








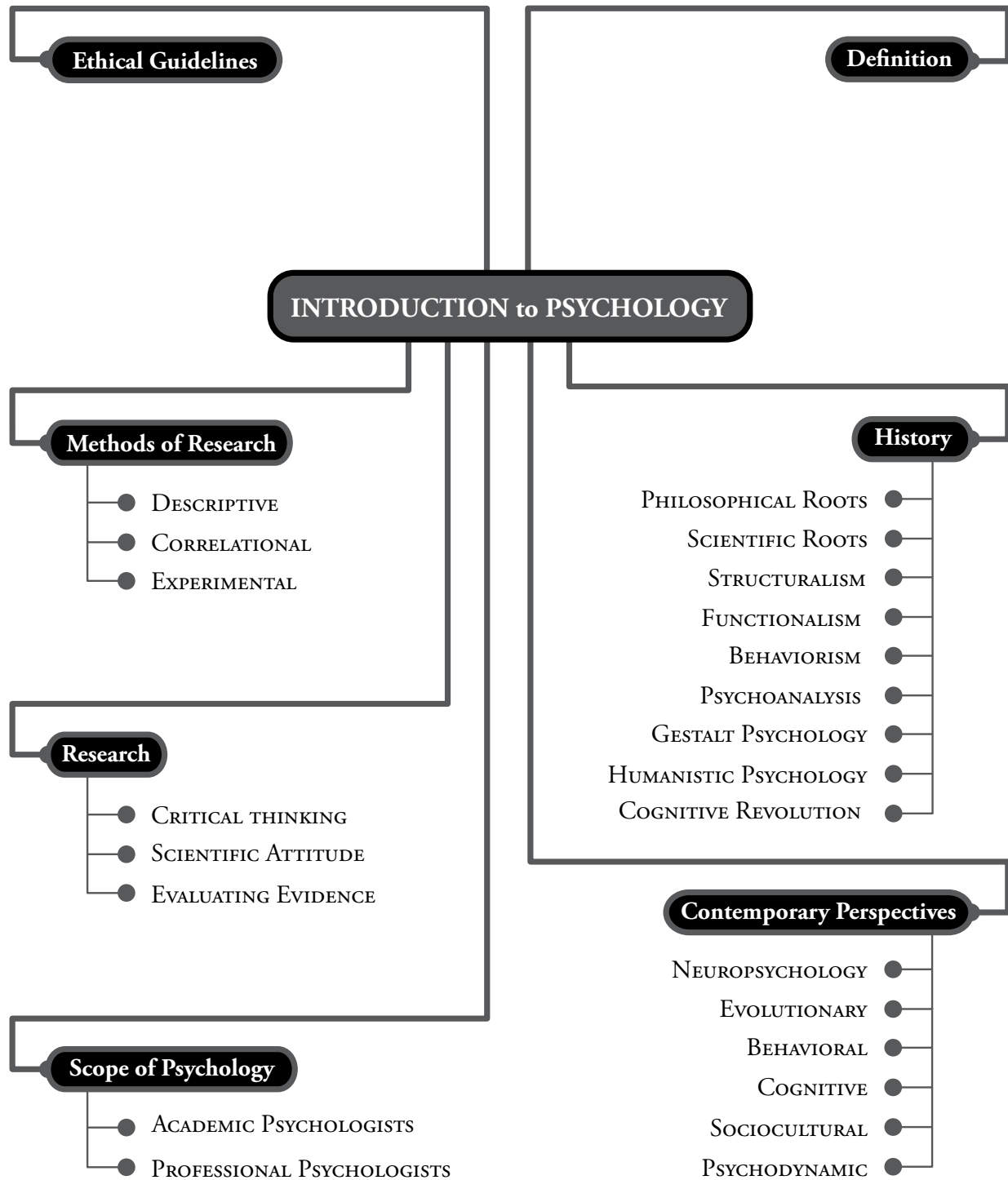
CHAPTER 1

Introduction to Psychology

ASSIGNMENT CHECKLIST

What You Should Do	Where?	When?	
Review the concept map			
Read the text			
Look up terms and concepts			
Try the learning activities			
Take the chapter quiz			
Participate in the Discussion Board Forum			
Notes:			

CONCEPT MAP



Introduction

Psychology is the scientific study of human behavior and the underlying biological and mental processes of behavior as well as the applications of such research and theory to the world around us. As a science, its goal is to use the scientific method to observe behavior, hypothesize on its causes and correlates, test the hypotheses, and formulate and publish the results so that others may scrutinize the work and use it in the real world.

Psychologists study behavior and mental processes that can be observed, experimented with, or measured. In this chapter, we will find that psychologists generally work in three main fields: experimental, teaching, and applied. Experimental psychologists conduct research; psychologists in schools, colleges, and universities teach psychology (and also conduct research); applied psychologists put psychological research to use in the real world. Some applied psychologists treat people with mental disorders, others apply learning and motivation principles to organizational problems in business and industry, and still others conduct tests and develop special programs for children in schools who have emotional problems or exceptional abilities.

Six major theoretical perspectives (schools of thought) on human behavior emerged in the 20th century. Each came into favor at a distinctive point in time and was the dominant paradigm until another perspective took its place. The current perspectives we will learn about are neuropsychology (biological), evolutionary, behavioral, cognitive, sociocultural, and psychodynamic.

Psychologists generally use one of three types of research methods to study human behavior: descriptive, correlational, or experimental. Descriptive research allows us to observe behavior in a systematic manner. Correlational research studies the strength of the relationship between two or more variables. Experimental research allows experimenters to control the situation being studied. The benefit of control is that it allows the researcher to imply a cause and effect relationship.

We will learn that when conducting research, it is important for psychologists to follow the code of ethics of the American Psychological Association (APA). This code requires researchers to give sufficient information about the experiment to participants in order to respect the rights of its voluntary participants through informed consent.

Learning Objectives

When you finish your study of this lesson, you should be able to

- Define psychology
- Identify interests of psychologists concerning behavior
- Describe the main forms of psychological research
- Recognize the basic goals of psychological research
- Identify the characteristics of basic research and applied research
- Recognize the philosophical and scientific roots of psychology
- Identify the characteristics of structuralism, functionalism, behaviorism, psychoanalysis, Gestalt psychology, humanistic psychology, and the cognitive revolution
- Identify six major contemporary theoretical perspectives of human behavior
- Recognize the scope of psychology in terms of specialization, academic psychology, and professional psychology
- Describe the difference between psychiatrists and psychologists



- Apply critical thinking to problems in psychology
- List the stages of the scientific method
- Identify the characteristics of the steps in conducting a research study
- Differentiate between independent variable and dependent variable
- Identify the characteristics of various research methods
- Identify the use of meta-analysis
- Explain how to reduce bias in experimental research
- Recognize ethical guidelines for research
- Explain why psychologists need a code of ethics
- Define the key terms and concepts

As defined above, **psychology** is the scientific study of human behavior, the underlying biological and mental processes, and the applications of such research and theory to the world around us. In this definition, there are several concepts that are important for our study and understanding of psychology and behavior. In this definition, **behavior** is used in its broadest sense as anything that the organism does, internally or externally. This means that we are concerned with both **overt behaviors**—the behaviors that we can actually observe—and **covert behaviors** such as thoughts, feelings, images, perceptions, and biological processes that we cannot observe directly. They are hidden from view. As we will come to appreciate, they are not always easy to measure. In this broad sense, psychology encompasses mind, behavior, and body.

Our study of behavior and mental processes is a science and as such uses the scientific method to investigate our questions about behavior. We must use objectivity when we look at people and their behavior.

Psychologists are concerned with an enormous range of questions about behavior. They are interested in such things as

- How do brain processes influence consciousness and behavior?
- What are the causes of aggression and prejudice?
- How do the genes we inherit interact with the environment we grow up in to affect our abilities, feelings, traits, and behavior?
- Why do we sleep, and what is the function of dreaming?
- Are there effective methods for treating addictions?
- How do drugs alter brain functioning and thereby affect behavior and consciousness?
- What are the causes of mental disorders, and how can behavior disorders be treated and/or prevented?

These are only a few of the questions we will consider in our journey to explore the fascinating world of behavior and mental processes.

Psychology: Basic Science or Applied Science

Using the scientific method, psychologists employ a variety of research methods for building and testing theories about behavior and mental processes. Sometimes a distinction is made between **basic research**, a quest for knowledge purely for its own sake, and **applied research**, a study designed to solve specific questions or problems. The goal of basic research is to identify the factors that influence or cause a particular type of behavior. It may be carried out in a laboratory or in real world environments. Applied research uses principles discovered through basic research to solve practical problems. As we proceed through our study of psychology, we will notice this link between basic and applied sciences.

Psychological research, like other sciences, has four basic goals:

1. To *describe* behavior
2. To *understand* (explain) its causes
3. To *predict* how people will behave
4. To *influence* behavior

Description. Answering questions about behavior requires a careful description of behavior. It is typically based on making a detailed record of behavioral observations. However, description by itself will not explain anything. It fails to answer the important “why” questions. *Why do more women attempt suicide? Why are bystanders unwilling to help in an emergency?*

Understanding. You have accomplished the goal of understanding when you can explain an event. It usually means that you can state the causes of a behavior. For example, *why do bystanders not help in an emergency?* People often fail to help other people when other potential helpers are nearby. Essentially, no one feels personally obligated to assist. Now we are in a better position to explain bystander apathy.

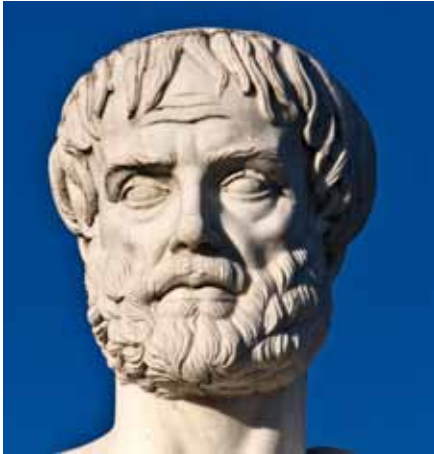
Prediction. Prediction is the ability to forecast behavior accurately. Our understanding about the factors affecting bystander helping will allow us to predict our chances of getting help if needed. If you are stranded on a busy expressway with car trouble, the chances of getting help are low. Having potential helpers nearby is no guarantee that anyone will stop to help you.

Influence. Influence (control) is the opportunity to alter conditions that affect behavior. If a teacher changes her/his classroom to help children learn better, s/he has exerted control.

WHERE DOES PSYCHOLOGY COME FROM?

It is often said that psychology has a long past but a brief history (Boring, 1950). Psychology is a relative newcomer in the world of sciences. We can trace its beginnings as an academic science to 1879 in Leipzig, Germany, when **Wilhelm Wundt** (1832-1920) set up a laboratory to study conscious experience. Others trace the beginning of psychology as a science to the publication of *Elements of Psychophysics* in 1860 by Gustav Theodor Fechner (1801-1887). Fechner showed how physical events were related to psychological sensations and perceptions. He also described the scientific measurement of these events. However, psychology's roots are actually in both philosophy and science.

Philosophical Roots



Aristotle

From the philosophical viewpoint, psychology's history can be traced back more than 2000 years to **Aristotle** (384-322 BCE). Aristotle wrote a book on psychology called *Peri Psyches*. Aristotle argued that human behavior is subject to rules and laws. He delved into topics such as personality, sensation and perception, thought, intelligence, needs and motives, feelings and emotion, and memory. Our course will present very similar topics. Aristotle wrote a number of works on behavior: *On Dreams*, *On Sleep and Sleeplessness*, *On Memory and Reminiscence*, and *On the Senses and the Sensed*. Aristotle's influence continues to impact psychology today (Biswas-Diener, Kashdan, & King, 2009).

Plato (428-347 BCE) believed that humans have an inborn knowledge—a position known as **nativism**. He believed that we can gain access to this inborn knowledge through reasoning—a position called **rationalism**.

Somewhere around 400 BCE, the Greek philosopher **Democritus** suggested that behavior should be thought of in terms of a body and a mind. Present day psychologists still debate the interaction of biological and mental processes. Democritus said that behavior was influenced by external stimulation, and he raised the question of free will or choice. Socrates provided a method that is still used in psychology today, introspection. He suggested that people should rely on rational thought and introspection or careful examination of one's own thoughts and emotions.

During the early Christian and medieval eras, answers to most questions about the behavior of humans were given primarily by theologian philosophers. The most important Western authority was **Saint Augustine** (354-430) who lived almost his entire life in what is today Algeria. In his autobiographical *Confessions*, he presented his views concerning memory, emotion, and motivation. Perhaps he was anticipating Freud when he mentioned that there was a continual battle between human reason and animal passions.

During the Middle Ages, scientific research became almost the sole province of Islamic intellectuals. The most important was the Persian scientist **Abu Ibn Sina** (980-1037) known also as Avicenna. He was responsible for keeping alive the teachings of Aristotle.

With the Renaissance, authorities again relied on philosophy to provide answers to questions about psychology. **Rene Descartes** (1596-1650) believed that we should doubt anything that is not proved by our own reasoning. We remember him for the statement "I think, therefore I am."



Descartes

Francis Bacon (1561-1626) proposed a scientific attitude that favored skepticism, systematic observation, and verification of claims by other scientists. He was the founder of applied science—seeking practical applications of research findings.

According to the English philosopher **John Locke** (1632-1704), each of us is born with a blank slate, a *tabula rasa*, on which is written life's experiences. Locke believed that knowledge is acquired through life experiences (Locke, 1959). Descartes, on the other hand, believed that much of our knowledge is inborn. This difference in the source of knowledge is at the core of the *nature versus nurture* controversy or the relative importance of heredity and life experiences. This controversy is still with us today and recurs in discussions of a number of topics—language, intelligence, personality, and mental disorders.

Immanuel Kant (1724-1804) believed that knowledge is the product of inborn mental faculties that organize and interpret sensory information from the environment. The ability to use language is dependent on inborn brain mechanisms, but the language you speak is dependent on your experiences.

Scientific Roots

Psychology remained largely an interest of philosophers and theologians for several thousand years. It did not begin to emerge as a scientific discipline until the later decades of the 19th century (Benjamin, 2007). As mentioned above, one of the first scientists to study psychological processes was the German physiologist **Gustav Theodor Fechner** (1801-1887). Fechner was studying *psychophysics*, ways in which the intensity and other physical characteristics of stimuli give rise to our psychological experience of them. Psychophysics was one of the first fields of psychological research. Fechner used psychophysical methods to quantify the relationship between physical stimulation and psychological experience. Psychophysics studies questions such as how loud does a sound have to be for you to hear it, and how much does a sound need to change for you to detect that change. Fechner published his book in 1860.



Darwin

Psychology during the late nineteenth century was also influenced by the theories of **Charles Darwin** (1809-1882). Darwin proposed his theory of evolution in *The Origin of Species* (Darwin, 1859) which described his experiences and observations during the voyage of the HMS Beagle. According to Darwin, natural selection is the process whereby physical characteristics that promote survival are likely to be passed on to offspring.

Darwin's ideas had an impact on psychology through the work of his cousin, **Francis Galton** (1822-1911). Galton believed that natural selection could account for the development of human abilities. He claimed that individuals with the most highly developed abilities would be most likely to survive. His beliefs led him to found the field of *differential psychology* to study variations among people with regard to personality, physical and intellectual attributes. Differential psychology was introduced to the United States by **James McKeen Cattell** (1860-1944). Cattell introduced the term “mental test” in 1890. Cattell founded the Psychological Corporation, which is still very active in developing tests that measure mental abilities, intelligence, and personality.

Structuralism

The founding of psychology as an independent science is usually attributed to **Wilhelm Wundt** (1832-1920) because in 1879, he established the first scientific laboratory dedicated to the study of psychology (Fancher, 1996). With the founding of Wundt's laboratory, psychology moved from philosophy to science. Wundt helped train the first generation of experimental psychologists. One of his students was **Edward Tichner**, who later established a psychological laboratory at Cornell University. Tichner believed the mind could be broken down into its basic components or structures. The approach became known as *structuralism*.

Structuralists believed that sensations were the basic elements of consciousness. Their method of studying sensations was **introspection**—looking within. Subjects were exposed to different kinds of sensory stimuli and asked to describe their inner experience. Through such techniques, the structuralists initiated a scientific investigation of cognition.

Functionalism

In the United States, structuralism eventually gave way to a perspective called **functionalism**, mostly because of the dissatisfaction with the method of introspection and a desire to study other aspects of the mind and behavior. **William James** and **John Dewey** were the chief founders of functionalism. Functionalists were more interested in how the mind *functions* than in how it is structured. Functionalism was influenced by evolutionary theory stressing the importance of adaptive behavior. Much of the early research on the nature of learning and memory was done by functionalists. Functionalism examined



Mary Whiton Calkins (1863-1930)

the roles or functions that underlie our mental processes—why we do what we do. They proposed that adaptive behavior was learned and maintained. Only the most successful behavior tends to be repeated and become habit. James was interested in the stream of consciousness, the continuous current of thoughts that seems to flow endlessly through our awareness or consciousness like a river or stream. William James published his now classic textbook, *Principles of Psychology*, in 1890 (James, 1890/1970) and helped establish psychology as a serious discipline. It is the only psychology book more than a century old still in print. William James helped open the doors for the entry of women into the discipline, especially for his student **Mary Whiton Calkins** (1863-1930). Although Calkins completed all coursework and her doctoral dissertation required for the doctoral degree, Harvard's administration refused to award her the PhD. In 1905, she became the first president of the American Psychological Association (Furumoto, 1981).

Behaviorism

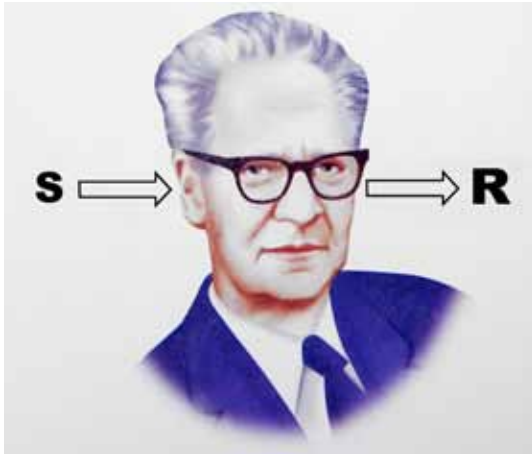
In the early 1900s, a new force was becoming active in psychology. **Behaviorism's** motto was that psychology should limit itself to the study of overt behavior that the observer could record and measure. The founder of behaviorism was the American psychologist **John Broadus Watson** (1878-1958). Watson felt that since one cannot observe another person's mental processes, psychology would advance when it rid itself of mentalistic concepts like mind, consciousness, thinking, and feeling. He also rejected introspection as a method of investigation. He proposed that psychology should focus on what could be observed—responses, reflexes, and other observable behaviors.

Watson believed that the environment molds the behavior of humans and other animals. In fact, he is often remembered for a famous statement:

Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might suggest—doctor, lawyer, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and the race of his ancestors. (Watson, 1924, p. 82)



John B. Watson (1878-1958)



B. F. Skinner (1904-1990)

By the 1920s, behaviorism had become the dominant school of psychology in the United States. It remained the primary force in psychology for several decades. Its popularity was due to the work of **B. F. Skinner** (1904-1990). Skinner studied how behavior was shaped by rewards and punishments—the environmental consequences that follow behavior (Skinner, 1938). For Skinner, there was no room in the science of psychology for the “mind” or unobservable “mental events.” For Skinner, “a person does not act upon the world, the world acts upon him” (Skinner, 1971, p. 211). If humans are to be changed, we must manipulate the environment that controls behavior through its patterns of rewards and punishments.

The behavioral perspective concentrates on the role of external environment in shaping and governing behaviors. The factors that control behavior reside in the external environment rather than within the individual. The person’s behavior is a joint function of previous life experiences and immediate environment. Special emphasis is placed on the effect of reward and punishment in shaping behavior.

Behaviorism is rooted in a seventeenth century school of philosophy known as British *empiricism*. Empiricists believed that all ideas and knowledge are gained empirically, that is, through sensory experiences. Empiricism maintained that observation was a more valid approach to knowledge than reason. Seeing was believing; reasoning was subject to errors. Scientific methods are rooted in empirical observation.

Psychoanalysis

About the time that behaviorism was getting started, a different model of psychology was emerging. It was based on the writings of Sigmund Freud (1836-1939). Freud’s psychology focused on a region of the mind that lay beyond the reach of consciousness—the region he termed the *unconscious*. He conceived of the unconscious as the repository of primitive sexual and aggressive drives or instincts. According to Freud, we may do or say things without understanding the true motives that prompted these behaviors.

Freud proposed that early childhood experiences play a determining role in shaping our personalities and behavior. Abnormal behavior patterns were seen as rooted in unconscious conflicts originating in childhood. Freud’s view is often called the *psychodynamic perspective*. Freud’s main purpose was to help individuals overcome psychological problems. This form of psychotherapy which he developed is called *psychoanalysis*.



Freud

Gestalt Psychology

In the 1920s, a German school of thought known as *Gestalt psychology* became influential in the United States. The word *gestalt* can be translated as “whole” or “form.” Gestalt psychology argued that our perceptions and mental processes are organized so that the whole is greater than and also different from the sum of its parts. One Gestalt psychologist, **Wolfgang Kohler** (1887-1967), worked with apes at a research

station in the Canary Islands during World War I. He concluded that the ability to perceive relationships is the essence of what we call intelligence. He termed the sudden perception of relationships *insight*. Gestalt psychology's demonstration of insight learning simulated new interest in human cognitive processes.

Humanistic Psychology

Humanistic psychology focuses on the uniqueness of each human being and the potential for personal growth as the processes that influence behavior. Two key psychologists in the development of the humanistic perspective have been **Carl Rogers** and **Abraham Maslow** (Maslow, 1971; Rogers, 1961). The humanistic perspective has been an influence since the 1950s to the present. In the beginning, it was a reaction to the two forces that dominated psychology at the time—behaviorism and Freudian psychology. For that reason, it was dubbed “*the third force*” in psychology. It rejected the deterministic views of behaviorism and psychodynamic psychology.

Free will and conscious choice are essential aspects of the human experience. This view emphasizes that psychology should focus on conscious experience. Today, the humanistic view has influenced the rise of *positive psychology*, which emphasizes the research of human strengths rather than human weaknesses (Seligman & Csikszentmihalyi, 2000).

The Cognitive Revolution

The *cognitive revolution* is the title of a rebellion led by a group of psychologists in the 1960s, during which psychology's early interest in mental processes was revisited (Gardner, 1987). However, these psychologists offered a new perspective on the study of mental processes and emphasized the scientific research of perception, information processing, and memory. Cognitive neuroscience has since developed, which has increased our knowledge of brain activities that correlate with thought.

CONTEMPORARY PERSPECTIVES

Psychology today owes a debt to the founders but has constantly been reinventing itself. Not all historical schools have survived. Structuralism has essentially disappeared. Functionalism, behaviorism, Gestalt psychology, and psychoanalysis have continued to evolve or have been incorporated into other perspectives. However, psychology remains a broad science exploring many different paradigms (Ash & Sturm, 2007).

Six major theoretical perspectives (schools of thought) on human behavior emerged in the 20th century. Each came into favor at a distinctive point in time and was the dominant paradigm until another perspective took its place.

Neuropsychology (biological or physiological) focuses on evolution, genetics, neurons, hormones, and the brain as the processes that influence behavior. This perspective examines the relationship between biological processes and behavior including the brain's role in behavior (Rilling & Sanfey, 2011). **Wilder Penfield, James Olds, and Roger Sperry** have been key contributors to the biological perspective. Their contributions have been important from the 1950s to the present. Some of the key ideas of the *biological perspective* are

- Human and animal behavior are the result of internal physical, chemical, and biological processes
- Behavior is explained through activity of the brain and nervous system, physiology, genetics, the endocrine system, biochemistry, and evolution
- Like behaviorism, the biological perspective has a rather neutral, reductionistic, mechanistic view of human nature
- Behavior is mainly determined by our biology

The *evolutionary perspective*, a variation of the biological perspective, believes that behavior patterns have evolved to solve adaptive problems. This perspective believes that natural selection favors behaviors that enhance reproductive success (Buss, 2011). As you may guess, it is concerned with the study of the evolutionary bases of behavior in humans and animals. Evolutionary psychologists interpret gender differences as the product of natural selection. Evolutionary psychology has been criticized, however, for not accounting for cultural diversity and experience (Wood & Eagly, 2010).

Behavioral (Learning) focuses on behavioral, social, and cognitive learning principles as the processes that influence behavior. Traditional behaviorism is no longer the dominant force it was during the early to mid-1900s (Shanks, 2010). Many psychologists today adopt a broader perspective called *social-cognitive theory*. From this viewpoint, behavior is shaped not only by environmental factors but also by cognitive factors. The behavioral perspective led to the development of a major kind of therapy, *behavior therapy*. Behavior therapy applies the learning principles that are grounded in the research of **Watson**, **Pavlov**, and **Skinner**. The behavior therapist helps people acquire more adaptive behaviors to overcome problems such as fears. Today, behavioral psychologists still apply the same rigorous methods for studying behavior as those set by **Watson**, **Pavlov**, and **Skinner** (Cheng & Holyoak, 2011).

Cognitive focuses on thinking, reasoning, and memory as the processes that influence behavior. The *cognitive perspective* stresses the active role of the mind in organizing perceptions, processing information, and interpreting experiences (Sternberg, 2009). It stresses the need for objective, well-controlled laboratory studies. Mental processes are inferred from observable responses. **Jean Piaget**, **Noam Chomsky**, and **Herbert Simon** have been major contributors to the cognitive perspective from the 1950s to the present.

Sociocultural focuses on social and cultural influences as the processes that influence behavior. Psychologists consider the importance of cultural context when examining how behavior and attitudes are shaped by social forces (Matthews & Gallo, 2011). The focus is upon ethnicity, gender, lifestyle, income level, and culture and their influence on behavior and mental processes.

Psychodynamic focuses on early childhood experiences and the unconscious as the processes that influence behavior. Neo-Freudians tend to place less emphasis on basic drives like sex and aggression and more emphasis on processes such as self-awareness, self-direction, and conscious choice. Psychodynamic theory has had an influence on popular literature, art, and culture. Widely endorsed are their views that psychological problems may be rooted in childhood and that people are not always aware of their motives and wishes. Some of the important contributors to the psychodynamic perspective have been Sigmund Freud, Carl Jung, and Alfred Adler. Psychoanalytic influence has lasted from about 1900 to the present.

THE SCOPE OF PSYCHOLOGY

As psychology has developed as a science, its fields of specialization have increased. Today, psychologists work in a wide variety of fields in both academic and professional settings.



Fields of Specialization

In a survey published in 2000 (Kyle and Williams, 2000), the following fields of specialization were identified:

- Clinical psychology
- Experimental psychology, comparative psychology, physiological psychology, and psychobiology
- Developmental psychology
- Social and personality psychology
- Counseling psychology
- Industrial/organization psychology
- School psychology
- Other fields

Practitioners in these specialties may be grouped generally into one of two major categories—academic psychologists and professional psychologists.

Academic Psychologists

Colleges and universities are the main employment settings for psychologists. The largest specialization area of academic psychologists is **experimental psychology**. Experimental psychologists conduct research on basic psychological processes—sensation, perception, learning, memory, personality, thinking, motivation, and emotion. Psychologists in almost all areas of psychology conduct experimental research.

In the field of **behavioral neuroscience**, psychologists study the biological bases of behavior and mental processes. Chapter 2 and others will discuss the field of behavioral neuroscience, which we have entitled neuropsychology.

Comparative psychologists study the similarities and differences in the physiology, behavior, and abilities of all animals. The comparative psychologist may study the motives related to eating, drinking aggression, courtship, and parenting.

Developmental psychologists are concerned with the study of factors responsible for the physical, cognitive, and social changes throughout the lifespan. Research by these psychologists often focuses on the role of nature, human biology, nurture, and the environment in behavior (Goldsmith, 2011).

Personality psychologists focus on factors that account for the differences and similarities in behavior and the enduring characteristics of individuals. Personality psychologists devise tests for assessing personality.

Social psychologists are concerned with the effects people have on one another and the power of the social situation. Research by these psychologists focuses on interpersonal relationships, social perceptions, social cognition, and attitudes (Bohner & Dickel, 2011; Erber & Erber, 2011).

Cross-cultural psychologists study the role of culture in behavior, including thought, emotion, and development (Kitayama, 2011).

Professional Psychologists

Professional psychologists work in situations outside the college classroom and laboratory. Two of the largest fields of professional psychology are **clinical psychology** and **counseling psychology**. **Clinical psychologists** deal with causes, prevention, diagnosis, and treatment of psychological disorders. Clinical psychologists use methods that have been supported by research (Beidas & Kendall, 2010). **Counseling psychologists** deal with problems of everyday living—career planning, academic performance, personal relations (Forrest, 2010).

Clinical psychology is not the same as the medical field of **psychiatry**. Clinical psychologists treat people through psychotherapy, which you will learn about in a later chapter. They usually cannot prescribe medications. A psychiatrist, however, is not a psychologist. A psychiatrist is a medical doctor who has served

a residency in psychiatry. A psychiatrist may prescribe drugs or other biomedical treatment procedure. The psychiatrist takes a medical approach to interpreting the causes of abnormal behaviors.

Psychologists in **health psychology** apply psychological principles to the maintenance of health and coping with illness. The health psychologist may be concerned with stress and illness and the individual's reactions to illness (Carver & Conner-Smith, 2010; Holsboer & Ising, 2010).

Community psychologists focus on improving the quality of life among individuals in their community and in the society at large (Moritsugu, Wong, & Duffy, 2010).

Industrial/organizational psychologists work to find ways to increase worker satisfaction and productivity in businesses, industries, government agencies, and many other kinds of organizations. They may focus on leadership skills (Avolio, Rotundo, & Walumbwa, 2009), effective training strategies (Aguinis & Kraiger, 2009), or even victimization at the workplace (Aquino & Thau, 2009).

One of the oldest fields of psychology is **school psychology** founded by a functionalist, G. Stanley Hull. The school psychologist works in elementary schools, middle schools, and high schools. This person aims to improve students' academic performance and school behavior.

The field of **educational psychology** is concerned with improving the educational process. Educational psychologists may work at universities and conduct research on teaching and learning (Banks, 2010).

Sport psychologists are interested in the acquisition of athletic skills and improving athletic performance. Sports psychologists typically work with collegiate, Olympic, or professional athletes to help them achieve excellence in performance (Rotella, 2010).

Forensic psychologists apply psychology to the legal system (Campbell & Brown, 2010). These psychologists study such things as jury deliberations and the best way to select jurors. They may help police to handle domestic disputes, negotiate with hostage takers, and relieve job related stress.

Environmental psychologists study the effect of physical environment on human behavior (Gifford, 2009).

None of these perspectives has completely answered all the questions about human behavior. In reality, it takes all of these perspectives, and even some not yet discovered, to fully understand and appreciate the complexity of human behavior. *As you progress through this course, utilize your critical thinking skills to assess which perspectives you think best explain the various aspects of behavior and cognitive processes.*

Research

CRITICAL THINKING AND THE SCIENTIFIC ATTITUDE



Critical thinking is essential for any kind of scientific analysis and is just one part of the scientific attitude. Information is presented in many forms, and not all forms can be reliable. *How can we know that the conclusions we draw are not based on personal belief, emotion, or opinion?* One must think critically in order to identify problems that may arise when interpreting results (Sternberg, Roediger, & Halpern, 2007). When conducting research, psychologists will usually turn to peer-reviewed sources, which are published with more rigorous credentials than most sources in the media (Stanovich, 2010). **Peer-reviewed** sources are materials that have been reviewed and critiqued by other professionals within the same field of study. Peer-reviewed journals tend to have the most accurate and current research in print and are more reliable than other sources of information.

When critiquing information, it is important to be aware of the kind of biases that can limit analysis. One type of bias is

confirmation bias, or the tendency to seek out information that supports one's ideas and to forget about or ignore information that does not support one's ideas. For example, as an employee, you may believe that your boss is cranky. You notice each time he exhibits bad behavior but gloss over his good behavior.

Another kind of bias that can limit critical analysis is **hindsight bias**. Hindsight bias is the tendency to report, after the fact, that one could have predicted the results all along. For example, after hearing that self-affirmations boost self-esteem, you might think that this was the obvious outcome, accept it, and move on. After all, one could reason that self-affirmations should result in a higher opinion of oneself since they are positive statements about oneself. However, upon greater evaluation, this conclusion may not have been so obvious. In fact, the opposite conclusion seems just as reasonable. Perhaps someone with a low self-esteem is not affected by self-affirmations. S/he would have to believe the statements in order to experience a boost in self-esteem, and someone with a low self-esteem is not likely to believe the self-affirmations. Both conclusions are reasonable, yet hindsight bias may limit our analysis and contribute to overconfidence and overgeneralization.

The **scientific attitude** is also comprised of curiosity, skepticism, and humility. Curiosity is a natural inquisitive behavior that drives exploration and critical thinking. Skepticism involves having a questioning attitude, which is necessary when interpreting information (Stanovich, 2010). A skeptical thinker may ask many questions: *What is the source? Where is the evidence? Does this issue involve other possible perspectives? What kinds of biases were present in this study?* This kind of questioning is essential and at the heart of the **empirical method**, which requires gaining knowledge through direct evidence through observation, data collection, or logical reasoning (Kuhn & Pearsall, 2009; Stanovich, 2010). Finally, humility is also an important quality of the scientific attitude. Researchers must be humble by recognizing their own biases, acknowledging multiple perspectives, and admitting to errors. Finding the truth is more important than being right.

Critical thinking and the scientific attitude are the backbone of the scientific method. Curiosity drives the generation of ideas, skepticism drives the gathering of empirical evidence, and humility drives the honest analysis of the results. It is the use of the scientific method that makes psychology a science (Langston, 2011; McBurney & White, 2010). In the next section, we will review each step of the scientific method.

STEPS IN GATHERING AND EVALUATING EVIDENCE

The following are general steps for conducting a research study.

Step 1. Generate Ideas

Step 2. Formulate a Research Question

Step 3. Develop a Hypothesis

Step 4. Devise a Study to Test the Hypothesis

Step 5. Run the Study and Get Results

Step 6. Analyze and Interpret the Results

Step 7. Communicate the Results



Step 1. Generate Ideas.

The starting place of all research studies is a single idea. Ideas come to us through our observations of the world, from conversations with other people, from sources such as books or television, or from reading other journal articles. Ideas represent the interests of a person. The idea does not have to be a full-fledged research project. All that is needed at this point is a thought, curiosity about the topic, and interest in pursuing the topic further.

Let's take an example that we will use for all of the steps. You notice that you are able to memorize items such as phone numbers better when you eat candy and wonder if there is a connection between candy and memory.

Step 2. Review the Literature/Formulate a Research Question.

After you have your idea, it is then appropriate to examine the literature on the topic in order to ascertain what other researchers have done and how they have conceptualized and tested the topic. Afterwards, convert your idea into a clearly posed research question or set of research questions. Later this literature review will form the text for the introduction section of a published research article. Continuing with our example, let's say that you researched the topic of memory enhancement and saw that other researchers have looked at how certain herbs and a healthy diet can improve memory. However, you find that no one has examined if sugar can improve memory. Therefore, your research question is this:

Can sugar improve memory? (Keep in mind this is just an example and does not accurately reflect the research literature on memory enhancement.)

Step 3. Develop a Hypothesis.

A ***hypothesis*** is a testable prediction/belief of what will happen in some circumstance. Recall from the review of theories that a good theory is one that is testable. In developing a hypothesis, you take your research question and restate it in specific terms that make a prediction. You may also choose to keep the hypothesis general if you are conducting an exploratory study.

For example, if the research question is to see if sugar affects memory, the hypothesis would be more specific:

College students who ingest two grams of sugar before studying for a memorization task will perform better than college students who do not ingest sugar.

Step 4. Devise a Study to Test the Hypothesis.

In this step, you a) define all important terms and variables in your study; b) decide on the best research method to test your hypothesis; and c) select what statistical methods you will use for analyzing the data. The researcher should define or create an operational definition of all important terms. An ***operational definition*** is a definition that specifies the operations or procedures used to measure some variable.

In our example, sugar and memory are terms that need to be defined in order for a reader to understand exactly what the researcher means by those terms (and for others to replicate the study). Sugar could be defined as white, granulated sugar while memory could be described as a score from a memorization test of nonsense syllables.

What is a variable? A variable is a characteristic that can have more than one value. Examples of variables include intelligence, sex, status in a family, type of behavior, etc. In a typical research study, there are two main types of variables. The ***independent variable*** is generally defined as the variable that influences whatever is expected to be changed—which is known as the dependent variable. The independent variable is any variable that defines different groups of participants who are measured via the dependent variable. It can also be a variable that describes the qualities of the participants. An independent variable is also defined in some textbooks as the variable researchers manipulate so that its effects may be observed. But this definition can be limiting, as explained below.

In our example, two grams of sugar would be the independent variable. Why? First, it is the sugar that is hypothesized to influence (in this case, improve) memory, not the other way around. Second, the independent variable is often the variable that can be changed or altered by the experimenter such as changing the independent variable to one gram of sugar or two or three.

Another example would be if we were comparing spelling ability for children with mental retardation and children without mental retardation. The independent variable for this example would be mental retardation condition (students with it and without it). Why?

First, whether or not one has mental retardation is hypothesized to influence spelling ability, not the other way around. Second, it is the variable that defines the groups of participants who are to have their spelling abilities measured. Third, it describes the quality of the participants (either having or not having mental retardation).

The experimenter cannot directly manipulate the degree of mental retardation in the participants; however, the experimenter could indirectly manipulate this through the recruitment procedure (i.e., recruit children with mild and moderate levels of mental retardation and children who are of normal intelligence). For this reason, defining the independent variable as the variable researchers manipulate can be confusing and limiting because it does not include preexisting independent variables such as the sex or age of a person. However, preexisting independent variables must be carefully analyzed because random assignment of subjects is not possible (Sternberg, Roediger, & Halpern, 2007).

The dependent variable is the variable that is hypothesized to change in response to the independent variable. It is the variable that is hypothesized to be influenced by the independent variable. The ***dependent variable*** is often a score of some sort but NOT ALWAYS.

In our sugar experiment, scores on the memorization task would be the dependent variable because that is what is hypothesized to change because of or to be influenced by (in this case, improve) the independent variable of sugar.

In the other example above, score on a spelling test would be the dependent variable because it is hypothesized to change in response to whether or not one has mental retardation. A study can have more than one independent variable and more than one dependent variable.

After you have these variables defined, you need to choose the best research method. For our sugar study, we would pick the experimental method. We would have two groups: college students who ingest two grams of sugar and college students who ingest two grams of a harmless placebo (something that may look like sugar but is not actually sugar). After both groups ingest their respective substance, they would have three minutes to memorize a list of nonsense syllables. After a five minute rest, both groups would recall as many of the syllables as possible. The number of correct syllables recalled would represent their memory score.

You also need to select your statistical procedures, but that is beyond the scope of this overview.

Step 5. Run the Study and Get Results.

Now that everything has been planned, it is time to run your study and collect the data. We take a brief look at data collection techniques below. In general, the data collection techniques used in a study depend largely on what is being investigated. Questionnaires are well-suited for studying attitudes, psychological tests for studying personality, and brain imaging techniques for studying physiological bases of behavior. Data collection may take months and sometimes years depending on the nature and complexity of the study.

Step 6. Analyze and Interpret the Results.

Once a research project is completed, we turn our attention to a crucial task: interpreting the results. Important questions are these: *How much confidence can we place in the findings? Are the correlations between variables or observed differences between experimental conditions real ones we can accept with confidence as accurate?* To answer such questions, we would employ inferential statistics.

Inferential statistics is a special form of mathematics that allows us to evaluate the likelihood that given patterns of research, results are indeed real—unlikely to be a chance event (Howell, 2010). Researchers perform appropriate statistical analyses on the data they collect. If these analyses suggest that the likelihood of obtaining the observed findings by chance is low, usually fewer than five times in one hundred, the results are described as **significant**. Only then are the results interpreted as being of value in helping to understand an aspect of behavior.

Step 7. Communicate the Results.

The communication of research results is a vital step in the overall process. Researchers typically communicate their results through publication of journal articles. Usually researchers prepare a report that may be delivered at a scientific meeting and submitted to a journal for publication. A **journal** is a periodical that publishes technical and scholarly material, usually in a narrowly defined area of study. Researchers may also choose to present a poster or conduct a discussion at a psychological meeting or research conference.

METHODS OF RESEARCH

When a researcher is ready to formulate a study, s/he chooses from several different methods. The best method depends on the research question and hypothesis. The different methods are

1. Descriptive Research, including:
 - a. Case Studies
 - b. Naturalistic Observation
 - c. Survey Method
 - d. Psychological Tests
2. Correlational Design
3. Experimental Method

Psychologists generally use one of three types of research methods to study human behavior: descriptive research, correlational design, or experimental methods.

Descriptive Research

Descriptive research allows us to observe behavior in a systematic manner. It is very useful in creating hypotheses. It does not give us cause and effect relationships because there is little or no experimenter control. Types of descriptive research include case studies, naturalistic observation, surveys, and psychological tests.

Case studies are unique experiences that cannot be replicated in the laboratory. If a person severely damages the frontal lobes of the brain and survives, we can study that individual to see if the injury has had any impact upon that person's behavior. We cannot recreate the injury in the lab. The method obtains detailed information about an individual to develop general principles about behavior. The method is useful in studying rare disorders or circumstances (Sternberg, Roediger, & Halpern, 2007). It is sometimes very helpful to study one person (or a very small group of people) in great depth to learn as much information as possible. Case studies require a lot of time, effort, and attention to detail. Yet they can reveal more about a particular subject than any other research method. Generalizing the findings to other people or groups is usually difficult. Here are some examples:

- Studying the life history of a man who acquired schizophrenia at the age of 20
- Following one child from conception to adulthood to examine this specific lifespan development

Naturalistic observation allows us to clandestinely view behavior as it naturally occurs. Participants are carefully observed in their natural setting without interference by the researchers (Leedy & Ormrod, 2010). Researchers should be inconspicuous and do nothing to change the environment or behavior of the



participants. For example, we can observe whether people wash their hands in a public restroom when there are other people present or when there are no people present. An animal behaviorist may unobtrusively observe wild gorillas in their natural habitat. This method is good if you want participants to react normally, but it can be time consuming since the anticipated behavior may never occur. The method has no control over the environment. It is difficult to know if the researcher will be able to be completely unobtrusive.

Surveys are a relatively inexpensive and easy way of asking people about their experiences and activities.

Utilizing a small representative sample, we can ask a small percentage of a population about, for example, their sexual habits and apply the results to a much larger population. It is important to watch out for participant bias and semantic errors in the questions, which may be difficult to do (Sternberg, Roediger, & Halpern, 2007). Conducting a survey requires a representative sample or at the very least a sample that reflects all

major characteristics of the population you want to represent. If you are attempting to survey America's attitude towards exercising, then your sample cannot include only Caucasian, upper-class college students between the ages of 18 and 22 years. This does not represent America. Surveys questions must use careful wording to prevent confusion or bias. This method is very quick and efficient; however, it is sometimes difficult to gain in-depth knowledge from a survey, and there is no guarantee that the person taking the survey is being open and honest.

Psychological tests allow us to measure an innumerable number of human activities from personality traits to intelligence to aptitudes. Tests must be reliable and valid in order to work effectively. **Reliability** is a statistical measure of a test's consistency or ability to result in similar scores if given repeatedly. **Validity** is a statistical measure of a test's ability to measure what it is supposed to measure.

Correlational Research

Correlational research studies the strength of the relationship between two or more variables. Correlations occur on a continuum between -1 and +1. Where the correlation lies on the continuum determines the strength and nature of the relationship.



Negative correlations are those in which relationships are closer to -1; they are negative in that the high values of one variable are associated with the low values of the other variable (e.g., the amount of ice cream eaten and the amount of weight lost). Negative correlations mean that as the value of one variable goes up, the value of the other variable goes down. There exists a negative correlation between eating junk food and overall health such that the more junk food a person ingests, the less healthy s/he is likely to be.

Positive correlations represent relationships which are closer to +1; they are positive in that the high values of one variable are associated with the high values of the other variable (e.g., the amount of ice cream eaten and the mean average temperature). The closer we get to zero, the weaker the relationship becomes (e.g., the amount of ice cream eaten and the number of traffic lights at which you have to stop). There exists a positive correlation between intelligence and grade point average so that the more intelligent a person is, the higher her/him grade point average is.

If the correlation is statistically significant and strong enough, we can predict the value of one variable by knowing the other. However, it is important to remember that CORRELATION DOES NOT MEAN CAUSATION. The most a researcher can state about two variables that correlate is that they relate to one another. It is NOT A TEST of cause-effect. In the second example above, it might be tempting to assume that consumption of junk food causes a decline in health. However, it is conceivable that the less healthy one is and feels, the more likely it is the person will give up on trying to be healthy and eat junk food. We do not know the direction of influence (whether eating junk food leads to poor health or poor health leads to eating junk food) and cannot know using a correlation alone. This is one limitation to this method.

Correlations can be deceiving. Finding a significant correlation between two variables does not guarantee that they are the only two variables. There may be an intervening variable that wasn't measured. Consider the first example above: Perhaps the more intelligent a person is, the more likely s/he is to study for tests, which then translates into a higher grade point average. Studying for tests is a potential intervening variable that was not examined. It is the absolute size of the correlation statistic and NOT its sign (– or +) that determines strength. While an $r = +.60$ shows a stronger correlation than an $r = -.40$, an $r = -.60$ shows a stronger correlation than an $r = +.50$.

Correlation is used widely in psychological testing examining correlations between such measures as

- SAT scores and university grades
- GRE scores and graduate school grades
- Law School Admission Test (LSAT) and law school grades
- Manual dexterity test scores and on-the-job success on a factory assembly line
- IQ scores on VERSION A of a standardized IQ test and VERSION B of the same test

Examples of positive correlations include

- Soft drink consumption at Everbank Field and ambient air temperature
- Hours spent studying and academic success
- Smoking rates and number of related health problems
- Dietary fat consumed and rates of coronary artery
- Dietary fat consumed and cholesterol levels
- Red meat consumed and colon cancer rates

Examples of negative correlations include

- Hot beverage consumption at Everbank Field and air temperature
- Number of extracurricular involvements and grades
- Dietary fiber consumption and colon cancer rates
- Exercise and blood pressure
- Teaching load and research output (university professors)
- Number of classes missed and exam grades

Experimental Research

Experimental research allows experimenters to control the situation being studied. An experiment is a study in which the investigator manipulates (at least) one variable while measuring (at least) one other variable. The benefit of control is that it allows the researcher to imply a cause and effect relationship. This is the feature that separates experimentation from all other forms of research. This method is often used

in psychological research and can potentially lead to answering cause-effect questions. The experimental method is very valuable because the researcher is able to constrain or control the situation and various variables.

The features of the experiment are

- **Hypothesis**—an educated guess
- **Independent variable**—the variable in an experiment that is manipulated or compared
- **Dependent variable**—the variable in an experiment that is measured; the outcome of an experiment
- **Experimental group**—the group that receives the independent variable
- **Control group**—the group that does not receive the independent variable but does everything the experimental group does
- **Placebo effect**—the phenomenon in research where the subject's beliefs about the outcome can significantly affect the outcome without any other intervention
- **Random assignment**—assigning subjects to experimental groups in a way that insures that each participant has the potential to be in the experimental group. Random assignment ensures that differences between groups due to extraneous factors are minimized.
- **Statistically insignificant difference**—the results of a statistical analysis that show that the difference between an experimental group and a control group is due to chance
- **Statistically significant difference**—the results of a statistical analysis that show that the difference between an experimental group and a control group is due to the independent variable

Let's suppose that we want to investigate the hypothesis that alcohol impairs memory. We would randomly assign subjects to experimental and control groups.

	<i>Independent Variable</i> Use of Alcohol	<i>Dependent Variable</i> Memory Test
Experimental Group Drinks Three Nonalcoholic Beers	No alcohol	Score on memory test
Control Group Drinks Three Alcoholic Beers	Alcohol	Score on memory test

A research finding is viewed as tentative until it is replicated. That is, different researchers in different laboratories report it again. This is the reason that researchers are interested in **replication**. Replication involves repeating a study using different participants in an attempt to duplicate the previous findings. This is when a serious problem arises. Only rarely do the results of research yield consistent findings. A more common pattern is that some studies support a given hypothesis, and others fail to support the hypothesis. The differences occur because different researchers use different methods and measures of behavior. Whatever the reason for contrasting results, they pose a problem for researchers who must decide which results should be accepted as most valid.

In the past, researchers used the majority-rules approach to resolve controversies in contradictory findings. They merely counted up the number of studies that found or did not find a particular result and then concluded that the result existed if it occurred the majority of the time.

Researchers now use techniques called meta-analysis (Hall & Brannick, 2002) to deal with contradictory results from replication studies. **Meta-analysis** is the use of statistical techniques to sum up a body of simple studies in order to objectively estimate the reliability and overall size of the effect (McDonald et al., 2010; Rothstein, McDaniel, & Borenstein, 2002; Stamps, 2002). Meta-analysis can determine if small effects are real or merely measurement error.

Reducing Bias in Experimental Research

In experimental research, the **validity**, or soundness, of the design is very important and necessary when interpreting results. There are two types of validity to consider when conducting experimental research: external validity and internal validity.

External validity refers to the ability to generalize the conclusion drawn from the experiment to real world issues. The controlled laboratory setting for an experiment may limit the ability to generalize findings to the population (Kantowitz, Roediger, & Elmes, 2009). For example, suppose that a researcher is conducting research on the effects of mindfulness meditation (independent variable) on stress (dependent variable). Participants are randomly assigned to one of two groups: a group where participants are instructed in mindfulness meditation (experimental group), or a group in which no instructions are given (control group). Skin conductance and heart rate levels are measured throughout the experiment and are compared between groups at the conclusion of the study. The researcher finds that those in the mindfulness meditation group had lower skin conductance levels and lower heart rates than those in the control group during the experiment. These findings might suggest that mindfulness reduces stress. However, in analyzing the external validity of this study, one might ask these questions: *How similar is practicing mindfulness meditation in a laboratory to practicing in the real world? How similar is the laboratory to everyday life experiences? Could the laboratory induce stress in those not instructed in relaxation techniques? Are higher skin-conductance and heart rate levels enough to indicate stress? In other words, did the researcher do a good job of operationally defining the variables?*

Another variable to consider when analyzing external validity is the diversity of the sample. *Is the sample biased? Are diverse ethnic groups represented?* The need for participants from diverse backgrounds is becoming more evident in research (Tamis-LeMonda & McFadden, 2010).

Internal validity refers to the degree of certainty that the changes in the dependent variable are due to the manipulation of the independent variable. We want to be certain that the experiment is free from bias or error. Experimenter bias and research participant bias may alter results. **Experimenter bias** occurs when the experimenter's expectations influence the outcome. This can occur if the experimenter interprets behavior to be in line with the hypothesis. However, this may also occur if the experiment has **demand characteristics**, that is, if it subtly reveals expectations of the outcomes to the participants in any way. The design of the study should be examined for demand characteristics before gathering data. **Research participant bias** occurs when the participants' behavior is influenced by how they think they are supposed to behave. To reduce research participant bias, a **placebo** may be used, a harmless treatment that should have no effect on the participant. If the placebo has an effect, that effect is likely due to the participant's expectations rather than the treatment.

To reduce both experimenter and research participant bias, a **double-blind procedure** may be used. During a double-blind procedure, neither the researcher administering the treatment nor the participants receiving the treatment are aware of which group is receiving the experimental treatment until the data are analyzed. Therefore, the researcher cannot form expectations during the experiment and cannot drop subtle hints. The participant also does not know if he or she is getting the experimental treatment or a placebo, reducing the chances that any behavioral change is due to expectations. If both experimenter and research participant biases are controlled for, the internal validity of the experiment is likely to be high.

ETHICAL GUIDELINES FOR RESEARCH

In the 1960s and 1970s, research ethics was a concern of many psychologists because of controversial studies that used deception and seemed to put participants at psychological harm (Darley & Latane, 1968; Latane & Darley, 1970; Milgram, 1963). **Deception** usually means trickery or lying to participants about some aspect of an experiment. Most psychological experiments are carried out in a laboratory situation and participants already know that some aspect of their behavior is being studied. *Will individuals' behavior change if participants have knowledge of what researchers really want to find? Could there be psychological harm to the participants if the researcher uses some form of deception? What if individuals participate in an experiment believing that they are going to be involved in a discussion of problems faced by incoming college students but when they leave, they learn that, in the face of a contrived emergency, they did not rush to the aid of another student?*

As a result of concerns over the welfare of persons involved in experimental studies, the U.S. government developed regulations requiring all institutions seeking federal funding to establish **institutional review boards (IRBs)** for research involving human participants. These boards make sure that the welfare of human participants is protected (Hayes, 2003).

Today, any time researchers study humans, they must balance a need to know with the need to protect an individual's rights and privacy (Smith & Davis, 2010). In order to help researchers deal with ethical decisions, most major professional organizations have developed **ethical guidelines**. According to the American Psychological Association (2002),

- Researchers must protect participants from physical and psychological harm. In research, the participant's rights always come first (Sieber, 2000).
- Researchers must obtain voluntary, written, informed consent from participants before their involvement in a study. Any time before, during, or after the research, individuals can withhold consent. Researchers are now required to inform participants of the following (Smith, 2003a, 2003b):
 - The experimental nature of the treatment
 - The services that will or will not be available to the control group
 - The means by which assignment to treatment and control groups will be made
 - Available treatment alternatives if an individual does not wish to participate in the research or wishes to withdraw once the study has begun
- If deception is used, it must be justified and cause no harm. If a research project is reasonably expected to cause physical pain or severe emotional distress, psychologists are required to not deceive participants. Any deception that is an integral part of the research design needs to be explained to participants as soon as possible.
- Participants' privacy must be maintained. The participants need to know that information they share with the researcher and all research records will be kept confidential. Data collected must be coded in such a way that the individual cannot be identified. The American Psychological Association (2002) defines **test data** as "raw and scaled scores, client/patient responses to test questions or stimuli, and psychologists' notes and recordings concerning client/patient statements and behavior during examinations" as well as "portions of test materials that include client/patient responses" (p. 14). As defined in standard 9.11, **test materials** are "manuals, instruments, protocols, and test questions or stimuli" (p. 14) and do not include test data. Psychologists must release the test data to clients and their designees when clients provide a written release.

If the researcher is working with children, the Society for Research in Child Development (2006) has issued a set of guidelines for use in research with children. The Society lists all its principles and guidelines on its Website at <http://www.srcd.org> in the Ethical Standards for Research with Children section.

Summary

What is psychology? Psychology can be defined as the scientific study of human behavior, the underlying biological and mental processes, and the applications of such research and theory to the world around us. As a science, its goal is to use the scientific method to observe behavior, hypothesize on its causes and correlates, test the hypotheses, and formulate and publish the results so that others may scrutinize the work so that others may use it in real world. Psychologists are studying behavior and mental processes that can be observed, experimented with, or measured. In this chapter, we found that psychologists generally work in three main fields: experimental, teaching, and applied. Experimental psychologists conduct research; psychologists teach in a variety of settings and academic institutions from elementary school through doctoral level universities, and applied psychologists put psychological research to use in the real world—in psychological clinics, in business and industry, and in schools and colleges.

We learned that six major theoretical perspectives (schools of thought) on human behavior emerged in the 20th century. Each came into favor at a distinctive point in time and was the dominant paradigm until another perspective took its place. The perspectives we learned about were the neuropsychological (biological), evolutionary, behavioral (learning), cognitive, sociocultural, and psychodynamic perspectives.

Psychologists generally use one of three types of research methods to study human behavior: descriptive, correlational, or experimental. Descriptive research allows us to observe behavior in a systematic manner. Correlational research studies the strength of the relationship between two or more variables. Experimental research allows experimenters to control the situation being studied. The benefit of control is that it allows the researcher to imply a cause and effect relationship.

We learned that when conducting research, it is important for psychologists to follow the code of ethics of the American Psychological Association (APA). This code requires researchers to give sufficient information about the experiment to participants in order to respect the rights of its voluntary participants through informed consent.

Terms and Concepts

psychology	p. 5	rationalism	p. 7
behavior	p. 5	tabula rasa	p. 8
overt behaviors	p. 5	psychophysics	p. 8
covert behaviors	p. 5	differential psychology	p. 8
basic research	p. 6	structuralism	p. 8
applied research	p. 6	introspection	p. 9
Description	p. 6	functionalism	p. 9
Understanding	p. 6	Behaviorism	p. 9
Prediction	p. 6	empiricism	p. 10
Influence	p. 6	unconscious	p. 10
nativism	p. 7	psychodynamic perspective	p. 10

psychoanalysis	p. 10	Critical thinking	p. 14
Gestalt psychology	p. 10	Peer-reviewed	p. 14
insight	p. 11	confirmation bias	p. 15
Humanistic	p. 11	hindsight bias	p. 15
the third force	p. 11	scientific attitude	p. 15
positive psychology	p. 11	empirical method	p. 15
cognitive revolution	p. 11	hypothesis	p. 16, p. 21
biological perspective	p. 11	operational definition	p. 16
evolutionary perspective	p. 12	independent variable	p. 16, p. 21
Behavioral (Learning)	p. 12	dependent variable	p. 17, p. 21
social-cognitive theory	p. 12	Inferential statistics	p. 18
behavior therapy	p. 12	significant	p. 18
Cognitive	p. 12	journal	p. 18
cognitive perspective	p. 12	Descriptive research	p. 18
Sociocultural	p. 12	Case studies	p. 18
Psychodynamic	p. 12	Naturalistic observation	p. 18
experimental psychology	p. 13	Surveys	p. 19
behavioral neuroscience	p. 13	Psychological tests	p. 19
Comparative psychologists	p. 13	Reliability	p. 19
Developmental psychologists	p. 13	Validity	p. 19 , p. 22
Personality psychologists	p. 13	Correlational research	p. 19
Social psychologists	p. 13	Negative correlations	p. 19
Cross-cultural psychologists	p. 13	Positive correlations	p. 19
Clinical psychologists	p. 13	Experimental research	p. 20
Counseling psychologists	p. 13	Experimental group	p. 21
psychiatry	p. 13	Control group	p. 21
health psychology	p. 14	Placebo effect	p. 21
Community psychologists	p. 14	Random assignment	p. 21
Industrial/organizational psychologists	p. 14	Statistically insignificant difference	p. 21
school psychology	p. 14	Statistically significant difference	p. 21
educational psychology	p. 14	replication	p. 21
Sport psychologists	p. 14	Meta-analysis	p. 22
Forensic psychologists	p. 14	validity	p. 22
Environmental psychologists	p. 14	External validity	p. 22

Internal validity	p. 22	Deception	p. 23
Experimenter bias	p. 22	institutional review boards (IRBs)	p. 23
demand characteristics	p. 22	ethical guidelines	p. 23
Research participant bias	p. 22	test data	p. 23
placebo	p. 22	test materials	p. 23
double-blind procedure	p. 22		

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