowing us to share favors when we need them. These are the direct effects of social support. But having people around us also makes us feel good about ourselves. These are the appreciation effects of social support. Gençöz and Özlale (2004) found that students with more friends felt less stress and reported that their friends helped them, but they also reported that having friends made them feel better about themselves. Again, you can see that the tend-and-befriend response, so often used by women, is an important and effective way to reduce stress.

What Makes Us Happy?

One difficulty that people face when trying to improve their happiness is that they may not always know what will make them happy. As one example, many of us think that if we just had more money we would be happier. While it is true that we do need money to afford food and

adequate shelter for ourselves and our families, after this minimum level of wealth is reached, more money does not generally buy more happiness (Easterlin, 2005). For instance, as you can see in , even though income and material success has improved dramatically in many countries over the past decades, happiness has not. Despite tremendous economic growth in France, Japan, and the United States between 1946 to 1990, there was no increase in reports of well-being by the citizens of these countries. Americans today have about three times the buying power they had in the 1950s, and yet overall happiness has not increased. The problem seems to be that we never seem to have enough money to make us "r eally‖ happy. Csikszentmihalyi (1999) reported that people who earned $30,000 per year felt that they would be happier if they made $50,000 per year, but that people who earned $100,000 per year said that they would need $250,000 per year to make them happy.

These findings might lead us to conclude that we don't always know what does or what might make us happy, and this seems to be at least partially true. For instance, Jean Twenge and her colleagues (Twenge, Campbell & Foster, 2003) have found in several studies that although people with children frequently claim that having children makes them happy, couples who do not have children actually report being happier than those who do.

Psychologists have found that people's ability to predict their future emotional states is not very accurate (Wilson & Gilbert, 2005). For one, people overestimate their emotional reactions toevents. Although people think that positive and negative events that might occur to them will make a huge difference in their lives, and although these changes do make at least some difference in life satisfaction, they tend to be less influential than we think they are going to be. Positive events tend to make us feel good, but their effects wear off pretty quickly, and the same is true for negative events. For instance, Brickman, Coates, and Janoff-Bulman (1978) interviewed people who had won more than $50,000 in a lottery and found that they were not happier than they had been in the past, and were also not happier than a control group of similar people who had not won the lottery. On the other hand, the researchers found that individuals who were paralyzed as a result of accidents were not as unhappy as might be expected.

How can this possibly be? There are several reasons. For one, people are resilient; they bring their coping skills to play when negative events occur, and this makes them feel better. Secondly, most people do not continually experience very positive, or very negative, affect over a long period of time, but rather adapt to their current circumstances. Just as we enjoy the second chocolate bar we eat less than we enjoy the first, as we experience more and more positive outcomes in our daily lives we habituate to them and our life satisfaction returns to a more moderate level (Small, Zatorre, Dagher, Evans, & Jones-Gotman, 2001).

Another reason that we may mispredict our happiness is that our social comparisons change when our own status changes as a result of new events. People who are wealthy compare themselves to other wealthy people, people who are poor tend to compare with other poor people, and people who are ill tend to compare with other ill people, When our

comparisons change, our happiness levels are correspondingly influenced. And when people are asked to predict their future emotions, they may focus only on the positive or negative event they are asked about, and forget about all the other things that won't change. Wilson, Wheatley, Meyers, Gilbert, and Axsom (2000) found that when people were asked to focus on all the more regular things that they will still be doing in the future (working, going to church, socializing with family and friends, and so forth), their predictions about how something really good or bad would influence them were less extreme.

If pleasure is fleeting, at least misery shares some of the same quality. We might think we can't be happy if something terrible, such as the loss of a partner or child, were to happen to us, but after a period of adjustment most people find that happiness levels return to prior levels (Bonnano et al., 2002). Health concerns tend to put a damper on our feeling of well-being, and those with a serious disability or illness show slightly lowered mood levels. But even when health is compromised, levels of misery are lower than most people expect (Lucas, 2007; Riis et al., 2005). For instance, although disabled individuals have more concern about health, safety, and acceptance in the community, they still experience overall positive happiness levels (Marinić & Brkljačić, 2008). Taken together, it has been estimated that our wealth, health, and life circumstances account for only 15% to 20% of life satisfaction scores (Argyle, 1999). Clearly the main ingredient in happiness lies beyond, or perhaps beneath, external factors.

Two Fundamental Human Motivations: Eating and Mating

Along with the need to drink fresh water, which humans can normally attain in all except the most extreme situations, the need for food is the most fundamental and important human need. More than 1 in 10 U.S. households contain people who live without enough nourishing food, and this lack of proper nourishment has profound effects on their abilities to create effective lives (Hunger Notes, n.d.). When people are extremely hungry, their motivation to attain food completely changes their behavior. Hungry people become listless and apathetic to save energy and then become completely obsessed with food. Ancel Keys and his colleagues (Keys, Brožek, Henschel, Mickelsen, & Taylor, 1950) found that volunteers who were placed on severely reduced-calorie diets lost all interest in sex and social activities, becoming preoccupied with food.

Like most interesting psychological phenomena, the simple behavior of eating has both biological and social determinants (Figure 10.12 "Biological, Psychological, and Social-Cultural Contributors to Eating"). Biologically, hunger is controlled by the interactions among complex pathways in the nervous system and a variety of hormonal and chemical systems in the brain and body. The stomach is of course important. We feel more hungry when our stomach is empty than when it is full. But we can also feel hunger even without input from the stomach. Two areas of the hypothalamus are known to be particularly important in eating. The lateral part of the hypothalamus responds primarily to cues to start eating, whereas the ventromedial part of the hypothalamus primarily responds to cues to stop eating. If the lateral part of the hypothalamus is

damaged, the animal will not eat even if food is present, whereas if the ventromedial part of the hypothalamus is damaged, the animal will eat until it is obese (Wolf & Miller, 1964).

Hunger is also determined by hormone levels (Figure 10.13 "Eating Is Influenced by the Appetite Hormones"). Glucose is the main sugar that the body uses for energy, and the brain monitors blood glucose levels to determine hunger. Glucose levels in the bloodstream are regulated by insulin, a hormone secreted by the pancreas gland. When insulin is low, glucose is not taken up by body cells, and the body begins to use fat as an energy source. Eating and appetite are also influenced by other hormones, including orexin, ghrelin, and leptin (Brennan & Mantzoros, 2006; Nakazato et al., 2001).

Insulin, secreted by the pancreas, controls blood glucose; leptin, secreted by fat cells, monitors energy levels; orexin, secreted by the hypothalamus, triggers hunger; ghrelin, secreted by an empty stomach, increases food intake.

Normally the interaction of the various systems that determine hunger creates a balance or homeostasis in which we eat when we are hungry and stop eating when we feel full. But homeostasis varies among people; some people simply weigh more than others, and there is little they can do to change their fundamental weight. Weight is determined in large part by thebasal metabolic rate, the amount of energy expended while at rest. Each person‘s basal metabolic rate is different, due to his or her unique physical makeup and physical behavior. A naturally occurring low metabolic rate, which is determined entirely by genetics, makes weight management a very difficult undertaking for many people.

How we eat is also influenced by our environment. When researchers rigged clocks to move faster, people got hungrier and ate more, as if they thought they must be hungry again because so much time had passed since they last ate (Schachter, 1968).] And if we forget that we have already eaten, we are likely to eat again even if we are not actually hungry (Rozin, Dow, Moscovitch, & Rajaram, 1998).

Cultural norms about appropriate weights also influence eating behaviors. Current norms for women in Western societies are based on a very thin body ideal, emphasized by television and movie actresses, models, and even children‘s dolls, such as the ever-popular Barbie. These norms for excessive thinness are very difficult for most women to attain: Barbie‘s measurements, if translated to human proportions, would be about 36 in.-18 in.-33 in. at bust-waist-hips, measurements that are attained by less than 1 in 100,000 women (Norton, Olds, Olive, & Dank, 1996). Many women idealize being thin and yet are unable to reach the standard that they prefer.

Eating Disorders

In some cases, the desire to be thin can lead to eating disorders, which are estimated to affect about 1 million males and 10 million females the United States alone (Hoek & van Hoeken, 2003; Patrick, 2002). Anorexia nervosais an eating disorder characterized by extremely low body weight, distorted body image, and an obsessive fear of gaining weight. Nine out of 10 sufferers are women. Anorexia begins with a

severe weight loss diet and develops into a preoccupation with food and dieting.

Bulimia nervosa is an eating disorder characterized by binge eating followed by purging. Bulimia nervosa begins after the dieter has broken a diet and gorged. Bulimia involves repeated episodes of overeating, followed by vomiting, laxative use, fasting, or excessive exercise. It is most common in women in their late teens or early 20s, and it is often accompanied by depression and anxiety, particularly around the time of the binging. The cycle in which the person eats to feel better, but then after eating becomes concerned about weight gain and purges, repeats itself over and over again, often with major psychological and physical results.

Eating disorders are in part heritable (Klump, Burt, McGue, & Iacono, 2007), and it is not impossible that at least some have been selected through their evolutionary significance in coping with food shortages (Guisinger, 2008). Eating disorders are also related psychological causes, including low self-esteem, perfectionism, and the perception that one‘s body weight is too high (Vohs et al., 2001), as well as to cultural norms about body weight and eating (Crandall, 1988). Because eating disorders can create profound negative health outcomes, including death, people who suffer from them should seek treatment. This treatment is often quite effective.

Obesity

Although some people eat too little, eating too much is also a major problem. Obesity is a medical condition in which so much excess body fat has accumulated in the body that it begins to have an adverse impact on health. In addition to causing people to be stereotyped and treated less positively by others (Crandall, Merman, & Hebl, 2009), uncontrolled obesity leads to health problems including cardiovascular disease, diabetes, sleep apnea, arthritis, Alzheimer‘s disease, and some types of cancer .

Obesity is determined by calculating the body mass index (BMI), a measurement that compares one‘s weight and height. People are defined as overweight when their BMI is greater than 25 kg/m2 and as obese when it is greater than 30 kg/m2. If you know your height and weight, you can go to http://www.nhlbisupport.com/bmi to calculate your BMI.

Obesity is a leading cause of death worldwide. Its prevalence is rapidly increasing, and it is one of the most serious public health problems of the 21st century. Although obesity is caused in part by genetics, it is increased by overeating and a lack of physical activity (Nestle & Jacobson, 2000; James, 2008).

There are really only two approaches to controlling weight: eat less and exercise more. Dieting is difficult for anyone, but it is particularly difficult for people with slow basal metabolic rates, who must cope with severe hunger to lose weight. Although most weight loss can be maintained for about a year, very few people are able to maintain substantial weight loss through dieting alone for more than three years (Miller, 1999). Substantial weight loss of more than 50 pounds is typically seen only when weight loss surgery has been performed (Douketis, Macie, Thabane, & Williamson, 2005). Weight loss surgery

reduces stomach volume or bowel length, leading to earlier satiation and reduced ability to absorb nutrients from food.

Although dieting alone does not produce a great deal of weight loss over time, its effects are substantially improved when it is accompanied by more physical activity. People who exercise regularly, and particularly those who combine exercise with dieting, are less likely to be obese (Borer, 2008). Exercise not only improves our waistline but also makes us healthier overall. Exercise increases cardiovascular capacity, lowers blood pressure, and helps improve diabetes, joint flexibility, and muscle strength (American Heart Association, 1998). Exercise also slows the cognitive impairments that are associated with aging.

Because the costs of exercise are immediate but the benefits are long-term, it may be difficult for people who do not exercise to get started. It is important to make a regular schedule, to work exercise into one‘s daily activities, and to view exercise not as a cost but as an opportunity to improve oneself (Schomer & Drake, 2001). Exercising is more fun when it is done in groups, so team exercise is recommended (Kirchhoff, Elliott, Schlichting, & Chin, 2008).

Sex: The Most Important Human Behavior

Perhaps the most important aspect of human experience is the process of reproduction. Without it, none of us would be here. Successful reproduction in humans involves the coordination of a wide variety of behaviors, including courtship, sex, household arrangements, parenting, and child care.

The Experience of Sex

The sexual drive, with its reward of intense pleasure in orgasm, is highly motivating. The biology of the sexual response was studied in detail by Masters and Johnson (1966), who monitored or filmed more than 700 men and women while they masturbated or had intercourse. Masters and Johnson found that the sexual response cycle—the biological sexual response in humans—was very similar in men and women, and consisted of four stages:

Excitement. The genital areas become engorged with blood. Women‘s breasts and nipples may enlarge and the vagina expands and secretes lubricant.

Plateau. Breathing, pulse, and blood pressure increase as orgasm feels imminent. The penis becomes fully enlarged. Vaginal secretions continue and the clitoris may retract.

Orgasm. Muscular contractions occur throughout the body, but particularly in the genitals. The spasmodic ejaculations of sperm are similar to the spasmodic contractions of vaginal walls, and the experience of orgasm is similar for men and women. The woman‘s orgasm helps position the uterus to draw sperm inward (Thornhill & Gangestad, 1995).

Resolution. After orgasm the body gradually returns to its prearoused state. After one orgasm, men typically experience a refractory period, in which they are incapable of reaching another orgasm for several minutes, hours, or even longer. Women may achieve several orgasms before entering the resolution stage.

The sexual response cycle and sexual desire are regulated by the sex hormonesestrogen in women and testosterone in both women and in men. Although the hormones are secreted by the ovaries and testes, it is the hypothalamus and the pituitary glands that control the process. Estrogen levels in women vary across the menstrual cycle, peaking during ovulation (Pillsworth, Haselton, & Buss, 2004). Women are more interested in having sex during ovulation but can experience high levels of sexual arousal throughout the menstrual cycle.

In men, testosterone is essential to maintain sexual desire and to sustain an erection, and testosterone injections can increase sexual interest and performance (Aversa et al., 2000; Jockenhövel et al., 2009). Testosterone is also important in the female sex cycle. Women who are experiencing menopause may develop a loss of interest in sex, but this interest may be rekindled through estrogen and testosterone replacement treatments (Meston & Frohlich, 2000).

Although their biological determinants and experiences of sex are similar, men and women differ substantially in their overall interest in sex, the frequency of their sexual activities, and the mates they are most interested in. Men show a more consistent interest in sex, whereas the sexual desires of women are more likely to vary over time (Baumeister, 2000). Men fantasize about sex more often than women, and their fantasies are more physical and less intimate (Leitenberg & Henning, 1995). Men are also more willing to have casual sex than are women, and their standards for sex partners is lower

Gender differences in sexual interest probably occur in part as a result of the evolutionary predispositions of men and women, and this interpretation is bolstered by the finding that gender differences in sexual interest are observed cross-culturally (Buss, 1989). Evolutionarily, women should be more selective than men in their choices of sex partners because they must invest more time in bearing and nurturing their children than do men (most men do help out, of course, but women simply do more [Buss & Kenrick, 1998]). Because they do not need to invest a lot of time in child rearing, men may be evolutionarily predisposed to be more willing and desiring of having sex with many different partners and may be less selective in their choice of mates. Women, on the other hand, because they must invest substantial effort in raising each child, should be more selective.

The Many Varieties of Sexual Behavior

Sex researchers have found that sexual behavior varies widely, not only between men and women but within each sex (Kinsey, Pomeroy, & Martin, 1948/1998; Kinsey, 1953/1998). About a quarter of women report having a low sexual desire, and about 1% of people report feeling no sexual attraction whatsoever (Bogaert, 2004; Feldhaus-Dahir, 2009; West et al., 2008). There are also people who experience hyperactive sexual drives. For about 3% to 6% of the population (mainly men), the sex drive is so strong that it dominates life experience and may lead to hyperactive sexual desire disorder(Kingston & Firestone, 2008).

There is also variety in sexual orientation, which is the direction of our sexual desire toward people of the opposite sex, people of the same sex, or people of both sexes. The vast majority of human beings have a

heterosexual orientation—their sexual desire is focused toward members of the opposite sex. A smaller minority is primarily homosexual (i.e., they have sexual desire for members of their own sex). Between 3% and 4% of men are gay, and between 1% and 2% of women are lesbian. Another 1% of the population reports being bisexual (having desires for both sexes). The love and sexual lives of homosexuals are little different from those of heterosexuals, except where their behaviors are constrained by cultural norms and local laws. As with heterosexuals, some gays and lesbians are celibate, some are promiscuous, but most are in committed, long-term relationships (Laumann, Gagnon, Michael, & Michaels, 1994). Although homosexuality has been practiced as long as records of human behavior have been kept, and occurs in many animals at least as frequently as it does in humans, cultures nevertheless vary substantially in their attitudes toward it. In Western societies such as the United States and Europe, attitudes are becoming progressively more tolerant of homosexuality, but it remains unacceptable in many other parts of the world. The American Psychiatric Association no longer considers homosexuality to be a " mental illness,‖ although it did so until 1973. Because prejudice against gays and lesbians can lead to experiences of ostracism, depression, and even suicide (Kulkin, Chauvin, & Percle, 2000), these improved attitudes can benefit the everyday lives of gays, lesbians, and bisexuals. Whether sexual orientation is driven more by nature or by nurture has received a great deal of research attention, and research has found that sexual orientation is primarily biological (Mustanski, Chivers, & Bailey, 2002). Areas of the hypothalamus are different in homosexual men, as well as in animals with homosexual tendencies, than they are in heterosexual members of the species, and these differences are in directions such that gay men are more similar to women than are straight men (Gladue, 1994; Lasco, Jordan, Edgar, Petito, & Byrne, 2002; Rahman & Wilson, 2003). Twin studies also support the idea that there is a genetic component to sexual orientation. Among male identical twins, 52% of those with a gay brother also reported homosexuality, whereas the rate in fraternal twins was just 22% (Bailey et al., 1999; Pillard & Bailey, 1998).

REVIEW QUESTIONS

1. Describe the Experience of Emotion .
2. Discuss about Cannon-Bard and James-Lange Theories of Emotion
3. What is The Two-Factor Theory of Emotion explain?
4. Describe Stress? Why it is called unseen killer?
5. What are The Negative Effects of Stress Stressors in Our Everyday Lives?
6. What are the effects of Positive Emotions?

FURTHER READINGS

1. A textbook of general psychology- Walter F. Daves
2. General Psychology- Abraham
3. Advanced general psychology-Russell W. Levanway
4. General Psychological Theory-Sigmund Freud
5. General Psychology-S K Mangal

UNIT-11 PERSONALITY

CONTENTS

Notes

INTRODUCTION

One of the most fundamental tendencies of human beings is to size up other people. We say that Bill is fun, that Marian is adventurous, or that Frank is dishonest. When we make these statements, we mean that we believe that these people have stable individual characteristics—their personalities. Personalityis defined as an individual’s consistent patterns of feeling, thinking, and behaving (John, Robins, & Pervin, 2008).

The tendency to perceive personality is a fundamental part of human nature, and a most adaptive one. If we can draw accurate generalizations about what other people are normally like, we can predict how they will behave in the future, and this can help us determine how they are likely to respond in different situations. Understanding personality can also help us better understand psychological disorders and the negative behavioral outcomes they may produce. In short, personality matters because it guides behavior.

In this Unit we will consider the wide variety of personality traits found in human beings. We‘ll consider how and when personality influences our behavior, and how well we perceive the personalities of others. We will also consider how psychologists measure personality, and the extent to which personality is caused by nature versus nurture. The fundamental goal of personality psychologists is to understand what makes people different from each other (the study of individual differences), but they also find that people who share genes (as do Paula Bernstein and Elyse Schein) have a remarkable similarity in personality.

Personality and Behavior:

Early theories assumed that personality was expressed in people‘s physical appearance. One early approach, developed by the German physician Franz Joseph Gall (1758–1828) and known as phrenology, was based on the idea that we could measure personality by assessing the

patterns of bumps on people‘s skulls (Figure 11.1 "Phrenology"). In the Victorian age, phrenology was taken seriously and many people promoted its use as a source of psychological insight and self-knowledge. Machines were even developed for helping people analyze skulls (Simpson, 2005). However, because careful scientific research did not validate the predictions of the theory, phrenology has now been discredited in contemporary psychology.

Another approach, known as somatology, championed by the psychologist William Herbert Sheldon (1898–1977), was based on the idea that we could determine personality from people‘s body types (Figure 11.2 "Sheldon‘s Body Types"). Sheldon (1940) argued that people with more body fat and a rounder physique (“ endomorphs‖) were more likely to be assertive and bold, whereas thinner people (“ectomorphs‖) were more likely to be introverted and intellectual. As with phrenology, scientific research did not validate the predictions of the theory, and somatology has now been discredited in contemporary psychology.

Another approach to detecting personality is known as physiognomy, or the idea that it is possible to assess personality from facial characteristics. In contrast to phrenology and somatology, for which no research support has been found, contemporary research has found that people are able to detect some aspects of a person‘s character—for instance, whether they are gay or straight and whether they are Democrats or Republicans—at above chance levels by looking only at his or her face.

Despite these results, the ability to detect personality from faces is not guaranteed. Olivola and Todorov (2010) recently studied the ability of thousands of people to guess the personality characteristics of hundreds of thousands of faces on the website What‘s My Image? In contrast to the predictions of physiognomy, the researchers found that these people would have made more accurate judgments about the strangers if they had just guessed, using their expectations about what people in general are like, rather than trying to use the particular facial features of individuals to help them. It seems then that the predictions of physiognomy may also, in the end, find little empirical support.

Personality as Traits

Personalities are characterized in terms of traits, which are relatively enduring characteristics that influence our behavior across many situations. Personality traits such as introversion, friendliness, conscientiousness, honesty, and helpfulness are important because they help explain consistencies in behavior.

The most popular way of measuring traits is by administering personality tests on which people self-report about their own characteristics. Psychologists have investigated hundreds of traits using the self-report approach, and this research has found many personality traits that have important implications for behavior. You can see some examples of the personality dimensions that have been studied by psychologists and their implications for behavior in Table 11.1 "Some Personality Traits That Predict Behavior", and you can try completing a trait measure at the website shown in Note

Notes

As with intelligence tests, the utility of self-report measures of personality depends on their reliability and construct validity. Some popular measures of personality are not useful because they are unreliable or invalid. Perhaps you have heard of a personality test known as the Myers-Briggs Type Indicator (MBTI). If so, you are not alone, because the MBTI is the most widely administered personality test in the world, given millions of times a year to employees in thousands of companies. The MBTI categorizes people into one of four categories on each of four dimensions: introversion versus extraversion,sensing versus intuiting, thinking versus feeling, and judging versusperceiving.

Although completing the MBTI can be useful for helping people think about individual differences in personality, and for " breaking the ice‖ at meetings, the measure itself is not psychologically useful because it is not reliable or valid. People's classifications change over time, and scores on the MBTI do not relate to other measures of personality or to behavior (Hunsley, Lee, & Wood, 2003).] Measures such as the MBTI remind us that it is important to scientifically and empirically test the effectiveness of personality tests by assessing their stability over time and their ability to predict behavior.

One of the challenges of the trait approach to personality is that there are so many of them; there are at least 18,000 English words that can be used to describe people (Allport & Odbert, 1936). Thus a major goal of psychologists is to take this vast number of descriptors (many of which are very similar to each other) and to determine the underlying important or " core‖ traits among them (John, Angleitner, & Ostendorf, 1988).

The trait approach to personality was pioneered by early psychologists, including Gordon Allport (1897–1967), Raymond Cattell (1905–1998), and Hans Eysenck (1916–1997). Each of these psychologists believed in the idea of the trait as the stable unit of personality, and each attempted to provide a list or taxonomy of the most important trait dimensions. Their approach was to provide people with a self-report measure and then to use statistical analyses to look for the underlying " factors‖ or " clusters‖ of traits, according to the frequency and the co-occurrence of traits in the respondents.

Allport (1937) began his work by reducing the 18,000 traits to a set of about 4,500 traitlike words that he organized into three levels according to their importance. He called them " cardinal traits‖ (the most important traits), " central traits‖ (the basic and most useful traits), and "secondary traits‖ (the less obvious and less consistent ones). Cattell (1990) used a statistical procedure known as factor analysis to analyze the correlations among traits and to identify the most important ones. On the basis of his research he identified what he referred to as " source‖ (more important) and " surface‖ (less important) traits, and he developed a measure that assessed 16 dimensions of traits based on personality adjectives taken from everyday language.

Hans Eysenck was particularly interested in the biological and genetic origins of personality and made an important contribution to understanding the nature of a fundamental personality trait: extraversion versus introversion (Eysenck, 1998). Eysenck proposed that people who are extroverted (i.e., who enjoy socializing with others) have lower levels

of naturally occurring arousal than do introverts (who are less likely to enjoy being with others). Eysenck argued that extroverts have a greater desire to socialize with others to increase their arousal level, which is naturally too low, whereas introverts, who have naturally high arousal, do not desire to engage in social activities because they are overly stimulating.

The fundamental work on trait dimensions conducted by All port, Cattell, Eysenck, and many others has led to contemporary trait models, the most important and well-validated of which is the Five-Factor (Big Five) Model of Personality. According to this model, there are five fundamental underlying trait dimensions that are stable across time, cross-culturally shared, and explain a substantial proportion of behavior(Costa & McCrae, 1992; Goldberg, 1982). As you can see in Table 11.2 "The Five Factors of the Five-Factor Model of Personality", the five dimensions (sometimes known as the " Big Five‖) are agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience. (You can remember them using the watery acronyms CANOE or OCEAN.)

A large body of research evidence has supported the five-factor model. The Big Five dimensions seem to be cross-cultural, because the same five factors have been identified in participants in China, Japan, Italy, Hungary, Turkey, and many other countries (Triandis & Suh, 2002). The Big Five dimensions also accurately predict behavior. For instance, a pattern of high conscientiousness, low neuroticism, and high agreeableness predicts successful job performance (Tett, Jackson, & Rothstein, 1991). Scores on the Big Five dimensions also predict the performance of U.S. presidents; ratings of openness to experience are correlated positively with ratings of presidential success, whereas ratings of agreeableness are correlated negatively with success (Rubenzer, Faschingbauer, & Ones, 2000). The Big Five factors are also increasingly being used in helping researchers understand the dimensions of psychological disorders such as anxiety and depression (Oldham, 2010; Saulsman & Page, 2004).

An advantage of the five-factor approach is that it is parsimonious. Rather than studying hundreds of traits, researchers can focus on only five underlying dimensions. The Big Five may also capture other dimensions that have been of interest to psychologists. For instance, the trait dimension of need for achievement relates to the Big Five variable of conscientiousness, and self-esteem relates to low neuroticism. On the other hand, the Big Five factors do not seem to capture all the important dimensions of personality. For instance, the Big Five does not capture moral behavior, although this variable is important in many theories of personality. And there is evidence that the Big Five factors are not exactly the same across all cultures (Cheung & Leung, 1998).

Situational Influences on Personality

One challenge to the trait approach to personality is that traits may not be as stable as we think they are. When we say that Malik is friendly, we mean that Malik is friendly today and will be friendly tomorrow and even next week. And we mean that Malik is friendlier than average in all situations. But what if Malik were found to behave in a friendly way

with his family members but to be unfriendly with his fellow classmates? This would clash with the idea that traits are stable across time and situation. The psychologist Walter Mischel (1968) reviewed the existing literature on traits and found that there was only a relatively low correlation (about r = .30) between the traits that a person expressed in one situation and those that they expressed in other situations. In one relevant study, Hartshorne, May, Maller, & Shuttleworth (1928) examined the correlations among various behavioral indicators of honesty in children. They also enticed children to behave either honestly or dishonestly in different situations, for instance, by making it easy or difficult for them to steal and cheat. The correlations among children's behavior was low, generally less than r = .30, showing that children who steal in one situation are not always the same children who steal in a different situation. And similar low correlations were found in adults on other measures, including dependency, friendliness, and conscientiousness (Bem & Allen, 1974).

Psychologists have proposed two possibilities for these low correlations. One possibility is that the natural tendency for people to see traits in others leads us to believe that people have stable personalities when they really do not. In short, perhaps traits are more in the heads of the people who are doing the judging than they are in the behaviors of the people being observed. The fact that people tend to use human personality traits, such as the Big Five, to judge animals in the same way that they use these traits to judge humans is consistent with this idea (Gosling, 2001). And this idea also fits with research showing that people use their knowledge representation (schemas) about people to help them interpret the world around them and that these schemas color their judgments of others' personalities (Fiske & Taylor, 2007).

The human tendency to perceive traits is so strong that it is very easy to convince people that trait descriptions of themselves are accurate. Imagine that you had completed a personality test and the psychologist administering the measure gave you this description of your personality:

You have a great need for other people to like and admire you. You have a tendency to be critical of yourself. You have a great deal of unused capacity, which you have not turned to your advantage. While you have some personality weaknesses, you are generally able to compensate for them. Disciplined and self-controlled outside, you tend to be worrisome and insecure inside. At times you have serious doubts as to whether you have made the right decision or done the right thing.

I would imagine that you might find that it described you. You probably do criticize yourself at least sometimes, and you probably do sometimes worry about things. The problem is that you would most likely have found some truth in a personality description that was the opposite. Could this description fit you too?

You frequently stand up for your own opinions even if it means that others may judge you negatively. You have a tendency to find the positives in your own behavior. You work to the fullest extent of your capabilities. You have few personality weaknesses, but some may show up under stress. You sometimes confide in others that you are concerned or worried, but inside you maintain discipline and self-control. You

generally believe that you have made the right decision and done the right thing.

The Barnum effect refers to the observation that people tend to believe in descriptions of their personality that supposedly are descriptive of them but could in fact describe almost anyone. The Barnum effect helps us understand why many people believe in astrology, horoscopes, fortune-telling, palm reading, tarot card reading, and even some personality tests. People are likely to accept descriptions of their personality if they think that they have been written for them, even though they cannot distinguish their own tarot card or horoscope readings from those of others at better than chance levels (Hines, 2003). Again, people seem to believe in traits more than they should.

A second way that psychologists responded to Mischel‘s findings was by searching even more carefully for the existence of traits. One insight was that the relationship between a trait and a behavior is less than perfect because people can express their traits in different ways (Mischel & Shoda, 2008). People high in extraversion, for instance, may become teachers, salesmen, actors, or even criminals. Although the behaviors are very different, they nevertheless all fit with the meaning of the underlying trait.

Psychologists also found that, because people do behave differently in different situations, personality will only predict behavior when the behaviors are aggregated or averaged across different situations. We might not be able to use the personality trait of openness to experience to determine what Saul will do on Friday night, but we can use it to predict what he will do over the next year in a variety of situations. When many measurements of behavior are combined, there is much clearer evidence for the stability of traits and for the effects of traits on behavior (Roberts & DelVecchio, 2000; Srivastava, John, Gosling, & Potter, 2003).

Taken together, these findings make a very important point about personality, which is that it not only comes from inside us but is also shaped by the situations that we are exposed to. Personality is derived from our interactions with and observations of others, from our interpretations of those interactions and observations, and from our choices of which social situations we prefer to enter or avoid (Bandura, 1986). In fact, behaviorists such as B. F. Skinner explain personality entirely in terms of the environmental influences that the person has experienced. Because we are profoundly influenced by the situations that we are exposed to, our behavior does change from situation to situation, making personality less stable than we might expect. And yet personality does matter—we can, in many cases, use personality measures to predict behavior across situations.

One of the most important measures of personality (which is used primarily to assess deviations from a “ normal‖ or “ average‖ personality) is theMinnesota Multiphasic Personality Inventory (MMPI), a test used around the world to identify personality and psychological disorders (Tellegen et al., 2003). The MMPI was developed by creating a list of more than 1,000 true-false questions and choosing those that best differentiated patients with different psychological disorders from other people. The current version (the MMPI-2) has more than 500 questions,

and the items can be combined into a large number of different subscales. Some of the most important of these are shown in Table 11.3 "Some of the Major Subscales of the MMPI", but there are also scales that represent family problems, work attitudes, and many other dimensions. The MMPI also has questions that are designed to detect the tendency of the respondents to lie, fake, or simply not answer the questions.

To interpret the results, the clinician looks at the pattern of responses across the different subscales and makes a diagnosis about the potential psychological problems facing the patient. Although clinicians prefer to interpret the patterns themselves, a variety of research has demonstrated that computers can often interpret the results as well as can clinicians (Garb, 1998; Karon, 2000). Extensive research has found that the MMPI-2 can accurately predict which of many different psychological disorders a person suffers from (Graham, 2006).

One potential problem with a measure like the MMPI is that it asks people to consciously report on their inner experiences. But much of our personality is determined by unconscious processes of which we are only vaguely or not at all aware. Projective measures are measures of personality in which unstructured stimuli, such as ink blots, drawings of social situations, or incomplete sentences, are shown to participants, who are asked to freely list what comes to mind as they think about the stimuli. Experts then score the responses for clues to personality. The proposed advantage of these tests is that they are more indirect—they allow the respondent to freely express whatever comes to mind, including perhaps the contents of their unconscious experiences.

One commonly used projective test is the Rorschach Inkblot Test, developed by the Swiss psychiatrist Hermann Rorschach (1884–1922). TheRorschach Inkblot Test is a projective measure of personality in which the respondent indicates his or her thoughts about a series of 10 symmetrical inkblots (Figure 11.5 "Rorschach Inkblots"). The Rorschach is administered millions of time every year. The participants are asked to respond to the inkblots, and their responses are systematically scored in terms of what, where, and why they saw what they saw.

TheThematic Apperception Test (TAT) is a projective measure of personality in which the respondent is asked to create stories about sketches of ambiguous situations, most of them of people, either alone or with others(Figure 11.6 "Sample Card From the TAT"). The sketches are shown to individuals, who are asked to tell a story about what is happening in the picture. The TAT assumes that people may be unwilling or unable to admit their true feelings when asked directly but that these feelings will show up in the stories about the pictures. Trained coders read the stories and use them to develop a personality profile of the respondent.

Other popular projective tests include those that ask the respondent to draw pictures, such as the Draw-A-Person test (Machover, 1949), and free association tests in which the respondent quickly responds with the first word that comes to mind when the examiner says a test word. Another approach is the use of " anatomically correct‖ dolls that feature representations of the male and female genitals. Investigators allow

children to play with the dolls and then try to determine on the basis of the play if the children may have been sexually abused.

The advantage of projective tests is that they are less direct, allowing people to avoid using their defense mechanisms and therefore show their " true‖ personality. The idea is that when people view ambiguous stimuli they will describe them according to the aspects of personality that are most important to them, and therefore bypass some of the limitations of more conscious responding.

Despite their widespread use, however, the empirical evidence supporting the use of projective tests is mixed (Karon, 2000; Wood, Nezworski, Lilienfeld, & Garb, 2003). The reliability of the measures is low because people often produce very different responses on different occasions. The construct validity of the measures is also suspect because there are very few consistent associations between Rorschach scores or TAT scores and most personality traits. The projective tests often fail to distinguish between people with psychological disorders and those without or to correlate with other measures of personality or with behavior.

In sum, projective tests are more useful as icebreakers to get to know a person better, to make the person feel comfortable, and to get some ideas about topics that may be of importance to that person than for accurately diagnosing personality.

The Origins of Personality

Although measures such as the Big Five and the Minnesota Multiphasic Personality Inventory (MMPI) are able to effectively assess personality, they do not say much about where personality comes from. In this section we will consider two major theories of the origin of personality: psychodynamic and humanistic approaches.

Psychodynamic Theories of Personality: The Role of the Unconscious

One of the most important psychological approaches to understanding personality is based on the theorizing of the Austrian physician and psychologist Sigmund Freud (1856–1939), who founded what today is known as the psychodynamic approach to understanding personality. Many people know about Freud because his work has had a huge impact on our everyday thinking about psychology, and the psychodynamic approach is one of the most important approaches to psychological therapy (Roudinesco, 2003; Taylor, 2009). Freud is probably the best known of all psychologists, in part because of his impressive observation and analyses of personality (there are 24 volumes of his writings). As is true of all theories, many of Freud‘s ingenious ideas have turned out to be at least partially incorrect, and yet other aspects of his theories are still influencing psychology.

Freud was influenced by the work of the French neurologist Jean-Martin Charcot (1825–1893), who had been interviewing patients (almost all women) who were experiencing what was at the time known as hysteria. Although it is no longer used to describe a psychological disorder, hysteria at the time referred to a set of personality and physical symptoms that included chronic pain, fainting, seizures, and paralysis.

Charcot could find no biological reason for the symptoms. For instance, some women experienced a loss of feeling in their hands and yet not in their arms, and this seemed impossible given that the nerves in the arms are the same that are in the hands. Charcot was experimenting with the use of hypnosis, and he and Freud found that under hypnosis many of the hysterical patients reported having experienced a traumatic sexual experience, such as sexual abuse, as children (Dolnick, 1998).

Freud and Charcot also found that during hypnosis the remembering of the trauma was often accompanied by an outpouring of emotion, known as catharsis, and that following the catharsis the patient‘s symptoms were frequently reduced in severity. These observations led Freud and Charcot to conclude that these disorders were caused by psychological rather than physiological factors.

Freud used the observations that he and Charcot had made to develop his theory regarding the sources of personality and behavior, and his insights are central to the fundamental themes of psychology. In terms of free will, Freud did not believe that we were able to control our own behaviors. Rather, he believed that all behaviors are predetermined by motivations that lie outside our awareness, in the unconscious. These forces show themselves in our dreams, in neurotic symptoms such as obsessions, while we are under hypnosis, and in Freudian " slips of the tongue‖ in which people reveal their unconscious desires in language. Freud argued that we rarely understand why we do what we do, although we can make up explanations for our behaviors after the fact. For Freud the mind was like an iceberg, with the many motivations of the unconscious being much larger, but also out of sight, in comparison to the consciousness of which we are aware (Figure 11.8 "Mind as Iceberg"). Figure 11.8 Mind as Iceberg

In Sigmund Freud’s conceptualization of personality, the most important motivations are unconscious, just as the major part of an iceberg is under water.

Freud proposed that the mind is divided into three components: id, ego, andsuperego, and that the interactions and conflicts among the components create personality (Freud, 1923/1943). According to Freudian theory, the id is the component of personality that forms the basis of our most primitive impulses. The id is entirely unconscious, and it drives our most important motivations, including the sexual drive (libido) and the aggressive or destructive drive (Thanatos). According to Freud, the id is driven by the pleasure principle—the desire for immediate gratification of our sexual and aggressive urges. The id is why we smoke cigarettes, drink alcohol, view pornography, tell mean jokes about people, and engage in other fun or harmful behaviors, often at the cost of doing more productive activities.

In stark contrast to the id, the superego represents our sense of morality and oughts. The superego tell us all the things that we shouldn‘t do, or the duties and obligations of society. The superego strives for perfection, and when we fail to live up to its demands we feel guilty.

In contrast to the id, which is about the pleasure principle, the function of theego is based on the reality principle—the idea that we must delay gratification of our basic motivations until the appropriate time with the

appropriate outlet. The ego is the largely conscious controller or decision-maker of personality. The ego serves as the intermediary between the desires of the id and the constraints of society contained in the superego (Figure 11.9 "Ego, Id, and Superego in Interaction"). We may wish to scream, yell, or hit, and yet our ego normally tells us to wait, reflect, and choose a more appropriate response.

Freud believed that psychological disorders, and particularly the experience of anxiety, occur when there is conflict or imbalance among the motivations of the id, ego, and superego. When the ego finds that the id is pressing too hard for immediate pleasure, it attempts to correct for this problem, often through the use of defense mechanisms—unconscious psychological strategies used to cope with anxiety and to maintain a positive self-image. Freud believed that the defense mechanisms were essential for effective coping with everyday life, but that any of them could be overused .

The most controversial, and least scientifically valid, part of Freudian theory is its explanations of personality development. Freud argued that personality is developed through a series of psychosexual stages, each focusing on pleasure from a different part of the body (Table 11.5 "Freud‘s Stages of Psychosexual Development"). Freud believed that sexuality begins in infancy,

In the first of Freud‘s proposed stages of psychosexual development, which begins at birth and lasts until about 18 months of age, the focus is on the mouth. During this oral stage, the infant obtains sexual pleasure by sucking and drinking. Infants who receive either too little or too much gratification becomefixated or “ locked‖ in the oral stage, and are likely to regress to these points of fixation under stress, even as adults. According to Freud, a child who receives too little oral gratification (e.g., who was underfed or neglected) will becomeorally dependent as an adult and be likely to manipulate others to fulfill his or her needs rather than becoming independent. On the other hand, the child who was overfed or overly gratified will resist growing up and try to return to the prior state of dependency by acting helpless, demanding satisfaction from others, and acting in a needy way.

The anal stage, lasting from about 18 months to 3 years of age is when children first experience psychological conflict. During this stage children desire to experience pleasure through bowel movements, but they are also being toilet trained to delay this gratification. Freud believed that if this toilet training was either too harsh or too lenient, children would become fixated in the anal stage and become likely to regress to this stage under stress as adults. If the child received too little anal gratification (i.e., if the parents had been very harsh about toilet training), the adult personality will be anal retentive—stingy, with a compulsive seeking of order and tidiness. On the other hand, if the parents had been too lenient, the anal expulsive personality results, characterized by a lack of self-control and a tendency toward messiness and carelessness.

The phallic stage, which lasts from age 3 to age 6 is when the penis (for boys) and clitoris (for girls) become the primary erogenous zone for sexual pleasure. During this stage, Freud believed that children develop a

powerful but unconscious attraction for the opposite-sex parent, as well as a desire to eliminate the same-sex parent as a rival. Freud based his theory of sexual development in boys (the " Oedipus complex‖) on the Greek mythological character Oedipus, who unknowingly killed his father and married his mother, and then put his own eyes out when he learned what he had done. Freud argued that boys will normally eventually abandon their love of the mother, and instead identify with the father, also taking on the father's personality characteristics, but that boys who do not successfully resolve the Oedipus complex will experience psychological problems later in life. Although it was not as important in Freud's theorizing, in girls the phallic stage is often termed the " Electra complex,‖ after the Greek character who avenged her father's murder by killing her mother. Freud believed that girls frequently experienced penis envy, the sense of deprivation supposedly experienced by girls because they do not have a penis.

The latency stage is a period of relative calm that lasts from about 6 years to 12 years. During this time, Freud believed that sexual impulses were repressed, leading boys and girls to have little or no interest in members of the opposite sex.

The fifth and last stage, the genital stage, begins about 12 years of age and lasts into adulthood. According to Freud, sexual impulses return during this time frame, and if development has proceeded normally to this point, the child is able to move into the development of mature romantic relationships. But if earlier problems have not been appropriately resolved, difficulties with establishing intimate love attachments are likely.

Freud's Followers: The Neo-Freudians

Freudian theory was so popular that it led to a number of followers, including many of Freud's own students, who developed, modified, and expanded his theories. Taken together, these approaches are known as neo-Freudian theories. The neo-Freudian theories are theories based on Freudian principles that emphasize the role of the unconscious and early experience in shaping personality but place less evidence on sexuality as the primary motivating force in personality and are more optimistic concerning the prospects for personality growth and change in personality in adults.

Alfred Adler (1870–1937) was a follower of Freud who developed his own interpretation of Freudian theory. Adler proposed that the primary motivation in human personality was not sex or aggression, but rather the striving for superiority. According to Adler, we desire to be better than others and we accomplish this goal by creating a unique and valuable life. We may attempt to satisfy our need for superiority through our school or professional accomplishments, or by our enjoyment of music, athletics, or other activities that seem important to us.

Adler believed that psychological disorders begin in early childhood. He argued that children who are either overly nurtured or overly neglected by their parents are later likely to develop an inferiority complex—a psychological state in which people feel that they are not living up to expectations, leading them to have low self-esteem, with a tendency to try to overcompensate for the negative feelings. People with an

inferiority complex often attempt to demonstrate their superiority to others at all costs, even if it means humiliating, dominating, or alienating them.

According to Adler, most psychological disorders result from misguided attempts to compensate for the inferiority complex in order meet the goal of superiority.

Carl Jung (1875–1961) was another student of Freud who developed his own theories about personality. Jung agreed with Freud about the power of the unconscious but felt that Freud overemphasized the importance of sexuality. Jung argued that in addition to the personal unconscious, there was also acollective unconscious, or a collection of shared ancestral memories. Jung believed that the collective unconscious contains a variety of archetypes, or cross-culturally universal symbols, which explain the similarities among people in their emotional reactions to many stimuli. Important archetypes include the mother, the goddess, the hero, and the mandala or circle, which Jung believed symbolized a desire for wholeness or unity. For Jung, the underlying motivation that guides successful personality is self-realization, or learning about and developing the self to the fullest possible extent.

Karen Horney (the last syllable of her last name rhymes with " eye‖; 1855–1952), was a German physician who applied Freudian theories to create a personality theory that she thought was more balanced between men and women. Horney believed that parts of Freudian theory, and particularly the ideas of the Oedipus complex and penis envy, were biased against women. Horney argued that women's sense of inferiority was not due to their lack of a penis but rather to their dependency on men, an approach that the culture made it difficult for them to break from. For Horney, the underlying motivation that guides personality development is the desire for security, the ability to develop appropriate and supportive relationships with others.

Another important neo-Freudian was Erich Fromm (1900–1980). Fromm's focus was on the negative impact of technology, arguing that the increases in its use have led people to feel increasingly isolated from others. Fromm believed that the independence that technology brings us also creates the need " escape from freedom,‖ that is, to become closer to others.

Strengths and Limitations of Freudian and Neo-Freudian Approaches

Freud has probably exerted a greater impact on the public's understanding of personality than any other thinker, and he has also in large part defined the field of psychology. Although Freudian psychologists no longer talk about oral, anal, or genital " fixations,‖ they do continue to believe that our childhood experiences and unconscious motivations shape our personalities and our attachments with others, and they still make use of psychodynamic concepts when they conduct psychological therapy.

Nevertheless, Freud's theories, as well as those of the neo-Freudians, have in many cases failed to pass the test of empiricism, and as a result they are less influential now than they have been in the past (Crews, 1998).] The problems are first, that it has proved to be difficult to

Notes

rigorously test Freudian theory because the predictions that it makes (particularly those regarding defense mechanisms) are often vague and unfalsifiable, and second, that the aspects of the theory that can be tested often have not received much empirical support.

As examples, although Freud claimed that children exposed to overly harsh toilet training would become fixated in the anal stage and thus be prone to excessive neatness, stinginess, and stubbornness in adulthood, research has found few reliable associations between toilet training practices and adult personality (Fisher & Greenberg, 1996). And since the time of Freud, the need to repress sexual desires would seem to have become much less necessary as societies have tolerated a wider variety of sexual practices. And yet the psychological disorders that Freud thought we caused by this repression have not decreased.

There is also little scientific support for most of the Freudian defense mechanisms. For example, studies have failed to yield evidence for the existence of repression. People who are exposed to traumatic experiences in war have been found to remember their traumas only too well (Kihlstrom, 1997). Although we may attempt to push information that is anxiety-arousing into our unconscious, this often has the ironic effect of making us think about the information even more strongly than if we hadn‘t tried to repress it (Newman, Duff, & Baumeister, 1997). It is true that children remember little of their childhood experiences, but this seems to be true of both negative as well as positive experiences, is true for animals as well, and probably is better explained in terms of the brain‘s inability to form long-term memories than in terms of repression. On the other hand, Freud‘s important idea that expressing or talking through one‘s difficulties can be psychologically helpful has been supported in current research (Baddeley & Pennebaker, 2009) and has become a mainstay of psychological therapy.

A particular problem for testing Freudian theories is that almost anything that conflicts with a prediction based in Freudian theory can be explained away in terms of the use of a defense mechanism. A man who expresses a lot of anger toward his father may be seen via Freudian theory to be experiencing the Oedipus complex, which includes conflict with the father. But a man who expresses no anger at all toward the father also may be seen as experiencing the Oedipus complex by repressing the anger. Because Freud hypothesized that either was possible, but did not specify when repression would or would not occur, the theory is difficult to falsify.

In terms of the important role of the unconscious, Freud seems to have been at least in part correct. More and more research demonstrates that a large part of everyday behavior is driven by processes that are outside our conscious awareness (Kihlstrom, 1987). And yet, although our unconscious motivations influence every aspect of our learning and behavior Freud probably overestimated the extent to which these unconscious motivations are primarily sexual and aggressive.

Taken together, it is fair to say that Freudian theory, like most psychological theories, was not entirely correct and that it has had to be modified over time as the results of new studies have become available. But the fundamental ideas about personality that Freud proposed, as well

as the use of talk therapy as an essential component of therapy, are nevertheless still a major part of psychology and are used by clinical psychologists every day.

Focusing on the Self: Humanism and Self-Actualization

Psychoanalytic models of personality were complemented during the 1950s and 1960s by the theories of humanistic psychologists. In contrast to the proponents of psychoanalysis, humanists embraced the notion of free will. Arguing that people are free to choose their own lives and make their own decisions, humanistic psychologists focused on the underlying motivations that they believed drove personality, focusing on the nature of the self-concept,the set of beliefs about who we are, and self-esteem, our positive feelings about the self.

One of the most important humanists, Abraham Maslow (1908–1970), conceptualized personality in terms of a pyramid-shaped hierarchy of motives(Figure 11.11 "Maslow‘s Hierarchy of Needs"). At the base of the pyramid are the lowest-level motivations, including hunger and thirst, and safety and belongingness. Maslow argued that only when people are able to meet the lower-level needs are they able to move on to achieve the higher-level needs of self-esteem, and eventually self-actualization, which is the motivation to develop our innate potential to the fullest possible extent.

Maslow studied how successful people, including Albert Einstein, Abraham Lincoln, Martin Luther King Jr., Helen Keller, and Mahatma Gandhi had been able to lead such successful and productive lives. Maslow (1970) believed that self-actualized people are creative, spontaneous, and loving of themselves and others. They tend to have a few deep friendships rather than many superficial ones, and are generally private. He felt that these individuals do not need to conform to the opinions of others because they are very confident and thus free to express unpopular opinions. Self-actualized people are also likely to have peak experiences, or transcendent moments of tranquility accompanied by a strong sense of connection with others. Figure 11.11 Maslow’s Hierarchy of Needs

Abraham Maslow conceptualized personality in terms of a hierarchy of needs. The highest of these motivations is self-actualization.

Perhaps the best-known humanistic theorist is Carl Rogers (1902–1987). Rogers was positive about human nature, viewing people as primarily moral and helpful to others, and believed that we can achieve our full potential for emotional fulfillment if the self-concept is characterized byunconditional positive regard—a set of behaviors including being genuine, open to experience, transparent, able to listen to others, and self-disclosing and empathic. When we treat ourselves or others with unconditional positive regard, we express understanding and support, even while we may acknowledge failings. Unconditional positive regard allows us to admit our fears and failures, to drop our pretenses, and yet at the same time to feel completely accepted for what we are. The principle of unconditional positive regard has become a foundation of psychological therapy; therapists who use it in their practice are more

effective than those who do not (Prochaska & Norcross, 2007; Yalom, 1995).

Although there are critiques of the humanistic psychologists (e.g., that Maslow focused on historically productive rather than destructive personalities in his research and thus drew overly optimistic conclusions about the capacity of people to do good), the ideas of humanism are so powerful and optimistic that they have continued to influence both everyday experiences as well as psychology. Today the positive psychology movement argues for many of these ideas, and research has documented the extent to which thinking positively and openly has important positive consequences for our relationships, our life satisfaction, and our psychological and physical health.

Is Personality More Nature or More Nurture? Behavioral and Molecular Genetics

One question that is exceedingly important for the study of personality concerns the extent to which it is the result of nature or nurture. If nature is more important, then our personalities will form early in our lives and will be difficult to change later. If nurture is more important, however, then our experiences are likely to be particularly important, and we may be able to flexibly alter our personalities over time. In this section we will see that the personality traits of humans and animals are determined in large part by their genetic makeup, and thus it is no surprise that identical twins Paula Bernstein and Elyse Schein turned out to be very similar even though they had been raised separately. But we will also see that genetics does not determine everything.

In the nucleus of each cell in your body are 23 pairs of chromosomes. One of each pair comes from your father, and the other comes from your mother. The chromosomes are made up of strands of the molecule DNA (deoxyribonucleic acid), and the DNA is grouped into segments known as genes. A gene is the basic biological unit that transmits characteristics from one generation to the next. Human cells have about 25,000 genes.

The genes of different members of the same species are almost identical. The DNA in your genes, for instance, is about 99.9% the same as the DNA in my genes and in the DNA of every other human being. These common genetic structures lead members of the same species to be born with a variety of behaviors that come naturally to them and that define the characteristics of the species. These abilities and characteristics are known as instincts—complex inborn patterns of behaviors that help ensure survival and reproduction(Tinbergen, 1951). Different animals have different instincts. Birds naturally build nests, dogs are naturally loyal to their human caretakers, and humans instinctively learn to walk and to speak and understand language.

But the strength of different traits and behaviors also varies within species. Rabbits are naturally fearful, but some are more fearful than others; some dogs are more loyal than others to their caretakers; and some humans learn to speak and write better than others do. These differences are determined in part by the small amount (in humans, the 0.1%) of the differences in genes among the members of the species.

Personality is not determined by any single gene, but rather by the actions of many genes working together. There is no " IQ gene" that

determines intelligence and there is no " good marriage partner gene‖ that makes a person a particularly good marriage bet. Furthermore, even working together, genes are not so powerful that they can control or create our personality. Some genes tend to increase a given characteristic and others work to decrease that same characteristic—the complex relationship among the various genes, as well as a variety of random factors, produces the final outcome. Furthermore, genetic factors always work with environmental factors to create personality. Having a given pattern of genes doesn't necessarily mean that a particular trait will develop, because some traits might occur only in some environments. For example, a person may have a genetic variant that is known to increase his or her risk for developing emphysema from smoking. But if that person never smokes, then emphysema most likely will not develop.

Perhaps the most direct way to study the role of genetics in personality is to selectively breed animals for the trait of interest. In this approach the scientist chooses the animals that most strongly express the personality characteristics of interest and breeds these animals with each other. If the selective breeding creates offspring with even stronger traits, then we can assume that the trait has genetic origins. In this manner, scientists have studied the role of genetics in how worms respond to stimuli, how fish develop courtship rituals, how rats differ in play, and how pigs differ in their responses to stress.

Although selective breeding studies can be informative, they are clearly not useful for studying humans. For this psychologists rely onbehavioral genetics—a variety of research techniques that scientists use to learn about the genetic and environmental influences on human behavior by comparing the traits of biologically and nonbiologically related family members (Baker, 2010). Behavioral genetics is based on the results of family studies, twin studies, and adoptive studies.

A family study starts with one person who has a trait of interest—for instance, a developmental disorder such as autism—and examines the individual's family tree to determine the extent to which other members of the family also have the trait. The presence of the trait in first-degree relatives (parents, siblings, and children) is compared to the prevalence of the trait in second-degree relatives (aunts, uncles, grandchildren, grandparents, and nephews or nieces) and in more distant family members. The scientists then analyze the patterns of the trait in the family members to see the extent to which it is shared by closer and more distant relatives.

Although family studies can reveal whether a trait runs in a family, it cannot explain why. In a twin study, researchers study the personality characteristics of twins. Twin studies rely on the fact that identical (or monozygotic) twins have essentially the same set of genes, while fraternal (or dizygotic) twins have, on average, a half-identical set. The idea is that if the twins are raised in the same household, then the twins will be influenced by their environments to an equal degree, and this influence will be pretty much equal for identical and fraternal twins. In other words, if environmental factors are the same, then the only factor that can make identical twins more similar than fraternal twins is their greater genetic similarity.

In a twin study, the data from many pairs of twins are collected and the rates of similarity for identical and fraternal pairs are compared. A correlation coefficient is calculated that assesses the extent to which the trait for one twin is associated with the trait in the other twin. Twin studies divide the influence of nature and nurture into three parts:

Heritability (i.e., genetic influence) is indicated when the correlation coefficient for identical twins exceeds that for fraternal twins, indicating that shared DNA is an important determinant of personality.

Shared environment determinants are indicated when the correlation coefficients for identical and fraternal twins are greater than zero and also very similar. These correlations indicate that both twins are having experiences in the family that make them alike.

Nonshared environment is indicated when identical twins do not have similar traits. These influences refer to experiences that are not accounted for either by heritability or by shared environmental factors. Nonshared environmental factors are the experiences that make individuals within the same family less alike. If a parent treats one child more affectionately than another, and as a consequence this child ends up with higher self-esteem, the parenting in this case is a nonshared environmental factor.

In the typical twin study, all three sources of influence are operating simultaneously, and it is possible to determine the relative importance of each type.

An adoption study compares biologically related people, including twins, who have been reared either separately or apart. Evidence for genetic influence on a trait is found when children who have been adopted show traits that are more similar to those of their biological parents than to those of their adoptive parents. Evidence for environmental influence is found when the adoptee is more like his or her adoptive parents than the biological parents.

Reviewing the Literature: Is Our Genetics Our Destiny?

Over the past two decades scientists have made substantial progress in understanding the important role of genetics in behavior. Behavioral genetics studies have found that, for most traits, genetics is more important than parental influence. And molecular genetics studies have begun to pinpoint the particular genes that are causing these differences. The results of these studies might lead you to believe that your destiny is determined by your genes, but this would be a mistaken assumption.

For one, the results of all research must be interpreted carefully. Over time we will learn even more about the role of genetics, and our conclusions about its influence will likely change. Current research in the area of behavioral genetics is often criticized for making assumptions about how researchers categorize identical and fraternal twins, about whether twins are in fact treated in the same way by their parents, about whether twins are representative of children more generally, and about many other issues. Although these critiques may not change the overall conclusions, it must be kept in mind that these findings are relatively new and will certainly be updated with time (Plomin, 2000).

Furthermore, it is important to reiterate that although genetics is important, and although we are learning more every day about its role in many personality variables, genetics does not determine everything. In fact, the major influence on personality is nonshared environmental influences, which include all the things that occur to us that make us unique individuals. These differences include variability in brain structure, nutrition, education, upbringing, and even interactions among the genes themselves.

The genetic differences that exist at birth may be either amplified or diminished over time through environmental factors. The brains and bodies of identical twins are not exactly the same, and they become even more different as they grow up. As a result, even genetically identical twins have distinct personalities, resulting in large part from environmental effects.

Because these nonshared environmental differences are nonsystematic and largely accidental or random, it will be difficult to ever determine exactly what will happen to a child as he or she grows up. Although we do inherit our genes, we do not inherit personality in any fixed sense. The effect of our genes on our behavior is entirely dependent upon the context of our life as it unfolds day to day. Based on your genes, no one can say what kind of human being you will turn out to be or what you will do in life.

Review Questions

1. Describe Personality and Behavior. What is the relation between personality and behaviour?
2. Describe Personality as Traits. What are Situational Influences on Personality
3. Discuss about the The Origins of Personality .
4. What are the Strengths and Limitations of Freudian and Neo-Freudian Approaches?
5. Is Personality More Nature or More Nurture?

Further Readings

1. A textbook of general psychology- Walter F. Daves
2. General Psychology- Abraham
3. Advanced general psychology-Russell W. Levanway
4. General Psychological Theory-Sigmund Freud
5. General Psychology-S K Mangal

UNIT-12 PSYCHOLOGY IN OUR SOCIAL LIVES

Notes

CONTENTS

INTRODUCTION

We have now reached the last Unit of our journey through the field of psychology. The subdiscipline of psychology discussed in this Unit reflects the highest level of explanation that we will consider. This topic, known associal psychology, is defined as the scientific study of how we feel about, think about, and behave toward the other people around us, and how those people influence our thoughts, feelings, and behavior.

The subject matter of social psychology is our everyday interactions with people, including the social groups to which we belong. Questions these psychologists ask include why we are often

helpful to other people but at other times are unfriendly or aggressive; why we sometimes conform to the behaviors of others but at other times are able to assert our independence; and what factors help groups work together in effective and productive, rather than in ineffective and unproductive, ways. A fundamental principle of social psychology is that, although we may not always be aware of it, our cognitions, emotions, and behaviors are substantially influenced by the social situation, or the people with whom we are interacting.

In this Unit we will introduce the principles of social cognition—the part of human thinking that helps us understand and predict the behavior of ourselves and others—and consider the ways that our judgments about other people guide our behaviors toward them. We‘ll explore how we

form impressions of other people, and what makes us like or dislike them. We'll also see how our attitudes—our enduring evaluations of people or things—influence, and are influenced by, our behavior.

Then we will consider the social psychology of interpersonal relationships, including the behaviors of altruism, aggression, and conformity. We will see that humans have a natural tendency to help each other, but that we may also become aggressive if we feel that we are being threatened. And we will see howsocial norms, the accepted beliefs about what we do or what we should do in particular social situations (such as the norm of binge drinking common on many college campuses), influence our behavior. Finally, we will consider the social psychology of social groups, with a particular focus on the conditions that limit and potentially increase productive group performance and decision-making.

The principles of social psychology can help us understand tragic events such as the death of Sam Spady. Many people might blame the tragedy on Sam herself, asking, for instance, " Why did she drink so much?‖ or " Why didn't she say no?‖ As we will see in this Unit, research conducted by social psychologists shows that the poor decisions Sam made on the night she died may have been due less to her own personal weaknesses or deficits than to her desires to fit in with and be accepted by the others around her—desires that in her case led to a disastrous outcome.

Social Cognition: Making Sense of Ourselvesand Others

One important aspect of social cognition involves forming impressions of other people. Making these judgments quickly and accurately helps us guide our behavior to interact appropriately with the people we know. If we can figure out why our roommate is angry at us, we can react to resolve the problem; if we can determine how to motivate the people in our group to work harder on a project, then the project might be better.

Perceiving Others

Our initial judgments of others are based in large part on what we see. The physical features of other people, particularly their sex, race, age, and physical attractiveness, are very salient, and we often focus our attention on these dimensions (Schneider, 2003; Zebrowitz & Montepare, 2006).

Although it may seem inappropriate or shallow to admit it, we are strongly influenced by the physical attractiveness of others, and many cases physical attractiveness is the most important determinant of our initial liking for other people). Infants who are only a year old prefer to look at faces that adults consider to be attractive than at unattractive faces (Langlois, Ritter, Roggman, & Vaughn, 1991). Evolutionary psychologists have argued that our belief that " what is beautiful is also good‖ may be because we use attractiveness as a cue for health; people whom we find more attractive may also, evolutionarily, have been healthier (Zebrowitz, Fellous, Mignault, & Andreoletti, 2003).

One indicator of health is youth. Leslie Zebrowitz and her colleagues (Zebrowitz, 1996; Zebrowitz, Luevano, Bronstad, & Aharon, 2009)] have extensively studied the tendency for both men and women to prefer

people whose faces have characteristics similar to those of babies. These features include large, round, and widely spaced eyes, a small nose and chin, prominent cheekbones, and a large forehead. People who have baby faces (both men and women) are seen as more attractive than people who are not baby-faced.

Another indicator of health is symmetry. People are more attracted to faces that are more symmetrical than they are to those that are less symmetrical, and this may be due in part to the perception that symmetrical faces are perceived as healthier (Rhodes et al., 2001).

Although you might think that we would prefer faces that are unusual or unique, in fact the opposite is true. Langlois and Roggman (1990) showed college students the faces of men and women. The faces were composites made up of the average of 2, 4, 8, 16, or 32 faces. The researchers found that the more faces that were averaged into the stimulus, the more attractive it was judged. Again, our liking for average faces may be because they appear healthier.

Although preferences for youthful, symmetrical, and average faces have been observed cross-culturally, and thus appear to be common human preferences, different cultures may also have unique beliefs about what is attractive. In modern Western cultures, "thin is in,‖ and people prefer those who have little excess fat (Crandall, Merman, & Hebl, 2009). The need to be thin to be attractive is particularly strong for women in contemporary society, and the desire to maintain a low body weight can lead to low self-esteem, eating disorders, and other unhealthy behaviors. However, the norm of thinness has not always been in place; the preference for women with slender, masculine, and athletic looks has become stronger over the past 50 years. In contrast to the relatively universal preferences for youth, symmetry, and averageness, other cultures do not show such a strong propensity for thinness (Sugiyama, 2005).

Forming Judgments on the Basis of Appearance: Stereotyping, Prejudice, and Discrimination

We frequently use people's appearances to form our judgments about them and to determine our responses to them. The tendency to attribute personality characteristics to people on the basis of their external appearance or their social group memberships is known as stereotyping. Our stereotypes about physically attractive people lead us to see them as more dominant, sexually warm, mentally healthy, intelligent, and socially skilled than we perceive physically unattractive people (Langlois et al., 2000). And our stereotypes lead us to treat people differently—the physically attractive are given better grades on essay exams, are more successful on job interviews, and receive lighter sentences in court judgments than their less attractive counterparts (Hosoda, Stone-Romero, & Coats, 2003; Zebrowitz & McDonald, 1991).

In addition to stereotypes about physical attractiveness, we also regularly stereotype people on the basis of their sex, race, age, religion, and many other characteristics, and these stereotypes are frequently negative (Schneider, 2004). Stereotyping is unfair to the people we judge because stereotypes are based on our preconceptions and negative emotions about the members of the group. Stereotyping is closely related to prejudice,

the tendency to dislike people because of their appearance or group memberships, and discrimination, negative behaviors toward others based on prejudice.Stereotyping, prejudice, and discrimination work together. We may not vote for a gay person for public office because of our negative stereotypes about gays, and we may avoid people from other religions or those with mental illness because of our prejudices.

Some stereotypes may be accurate in part. Research has found, for instance, that attractive people are actually more sociable, more popular, and less lonely than less attractive individuals (Langlois et al., 2000). And, consistent with the stereotype that women are " emotional,‖ women are, on average, more empathic and attuned to the emotions of others than are men (Hall & Schmid Mast, 2008). Group differences in personality traits may occur in part because people act toward others on the basis of their stereotypes, creating a self-fulfilling prophecy. A self-fulfilling prophecyoccurs when our expectations about the personality characteristics of others lead us to behave toward those others in ways that make those beliefs come true. If I have a stereotype that attractive people are friendly, then I may act in a friendly way toward people who are attractive. This friendly behavior may be reciprocated by the attractive person, and if many other people also engage in the same positive behaviors with the person, in the long run he or she may actually become friendlier.

But even if attractive people are on average friendlier than unattractive people, not all attractive people are friendlier than all unattractive people. And even if women are, on average, more emotional than men, not all men are less emotional than all women. Social psychologists believe that it is better to treat people as individuals rather than rely on our stereotypes and prejudices, because stereotyping and prejudice are always unfair and often inaccurate (Fiske, 1989; Stangor, 1995). Furthermore, many of our stereotypes and prejudices occur out of our awareness, such that we do not even know that we are using them.

We use our stereotypes and prejudices in part because they are easy; if we can quickly size up people on the basis of their physical appearance, that can save us a lot of time and effort. We may be evolutionarily disposed to stereotyping. Because our primitive ancestors needed to accurately separate members of their own kin group from those of others, categorizing people into " us‖ (the ingroup) and " them‖ (the outgroup) was useful and even necessary (Neuberg, Kenrick, & Schaller, 2010). And the positive emotions that we experience as a result of our group memberships—known associal identity—can be an important and positive part of our everyday experiences (Hogg, 2003). We may gain social identity as members of our university, our sports teams, our religious and racial groups, and many other groups.

But the fact that we may use our stereotypes does not mean that we should use them. Stereotypes, prejudice, and discrimination, whether they are consciously or unconsciously applied, make it difficult for some people to effectively contribute to society and may create both mental and physical health problems for them (Swim & Stangor, 1998). In some cases getting beyond our prejudices is required by law, as detailed

in the U.S. Civil Rights Act of 1964, the Equal Opportunity Employment Act of 1972, and the Fair Housing Act of 1978.

There are individual differences in prejudice, such that some people are more likely to try to control and confront their stereotypes and prejudices whereas others apply them more freely (Czopp, Monteith, & Mark, 2006; Plant & Devine, 1998). For instance, some people believe in group hierarchies—that some groups are naturally better than others—whereas other people are more egalitarian and hold fewer prejudices (Sidanius & Pratto, 1999; Stangor & Leary, 2006).

Social psychologists believe that we should work to get past our prejudices. The tendency to hold stereotypes and prejudices and to act on them can be reduced, for instance, through positive interactions and friendships with members of other groups, through practice in avoiding using them, and through education (Hewstone, 1996).

Close Relationships

One of the most important tasks faced by humans is to develop successful relationships with others. These relationships include acquaintanceships and friendships but also the more important close relationships, which are the long-term intimate and romantic relationships that we develop with another person—for instance, in a marriage (Hendrick & Hendrick, 2000). Because most of us will want to enter into a close relationship at some point, and because close relationships are evolutionarily important as they form the basis for effective child rearing, it is useful to know what psychologists have learned about the principles of liking and loving within them.

A major interest of social psychologists is the study of interpersonal attraction, or what makes people like, and even love, each other. One important factor is a perceived similarity in values and beliefs between the partners (Davis & Rusbult, 2001). Similarity is important for relationships both because it is more convenient (it‘s easier if both partners like to ski or go to the movies than if only one does), but also because similarity supports our values—I can feel better about myself and my choice of activities if I see that you also enjoy doing the same things that I do.

Liking is also enhanced by self-disclosure, the tendency to communicate frequently, without fear of reprisal, and in an accepting and empathetic manner. Friends are friends because we can talk to them openly about our needs and goals, and because they listen to and respond to our needs (Reis & Aron, 2008). But self-disclosure must be balanced. If I open up to you about the concerns that are important to me, I expect you to do the same in return. If the self-disclosure is not reciprocal, the relationship may not last.

Another important determinant of liking is proximity, or the extent to which people are physically near us. Research has found that we are more likely to develop friendships with people who are nearby, for instance, those who live in the same dorm that we do, and even with people who just happen to sit nearer to us in our classes (Back, Schmukle, & Egloff, 2008).

Proximity has its effect on liking through the principle of mere exposure, which is the tendency to prefer stimuli (including but not limited to

people) that we have seen more frequently. Moreland and Beach (1992) studied mere exposure by having female confederates attend a large lecture class of over 100 students 0, 5, 10, or 15 times during a semester. At the end of the term, the other students in the class were shown pictures of the confederates and asked to indicate both if they recognized them and also how much they liked them. The number of times the confederates had attended class didn‘t influence the other students‘ ability to recognize them, but it did influence their liking for them. As predicted by the mere exposure hypothesis, students who had attended class more often were liked more (Figure 14.5 "Mere Exposure in the Classroom").

The effect of mere exposure is powerful and occurs in a wide variety of situations. Infants tend to smile at a photograph of someone they have seen before more than they smile at a photograph of someone they are seeing for the first time (Brooks-Gunn & Lewis, 1981), and people prefer side-to-side reversed images of their own faces over their normal (nonreversed) face, whereas their friends prefer their normal face over the reversed one (Mita, Dermer, & Knight, 1977). This is expected on the basis of mere exposure, since people see their own faces primarily in mirrors and thus are exposed to the reversed face more often.

Mere exposure may well have an evolutionary basis. We have an initial fear of the unknown, but as things become more familiar they seem more similar and safe, and thus produce more positive affect and seem less threatening and dangerous (Freitas, Azizian, Travers, & Berry, 2005). In fact, research has found that stimuli tend to produce more positive affect as they become more familiar (Harmon-Jones & Allen, 2001). When the stimuli are people, there may well be an added effect. Familiar people become more likely to be seen as part of the ingroup rather than the outgroup, and this may lead us to like them more. Leslie Zebrowitz and her colleagues found that we like people of our own race in part because they are perceived as similar to us (Zebrowitz, Bornstad, & Lee, 2007).

In the most successful relationships the two people begin to see themselves as a single unit. Arthur Aron and his colleagues (Aron, Aron, & Smollan, 1992) assessed the role of closeness in relationships using the Inclusion of Other in the Self Scale as shown in Figure 14.6 "The Inclusion of Other in the Self Scale". You might try completing the measure yourself for some different people that you know—for instance, your family members, friends, spouse, or girlfriend or boyfriend. The measure is simple to use and to interpret; if people see the circles representing the self and the other as more overlapping, this means that the relationship is close. But if they choose the circles that are less overlapping, then the relationship is less so. Figure 14.6 The Inclusion of Other in the Self Scale

Although the closeness measure is very simple, it has been found to be predictive of people‘s satisfaction with their close relationships, and of the tendency for couples to stay together (Aron, Aron, Tudor, & Nelson, 1991; Aron, Paris, & Aron, 1995). When the partners in a relationship feel that they are close, and when they indicate that the relationship is based on caring, warmth, acceptance and social support, we can say that the relationship is intimate (Reis & Aron, 2008).

When a couple begins to take care of a household together, has children, and perhaps has to care for elderly parents, the requirements of the relationship become correspondingly bigger. As a result of this complexity, the partners in close relationships increasingly turn to each other for help in coordinating activities, remembering dates and appointments, and accomplishing tasks. Relationships are close in part because the couple becomes highly interdependent, relying on each other to meet important goals (Berscheid & Reis, 1998).

In relationships in which a positive rapport between the partners is developed and maintained over a period of time, the partners are naturally happy with the relationship and they become committed to it. Commitment refers to the feelings and actions that keep partners working together to maintain the relationship (Rusbult, Olsen, Davis, Hannon, 2001) and is characterized by mutual expectations that the self and the partner will be responsive to each other‘s needs (Clark & Mills, 2004). Partners who are committed to the relationship see their mates as more attractive, are less able to imagine themselves with another partner, express less interest in other potential mates, and are less likely to break up (Simpson & Harris, 1994).

People also find relationships more satisfactory, and stay in them longer, when they feel that they are being rewarded by them. When the needs of either or both of the partners are not being met, the relationship is in trouble. This is not to say that people only think about the benefits they are getting; they will also consider the needs of the other. But over the long term, both partners must benefit from the relationship.

Although sexual arousal and excitement are more important early on in relationships, intimacy is also determined by sexual and romantic attraction. Indeed, intimacy is also dependent on passion—the partners must display positive affect toward each other. Happy couples are in positive moods when they are around each other; they laugh with each other, express approval rather than criticism of each other‘s behaviors, and enjoy physical contact. People are happier in their relationships when they view the other person in a positive or even an “ idealized‖ sense, rather than a more realistic and perhaps more negative one (Murray, Holmes, & Griffin, 1996).

Margaret Clark and Edward Lemay (2010) recently reviewed the literature on close relationships and argued that their most important characteristic is a sense of responsiveness. People are happy, healthy, and likely to stay in relationships in which they are sure that they can trust the other person to understand, validate, and care for them. It is this unconditional giving and receiving of love that promotes the welfare of both partners and provides the secure base that allows both partners to thrive.

Causal Attribution: Forming Judgments by Observing Behavior

When we observe people‘s behavior we may attempt to determine if the behavior really reflects their underlying personality. If Frank hits Joe, we might wonder if Frank is naturally aggressive or if perhaps Joe had provoked him. If Leslie leaves a big tip for the waitress, we might wonder if she is a generous person or if the service was particularly

excellent. The process of trying to determine the causes of people's behavior, with the goal of learning about their personalities, is known as causal attribution (Jones et al., 1987).

Making causal attributions is a bit like conducting an experiment. We carefully observe the people we are interested in and note how they behave in different social situations. After we have made our observations, we draw our conclusions. Sometimes we may decide that the behavior was caused primarily by the person; this is called making a person attribution. At other times, we may determine that the behavior was caused primarily by the situation; this is called making a situation attribution. And at other times we may decide that the behavior was caused by both the person and the situation.

It is easier to make personal attributions when behavior is more unusual or unexpected. Imagine that you go to a party and you are introduced to Tess. Tess shakes your hand and says "N ice to meet you!‖ Can you readily conclude, on the basis of this behavior, that Tess is a friendly person? Probably not. Because the social situation demands that people act in a friendly way (shaking your hand and saying " nice to meet you‖), it is difficult to know whether Tess acted friendly because of the situation or because she is really friendly. Imagine, however, that instead of shaking your hand, Tess sticks out her tongue at you and walks away. I think you would agree that it is easier in this case to infer that Tess is unfriendly because her behavior is so contrary to what one would expect (Jones, Davis, & Gergen, 1961).

Although people are reasonably accurate in their attributions (we could say, perhaps, that they are " good enough‖; Fiske, 2003), they are far from perfect. One error that we frequently make when making judgments about ourselves is to make self-serving attributions by judging the causes of our own behaviors in overly positive ways. If you did well on a test, you will probably attribute that success to person causes (" I'm smart,‖ " I studied really hard‖), but if you do poorly on the test you are more likely to make situation attributions (" The test was hard,‖ " I had bad luck‖). Although making causal attributions is expected to be logical and scientific, our emotions are not irrelevant.

Another way that our attributions are often inaccurate is that we are, by and large, too quick to attribute the behavior of other people to something personal about them rather than to something about their situation. We are more likely to say, " Leslie left a big tip, so she must be generous‖ than " Leslie left a big tip, but perhaps that was because the service was really excellent.‖The common tendency to overestimate the role of person factors and overlook the impact of situations in judging others is known as thefundamental attribution error (or correspondence bias).

The fundamental attribution error occurs in part because other people are so salient in our social environments. When I look at you, I see you as my focus, and so I am likely to make personal attributions about you. If the situation is reversed such that people see situations from the perspectives of others, the fundamental attribution error is reduced (Storms, 1973). And when we judge people, we often see them in only one situation. It's easy for you to think that your math professor is "pic

ky and detail-oriented‖ because that describes her behavior in class, but you don‘t know how she acts with her friends and family, which might be completely different. And we also tend to make person attributions because they are easy. We are more likely to commit the fundamental attribution error—quickly jumping to the conclusion that behavior is caused by underlying personality—when we are tired, distracted, or busy doing other things (Trope & Alfieri, 1997). 0]

An important moral about perceiving others applies here: We should not be too quick to judge other people. It is easy to think that poor people are lazy, that people who say something harsh are rude or unfriendly, and that all terrorists are insane madmen. But these attributions may frequently overemphasize the role of the person, resulting in an inappropriate and inaccurate tendency to blame the victim (Lerner, 1980; Tennen & Affleck, 1990). 1] Sometimes people are lazy and rude, and some terrorists are probably insane, but these people may also be influenced by the situation in which they find themselves. Poor people may find it more difficult to get work and education because of the environment they grow up in, people may say rude things because they are feeling threatened or are in pain, and terrorists may have learned in their family and school that committing violence in the service of their beliefs is justified. When you find yourself making strong person attributions for the behaviors of others, I hope you will stop and think more carefully. Would you want other people to make person attributions for your behavior in the same situation, or would you prefer that they more fully consider the situation surrounding your behavior? Are you perhaps making the fundamental attribution error?

Attitudes and Behavior

Attitude refer to our relatively enduring evaluations of people and things(Albarracín, Johnson, & Zanna, 2005). 2] We each hold many thousands of attitudes, including those about family and friends, political parties and political figures, abortion rights, preferences for music, and much more. Some of our attitudes, including those about sports, roller coaster rides, and capital punishment, are heritable, which explains in part why we are similar to our parents on many dimensions (Olson, Vernon, Harris, & Jang, 2001). 3] Other attitudes are learned through direct and indirect experiences with the attitude objects (De Houwer, Thomas, & Baeyens, 2001). 4]

Attitudes are important because they frequently (but not always) predict behavior. If we know that a person has a more positive attitude toward Frosted Flakes than toward Cheerios, then we will naturally predict that she will buy more of the former when she gets to the market. If we know that Charlie is madly in love with Charlene, then we will not be surprised when he proposes marriage. Because attitudes often predict behavior, people who wish to change behavior frequently try to change attitudes through the use of persuasive communications. Table 14.2 "Techniques That Can Be Effective in Persuading Others" presents some of the many techniques that can be used to change people‘s attitudes (Cialdini, 2001). 5]

Attitudes predict behavior better for some people than for others. People who are high in self-monitoring—the tendency to regulate behavior to

meet the demands of social situations—tend to change their behaviors to match the social situation and thus do not always act on their attitudes (Gangestad & Snyder, 2000). 6] High self-monitors agree with statements such as, " In different situations and with different people, I often act like very different persons‖ and " I guess I put on a show to impress or entertain people.‖ Attitudes are more likely to predict behavior for low self-monitors, who are more likely to act on their own attitudes even when the social situation suggests that they should behave otherwise. Low self-monitors are more likely to agree with statements such as "A t parties and social gatherings, I do not attempt to do or say things that others will like‖ and " I can only argue for ideas that I already believe.‖

The match between the social situations in which the attitudes are expressed and the behaviors are engaged in also matters, such that there is a greater attitude-behavior correlation when the social situations match. Imagine for a minute the case of Magritte, a 16-year-old high school student. Magritte tells her parents that she hates the idea of smoking cigarettes. But how sure are you that Magritte's attitude will predict her behavior? Would you be willing to bet that she'd never try smoking when she's out with her friends?

The problem here is that Magritte's attitude is being expressed in one social situation (when she is with her parents) whereas the behavior (trying a cigarette) is going to occur in a very different social situation (when she is out with her friends). The relevant social norms are, of course, much different in the two situations. Magritte's friends might be able to convince her to try smoking, despite her initial negative attitude, by enticing her with peer pressure. Behaviors are more likely to be consistent with attitudes when the social situation in which the behavior occurs is similar to the situation in which the attitude is expressed (Ajzen, 1991). 7]

Although it might not have surprised you to hear that our attitudes predict our behaviors, you might be more surprised to learn that our behaviors also have an influence on our attitudes. It makes sense that if I like Frosted Flakes I'll buy them, because my positive attitude toward the product influences my behavior. But my attitudes toward Frosted Flakes may also become more positive if I decide—for whatever reason—to buy some. It makes sense that Charlie's love for Charlene will lead him to propose marriage, but it is also the case that he will likely love Charlene even more after he does so.

Behaviors influence attitudes in part through the process of self-perception.Self-perception occurs when we use our own behavior as a guide to help us determine our own thoughts and feelings (Bem, 1972; Olson & Stone, 2005).8] In one demonstration of the power of self-perception, Wells and Petty (1980) 9] assigned their research participants to shake their heads either up and down or side to side as they read newspaper editorials. The participants who had shaken their heads up and down later agreed with the content of the editorials more than the people who had shaken them side to side. Wells and Petty argued that this occurred because the participants used their own head-shaking behaviors to determine their attitudes about the editorials.

Persuaders may use the principles of self-perception to change attitudes. The foot-in-the-door technique is a method of persuasion in which the person is first persuaded to accept a rather minor request and then asked for a larger one after that. In one demonstration, Guéguen and Jacob (2002) [60] found that students in a computer discussion group were more likely to volunteer to complete a 40-question survey on their food habits (which required 15 to 20 minutes of their time) if they had already, a few minutes earlier, agreed to help the same requestor with a simple computer-related question (about how to convert a file type) than if they had not first been given the smaller opportunity to help. The idea is that when asked the second time, the people looked at their past behavior (having agreed to the small request) and inferred that they are helpful people.

Behavior also influences our attitudes through a more emotional process known as cognitive dissonance. Cognitive dissonance refers to the discomfort we experience when we choose to behave in ways that we see as inappropriate (Festinger, 1957; Harmon-Jones & Mills, 1999). [61] If we feel that we have wasted our time or acted against our own moral principles, we experience negative emotions (dissonance) and may change our attitudes about the behavior to reduce the negative feelings.

Interacting With Others: Helping, Hurting, and Conforming

Humans have developed a variety of social skills that enhance our ability to successfully interact with others. We are often helpful, even when that helping comes at some cost to ourselves, and we often change our opinions and beliefs to fit in with the opinions of those whom we care about. Yet we also are able to be aggressive if we feel the situation warrants it. Helping Others: Altruism Helps Create Harmonious Relationships

Altruism refers to any behavior that is designed to increase another person's welfare, and particularly those actions that do not seem to provide a direct reward to the person who performs them (Dovidio, Piliavin, Schroeder, & Penner, 2006). Altruism occurs when we stop to help a stranger who has been stranded on the highway, when we volunteer at a homeless shelter, or when we donate to a charity. According to a survey given by an established coalition that studies and encourages volunteering (http://www.independentsector.org), in 2001 over 83 million American adults reported that they helped others by volunteering, and did so an average of 3.6 hours per week. The survey estimated that the value of the volunteer time that was given was over 239 billion dollars.

Why Are We Altruistic?

Because altruism is costly, you might wonder why we engage in it at all. There are a variety of explanations for the occurrence of altruism, and Table 14.3 "Some of the Variables Known to Increase Helping" summarizes some of the variables that are known to increase helping. Table 14.3 Some of the Variables Known to Increase Helping

The tendency to help others in need is in part a functional evolutionary adaptation. Although helping others can be costly to us as individuals,

helping people who are related to us can perpetuate our own genes (Madsen et al., 2007; McAndrew, 2002; Stewart-Williams, 2007). Burnstein, Crandall, and Kitayama (1994) found that students indicated they would be more likely to help a person who was closely related to them (e.g., a sibling, parent, or child) than they would be to help a person who was more distantly related (e.g., a niece, nephew, uncle, or grandmother). People are more likely to donate kidneys to relatives than to strangers (Borgida, Conner, & Manteufel, 1992), and even children indicate that they are more likely to help their siblings than they are to help a friend (Tisak & Tisak, 1996).]

Although it makes evolutionary sense that we would help people who we are related to, why would we help people to whom we not related? One explanation for such behavior is based on the principle of reciprocal altruism (Krebs & Davies, 1987; Trivers, 1971). Reciprocal altruismis the principle that, if we help other people now, those others will return the favor should we need their help in the future. By helping others, we both increase our chances of survival and reproductive success and help others increase their survival too. Over the course of evolution, those who engage in reciprocal altruism should be able to reproduce more often than those who do not, thus enabling this kind of altruism to continue.

We also learn to help by modeling the helpful behavior of others. Although people frequently worry about the negative impact of the violence that is seen on TV, there is also a great deal of helping behavior shown on television. Smith et al. (2006) found that 73% of TV shows had some altruism, and that about three altruistic behaviors were shown every hour. Furthermore, the prevalence of altruism was particularly high in children‘s shows. But just as viewing altruism can increase helping, modeling of behavior that is not altruistic can decrease altruism. For instance, Anderson and Bushman (2001) found that playing violent video games led to a decrease in helping.

We are more likely to help when we receive rewards for doing so and less likely to help when helping is costly. Parents praise their children who share their toys with others, and may reprimand children who are selfish. We are more likely to help when we have plenty of time than when we are in a hurry (Darley and Batson 1973). Another potential reward is the status we gain as a result of helping. When we act altruistically, we gain a reputation as a person with high status who is able and willing to help others, and this status makes us more desirable in the eyes of others (Hardy & Van Vugt, 2006).

The outcome of the reinforcement and modeling of altruism is the development of social norms about helping—standards of behavior that we see as appropriate and desirable regarding helping. The reciprocity norm reminds us that we should follow the principles of reciprocal altruism. If someone helps us, then we should help them in the future, and we should help people now with the expectation that they will help us later if we need it. The reciprocity norm is found in everyday adages such as “ Scratch my back and I‘ll scratch yours‖ and in religious and philosophical teachings such as the “ Golden Rule‖: “D o unto other as you would have them do unto you.‖

Because helping based on the reciprocity norm is based on the return of earlier help and the expectation of a future return from others, it might not seem like true altruism. We might hope that our children internalize another relevant social norm that seems more altruistic: the social responsibility norm. The social responsibility norm tells us that we should try to help others who need assistance, even without any expectation of future paybacks. The teachings of many religions are based on the social responsibility norm; that we should, as good human beings, reach out and help other people whenever we can.

How the Presence of Others Can Reduce Helping

Late at night on March 13, 1964, 28-year-old Kitty Genovese was murdered within a few yards of her apartment building in New York City after a violent fight with her killer in which she struggled and screamed. When the police interviewed Kitty‘s neighbors about the crime, they discovered that 38 of the neighbors indicated that they had seen or heard the fight occurring but not one of them had bothered to intervene, and only one person had called the police

The first step in the model is noticing the event. Latané and Darley (1968) demonstrated the important role of the social situation in noticing by asking research participants to complete a questionnaire in a small room. Some of the participants completed the questionnaire alone, whereas others completed the questionnaire in small groups in which two other participants were also working on questionnaires. A few minutes after the participants had begun the questionnaires, the experimenters started to let some white smoke come into the room through a vent in the wall. The experimenters timed how long it took before the first person in the room looked up and noticed the smoke.

The people who were working alone noticed the smoke in about 5 seconds, and within 4 minutes most of the participants who were working alone had taken some action. On the other hand, on average, the first person in the group conditions did not notice the smoke until over 20 seconds had elapsed. And, although 75% of the participants who were working alone reported the smoke within 4 minutes, the smoke was reported in only 12% of the groups by that time. In fact, in only 3 of the 8 groups did anyone report the smoke, even after it had filled the room. You can see that the social situation has a powerful influence on noticing; we simply don‘t see emergencies when other people are with us.

Even if we notice an emergency, we might not interpret it as one. Were the cries of Kitty Genovese really calls for help, or were they simply an argument with a boyfriend? The problem is compounded when others are present, because when we are unsure how to interpret events we normally look to others to help us understand them, and at the same time they are looking to us for information. The problem is that each bystander thinks that other people aren‘t acting because they don‘t see an emergency. Believing that the others know something that they don‘t, each observer concludes that help is not required.

Even if we have noticed the emergency and interpret it as being one, this does not necessarily mean that we will come to the rescue of the other person. We still need to decide that it is our responsibility to do

something. The problem is that when we see others around, it is easy to assume that they are going to do something, and that we don‘t need to do anything ourselves. Diffusion of responsibility occurs when we assume that others will take action and therefore we do not take action ourselves. The irony again, of course, is that people are more likely to help when they are the only ones in the situation than when there are others around.

Perhaps you have noticed diffusion of responsibility if you participated in an Internet users group where people asked questions of the other users. Did you find that it was easier to get help if you directed your request to a smaller set of users than when you directed it to a larger number of people? Markey (2000) found that people received help more quickly (in about 37 seconds) when they asked for help by specifying a participant‘s name than when no name was specified (51 seconds).

The final step in the helping model is knowing how to help. Of course, for many of us the ways to best help another person in an emergency are not that clear; we are not professionals and we have little training in how to help in emergencies. People who do have training in how to act in emergencies are more likely to help, whereas the rest of us just don‘t know what to do, and therefore we may simply walk by. On the other hand, today many people have cell phones, and we can do a lot with a quick call; in fact, a phone call made in time might have saved Kitty Genovese‘s life.

Human Aggression: An Adaptive yet Potentially Damaging Behavior

Aggression is behavior that is intended to harm another individual. Aggression may occur in the heat of the moment, for instance, when a jealous lover strikes out in rage or the sports fans at a university light fires and destroy cars after an important basketball game. Or it may occur in a more cognitive, deliberate, and planned way, such as the aggression of a bully who steals another child‘s toys, a terrorist who kills civilians to gain political exposure, or a hired assassin who kills for money.

Not all aggression is physical. Aggression also occurs in nonphysical ways, as when children exclude others from activities, call them names, or spread rumors about them. Paquette and Underwood (1999) found that both boys and girls rated nonphysical aggression such as name-calling as making them feel more “ sad and bad‖ than did physical aggression.

The Ability to Aggress Is Part of Human Nature

We may aggress against others in part because it allows us to gain access to valuable resources such as food, territory, and desirable mates, or to protect ourselves from direct attack by others. If aggression helps in the survival of our genes, then the process of natural selection may well have caused humans, as it would any other animal, to be aggressive (Buss & Duntley, 2006).

There is evidence for the genetics of aggression. Aggression is controlled in large part by the amygdala. One of the primary functions of the amygdala is to help us learn to associate stimuli with the rewards and the punishment that they may provide. The amygdala is particularly

activated in our responses to stimuli that we see as threatening and fear-arousing. When the amygdala is stimulated, in either humans or in animals, the organism becomes more aggressive.

But just because we can aggress does not mean that we will aggress. It is not necessarily evolutionarily adaptive to aggress in all situations. Neither people nor animals are always aggressive; they rely on aggression only when they feel that they absolutely need to (Berkowitz, 1993). The prefrontal cortex serves as a control center on aggression; when it is more highly activated, we are more able to control our aggressive impulses. Research has found that the cerebral cortex is less active in murderers and death row inmates, suggesting that violent crime may be caused at least in part by a failure or reduced ability to regulate aggression (Davidson, Putnam, & Larson, 2000).

Hormones are also important in regulating aggression. Most important in this regard is the male sex hormone testosterone, which is associated with increased aggression in both males and females. Research conducted on a variety of animals has found a positive correlation between levels of testosterone and aggression. This relationship seems to be weaker among humans than among animals, yet it is still significant (Dabbs, Hargrove, & Heusel, 1996).

Consuming alcohol increases the likelihood that people will respond aggressively to provocations, and even people who are not normally aggressive may react with aggression when they are intoxicated (Graham, Osgood, Wells, & Stockwell, 2006). Alcohol reduces the ability of people who have consumed it to inhibit their aggression because when people are intoxicated, they become more self-focused and less aware of the social constraints that normally prevent them from engaging aggressively (Bushman & Cooper, 1990; Steele & Southwick, 1985).

Negative Experiences Increase Aggression

If I were to ask you about the times that you have been aggressive, I bet that you would tell me that many of them occurred when you were angry, in a bad mood, tired, in pain, sick, or frustrated. And you would be right—we are much more likely to aggress when we are experiencing negative emotions. One important determinant of aggression is frustration. When we are frustrated we may lash out at others, even at people who did not cause the frustration. In some cases the aggression is displaced aggression, which is aggression that is directed at an object or person other than the person who caused the frustration.

Other negative emotions also increase aggression. Griffit and Veitch (1971) had students complete questionnaires in rooms in which the heat was at a normal temperature or in which the temperature was over 90 degrees Fahrenheit. The students in the latter conditions expressed significantly more hostility. Aggression is greater on hot days than it is on cooler days and during hot years than during cooler years, and most violent riots occur during the hottest days of the year (Bushman, Wang, & Anderson, 2005). Pain also increases aggression (Berkowitz, 1993). If we are aware that we are feeling negative emotions, we might think that we could release those emotions in a relatively harmless way, such as by punching a pillow or kicking something, with the hopes that doing so

will release our aggressive tendencies. Catharsis—the idea that observing or engaging in less harmful aggressive actions will reduce the tendency to aggress later in a more harmful way—has been considered by many as a way of decreasing violence, and it was an important part of the theories of Sigmund Freud. As far as social psychologists have been able to determine, however, catharsis simply does not work. Rather than decreasing aggression, engaging in aggressive behaviors of any type increases the likelihood of later aggression. Bushman, Baumeister, and Stack (1999) first angered their research participants by having another student insult them. Then half of the participants were allowed to engage in a cathartic behavior: They were given boxing gloves and then got a chance to hit a punching bag for 2 minutes. Then all the participants played a game with the person who had insulted them earlier in which they had a chance to blast the other person with a painful blast of white noise. Contrary to the catharsis hypothesis, the students who had punched the punching bag set a higher noise level and delivered longer bursts of noise than the participants who did not get a chance to hit the punching bag. It seems that if we hit a punching bag, punch a pillow, or scream as loud as we can to release our frustration, the opposite may occur—rather than decreasing aggression, these behaviors in fact increase it.

Viewing Violent Media Increases Aggression

The average American watches over 4 hours of television every day, and these programs contain a substantial amount of aggression. At the same time, children are also exposed to violence in movies and video games, as well as in popular music and music videos that include violent lyrics and imagery. Research evidence makes it very clear that, on average, people who watch violent behavior become more aggressive. The evidence supporting this relationship comes from many studies conducted over many years using both correlational designs as well as laboratory studies in which people have been randomly assigned to view either violent or nonviolent material (Anderson et al., 2003). Viewing violent behavior also increases aggression in part through observational learning. Children who witness violence are more likely to be aggressive. One example is in the studies of Albert Bandura, as shown in below.

Conformity and Obedience: How Social Influence Creates Social Norms

When we decide on what courses to enroll in by asking for advice from our friends, change our beliefs or behaviors as a result of the ideas that we hear from others, or binge drink because our friends are doing it, we are engaging in conformity, a change in beliefs or behavior that occurs as the result of the presence of the other people around us. We conform not only because we believe that other people have accurate information and we want to have knowledge (informational conformity) but also because we want to be liked by others (normative conformity).

The typical outcome of conformity is that our beliefs and behaviors become more similar to those of others around us. But some situations create more conformity than others, and some of the factors that

contribute to conformity are shown in Table 14.4 "Variables That Increase Conformity".

At times conformity occurs in a relatively spontaneous and unconscious way, without any obvious intent of one person to change the other, or an awareness that the conformity is occurring. Robert Cialdini and his colleagues (Cialdini, Reno, & Kallgren, 1990) found that college students were more likely to throw litter on the ground themselves when they had just seen another person throw some paper on the ground, and Cheng and Chartrand (2003) found that people unconsciously mimicked the behaviors of others, such as by rubbing their face or shaking their foot, and that that mimicry was greater when the other person was of high versus low social status.

Muzafer Sherif (1936) studied how norms develop in ambiguous situations. In his studies, college students were placed in a dark room with a single point of light and were asked to indicate, each time the light was turned on, how much it appeared to move. (The movement, which is not actually real, occurs because of the saccadic movement of the eyes.) Each group member gave his or her response on each trial aloud and each time in a different random order

Not all conformity is passive. In the research of Solomon Asch (1955) the judgments that group members were asked to make were entirely unambiguous, and the influence of the other people on judgments was apparent. The research participants were male college students who were told that they were to be participating in a test of visual abilities. The men were seated in front of a board that displayed the visual stimuli that they were going to judge. The men were told that there would be 18 trials during the experiment, and on each trial they would see two cards. The standard card had a single line that was to be judged, and the test card had three lines that varied in length between about 2 and 10 inches.

On each trial, each person in the group answered out loud, beginning with one end of the group and moving toward the other end. Although the real research participant did not know it, the other group members were actually not participants but experimental confederates who gave predetermined answers on each trial. Because the real participant was seated next to last in the row, he always made his judgment following most of the other group members. Although on the first two trials the confederates each gave the correct answer, on the third trial, and on 11 of the subsequent trials, they all had been instructed to give the same wrong choice. For instance, even though the correct answer was Line 1, they would all say it was Line 2. Thus when it became the participant‘s turn to answer, he could either give the clearly correct answer or conform to the incorrect responses of the confederates.

Remarkably, in this study about 76% of the 123 men who were tested gave at least one incorrect response when it was their turn, and 37% of the responses, overall, were conforming. This is indeed evidence for the power of conformity because the participants were making clearly incorrect responses in public. However, conformity was not absolute; in addition to the 24% of the men who never conformed, only 5% of the men conformed on all 12 of the critical trials.

Do We Always Conform?

The research that we have discussed to this point suggests that most people conform to the opinions and desires of others. But it is not always the case that we blindly conform. For one, there are individual differences in conformity. People with lower self-esteem are more likely to conform than are those with higher self-esteem, and people who are dependent on and who have a strong need for approval from others are also more conforming (Bornstein, 1993). People who highly identify with or who have a high degree of commitment to a group are also more likely to conform to group norms than those who care less about the group (Jetten, Spears, & Manstead, 1997). Despite these individual differences among people in terms of their tendency to conform, however, research has generally found that the impact of individual difference variables on conformity is smaller than the influence of situational variables, such as the number and unanimity of the majority.

We have seen that conformity usually occurs such that the opinions and behaviors of individuals become more similar to the opinions and behaviors of the majority of the people in the group. However, and although it is much more unusual, there are cases in which a smaller number of individuals is able to influence the opinions or behaviors of the larger group—a phenomenon known as minority influence. Minorities who are consistent and confident in their opinions may in some cases be able to be persuasive (Moscovici, Mugny, & Van Avermaet, 1985).

Persuasion that comes from minorities has another, and potentially even more important, effect on the opinions of majority group members: It can lead majorities to engage in fuller, as well as more divergent, innovative, and creative thinking about the topics being discussed (Martin, Hewstone, Martin, & Gardikiotis, 2008). Nemeth and Kwan (1987) found that participants working together in groups solved problems more creatively when only one person gave a different and unusual response than the other members did (minority influence) in comparison to when three people gave the same unusual response.

It is a good thing that minorities can be influential; otherwise, the world would be pretty boring indeed. When we look back on history, we find that it is the unusual, divergent, innovative minority groups or individuals, who—although frequently ridiculed at the time for their unusual ideas—end up being respected for producing positive changes.

Another case where conformity does not occur is when people feel that their freedom is being threatened by influence attempts, yet they also have the ability to resist that persuasion. In these cases they may develop a strong emotional reaction that leads people to resist pressures to conform known aspsychological reactance (Miron & Brehm, 2006). Reactance is aroused when our ability to choose which behaviors to engage in is eliminated or threatened with elimination. The outcome of the experience of reactance is that people may not conform at all, in fact moving their opinions or behaviors away from the desires of the influencer. Consider an experiment conducted by Pennebaker and Sanders (1976), who attempted to get people to stop writing graffiti on the walls of campus restrooms. In the first group of restrooms they put a sign that read " Do not write on these walls under any circumstances!‖

whereas in the second group they placed a sign that simply said "Pl ease don't write on these walls.‖ Two weeks later, the researchers returned to the restrooms to see if the signs had made a difference. They found that there was significantly less graffiti in the second group of restrooms than in the first one. It seems as if people who were given strong pressures to not engage in the behavior were more likely to react against those directives than were people who were given a weaker message. Reactance represents a desire to restore freedom that is being threatened. A child who feels that his or her parents are forcing him to eat his asparagus may react quite vehemently with a strong refusal to touch the plate. And an adult who feels that she is being pressured by a car salesman might feel the same way and leave the showroom entirely, resulting in the opposite of the salesman's intended outcome.

Just as our primitive ancestors lived together in small social groups, including families, tribes, and clans, people today still spend a great deal of time in groups. We study together in study groups, we work together on production lines, and we decide the fates of others in courtroom juries. We work in groups because groups can be beneficial. A rock band that is writing a new song or a surgical team in the middle of a complex operation may coordinate their efforts so well that it is clear that the same outcome could never have occurred if the individuals had worked alone. But group performance will only be better than individual performance to the extent that the group members are motivated to meet the group goals, effectively share information, and efficiently coordinate their efforts. Because these things do not always happen, group performance is almost never as good as we would expect, given the number of individuals in the group, and may even in some cases be inferior to that which could have been made by one or more members of the group working alone.

Working in Front of Others: Social Facilitation and Social Inhibition

In an early social psychological study, Norman Triplett (1898) found that bicycle racers who were competing with other bicyclers on the same track rode significantly faster than bicyclers who were racing alone, against the clock. This led Triplett to hypothesize that people perform tasks better when there are other people present than they do when they are alone. Subsequent findings validated Triplett's results, and experiments have shown that the presence of others can increase performance on many types of tasks, including jogging, shooting pool, lifting weights, and solving problems (Bond & Titus, 1983). The tendency to perform tasks better or faster in the presence of others is known as social facilitation.

However, although people sometimes perform better when they are in groups than they do alone, the situation is not that simple. Perhaps you remember an experience when you performed a task (playing the piano, shooting basketball free throws, giving a public presentation) very well alone but poorly with, or in front of, others. Thus it seems that the conclusion that being with others increases performance cannot be entirely true. The tendency to perform tasks more poorly or more slowly in the presence of others is known as social inhibition.

A great deal of experimental research has now confirmed these predictions. A meta-analysis by Bond and Titus (1983), which looked at the results of over 200 studies using over 20,000 research participants, found that the presence of others significantly increased the rate of performing on simple tasks, and also decreased both rate and quality of performance on complex tasks.

Although the arousal model proposed by Zajonc is perhaps the most elegant, other explanations have also been proposed to account for social facilitation and social inhibition. One modification argues that we are particularly influenced by others when we perceive that the others are evaluating us or competing with us (Baron, 1986).] In one study supporting this idea, Strube, Miles, and Finch (1981) found that the presence of spectators increased joggers‘ speed only when the spectators were facing the joggers, so that the spectators could see the joggers and assess their performance. The presence of others did not influence joggers‘ performance when the joggers were facing in the other direction and thus could not see them.

Working Together in Groups

The ability of a group to perform well is determined by the characteristics of the group members (e.g., are they knowledgeable and skilled?) as well as by the group process—that is, the events that occur while the group is working on the task. When the outcome of group performance is better than we would expect given the individuals who form the group, we call the outcome a group process gain, and when the group outcome is worse than we would have expected given the individuals who form the group, we call the outcome a group process loss.

One group process loss that may occur in groups is that the group members may engage in social loafing, a group process loss that occurs when people do not work as hard in a group as they do when they are working alone. In one of the earliest social psychology experiments, Ringelmann (1913; reported in Kravitz & Martin, 1986) had individual men, as well as groups of various numbers of men, pull as hard as they could on ropes while he measured the maximum amount that they were able to pull. As you can see in Figure 14.16 "Group Process Loss", although larger groups pulled harder than any one individual, Ringelmann also found a substantial process loss. In fact, the loss was so large that groups of three men pulled at only 85% of their expected capability, whereas groups of eight pulled at only 37% of their expected capability. This type of process loss, in which group productivity decreases as the size of the group increases, has been found to occur on a wide variety of tasks.

Group process losses can also occur when group members conform to each other rather than expressing their own divergent ideas. Groupthink is a phenomenon that occurs when a group made up of members who may be very competent and thus quite capable of making excellent decisions nevertheless ends up, as a result of a flawed group process and strong conformity pressures, making a poor decision (Baron, 2005; Janis, 2007). Groupthink is more likely to occur in groups whose members feel a strong group identity, when there is a strong and directive leader, and

when the group needs to make an important decision quickly. The problem is that groups suffering from groupthink become unwilling to seek out or discuss discrepant or unsettling information about the topic at hand, and the group members do not express contradictory opinions. Because the group members are afraid to express opinions that contradict those of the leader, or to bring in outsiders who have other information, the group is prevented from making a fully informed decision.

It has been suggested that groupthink was involved in a number of well-known and important, but very poor, decisions made by government and business groups, including the decision to invade Iraq made by President Bush and his advisors in 2002, the crashes of two Space Shuttle missions in 1986 and 2003, and the decision of President John Kennedy and his advisors to commit U.S. forces to help invade Cuba and overthrow Fidel Castro in 1962. Analyses of the decision-making processes in these cases have documented the role of conformity pressures.

As a result of the high levels of conformity in these groups, the group begins to see itself as extremely valuable and important, highly capable of making high-quality decisions, and invulnerable. The group members begin to feel that they are superior and do not need to seek outside information. Such a situation is conducive to terrible decision-making and resulting fiascoes.

Taken together, working in groups has both positive and negative outcomes. On the positive side, it makes sense to use groups to make decisions because people can create outcomes working together that any one individual could not hope to accomplish alone. In addition, once a group makes a decision, the group will normally find it easier to get other people to implement it, because many people feel that decisions made by groups are fairer than are those made by individuals.

Yet groups frequently succumb to process losses, leading them to be less effective than they should be. Furthermore, group members often don‘t realize that the process losses are occurring around them. For instance, people who participate in brainstorming groups report that they have been more productive than those who work alone, even if the group has actually not done that well (Nijstad, Stroebe, Lodewijkx, 2006; Stroebe, Diehl, & Abakoumkin, 1992). The tendency for group members to overvalue the productivity of the groups they work in is known as theillusion of group productivity, and it seems to occur for several reasons. For one, the productivity of the group as a whole is highly accessible, and this productivity generally seems quite good, at least in comparison to the contributions of single individuals. The group members hear many ideas expressed by themselves and the other group members, and this gives the impression that the group is doing very well, even if objectively it is not. And, on the affective side, group members receive a lot of positive social identity from their group memberships. These positive feelings naturally lead them to believe that the group is strong and performing well. What we need to do, then, is to recognize both the strengths and limitations of group performance and use whatever techniques we can to increase process gains and reduce process losses. Table 14.5 "Techniques That Can Be Used to Improve Group Performance" presents some of the techniques that are known to help

groups achieve their goals. Table 14.5 Techniques That Can Be Used to Improve Group Performance

REVIEW QUESTIONS

1. What is Social Cognition?
2. Explain following process of Forming Judgments on the Basis of Appearance: Stereotyping, Prejudice, and Discrimination?
3. Why Are We Altruistic?
4. How the Presence of Others Can Reduce Helping ?
5. Describe Negative Experiences Increase Aggression.
6. Discuss How Social Influence Creates Social Norms.
7. Discuss what the effect of Working Together in Groups is.

FURTHER READINGS

1. A textbook of general psychology- Walter F. Daves
2. General Psychology- Abraham
3. Advanced general psychology-Russell W. Levanway
4. General Psychological Theory-Sigmund Freud
5. General Psychology-S K Mangal

BIBLIOGRAPHY

6. A textbook of general psychology- Walter F. Daves
7. General Psychology- Abraham
8. Advanced general psychology-Russell W. Levanway
9. General Psychological Theory-Sigmund Freud
10. General Psychology-S K Mangal
11. General Psychology-Carl Newton Rexroad
12. General Psychology-Ram Nath Sharma, S.S. Chandra, S.S. Chandra