CHAPTER 1

Introducing Psychology and Its Methods

WHAT IS PSYCHOLOGY?
- Historical Roots
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- A Diversity of Perspectives

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- Biological Perspectives
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WHAT’S YOUR PREDICTION?

Thinking Like a Psychologist

The SITUATION

When you first signed up to take Introductory Psychology, you weren’t really sure what you were in for. You may have read about Sigmund Freud or B. F. Skinner, you may have seen a child psychologist on a TV talk show, or you may have heard a therapist giving personal advice on the radio. You may even have taken a psychology course in high school, had exposure to psychology in other classes, or done some reading on your own. Whatever your background may be, it’s important to realize that you come into this course with many intuitive or commonsense theories about people. Everyone does. What are some of your theories? And are they correct in light of what psychologists know on the basis of scientific research?

Make a PREDICTION

Let’s stop and evaluate some of your intuitive beliefs about people. The ten statements on your right concern topics in psychology that you will find in this book (the chapters in which they appear are shown in parentheses). Read each statement carefully and write down whether you think it is generally TRUE or FALSE. When you’ve finished, try to estimate the number of answers you got correct.

1. Although 90 percent of Americans are right-handed, left-handedness is common in many nonindustrialized cultures. (2)
2. Some people dream; others do not. (4)
3. Behaviorists often use punishment to eliminate unwanted behaviors. (5)
4. Human memory capacity is limited and cannot truly be increased through the use of memory “tricks.” (6)
5. Contrary to popular belief, the ability to memorize new material does not decline in old age. (9)
6. Children’s IQ scores are not predictive of their grades in school. (7)
7. A smile has different meanings in different cultures. (10)
8. If you’re assaulted on the street, you are more likely to get help if there are three onlookers than if there’s only one. (11)
9. A schizophrenic is someone with a multiple or split personality. (13)
10. People who think about themselves a lot are healthier and happier than those who do not. (15)
The RESULTS

Now that you have completed the commonsense psychology quiz, you are ready to read this section on how to score it. In fact, the scoring is easy: All ten statements are false. So how well did you do? This is a true-false quiz, so you could expect to get about five answers right just by guessing or flipping a coin. Did you do any better than that? Did you do worse?

What Does It All MEAN?

Look back at the statements in this quiz and you’ll notice that they cover a broad spectrum of topics, including sleep and dreams, intelligence and education, memory, aging, helping in emergencies, and mental health. These topics represent psychology today—a remarkably diverse discipline with many areas of specialization.

If you did not get a perfect score on the test, you’ll also have noticed that at least some of the answers are not obvious as a matter of common sense. For example, later in this book we’ll see that right-handedness predominates in all human cultures and across all generations. We’ll also see that everyone dreams, that behaviorists advise against the use of punishment, that a smile has the same meaning all over the world, that there are ways to powerfully boost memory, and that people are less likely to help in an emergency when others are present—contrary to the belief that there is safety in numbers. And there’s a lot more. But for now, let’s step back and define what psychology is and look at its history and its methods.

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as you prepare for the challenges of life in the twenty-first century, there are many directions you can take. In the future, as in the past, it will be essential to be equipped with the most basic tools of literacy: reading, writing, arithmetic, an awareness of geography, a sense of history, and some knowledge of general science. Knowing a second or third language will be helpful, too. You may be especially intrigued by business or the world of high technology.

But tomorrow, like yesterday and today, the key to success in life will be understanding people—including yourself. How do we make important life decisions? Can people accurately bring back memories repressed from childhood? What motivates us to work hard or slack off, or to pursue one career instead of another? Why are some men and women homosexual and others heterosexual? Why do some teenagers get so depressed that they commit suicide, and what can be done to prevent it? What is intelligence, and how can it be measured? Why do some athletes choke under pressure? What causes prejudice, religious intolerance, and terrorism, and why are these problems so widespread? If you find these questions interesting and important, and if you think the answers should be sought in a serious manner, then the study of psychology should be part of your future.

What Is Psychology?

■ How would you define psychology?
■ Is psychology the study of the human mind, or does it focus on behavior?
■ How has the field changed over the years?
■ What do you see as important issues and areas of specialization?

Psychology is the scientific study of behavior and the mind. If you dissect this definition, you’ll see that it contains three elements. First, psychology is a scientific enterprise. At an intuitive level, everyone is a psychologist—you, me, the bartender.
who listens to one drunken sob story after another, and the novelist who paints
exquisite verbal portraits of fictional characters. Unlike those who rely on their per-
sonal experience, however, psychologists employ systematic, objective methods of
observation.

The second key element in the definition of psychology is that it is the study of be-
havior. The term behavior refers to any activity that can be observed, recorded, and
measured. It may be as simple as the blink of an eye or as complex as making the de-
cision to get married.

Third, psychology is the study of the mind. For many years, researchers flinched
at the mere use of the term. It was like talking about spirits or souls or ghosts in the
human machine. Today, the term mind is used to refer to all conscious and uncon-
scious mental states. These states cannot actually be seen, but psychologists try to
infer them from observable behavior.

**HISTORICAL ROOTS**

Having its origins in philosophy, psychology is said to have a long past but a short
history. There is truth in this statement. The Greek philosopher Socrates (470–399 BCE)
and his followers Plato and Aristotle wrote extensively about human nature. They
wrote about pleasure and pain, the senses, imagination, desire, and other aspects of
the “psyche.” They also speculated about whether human beings were innately good
or evil, rational or irrational, and capable of free will or controlled by outside forces.

At about the same time, Hippocrates (460–377 BCE), the “father of modern medicine,”
referred to the human brain as an “interpreter of consciousness.” He also tried to dif-
ferentiate for the first time among different psychological disorders. Years later, Roman
physician Galen (130–200 CE) theorized that every individual is born with one of
four personality types or “temperaments.”

Many other men and women have planted more recent seeds. French mathemati-
cian and philosopher René Descartes (1596–1650) theorized that the body is a phys-
ical structure, that the mind is a spiritual entity, and that the two interact only through
a tiny structure in the brain. This position, known as dualism, implied that although
the body could be studied scientifically, the mind—as the product of a willful “soul”—
could not. Thomas Hobbes (1588–1679) disagreed. He and other English philoso-
phers argued that the entire human experience, including our conscious thoughts and
feelings, are physical processes emanating from the brain—and therefore are subject
to study. In this view, which later became known as monism, the mind and body are
one and the same.

Psychology also has its origins in physiology (a branch of biology that deals with
living organisms) and medicine. In the nineteenth century, physiologists began study-
ing the brain and nervous system. For example, German scientist Hermann von
Helmholtz (1821–1894) studied sensory receptors in the eye and ear and investigat-
ed such topics as the speed of neural impulses, color vision, and space perception.
Gustav Fechner (1801–1887), another German scientist, founded psychophysics, the
study of the relationship between physical stimuli and our subjective sensations of
those stimuli.

Within the medical community, there were two particularly notable developments.
In an influential textbook, German psychiatrist Emil Kraepelin (1856–1926) likened
mental disorders to physical illness and devised the first comprehensive system for
classifying the various disorders. In Paris, neurologist Jean Charcot (1825–1893)
discovered that patients suffering from nervous disorders could sometimes be cured
through hypnosis, a psychological form of intervention. From philosophy, physiology,
and medicine, then, psychology is deeply rooted in the past (Hilgard, 1987; Watson
& Evans, 1991).
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Pioneers in the Study of the Mind

The history of modern psychology is a history of both great thinkers and the social, cultural, and political climates in which they lived. Dean Keith Simonton (2002) thus said of psychology’s history that it springs from a combination of individual genius and zeitgeist, which is German for “spirit of the times.”

Modern experimental psychology was born in 1879, in Germany, at the University of Leipzig. It was there that physiologist Wilhelm Wundt (1832–1920) founded the first laboratory dedicated to the scientific study of the mind. At the time, no courses in psychology were being taught because the discipline did not exist on its own. Yet many students from Europe and the United States were drawn to Wundt’s laboratory, comprising the first generation of scholars to call themselves psychologists. This distinguished group included G. Stanley Hall (who in 1891 founded the American Psychological Association [APA], with twenty-six members), James McKeen Cattell (the first to study individual differences), and Hugo Münsterberg (among the first to apply psychology to industry and the law). Overall, 186 students were awarded doctoral degrees under Wundt’s supervision, including 33 from the United States (Benjamin et al., 1992). Over the course of his career, Wundt published 53,735 pages of material, edited psychology’s first journal, and wrote his first book. His goal, as stated in the book’s preface, was ambitious: “to mark out a new domain of science.”

Wundt’s approach to the study of the mind was a far cry from the “armchair speculation” of the philosophers of his time. Among the methods he developed was intensive introspection, in which trained observers reported on their moment-to-moment reactions to tones, visual displays, and other stimuli presented to them. In this way, Wundt studied such topics as attention span, reaction time, color vision, and time perception. In one study, for example, he had an observer look at a block of twelve letters for a fraction of a second, then immediately report as many as he could remember. Six letters seemed to be his limit. What would happen if the number of letters in the array were varied? How would others do if given the same task? By recruiting people to serve as participants, varying stimulus conditions, and demanding that all observations be repeated, Wundt was laying the foundation for today’s psychology experiment.

In the United States, this budding new field was hearing a second voice. That voice belonged to William James (1842–1910)—a medical school graduate who went on to become a professor at Harvard University. In 1875, James (whose brother Henry was the famous novelist) offered his first course in psychology. He was very different from Wundt, but he too was influential. While Wundt was establishing psychology as a rigorous new laboratory science, James was arousing interest in the subject matter through rich ideas and eloquent prose. Those who studied with James described him as an “artist” (Leary, 1992). This group included G. Stanley Hall (who had also worked with Wundt), Mary Whiton Calkins (a memory researcher who conducted one of the first studies of dreams and in 1905 became the first female president of the American Psychological Association), and Edward Thorndike (known for his work on animal learning and for the first textbook on educational psychology).

In 1890, James published a brilliant two-volume text entitled Principles of Psychology, and in 1892 he followed it with a condensed version. In twenty-eight chapters, James wrote about habit formation, the stream of consciousness, individuality, the link between mind and body, emotions, the self, and other deep and challenging topics. The original text was referred to as “James”; the brief version was nicknamed “Jimmy.” For American psychology students of many generations, at least one of these books was required reading. Now, more than a hundred years later, psychologists continue to cite these classics. The brief version can still be found in the paperback section of many bookstores.

introspection
Wundt’s method of having trained observers report on their conscious, moment-to-moment reactions.
A third prominent leader of the new psychology was Sigmund Freud (1856–1939), a neurologist from Vienna. Quite far removed from the laboratory, Freud was developing a very different approach to psychology through clinical practice. After graduating from medical school, he saw patients who seemed to be suffering from ailments that had no physical basis. These patients were not consciously faking, and they could often be “cured” under hypnosis. Based on his observations, Freud formulated psychoanalysis—a theory of personality, a form of psychotherapy, and one of the most influential schools of thought in modern history. Freud and his many followers (most notably, Carl Jung, Alfred Adler, and Karen Horney) left a permanent mark on psychology.

Freud (1900) introduced his theory in The Interpretation of Dreams, the first of twenty-four books he would write. In sharp contrast to Wundt and James, who defined psychology as the study of conscious experience, Freud argued that people are driven largely by unconscious forces. Indeed, he likened the human mind to an iceberg: The small tip above the water is the conscious part, and the vast region submerged beneath the surface is the unconscious. Working from this assumption, Freud and his followers developed personality tests and therapy techniques designed to penetrate this hidden but important part of the human mind (see Chapters 12 and 14).

Despite the differences in their approaches, Wundt, James, and Freud were the pioneers of modern psychology. Indeed, they were ranked by twenty-nine prominent historians as the first, second, and third most important psychologists of all time (Korn et al., 1991). Many others also helped shape this new discipline (see Table 1.1). In 1885, German philosopher Hermann Ebbinghaus published the results of classic experiments on memory and forgetting, using himself as a subject. In 1886, American Lightner Witmer opened the first psychological clinic. He later established the first journal and training program in a new helping profession that he would call “clinical psychology” (McReynolds, 1997). In 1905, French psychologist Alfred Binet devised the first major intelligence test in order to assess the academic potential of schoolchildren in Paris. And in 1912, Max Wertheimer discovered that people see two stationary lights flashing in succession as a single light moving back and forth. This illusion paved the way for Gestalt psychology, a school of thought based on the idea that what

**psychoanalysis**

Freud’s theory of personality and method of psychotherapy, both of which assume the importance of unconscious processes.
The emergence of psychology as the study of mental processes, there were many, many heroes.

The Behaviorist Alternative
The first generation of psychologists was just beginning to explore conscious and unconscious mental processes when they were struck by controversy about the direction they were taking: Can a science really be based on introspective reports of subjective experience or on mental processes that supposedly reside in the unconscious? Should understanding how the mind works be the goal of this new science? There were those who did not think so.

In 1898, Edward Thorndike ran a series of novel experiments on “animal intelligence.” In one study, he put cats into a cage, put food outside a door, and timed how long it took for them to learn how to escape. After several trials, Thorndike found that the cats, by repeating behaviors that “worked,” became quicker with practice. Then in 1906, Russian physiologist Ivan Pavlov made another key discovery. Pavlov was studying the digestive system in dogs by putting food in their mouths and measuring the flow of saliva. After repeated testing, he found that the dogs would salivate in anticipation, before the food was in the mouth. At first, Pavlov saw this “psychic secretion” as a nuisance. But soon he realized what it revealed: that a very basic form of learning had taken place.

Interesting. But what do puzzle-solving cats and salivating lab dogs have to do with psychology? Indeed, what’s the relevance to people of any animal research? To answer these questions, John Watson—an American psychologist who experimented with dogs, cats, fish, rats, monkeys, frogs, and chickens—redefined psychology as the study of observable behavior, not of the invisible and elusive mind. Said Watson, “Psychology as the behaviorist views it is a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of behavior” (1913, p. 158). Sensations, thoughts, feelings, and motivations may fuel speculation for the curious philosopher, but if something can’t be seen, then it has no place in psychology. Psychoanalysis, barked Watson, is “voodooism” (1927, p. 502). As for using animals, Watson—like others who were influenced by Darwin’s theory of evolution—saw no reason to believe that the principles of behavior would differ from one species to the next.

American psychologists were immediately drawn to the hard-boiled approach of behaviorism. The behaviorist’s research goals were clear: Vary a stimulus in the environment and observe the organism’s response. There were no fuzzy ideas about mental processes inside the head, just stimulus–response connections. It was all neat, clean, and objective. Watson himself was forced out of academic psychology in 1920 when it became public that he had an extramarital affair with his research assistant. He divorced his wife, married the assistant whom he loved, and left psychology as a result of this incident. (Watson then went into advertising, where he applied the principles of conditioning and became a leader in the industry.) But behaviorism was alive and well. Psychology was defined as the scientific study of behavior, and animal laboratories were springing up all over North America.

Behaviorism had many proponents and was popular for many years. After Watson, another leader emerged: B. F. Skinner, the psychologist who coined the term reinforcement, invented an apparatus for use in testing animals, and demonstrated in numerous experiments with rats and pigeons that behavior is controlled by reward contingencies in the environment. Skinner first reported on his experiments in 1938. Later, he and others used his findings to modify behavior in the workplace, the classroom, the clinic, and other settings. To the day he died, Skinner (1990) maintained that psychology could never be a science of mind.

behaviorism
A school of thought that defines psychology as the scientific study of observable behavior.
The “Cognitive Revolution”

Behaviorism dominated psychology in the United States and Canada from the 1920s through the 1960s. Ultimately, however, psychologists were unwilling to limit their scope to the study of observable behavior. There was too much happening inside the human organism that was interesting and hard to ignore. Physiologists were locating new pathways in the brain that regulate thoughts, feelings, and behavior. Animal researchers were finding that inborn biological instincts often interfere with learning. Child development researchers were noticing that children pass through a series of cognitive stages in the way they think about the world. Those interested in social relations were finding that our interactions with other people are influenced by the way we perceive and interpret their actions. Those studying psychoanalysis were increasingly coming to appreciate the powerful influences of unconscious motivation. And psychologists who called themselves humanists argued that people strive not only for reward but also to achieve “self-actualization,” a higher state of fulfillment. There were many, many voices in the wilderness waiting to be heard.

The most dramatic change that took place in psychology was (and still is) the “cognitive revolution.” The term cognition refers to the mental processes that intervene between a stimulus and response—including images, memories, expectations, and abstract concepts. At least in the United States, the cognitive psychologies of Wundt and James were swept under the proverbial rug for years during the rise of behaviorism. The subject matter was considered too “soft” and nonscientific. In the 1960s, however, the pendulum swung back and cognitive psychology reemerged, stronger than ever, in a trend that has continued to this day (Robins et al., 1999).

What rekindled this interest in mental processes? One source of inspiration was the invention of the computer. Built for information-processing purposes, computers provided a new and intriguing model of the human mind. The computer receives input in the form of symbols, converts the symbols into a special code, stores the

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**Visual Imaging**

Part of the renewed focus on mental processes included the phenomenon of selective attention: Information can be included or excluded from consciousness when a person is trying to pay attention to two things at once. To see this for yourself, **TRY THIS:** The passage below contains two messages—one in red ink, the other in blue. Read only the red-ink message aloud as quickly as possible. Now, without looking back, write down all the blue-ink words you can remember.

**In performing an experiment like this one on man attention car it house is boy critically hat important shoe that candy the old material horse that tree is pen being phone read cow by book the hot subject tape for pin the stand relevant view task sky be red cohesive man and car grammatically house complete boy but hat without shoe either candy being horse so tree easy pen that phone full cow attention book is hot not tape required pin in stand order view to sky read red it nor too difficult**

The result? You probably did not recall many of the blue-ink words, even though the same words appeared over and over again.
information, and retrieves it from memory when directed to do so. Computer hardware was likened to the brain, and computer programs provided a step-by-step flowchart model of how information about a stimulus is processed to produce a response. Computers were at the cutting edge of science, so the metaphor was readily accepted (Neisser, 1967; Newell et al., 1958).

A second source of inspiration came from Swiss psychologist Jean Piaget. Beginning in the 1920s, Piaget studied the way children think. He developed various tasks that revealed how children of various ages reason about people, objects, time, nature, morality, and other aspects of the world. From dozens of studies described in his more than 40 books and 62,935 pages of writing, Piaget theorized that from infancy to adolescence, all children advance through a series of cognitive stages. Despite the dominance of behaviorism in the United States, Piaget had a large following in Europe, and his writings—which were translated into English in the 1950s and 1960s—were ultimately deemed too important to ignore.

The cognitive revolution was also fueled by developments in the study of language. B. F. Skinner (1957) had argued that the laws of learning control the acquisition of language in much the same way that they control the way a laboratory rat learns to press a metal bar to get food. However, linguist Noam Chomsky (1959) charged that such an account was naive. Chomsky noted that children all over the world start to speak at roughly the same age and proceed at approximately the same rate without explicit training or reinforcement. He argued convincingly that our capacity for language is innate and that specialized cognitive structures are “hard-wired” into the human brain as a product of evolution. Chomsky’s theory dealt a serious blow to behaviorism and sparked a great deal of interest in psycholinguistics—a topic that has played a key role in the cognitive revolution.

Today, very few psychologists identify themselves as strict behaviorists. Free to probe beneath the surface, researchers have thus made some fascinating discoveries. For example, psychologists now know that people all over the world smile when they’re happy; that memories of the past can be altered by misinformation; that our views of one another are biased by first impressions; that personality traits are partly inherited; and that drugs can be used to treat certain psychological disorders. Behaviorism has had a profound, lasting, and positive impact, but psychology’s horizons have expanded beyond it in exciting ways.

**EXPANSION OF PSYCHOLOGY’S HORIZONS**

Just over one hundred years ago, psychology was in its infancy. Since that time, it has grown larger and stronger (see Figure 1.1). Psychology has developed in four important ways. First, there are many more areas of basic research today than in the
past. The goals of **basic research** are to test theories, study processes, discover general principles, and build a factual foundation of knowledge for the field. Psychology now has many subfields, and each focuses on mind and behavior from a somewhat different perspective.

Second, psychology has expanded in the area of **applied research**. Although some psychologists believe that the discipline should remain a pure and basic laboratory science, others want to study people in real-world settings, using the results to solve practical human problems. Some specific areas of applied research include health, education, business, law, religion, politics, engineering, behavior in the military, and sports.

Third, psychology has become more open and inclusive as a profession and contains within its ranks a more diverse group of people than in the past. When psychology was forming as a new discipline, virtually all psychologists were white, male, and from North America or Europe. This has changed dramatically over time—particularly in recent years—a change that has both elevated the pool of talent within the field and brought in important new perspectives on the human condition. Today, there are more female and minority psychologists than ever before, as well as more psychologists from other parts of the world.

Fourth, psychology has strengthened over the years by refining its research methods. Human beings are complex and difficult to study. As individuals, we differ in our biological makeup, age, experience, and cultural background. The way we behave in one setting may differ from the way we behave in another. The inner workings of the mind can never actually be “seen.” In fact, we often lack insight even into ourselves. To meet these challenges, researchers use various tests, mazes, inkblots, shock-generating devices, computerized perception tasks, brain scans, and sophisticated instruments that record physiological states. Most important, as we’ll soon see, psychology stands high on the shoulders of the scientific method.

**Psychology as a Basic Science**

Psychology is now a highly specialized discipline in which researchers examine people from a number of different perspectives. The product of evolution, human beings
are, first and foremost, biological animals, genetically predisposed to behave in some ways rather than others. Many psychologists focus on these biological aspects of human nature. For some, this means studying the neuroscience of the human body, brain, and nervous system—and their influence on our behavior. Others recently have found that trauma, good friends, and other “psychological” variables affect the body’s immune system—and our physical health. Still others bring biological perspectives into psychology through the study of animal behavior, the evolutionary origins of human behavior, behavioral genetics, and the influences of hormones and drugs.

Also important in psychology today is a focus on internal psychological processes and what goes on “inside the head.” With the computer serving as a model of the human mind, cognitive psychologists study the ways in which people are competent, rational, and objective in the way they process information about the world. They study such topics as sensation and perception, consciousness, learning, memory and forgetting, thought, and language. Also focused on inner processes, many researchers study the ways in which we warm-blooded humans are driven by motivations and emotions.

Another major perspective is provided by developmental psychologists, who focus on the ways in which people develop over the lifespan. In this perspective, an important issue is the “nature–nurture” debate concerning evolutionary, genetic, and biological influences on us—and the ways in which these influences are tempered by environmental factors from parents, siblings, peers, and culture as a whole. Some developmental psychologists study prenatal development; some study infants, children, or adolescents; others specialize in various aspects of adulthood and old age. Still others are interested in intelligence, testing, and the psychology of education.

Human beings are gregarious animals, not isolated hermits, so a social psychological perspective is also necessary to fully understand the human experience. Drawn together by the belief that social situations sometimes cause us to behave in ways that are “out of character,” social psychologists focus on the influences of other people on the individual. By observing people in carefully staged social settings, researchers in this area study a range of behaviors—including attraction, conformity, persuasion, aggression, altruism, and group dynamics. They also study cultural influences and the intergroup problems of stereotyping, prejudice, and discrimination.

Clinical psychology is the largest and most visible branch of the discipline (see Figure 1.6 on page 34). In contrast to those who strive to understand what’s “normal,” clinical psychologists study people who are “abnormal” in their perceptions, thoughts, feelings, and behavior. Based on the study of human personality and the belief that people have a capacity for change and renewal, clinical psychologists—and other mental-health workers—routinely seek to diagnose and treat psychological disorders such as anxiety, depression, and schizophrenia. In a related pursuit, counseling psychologists provide marriage, family, career, and guidance counseling to people with less severe problems.

**Psychology as a Responsive Science**

Psychology is—and always has been—a science that is responsive to current events. From the beginning, psychologists from all basic areas of specialization have sought to apply what they have learned to the solution of important human problems. Early in the twentieth century, French psychologist Alfred Binet developed the first modern

*“There are no such things as applied sciences, only applications of science.”*  
—LOUIS PASTEUR
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introduction test to help schools identify children needing special attention. After the Nazi horrors of World War II, psychologists began intensively to study obedience to authority, propaganda, prejudice, and aggression. Today, researchers study traumatic stress and other psychological consequences of terrorism. (See Psychology and World Events.)

Psychology today has a number of important domains of application. Health psychologists, many of whom work in medical schools, study a range of problems, such as how stress affects the heart and the immune system, what coping mechanisms are most adaptive, and why people live longer if they have friends and other social connections than if they are alone. Educational psychologists study such topics as intelligence and testing, classroom management, and academic motivation. Industrial/organizational (I/O) psychologists focus on human behavior in the workplace, as they study personnel selection, leadership in management, motivation, and worker productivity. Consumer psychologists focus on advertising and other aspects of behavior in the marketplace. Environmental psychologists study the relations between people and their physical surroundings—including the effects of street noise, heat, and population density. Many psychologists also work in the legal system, consulting with attorneys and judges, testifying in court, teaching in law schools, and researching such issues as jury selection and decision making, eyewitness identifications, lie-detector tests, prison reform, and the insanity defense (see The Process of Discovery). Still others work as psychologists in sports, politics, and other exciting areas. As with all other basic sciences, psychology has strayed from the laboratories of the ivory tower into the real world. The secret is out.

Values, Ethics, and Social Responsibility

The application of psychology—or any other science, for that matter—raises hard and sometimes tricky questions about values, professional ethics, and social responsibility (Koocher & Keith-Spiegel, 1998). For example, should research be suppressed if it yields socially sensitive results? It’s easy in the abstract for psychologists to assert that they must seek the truth regardless of where it may lead, but what about the policy implications? Should IQ-test scores of different racial and ethnic groups be compared? And if some groups score lower than others, should the disparity be reported? What about studies suggesting that the testimony of young children, often essential to the prosecution of sex abusers, cannot be trusted?

These kinds of questions recently erupted in an intense, divisive, and public controversy within psychology. In 1998, Bruce Rind and his colleagues published in a prestigious journal a quantitative review of fifty-nine studies, suggesting, contrary to popular belief, that victims of child sexual abuse are not inevitably impaired later in life—that “child sexual abuse does not cause intense harm on a pervasive basis regardless of gender in the college population” (p. 46). You might think of this as welcome news. But through a convoluted chain of events in which the article was condemned by radio personality Dr. Laura Schlessinger, the national news media, and even the U.S. Congress, the American Psychological Association (APA)—which publishes the journal in which the article appeared—was accused of promoting pedophilia. The APA responded with conciliatory gestures that some psychologists saw as appropriate but that others saw as unsupportive of academic and scientific freedom. This storm came to a head when the editor of another APA journal overturned an earlier decision to publish a critique of how APA handled the matter (Lilienfeld, 2002). This entire episode was chronicled in a special 2002 issue of the American Psychologist on “interactions among scientists and policymakers.”

Additional questions confront those who apply psychology. Is it ethical to dispense mental-health advice on TV or radio? Should psychologists use their scientific
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The terrorist assault on the World Trade Center and the Pentagon on September 11, 2001, was a trauma like no other. In New York City, the morning was sunny, bright, and clear until 8:46 A.M., when a Boeing 767, hijacked by Middle Eastern terrorists, crashed into the north tower of the World Trade Center. Eighteen minutes later, a second jet stabbed the south tower. Nobody knew it at the time, but both towers would soon collapse, a third hijacked jet would slam into the Pentagon outside of Washington, DC, and a fourth, possibly headed for the White House, would dive into the woods of Pennsylvania. In all, more than three thousand sons and daughters, mothers and fathers, brothers and sisters, friends, coworkers, classmates, and rescue workers would be killed.

For many years to come, historians will write about the events of 9/11. In some respects, however, psychological perspectives are needed to shed light not only on what caused a group of human beings to kill themselves and others, but also on the psychological consequences for the rest of us. Whether they were present or not, Americans all over the world were affected. The theories and studies described in this book will offer some important insights in this regard. You’ll read, for example, about how each of us will likely form and retain a vivid “flashbulb memory” of where we were, who we were with, and what we were doing the moment we heard about the attacks. And you’ll read about how, as a result of this horrific, high-profile event, people now overestimate the risk of flying, even though driving is statistically more dangerous. For now, let’s consider two predictable effects of terrorism—on our mental health and well-being, and on the way we view ourselves and the social groups around us.

Mental Health and Well-Being
Surveys consistently show that most people are happy most of the time. In any given one-year period, however, an estimated 28 percent of American adults suffer from anxiety, depression, or some other form of psychological distress (Kessler et al., 1994). Some mental-health problems are rooted in biological vulnerabilities; others spring from bad life experiences such as war, poverty, neglect, or physical and sexual abuse.

At times, a single trauma can trigger what is known as posttraumatic stress disorder, or PTSD. In a nationwide telephone survey conducted the week of 9/11, 90 percent of Americans who were not themselves present during the attack said they were stressed by it—and 44 percent reported “substantial” symptoms such as recurring thoughts and memories, difficulty falling or staying asleep, difficulty concentrating, crying, irritability, and unprovoked outbursts of anger (Schuster et al., 2001). These problems were far more common among New Yorkers than among people living in other cities and towns, including Washington, DC (Schlenger et al., 2002). Even within Manhattan, researchers compared local residents who lived varying distances from ground zero and found that the closer they lived, the more traumatized and depressed they were from the experience (Galea et al., 2002). For those directly touched, one wonders how long the effects will last. In some cases, loved ones will need to be patient. Time has the power to heal. In people diagnosed with PTSD, however, the symptoms may persist for several months or years.

Perceptions of “Us” and “Them”
Do you ever think about death, or your own mortality? As with other living creatures, we humans are biologically programmed for self-preservation. Unique among species, however, we are conscious of—and terrified by—the inevitability of our own demise. How do we cope with the threat of death that privately haunts us? In recent years, Jeff Greenberg, Sheldon Solomon, and Thomas Pyszczynski...
(1997) have proposed and tested “Terror Management Theory” to explain how people cope with the fear of their own mortality. According to the theory, all human cultures construct—and individuals accept—worldviews about how, why, and by whom the earth was created; the purpose of our existence; a sense of history, complete with heroes, villains, momentous events, and traditions. These worldviews provide meaning and purpose—and a buffer against people’s anxiety about death.

How will people be affected in the long term by the World Trade Center attack and the ever-present threat of terrorist annihilation, which serve to remind us of how vulnerable we are? In their book, *In the Wake of 9/11*, Pyszczynski and his colleagues (2002) predict that a fear of terrorism will motivate people to validate their own cultural worldviews and lash out at those who challenge and threaten those same views. These are normal human tendencies, they note, that become exaggerated when people are confronted by thoughts of death. In a series of clever experiments, these investigators found that after research subjects were prompted to imagine their own death, they became friendlier to others who are similar and supportive of cherished cultural values and more hostile to those who are different, foreign, or not supportive of those values. These studies correctly suggested that as Americans recover from the trauma of 9/11, and try to protect themselves from the terror that it triggered, they would exhibit a surge of national pride and patriotism—and some measure of intolerance for difference and dissent. What about the future? As world leaders seek to prevent additional acts of terrorism using political, economic, and military muscles, psychologists will try to understand the impacts of this violence on us all.
Q: How did you first become interested in psychology?
A: When I took my first psychology course, I noticed something different between it and the other courses I was taking. Whereas most people who made the great discoveries in math, chemistry, and other disciplines were dead, almost everyone in my psychology textbook were still alive; many were young. That meant that psychology was in its early stages and that I had a chance to contribute something important. This is still true today. Psychology is a young discipline and many of our best discoveries will come from students sitting in our classrooms today.

Q: How did you come up with your important discovery?
A: My discoveries about eyewitnesses came about the way that I think most discoveries happen: through an attitude of skepticism and a belief in the power of scientific proof. When I was in graduate school, I was shocked to learn that the legal system had never collected data on the accuracy of eyewitnesses even though it relied heavily on their identifications.

Psychology’s methods were perfectly suited for testing eyewitness performance. We stage crimes for unsuspecting bystanders and then show them a lineup, so we know for sure whether they identified the actual culprit or an innocent person. One of the most striking findings was that eyewitnesses often make mistakes even if they are positive they are right. In fact, observers, like judges and juries, cannot tell if these identifications are accurate or mistaken. Clearly, we had to find ways to prevent mistaken identifications from occurring in the first place.

Q: How has the field you inspired developed over the years?
A: Amazing things have happened. First, many researchers joined in the effort to improve how police conduct lineups. Then in the 1990s, cases surfaced in which DNA tests freed innocent people convicted of crimes they did not commit. It turns out that over three-fourths of these people were in prison primarily because of mistaken identifications.

Our studies are now having an impact on how police conduct lineups. Recently, former U.S. Attorney General Janet Reno took note of the problems and directed the National Institute of Justice to develop guidelines for police on how to collect good eyewitness evidence. Along with four other psychologists, I became a part of a group that included police, prosecutors, and defense attorneys from across the country. In 1999, we published the first ever set of guidelines, all based on psychology research. Police departments soon began using techniques we had recommended. In 2001, for example, the state of New Jersey adopted our call for double-blind lineups—that those who test eyewitnesses not know which lineup member is the suspect, thereby preventing them from consciously or unconsciously influencing the witness’s decision. Progressive police departments are looking toward scientific psychology to help them solve crimes with fewer mistakes.

Q: What is your prediction for where the field is heading?
A: I think we are heading into a new era in which psychology is used more heavily by the justice system. I even envision a time in the not too distant future in which research psychologists are routinely involved in major criminal investigations and in the training of detectives.
A DIVERSITY OF PERSPECTIVES

When Wundt, James, Freud, and others were defining this new discipline in the late nineteenth and early twentieth centuries, virtually all psychologists were white, male, and from North America or Europe. In part, this situation existed because of discrimination and other societal barriers that made it difficult for women and minorities to enter the professional ranks. Consider the distinguished career of Mary Whiton Calkins. In the 1890s, Calkins successfully completed graduate coursework at Harvard to the acclaim of William James and her other professors there. She went on to write two textbooks and a number of important research articles, she founded one of the first psychology laboratories in the United States at Wellesley College, and in 1905 she was elected first female president of the American Psychological Association. Yet at the time, Harvard University would not grant her a Ph.D. because she was a woman. The pages of psychology’s history are filled with other important women who faced institutional obstacles (O’Connell & Russo, 1990). Today, a majority of psychologists entering practice in North America are women (Denmark, 1998).

Minorities were also highly underrepresented in the early years of psychology. In 1920, Francis Sumner, who studied at Clark University with G. Stanley Hall, became the first African American to earn a Ph.D. in psychology. He went on to publish two articles about the higher education of African American youths (Sawyer, 2000). Since that time, others of Asian, African, and Hispanic descent have joined the ranks—and many have made significant contributions. Consider the landmark case of Brown v. Board of Education of Topeka (1954), in which the United States Supreme Court ruled for the first time that racially separate schools were unequal and had to be integrated. In support of its opinion, the Court cited studies by Kenneth B. Clark, an African American psychologist whose research suggested that racial segregation makes black schoolchildren feel inferior. Behind the scenes, Clark played a pivotal role in the application of psychology to the civil rights movement. This was also the first time that the U.S. Supreme Court had cited psychology research in an opinion.
The demographic face of psychology today is different, as it includes more women, minorities, and others from the international community. Clearly, the more perspectives brought to bear on the study of mind and behavior, the better. In the past, researchers typically observed the behavior of predominantly male college students on the assumption that the results would apply generally to men and women all over the world. This assumption was largely unchallenged for many years until finally, in the 1960s and 1970s, a new generation of researchers, many of whom were female, identified important similarities and differences between men and women. As we’ll see in later chapters, the study of sex and gender is now basic to all areas of psychology. Also, researchers of varying nationalities are now testing psychology’s theories in different parts of the world. These studies enable us to determine the extent to which certain patterns of human behavior are “universal” or found only in certain populations. As we’ll see throughout this text, “Everyone is basically the same, yet no two people are alike.”

Diversity considerations within the profession are also important in the mental-health area. In countries with heterogeneous populations, such as the United States and Canada, many racial and ethnic minority groups have their own unique languages, worldviews, lifestyles, experiences, and problems. Some researchers now specialize in diagnosing and treating Asian American groups (Kurasaki et al., 2002). Others focus on mental health in Latino American populations (Lopez & Carrillo, 2001). To be most helpful in treating individuals from diverse populations, psychotherapists need to understand the ways in which their clients are “culturally different” (Cuellar & Paniagua, 2000; Sue & Sue, 2002).

Scientific Methods

- What are scientific methods, and why are they important?
- Is it better to study people in a laboratory or in natural settings?
- Why do psychologists devise subtle measures of behavior when they can just ask people about themselves?
What ethical concerns have been raised about using human participants in research?

What about the use of animals?

It happens all the time. I’ll see a report on the evening news, a magazine story, or an ad for a new product, and I’ll react with a mixture of curiosity and skepticism. For example, I’ve heard that students can raise SAT scores 150 points by taking a test-preparation course, that a full moon triggers bizarre behavior, that workaholics drive themselves to an early grave, that pornography incites rape, that cell phones increase the risk of car accidents, and that girls start talking before boys do. Some of these claims are true; others are not. My reaction is always the same: “Hmm. Interesting,” I’ll say to myself. “But prove it!”

Many of us are drawn to psychology because people are fascinating and the subject matter is important. What unifies the entire discipline, however, is its commitment to scientific methods. A basic goal in science is one that should be modeled by everyone: critical thinking. Critical thinking is a skill, and it’s also an attitude. Psychologists are trained to practice critical thinking. This means that we challenge blind assumptions, distrust our intuition in favor of systematic observation, maintain a healthy air of skepticism, revise our theories in the light of evidence, scrutinize carefully the methods used to derive that evidence, and search for alternative explanations.

The objective of scientific inquiry is to generate creative ideas and entertain these ideas with an open mind—but, at the same time, to be cautious, to demand that all claims be tested, and then to scrutinize the results. The “art” in science is to achieve a balance between these competing objectives. It’s good to be creative but not intellectually sloppy. Similarly, it’s good to be critical, even skeptical, but not closed-minded. The key to thinking like a psychologist is learning how to walk these fine lines. And that means knowing something about psychology’s methods of research.

THE RESEARCH PROCESS

The research process involves coming up with ideas and questions, and then proceeding through a series of steps designed to answer the questions in a systematic manner. The first step is to come up with a theory, or at least a loose set of ideas. As discussed earlier, you already have many intuitive theories on psychological issues. Everyone does. When I was choosing a graduate school to attend, I had to decide whether or not to leave my hometown to go to the best possible program—which meant leaving behind a girlfriend. What should I do? What effect would distance have on our relationship? One friend was certain he knew the answer: “Absence makes the heart grow fonder.” Those words of encouragement made sense to me until a second friend said with equal certainty, “Out of sight, out of mind.” Just what I needed. Two contradictory assumptions, both derived from common sense.

Psychological theories are more formal than the hunches we come up with in everyday conversation. A theory is an organized set of principles that describes, predicts, and explains a phenomenon. We can derive a theory from logic, a world event, a personal experience or an observation, another theory, a research finding, or an accidental discovery. Some theories are broad and encompassing; others account for only a thin slice of behavior. Some are simple; others contain a large number of interrelated propositions.

The second step in the research process is to formulate from one’s theory specific testable predictions, or hypotheses, about the relationship between two or more variables. Researchers can then test these hypotheses to evaluate the theory as a
operational definition
A concrete definition of a research variable in terms of the procedures needed to control and measure it.

laboratory research
Research conducted in an environment that can be regulated and in which participants can be carefully observed.

field research
Research that is conducted in real-world locations.

whole. In a typical study, psychologists would test one or more specific hypotheses derived from the theory. If the results support the hypotheses, confidence in the theory is increased. If the results fail to support the hypotheses, the theory as a whole is revised, qualified, or discarded. To formulate a testable hypothesis, researchers must provide operational definitions that specify, in concrete “how-to” terms, the procedures needed to control and measure the variables in the hypothesis. Over the years, for example, psychologists have tried to determine what causes aggression. To do so, they gave research subjects an opportunity to administer painful electric shocks to another subject and they operationally defined aggression as the number and intensity of shocks administered.

Once researchers have a theory, hypothesis, and operational definition in place, they are ready for the next and remaining steps—to design the study, collect data from human or animal participants, analyze the results, and draw a conclusion (see Figure 1.2). There is no magic formula for determining how to test a hypothesis. In fact, as we’ll see, studies vary along at least three dimensions: (1) the setting in which observations are made, (2) the ways in which psychological variables are measured, and (3) the types of conclusions that can be drawn. Let’s separately examine each of these dimensions.

RESEARCH SETTINGS
There are two types of settings in which people can be studied. Sometimes, data are collected in a laboratory, usually located at a university, so that the environment can be regulated and the subject carefully observed. Laboratory research offers control, precision, and an opportunity to keep conditions uniform for different participants. For example, bringing volunteers into a sleep lab enables the psychologist to monitor their eye movements and brain waves, record the exact time they fall asleep, and get dream reports the moment they awaken. Likewise, bringing a parent and child into a special playroom equipped with hand-picked toys, two-way mirrors, a hidden camera, and a microphone enables the psychologist to record every word uttered and analyze every nuance of their interaction. To study the way juries make decisions, I recruit people to serve on mock juries so that I can videotape and analyze their deliberations.

Laboratory research is common in science. NASA physicists construct special chambers to simulate weightlessness in space; chemists spark chemical reactions in the test tube; botanists study plant growth in the greenhouse; and meteorologists use wind tunnels to mimic atmospheric conditions. Similarly, psychologists often find it necessary to simulate events in a laboratory. There is, however, a drawback. Can someone sleep normally in a strange bed with metal electrodes pasted to the scalp? Will a parent and child interact in the playroom the way they do at home? Do mock juries reach verdicts the same way real juries do? Being an artificially constructed world, the laboratory may at times elicit atypical behavior.

The alternative is field research conducted in real-world locations. The psychologist interested in sleep and dreams may have participants report back periodically on their experiences. The parent and child could be visited in their own home. And jurors could be questioned about their decision-making process after a trial is over. The setting chosen depends on the behavior to be measured. Indeed, psychologists have
observed people in city streets, classrooms, factories, offices, singles bars, subways, dormitories, elevators, and even public restrooms. To understand behavior in real-world settings, there is no substitute for field research. Unfortunately, the psychologist “out there” cannot control what happens to his or her participants or measure with precision all aspects of their experiences. That’s why the most fruitful approach is to use both laboratory and field settings.

**PSYCHOLOGICAL MEASUREMENTS**

Regardless of where observations are made, many different types of measurements can be taken. These types fall into three categories: self-reports, behavioral observations, and archival records. These three types of observations, and the advantages and disadvantages of each, are summarized in Table 1.2.

**Self-Reports**

One way to assess a person’s thoughts, feelings, or behavior is to go right to the source and ask. This is the method of **self-report**. Through interviews, questionnaires, or diaries, people are asked to report on their behavior, perceptions, beliefs, attitudes, and emotions. Self-reports are quick and easy to get. The information, however, can be inaccurate and misleading.

There are two problems with self-reports. First, people sometimes distort their responses in order to present themselves in a favorable light. It’s hard to get anyone to admit to failures, mistakes, and shortcomings. Studies show, for example, that people overestimate their own contributions to a joint effort (Ross & Sicoly, 1979), report after the occurrence of an event that they knew all along it would happen (Hawkins & Hastie, 1990), hide their feelings of prejudice (Crosby et al., 1980), and overestimate the accuracy of their own predictions (Dunning et al., 1990). When James Shepperd (1993) asked college students about their SAT scores and then checked their academic records, he discovered that they overestimated their actual scores by an average of seventeen points.

A second problem with self-report data is that even when respondents try to be accurate, they are often limited in their ability to do so. Long ago, Freud noted that

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**Table 1.2** Three Ways to “Observe” People

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-reports</td>
<td>Ask people to report on themselves in interviews, surveys, or questionnaires.</td>
<td>People often reveal inner states that cannot be “seen” by others.</td>
<td>People distort self-reports to present themselves in a favorable light.</td>
</tr>
<tr>
<td>Behavioral observations</td>
<td>Observe behavior firsthand, openly or covertly, sometimes using special tasks or instruments.</td>
<td>Behavior can be measured objectively.</td>
<td>Inner states can only be inferred from behavior, not actually seen.</td>
</tr>
<tr>
<td>Archival records</td>
<td>Observe behavior second-hand, using available records of past activities.</td>
<td>The behavior occurs without the biasing presence of an observer.</td>
<td>People may behave differently if they know they are being observed.</td>
</tr>
</tbody>
</table>

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**self-report**

A method of observation that involves asking people to describe their own thoughts, feelings, or behavior.
people block certain thoughts and wishes from awareness. And studies show that people often lack insight into the causes of their own behavior (Nisbett & Wilson, 1977). In a surprising illustration of the limits of self-reports, Stanley Coren (1993), an expert on handedness, notes that when he asks people whether they’re right- or left-handed, 7 percent answer incorrectly. “One man who confidently reported that he was a right-hander, when tested to see which hand he used to throw a ball, aim a dart, cut with scissors, and the like, performed every single action with his left hand. His only detectable right-handed activity was writing” (p. 34).

Self-report measures are common in psychology, sometimes even essential. As you read through this book, however, you’ll see that researchers often go out of their way to collect data in more subtle, indirect ways. Now you know the reason: The source is not always the best source.

**Behavioral Observations**

It is said that actions speak louder than words—and many researchers would agree. Many years ago, the Nielsen ratings of TV shows (which determine the cost of advertising and success of programs) were derived from the results of surveys and diary forms mailed to viewers. Realizing that these self-reports are flawed, however, Nielsen Media Research later installed “People Meters” in thousands of sample households across the country to electronically record what viewers are watching, when, and for how long. Similarly today, Internet marketing companies measure the value of specific Web sites by monitoring the number of users who enter the site, the amount of time spent there, and the frequency with which users click on the advertising banners.

In psychology as well, the major alternative to self-reports is firsthand behavioral observation. To animal researchers, the pressing of a metal bar, the running of a maze, and the consumption of food pellets are important behaviors. Sucking, smiling, crying, moving the eyes, and turning the head are significant sources of information for those who study infants. As for those who study adults, psychologically relevant behaviors range from the blink of an eye to the choice of a marital partner or career. Even changes in internal states (such as respiration, heart rate, eye movements, brain waves, hormone levels, muscle contractions, and white blood cell activity) can be monitored with the use of special instruments.

Behavioral observation plays a particularly important role in the study of subjective experience. One cannot crawl under a subject’s skin and see what’s on his or her mind. But researchers can try to infer various internal states from behavior. It is usually (though not always) safe to assume, for example, that recognition reveals the presence of a memory, that solving difficult problems reveals intelligence, and that the person who breaks into a cold sweat and runs at the sight of a snake has a fear of snakes.

**Archival Records**

A third way to collect information about people is to conduct archival research that involves examining records of past activities instead of ongoing behavior. Archival measures used in psychology include medical records, birthrates, literacy rates, newspaper stories, sports statistics, photographs, absenteeism rates at work, personal ads, marriages, and divorce. A major advantage of these kinds of measures is that by observing behavior secondhand, researchers can be sure that they did not influence the participants by their presence. An obvious limitation is that existing and available records of human activity are not always complete or detailed enough to be useful.
Archival measures are particularly valuable for examining cultural or historical trends. For example, Coren (1993) wanted to know if right-handedness was always dominant among humans (today, roughly 90 percent of the population is right-handed). So he went through a collection of art books and analyzed 1,180 drawings, paintings, and engravings that depicted an individual using a tool or a weapon. The drawings ranged from Stone Age sketches dated 15,000 BCE to paintings from the year 1950 CE. Yet Coren found that 90 percent of all characters were portrayed as right-handers—and that this percentage was the same thousands of years ago as in the twentieth century.

**RESEARCH DESIGNS**

Regardless of how and where the information is obtained, researchers use statistics to summarize and then analyze the results. In some cases, statistical tests are used simply to describe what happened in terms of averages, percentages, frequencies, and other quantitative measures. In other cases, analyses are used to test inferences about people in general and their behavior. More about the use of statistics in psychological research is available in the Appendix of this book. For now, it is important to note that the types of conclusions that are drawn are limited by the way a study is designed. In particular, three types of research are used: descriptive studies, correlational studies, and experiments.

**Descriptive Research**

The first purpose of research is simply to describe a person, a group, or a psychological phenomenon through systematic observation. This goal can be achieved through case studies, surveys, and naturalistic observations.

**CASE STUDIES** Sometimes it is useful to study one or more individuals in great detail. Information about a person can be obtained through tests, interviews, firsthand observation, and biographical material such as diaries and letters written. Case studies are conducted in the hope that an in-depth look at one individual will reveal something important about people in general. The problem with case studies is that they are time consuming and often are limited in their generality. To the extent that a subject is atypical, the results may say little about the rest of us.

Nevertheless, case studies have played an influential role in psychology. Sigmund Freud based his theory of personality on a handful of patients. Behaviorist John Watson used a case study involving an infant to try to debunk psychoanalysis. Swiss psychologist Jean Piaget formulated a theory of intellectual development by questioning his own children. Neuroscientists gain insights into the workings of the brain by observing and testing patients who have suffered brain damage. Cognitive psychologists learn about memory from rare individuals who can retain enormous amounts of information. Psycholinguists study language development by recording the speech utterances of their own children over time. Intelligence researchers learn about human intellectual powers by studying child prodigies, chess masters, and other gifted individuals. Social psychologists pick up clues about leadership by analyzing biographies of great leaders. And clinical psychologists refine the techniques of psychotherapy through their shared experiences with patients. When an individual comes along who is exceptional in some way or when a psychological hypothesis can be answered only through systematic, long-term observation, the case study provides a valuable starting point.

Have human beings always been predominantly right-handed? This Greek vase from 500 BCE depicts running warriors. As with 90 percent of all people depicted in ancient artwork, these warriors brandished their spears in their right hands.
SURVEYS  In contrast to the in-depth study of one individual, surveys describe an entire population by looking at many cases. In a survey—which can be conducted in person, over the phone, through the mail, or over the Internet—people can be asked various questions about themselves. Surveys have become very popular in recent years and tell us, for example, that 95 percent of American men and women have sexual fantasies (Laumann & Michael, 2001), that 96 percent believe in God (Golay & Rollyson, 1996), that 49 percent daydream about being rich (Roper Reports, 1989), that 80 percent are happy (Diener, 2000), and that 60 percent would like to lose weight (Harris Poll, 2002). In case you’ve been wondering, 37 percent of women and 18 percent of men squeeze the toothpaste tube from the bottom (Weiss, 1991).

Surveys are sometimes necessary to describe psychological states that are difficult to observe directly. For example, this method is a vital tool in epidemiology—the study of the distribution of illnesses in a population. How many children are awakened by nightmares? What percentage of college students are struck by test anxiety? How common are depression, drug use, and suicide? These kinds of questions are vital for determining the extent of a problem and knowing how to allocate healthcare resources. Surveys are also useful for describing sexual practices. With AIDS spreading at an alarming rate, it’s important to know how sexually active people are, whether they use condoms, and whether some segments of the population are more at risk than others. Today, surveys are so common, and the results have such significant implications, that the methods (which, after all, rely on self-report) should be carefully scrutinized. Two factors are particularly important in this regard: who the respondents are and how the questions are asked (Krosnick, 1999; Tourangeau et al., 2000).

To describe a group, any group—males, females, college students, redheads, Americans, or all registered voters—researchers select a subset of individuals. The entire group is called the population; the subset of those questioned constitutes a sample. For a survey to be accurate, the sample must be similar to or representative of the population on key characteristics such as sex, race, age, region, income, education, and cultural background. Short of questioning everyone in the population, the best way to ensure representativeness is to use a random sample, a method of selection in which everyone has an equal chance of being chosen.

Survey researchers usually pick names arbitrarily from a phone book or some other list. This seems like a reasonable strategy (and the larger the sample, the smaller the margin of error), but no sample is perfect. Not everyone has a telephone, some people have unlisted numbers, and some people who are called may not be home or may refuse to participate. Prior to the 1936 presidential election, pollsters for the magazine Literary Digest mailed postcards to more than ten million people selected from telephone directories and automobile registration lists. The cards asked the respondents to indicate for whom they intended to vote. Based on the more than two million cards that were returned, the Literary Digest predicted that Republican Alfred Landon would defeat Democrat Franklin D. Roosevelt in a landslide. In fact, the opposite occurred. The problem: At the time, more Republicans than Democrats owned telephones and automobiles, which skewed the poll results. For a sample to accurately reflect its parent population, it must be selected in a manner that is random, not biased.

A second factor to consider is the way in which survey questions are asked. Studies show that the answers people give are influenced by the wording of the questions, the context in which they are asked, and other extraneous factors (Schwarz, 1999). The following example illustrates the point: When survey respondents were asked about “assisting the poor,” only 23 percent said that too much money was being spent. Yet among those asked about “welfare,” 53 percent gave this negative response (Time, 1994).

**survey**  A research method that involves interviewing or giving questionnaires to a large number of people.

**epidemiology**  The study of the distribution of illnesses in a population.

**random sample**  A method of selection in which everyone in a population has an equal chance of being chosen.
Survey Says. . .

To see how the wording of questions can affect survey results, TRY THIS: Ask three people at random one of the questions in the left-hand column. Then ask a second random group of three the corresponding question from the right-hand column:

- Consider whether there are more than 100 calories in a medium-size slice of pizza. How many calories do you think there are?
- Consider whether there were more than 50 episodes made of the original Star Trek series. How many episodes do you think were made?
- Consider whether Ozzy Osbourne is over 45 years old. How old do you think he is?

- Consider whether there are less than 400 calories in a medium-size slice of pizza. How many calories do you think there are?
- Consider whether there were less than 50 episodes made of the original Star Trek series. How many episodes do you think were made?
- Consider whether Ozzy Osbourne is under 55 years old. How old do you think he is?

Next, add up your two sets of answers and divide each by 3 to arrive at your survey respondents’ average estimate. Was the second average higher or lower than the first? What does this say about how survey questions are phrased? How should these questions have been phrased to obtain the most objective result possible?

(For the record: according to Pizza Hut, a medium slice of cheese pizza has 240 calories. The original Star Trek ran 79 episodes. And Ozzy Osbourne was born December 3, 1948.)

NATURALISTIC OBSERVATIONS

A third descriptive approach is to observe behavior as it occurs in the real world. Naturalistic observations are common in sociology and anthropology, where field-workers seek to describe a group, organization, or culture by “living” in it for long periods of time. Psychologists use this method as well to study parents and their children, corporate executives, factory workers, nursing-home residents, and others.

Naturalistic observation is particularly common among ethologists, who study the behavior of animals in their natural habitats. For example, Jane Goodall (1986, 2000) has spent more than forty years watching chimpanzees in African jungles. She has observed their social structure, courting rituals, struggles for dominance, and child-rearing practices. She observed cannibalism and a war between chimpanzee troops. She also saw the chimps strip leaves from twigs and use the twigs to fish termites out of nests—a finding that disproved the widely held assumption that only humans are capable of making tools. In another program of research, Dorothy Cheney and Robert Seyfarth (1990) observed vervet monkeys in Kenya and discovered that these monkeys behave as if they know the kinship bonds within the group, use deception to outsmart rivals, and use vocal calls in ways that are more sophisticated than anyone before had expected. To truly understand primates, and perhaps their similarities to humans, one has to observe their behavior in the wild—not captive in a zoo or laboratory.

Correlational Studies

Description is a nice first step, but science demands much more. A second goal is to find connections, or correlations, between variables so that one factor can be used to predict another. Correlational research is reported in psychology—and in the naturalistic observation The observation of behavior as it occurs naturally in real-world settings.
news—with remarkable frequency. Consider a few examples: The more violence children watch on TV, the more aggressive they are. College graduates earn more money than nongraduates. The more optimistic people are, the less often they get sick. Adults who exercise regularly live longer than those who do not. People who are shy have fewer friends than those who are outgoing. So what do these statements of correlation really prove? And what do they not prove?

A correlation is a statistical measure of the extent to which two factors are associated. Expressed in numerical terms, correlation coefficients range from −1 to +1. A positive correlation exists when the two variables increase or decrease together, in the same direction. The link between TV violence and aggression is positive—more of one means more of the other; so are the correlations between education and income and between exercise and longevity. In contrast, a negative correlation exists when an increase in one variable is accompanied by a decrease in the other, and vice versa. The link between optimism and illness is in a negative direction, as is the one between shyness and friendships.

Correlation coefficients vary not only in direction but also in strength. The higher a correlation is, regardless of whether it is positive or negative, the stronger the link is between variables. Correlations that are very low, near zero, indicate that two variables are independent. Contrary to popular opinion, for example, research shows that there is no correlation between phases of the moon and criminal activity or between intelligence-test scores in infancy and adulthood. In short, full moons and infant test scores cannot be used to predict crime or adult IQ. As shown in Figure 1.3, the direction and strength of a correlation can be represented in a scatterplot.

Correlational studies serve an important function: Based on existing associations, researchers can use one variable (or more) to make predictions about another variable. Before interpreting correlations, however, two important limitations guide the cautious scientist. First, correlations between psychological variables are seldom perfect. Human beings are complex creatures and their behavior is multidetermined. If you know a boy who spends twenty hours a week watching professional wrestling, or playing violent video games such as Mortal Kombat, you might predict that he gets into fights at school. But the positive correlation between media violence exposure and aggressiveness is far from perfect, and you may well be wrong. Similarly, not every optimist is healthy and not every college graduate brings home a hefty paycheck. Unless

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**correlation**
A statistical measure of the extent to which two variables are associated.

**scatterplot**
A graph in which paired scores \((X, Y)\) for many participants are plotted as single points to reveal the direction and strength of their correlation.

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**FIGURE 1.3 Visualizing Correlations**
Scatterplots provide a graphic representation of the observed relationship between two variables. The graphs above illustrate a positive correlation (left), a negative correlation (center), and a zero correlation (right). Each point locates the position of a single subject on the two variables. The solid straight lines show what the correlations would look like if they were perfect.
a correlation is close to 1, it can be used only to make general statements of probability, not predictions about specific individuals.

**CORRELATION AND CAUSATION** The types of conclusions that can be drawn from correlational evidence are limitless. It’s tempting to assume that because one variable predicts another, the first must have caused the second. Not true. This interpretation is an error often committed by laypeople, college students, the news media, and sometimes even researchers themselves. Think about the correlations described earlier. Now, admit it: Didn’t you assume that exposure to TV violence causes aggression, that a college diploma brings financial reward, that optimism fosters health, that exercise prolongs life, and that shyness inhibits friendships? Regardless of how intuitive or accurate these conclusions may be, the cardinal rule of statistics is: Correlation does not prove causation.

It’s important to know and understand this rule. It does not mean that correlated variables are never causally related, only that the link may or may not be causal. Think again about our examples, and you’ll see there are other ways to interpret these correlations. Sure, it’s possible that media violence (X) triggers aggression (Y). But based solely on the observation that these two variables go hand in hand, it’s also possible that the causal arrow points in the opposite direction—that children who are aggressive (Y) are naturally drawn to violent TV shows (X). Or perhaps both variables—watching violent shows and aggressive behavior—are caused by a third factor (Z), such as the absence of involved parents at home.

Reconsider our other examples and you’ll further appreciate the point. Perhaps people become optimistic because they are healthy or are shy because they lack friends. As for the fact that college graduates earn more money than high-school graduates, being smart or coming from an upper-middle-class family (Z) may both propel a student through college (X) and lead to their financial success (Y). In a similar vein, maybe adults who exercise live longer because they also tend to smoke less, drink less, and eat healthier foods (see Figure 1.4).

**Experiments**
Correlation allows prediction, but to explain a relationship between variables, we need a more exacting method of research: the scientific experiment. In an experiment, the psychologist seeks to establish causal connections by actively controlling the variables in a situation and measuring the subject’s behavior. The factor an experimenter manipulates (the proposed cause) is called the independent variable, so named because it can be varied on its own, “independent” of any other factors. The behavior that is being measured (the proposed effect) is known as the dependent variable because it is said to “depend” on the experimental situation. If you were to test the hypothesis that exposure to TV violence causes aggression, TV violence would be the independent variable, and aggression would be the dependent variable.

The purpose of an experiment is to focus on a causal hypothesis by manipulating the independent variable, keeping other aspects of the situation constant, and observing behavior. A true experiment contains two essential sets of ingredients. The first is control over the independent variable and use of a comparison group. Second is the random assignment of participants to conditions. By means of these ingredients, any

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**FIGURE 1.4 Explaining Correlations**

There are three possible ways to explain the association between two variables, X and Y. Look at the examples above and consider possible alternatives (Z refers to extraneous variables). In 1998, the magazine *American Demographics* reported on a survey of ten thousand American adults which showed that the more educated people are, the less frequently they have sex. That same year, researchers surveyed adults in Norway and Sweden and found that the more time people spend on cell phones, the more headaches they suffer. Does a college degree dampen the sex life, and do cell phones cause headaches? Can you come up with other possible interpretations of these correlations?

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“No amount of experimentation can ever prove me right; a single experiment can prove me wrong.”

—ALBERT EINSTEIN

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**experiment**
A type of research in which the investigator varies some factors, keeps others constant, and measures the effects on randomly assigned participants.

**independent variable**
Any variable that the researcher manipulates in an experiment (the proposed cause).

**dependent variable**
A variable that is being measured in an experiment (the proposed effect).
CHAPTER 1  Introducing Psychology and Its Methods

FIGURE 1.5 Basic Model of an Experiment
To test the hypothesis that TV violence triggers aggression, researchers select a subset of the population, randomly assign these participants to an experimental (exposure) or control (no-exposure) group, and measure subsequent behavior.

control group
The condition of an experiment in which participants are not exposed to the independent variable.

random assignment
The procedure of assigning participants to conditions of an experiment in an arbitrary manner.

random assignment
random assignment
The procedure of assigning participants to conditions of an experiment in an arbitrary manner.

experimental group
Any condition of an experiment in which participants are exposed to an independent variable.

CONTROL AND COMPARISON
I heard a report on the radio recently that half of all couples who live together before marriage later get divorced. “Wow, that’s high,” I said to a friend. “I wonder why.” Then it hit me. “Wait a second. Isn’t there a 50 percent divorce rate in the United States?”

To evaluate the significance of any number, you have to ask the question “Compared to what?” In its most basic form, a typical experiment compares research participants who are exposed to the independent variable with others, similarly treated, who are not. Those who receive the treatment make up the experimental group; the others constitute the control group. To the extent that the two groups differ in behavior, the difference can then be attributed, with varying degrees of certainty, to the independent variable. The key is to vary one factor, keep other aspects of the situation constant, and measure the effect. To test the hypothesis that media violence triggers aggression, for example, researchers bring children, adolescents, or adults into the laboratory, show rock ‘em-sock ‘em films or video games to half of them (the others would watch nonviolent films and games or else nothing at all), and measure subsequent aggression in a laboratory or field setting (Anderson & Bushman, 2001; Wood et al., 1991).

The comparison between an experimental and a control group provides the building blocks for more complex experiments. This basic two-group design can be expanded on in three ways. The first is to create more than two levels of the independent variable. Instead of comparing the presence and absence of TV violence, for example, one might form three groups by varying the amount, or “dosage,” of exposure (high, medium, low). Second, researchers can manipulate more than one independent variable in the same experiment. For example, they might vary not only the amount of exposure but also the context in which the violence is portrayed (cartoons, films, sports, or video games). The separate and joint effects of these variables can then be evaluated. The third way to increase the complexity of an experiment is to use more than one dependent variable, or to measure the dependent variable on more than one occasion. In our example, aggression could be measured both before and after the exposure to violence.

RANDOM ASSIGNMENT
The second essential ingredient of an experiment is that participants be assigned to conditions in an arbitrary manner. Random assignment
ensures that everyone in a study has an equal chance of being put into an experimental or control group. If I were to show *Psycho* to children in one school and *Mary Poppins* to those in another school, it would later be impossible to know if observed differences in aggression were produced by this exposure or whether they reflect preexisting differences between the schools. Similarly, if I were to let the children pick their own condition (“Which show would you rather see?”), observed differences might mean that those who chose the violent show were more aggressive to begin with.

By flipping a coin to determine which children in a sample are in the experimental and control groups, a researcher can neutralize individual differences. Assuming that enough participants are recruited, the two conditions would contain roughly equal numbers of male and female children as well as rich and poor, active and passive, and bright and dull. Similarly, to evaluate the health benefits of exercise, we might recruit volunteers and assign half of them randomly to take part in an experimental aerobics program. Chances are that both the exercise and the no-exercise groups would then have an equal mixture of men, women, smokers, health-food eaters, couch potatoes, and so on. Then if exercisers turn out to be healthier, the reason would be clear.

**Literature Reviews**

Seeking to describe, predict, and explain psychological phenomena, researchers use a diverse assortment of investigative tools—including single case studies, large-scale surveys, naturalistic observations, correlational studies, and experiments in laboratory and field settings. Yet regardless of the method used, there is a humbling lesson in this scientific enterprise. It is that knowledge accumulates slowly, in increments, one small step at a time. There are no “critical” experiments, and no single study can literally “prove” a hypothesis.

There are exciting new discoveries destined to become research classics. But each raises questions, the most important being: Will a finding replicate? **Replication** is an essential property of science. It refers to the process of conducting a second, nearly identical study to see if the initial findings can be repeated. If the result does not replicate, the cautious scientist concludes that the findings may not be reliable enough to pursue further. If the result does replicate—in other words, if the result is consistent enough to stand the test of time—then attention shifts to a second important question, that of **generalizability**: Is a finding limited to a narrow set of conditions, or does it apply across a broad range of circumstances? Just how generalizable is the result? Suppose you found that media violence causes aggression. Would the result be the same if the study were conducted in another culture or if children of a different age group were used? What if participants were shown different materials or if aggression were measured in a different way? Once replication is achieved, the next step is to establish the boundaries of the phenomenon. As with some fine wines, good science takes time.

Science demands replication and generalizability, but it is often difficult to make sense of the growing bodies of evidence. One study may show that exposure to media violence causes aggression in children, but another study may produce contradictory or ambiguous results. Why the disparity? Sometimes many studies are needed before clear patterns begin to emerge. There are two ways to discern these patterns. One is to conduct a review of the research literature, noting the strengths or weaknesses of various studies, making comparisons, and arguing for certain conclusions. In contrast to the interpretive, somewhat subjective style of a review, the second method is to use a recently developed quantitative technique known as **meta-analysis**.

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**replication**
The process of repeating a study to see if the results are reliable enough to be duplicated.

**generalizability**
The extent to which a finding applies to a broad range of subject populations and circumstances.

**meta-analysis**
A set of statistical procedures used to review a body of evidence by combining the results of individual studies.
Meta-analysis is a set of statistical procedures that is used to review a body of evidence by combining the data and results from multiple studies (Cook et al., 2001; Hunt, 1997; Rosenthal & DiMatteo, 2001). By “meta-analyzing” a sample of studies the way researchers “analyze” individual participants, reviewers can draw precise conclusions concerning the strength and breadth of support for a hypothesis. Many of the conclusions drawn in this textbook were informed by the reviews and meta-analyses published by others.

To summarize, advances in psychological knowledge are made through primary research in the form of descriptive studies, correlational studies, and experiments. As the data from these efforts accumulate in the published literature, patterns begin to emerge. These patterns become revealed in reviews and statistical meta-analyses. The various tools of discovery discussed here are summarized in Table 1.3.

<table>
<thead>
<tr>
<th>Method</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive research</td>
<td>To describe the thoughts, feelings, and behaviors of an individual or group using case studies, surveys, and naturalistic observations</td>
</tr>
<tr>
<td>Correlational studies</td>
<td>To uncover links, or “correlations,” between variables so that one factor can be used to predict another</td>
</tr>
<tr>
<td>Experiments</td>
<td>To test hypotheses about cause and effect in order to establish that one factor can cause another</td>
</tr>
<tr>
<td>Literature reviews</td>
<td>To summarize an existing body of research in a narrative review or in a statistical meta-analysis of studies previously conducted</td>
</tr>
</tbody>
</table>

**ETHICAL CONSIDERATIONS**

All professions wrestle with ethical questions, and psychology is no exception. Regardless of whether a psychologist teaches for a living, administers tests, offers counseling and psychotherapy, conducts research, writes books, consults with the news media or experts in other areas, or testifies in the courts, ethical dilemmas abound (Koocher & Keith-Spiegel, 1998). For the scientists of psychology, questions arise most often concerning the use and treatment of research participants.

**Ethics Considerations in Human Research**

When I took introductory psychology in my first year of college, I signed up for all sorts of experiments. In one, other students and I were preparing to fill out questionnaires...
Introducing Psychology and Its Methods  CHAPTER 1

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decception
A research procedure used to mislead participants about the true purposes of a study.

ingformed consent
The ethical requirement that prospective participants receive enough information to permit them to decide freely whether to participate in a study.

when our experimenter—a young female graduate student—was mugged by an intruder, right there in front of us, in the classroom! Soon after the commotion subsided, a security officer walked in and asked us to describe what happened and to pick the culprit from a set of photographs. In fact, the “crime” had been staged, and we were unsuspecting participants in a study of eyewitness memory. Years later, I came to realize that this experiment was a classic. It was an awesome experience.

That same semester, I spent an hour trying to memorize one hundred strings of letters (I still see them in my dreams: PTVPS, PVV, TSSXXS), only to be tested afterward for whether I had discerned the rules that were used to generate these items (I didn’t even know there were rules). The session was harmless but boring. Then three years later, I heard more about the research (the task was designed to simulate the way people learn grammar, by mere exposure) and was so intrigued by it (people seem to “learn” the grammar without even realizing there is one) that I seized upon an opportunity to get involved by serving as an experimenter. That experience was my real introduction to psychology.

I was also in a third experiment I’ll never forget. I was given an IQ test containing SAT-like analogies and math questions and was told afterward that my score was very low, in the 25th percentile. I don’t remember exactly how bad I felt, but after I left and walked down the hall, I was approached by a student conducting a survey. Would I answer some questions? Not being in the mood, I said no. Suddenly my experimenter reappeared to tell me that there was no survey and that the feedback I was given earlier was false. The purpose was to see if having a positive or negative experience in one situation (some participants were told they scored high on the IQ test) influences whether people are then willing to help someone in an unrelated situation (the student with the survey).

My encounters as a psychology subject were, I think, quite typical. In most experiments, participants fill out questionnaires; work on learning, problem-solving, perception, or memory tasks; or interact socially with other people. Physiological functions may be recorded, responses may be made on a computer keyboard, or behavior may be videotaped. Some experiments are interesting and fun; others are tedious and relatively boring. Most of them are inoffensive. But sometimes participants are asked personal questions or are stressed, saddened, or put into a bad mood—or are deceived about the true purposes of the experiment. Witnessing a crime and being told I had failed an IQ test were temporarily upsetting experiences. Trying to memorize letter strings was not. In all cases, I was misled about what was being tested.

What ethical issues are raised by research involving human subjects, and how are these issues resolved? There are three specific concerns: the participant’s right to privacy, the possible harm or discomfort caused by experimental procedures, and the use of deception. In response to these concerns, researchers must follow guidelines established by professional organizations, university ethics committees, and government granting agencies. For example, the American Psychological Association (1992) urges its members to (1) tell prospective participants what they will encounter so they can give their informed consent, (2) instruct participants that they’re free to withdraw from the experiment at any time, (3) minimize all harm and discomfort, (4) keep the data obtained from participants confidential, and (5) if deception is necessary, “debrief” participants afterward by fully explaining the purposes and procedures of the study.

The principles contained in these guidelines are important, and all investigators are responsible for the well-being of those who take part in their research. Some psychologists argue that these rules should be followed without exception. Others point out that many important issues could not then be investigated. In practice, ethical decisions are seldom clear-cut. For example, informed consent is necessary, and everyone agrees that deception is undesirable, but it’s often impossible to test a
hypothetical on a fully informed participant. Think about my own experiences. Had I known in advance that I would witness a staged crime, had I known that I was supposed to look for patterns while memorizing letters, and had I known that the IQ test I took was phony, I would have behaved in ways that were not natural and spontaneous. As a matter of compromise, therefore, many researchers describe to participants the procedures that they may encounter but withhold complete disclosure of the key variables and hypothesis until later, when participants are debriefed.

Other types of judgment calls also must be made from time to time. For example, is it ethical to put participants under stress—perhaps by presenting impossible problems to solve, showing a pornographic film, sharing the negative results of a test they took, or leading them to think temporarily that they inflicted harm on another person? Is it ethical to study pain tolerance or to ask participants to recount a traumatic episode? When the polio vaccine was tested in 1954, two million children were selected for study, but many received a placebo (a dummy medication that contains no active ingredients) instead of the real vaccine. More recently, in the 1990s, AIDS researchers in a number of developing countries administered placebos to hundreds of HIV-infected pregnant women instead of AZT—an expensive drug that would have prevented these women from passing on the virus to their babies. Were these studies ethical? Similarly, is it ethical for psychologists testing a new remedy for anxiety or depression to randomly assign half the participants to a no-treatment control group? In making these kinds of decisions, researchers weigh the costs to the individual participants against the benefits to science and humanity. In weighing these outcomes, however, there is widespread disagreement among psychologists of differing values (Kimmel, 1991; Rosnow et al., 1993).

Ethics Considerations in Animal Research

When Charles Darwin (1859) introduced his theory of evolution in The Origin of Species, he not only revolutionized conceptions of human history but also set the stage for the use of animals in research. Human beings, said Darwin, are biologically related to other creatures on the planet. Hence, the study of animals has relevance for understanding people. Does it ever. Over the years, psychology has made great strides using animals to study the brain and nervous system, vision and other senses, learning, reasoning, social behavior, anxiety, stress, and other psychological disorders, aggression, addiction, spinal cord injury, the workings of the immune system, and the impact of various drugs. Mice, rats, rabbits, cats, dogs, apes, monkeys, and even birds, fish, insects, and sea slugs have all proved valuable in this endeavor.

There are three reasons for using animals in research: to learn more about certain kinds of animals, to evaluate the cross-species generality of the principles of behavior, and to examine variables that cannot ethically be imposed on human participants.

Is it ethical to experiment on animals? Many animal-rights activists say no—and are quite vocal in their opposition (Langley, 1989). To understand how psychologists respond to these charges, it helps to know what both sides stand for. Everyone, including those in the research community, consider themselves to be advocates for animal welfare and support the establishment of shelters for lost pets, inoculation programs, the prevention of cruelty to animals, and the protection of endangered species (Johnson, 1990). Indeed, researchers argue that although food deprivation, mild shock, drugs, and surgery are sometimes performed, allegations of mistreatment are exaggerated. Caroline Coile and Neil Miller (1984) analyzed 608 animal-based research articles published in the preceding five years and found that the charges were not supported in a single instance.

Psychologists and medical researchers defend their practices by pointing to the many ways in which their work has helped to improve the quality of human life and
arguing that it would be immoral not to use animals for our most serious problems (Miller, 1985). Animal studies were instrumental in the development of a rabies vaccine, in organ transplants, and in understanding diseases such as cancer and diabetes. Animal studies have contributed to the treatment of anxiety, depression, and other mental disorders, and they have shed light on what is currently known about neuromuscular disorders, Alzheimer’s disease, alcoholism, aggression, ulcers, and obesity. Indeed, recent animal research has played a pivotal role in helping us to understand the links between psychology and the immune system (Carroll & Overmier, 2001).

**Psychology Today**

- In what ways is psychology strongly influenced by biological perspectives?
- Why do researchers study people from different cultures and ethnic groups?

Before psychology became established in science, it was popularly associated with astrology, numerology, handwriting analysis, and psychic powers. To this day, the phenomena of “parapsychology” continue to fascinate people. Yet you are in no way influenced by the movements of planets and stars (I’m a Taurus and, yes, often I’m stubborn, but who isn’t?); your personality cannot be judged by the size of your nose, the bumps on your head, or the way you curve your S when you write; and nobody can predict the future by analyzing your dreams or reading your palm. The problem with these claims is that despite their widespread appeal (according to Gallup polls, more Americans believe in ESP than in evolution) and despite thousands of experiments, there is no convincing empirical support for these various claims (Marks, 1986).

Grounded in the older disciplines of philosophy, biology, and medicine, and firmly rooted in the conviction that mind and behavior can be studied only by using scientific methods, psychology has made enormous progress as a field of study. From the first subject to be tested in Wundt’s original Leipzig laboratory, to the first patient to lie on Freud’s couch, to the first psychologist hired to work in an applied setting, to the barrage of new discoveries concerning the links among mind, body, and health, psychology has come a long, long way.

Although psychologists study basic processes, psychology is also a responsive science, leading researchers to touch on some of the most important and socially sensitive topics of our generation. The similarities and differences between men and women; racial and ethnic diversity; sexuality; AIDS; abortion; adoption; terrorism; IQ testing; obesity and dieting; and the effects of Ritalin, Prozac, Viagra, and other drugs are among the topics now being addressed. If you’re interested in the possibility of a future career in psychology, refer to the list of major subfields (what psychologists do) and employment settings (where they do it) presented in Figure 1.6.

In recent years, psychology has grown by leaps and bounds. At the college level, psychology’s popularity is unprecedented. According to the U.S. Department of Education, it is currently the second largest college major, behind only business administration. There are more women in the field than ever before, more minorities, more articles being published, and more topics being studied. The American Psychological Association now has as members more than 155,000 researchers, educators, clinicians, consultants, and students—and contains 53 divisions, each dedicated to a particular area of specialization. Across the northern border, the Canadian Psychological Association was founded in 1939. In addition, a group of scientifically oriented psychologists recently established an organization dedicated solely to basic and applied research (APA and CPA also address the concerns of practicing clinical and...
This new organization, which was founded in 1988, is called the American Psychological Society, or APS. It has twelve thousand members. APA, CPA, and APS have Internet Web sites, where you can check for news updates on the latest advances in psychology.

**BIOLOGICAL PERSPECTIVES**

Increasingly, all branches of psychology are being influenced by two broad perspectives: biological and sociocultural. At the heart of a biological perspective is the notion that humans, like other species, have an evolutionary history that predisposes us to behave in certain adaptive ways to survive and reproduce. We’ll see in discussions of thought and language, intelligence, sexual attraction, adolescence, aggression, altruism, and various psychological disorders, that evolutionary psychology is a growing force and has a great deal to say about the possible innate and universal tendencies in human mind and behavior (Plotkin, 1998; Buss, 1999).

Related to this interest in evolution is an increasing interest in the study of behavioral genetics—a subfield that examines the effects of genes on behavior. Nobody disputes the claim that there is a genetic basis for height, weight, skin color, and other physical attributes. But can the same be said of our psychological makeup? Is musical talent an inherited trait? What about athletic ability, shyness, happiness, or the tendency to commit suicide? We’ll see in Chapter 8 that researchers try to estimate the contribution of genetic factors by looking at the similarities between pairs of individuals who vary in their genetic relatedness. In other chapters, we’ll also see that this method has been used to estimate the genetic bases of sexual orientation, infant temperament, intelligence, personality, and psychological disorders such as schizophrenia (Plomin et al., 2000; Carson et al., 1999).

A third important biological perspective is provided by a large and growing body of research in behavioral neuroscience, the study of the links between the brain and behavior. Triggered by recent breakthroughs in biomedical technology, which enable researchers to observe the living brain in action, this area is generating a great deal of excitement. Two related areas are also making important contributions. One is clinical neuroscience, which focuses on how abnormalities in the brain and nervous system can alter perceptions, thoughts, language, memory, emotions, and motivations and can trigger the onset of various psychological disorders (Yudofsky & Hales, 2002). The other related area is cognitive neuroscience, in which researchers record physical activity in different parts of the brain as a subject reads, speaks, looks at pictures, listens to music, or solves math problems. In this way, researchers are able to pinpoint regions and...
Cross-cultural research
A body of studies designed to compare and contrast people of different cultures.

For information on psychology in education, as a profession, and in the news, you can visit the Web sites of the American Psychological Association (http://www.apa.org) and the American Psychological Society (http://www.psychologicalscience.org).

Behavioral genetics
A subfield that examines the role of genetic factors on behavior.

Behavioral neuroscience
A subfield that studies the links among the brain, nervous system, and behavior.

Sociocultural perspectives
Just as evolutionary and biological perspectives are prominent today, so are sociocultural perspectives. Now that we have entered the twenty-first century, communication satellites, cell phones, and the Internet bring together people from vastly different cultures—and raise questions about the ways that we are all similar and different. Are there, psychologists ask, “universals” in human nature, ways in which everyone is fundamentally the same? In what ways are people from different parts of the world distinct from one another because of the regions and cultures in which they live?

Over the years, psychologists have tried to identify lawful patterns of behavior that are universally applicable to all members of the human species. People in general, we have been told, see better in daylight than in darkness, prefer reward to punishment, remember landmark events better than trivial ones, undergo an identity crisis in adolescence, strive to boost self-esteem, lash out at others when frustrated, and suffer depression after the loss of a loved one. Are these universal tendencies? Until recently, psychologists had studied only a small segment of the human population. All that has changed. Today, more and more psychologists do cross-cultural research, by which they compare people from different regions of the world who have lived very different lives (Berry et al., 2002).
cross-cultural similarities and differences are discussed throughout the text and are highlighted in chapter 11, “social and cultural groups.” in table 1.4, you’ll see a preview of the kinds of questions that psychologists ask and the chapters in which these questions are addressed.

in addition to comparing people from different parts of the world, psychologists also conduct multicultural research, the study of racial and ethnic groups within cultures. as in most countries, the populations of north america are heterogeneous and diverse—and are becoming more so with time. this diversity is an important fact of social life in all open societies, and it raises profound questions for psychologists in all areas of the discipline. are there racial and ethnic differences in intelligence-test scores? if so, what do these differences mean? how do immigrants torn between two cultures form a new identity, and what special problems do they face? why are racism and other forms of prejudice so pervasive and what can be done about them? what special problems do gays and lesbians face as a result of their minority status? these topics are discussed throughout the text.

**thinking like a psychologist about psychology and its methods**

psychology is a broad discipline that examines the biological roots of experience, internal cognitive and affective processes, the nature and nurture of human development, social and cultural influences, and the diagnosis and treatment of clinical disorders. psychology is also a dynamic discipline. new theories are always being proposed, and old ones supported, revised, and discarded; new research methods are developed, and old ones are refined. on an ongoing basis, psychology is also a responsive discipline that tackles problems posed by world events and in such areas as health, education, race relations, and law. finally, despite all the diversity and specialization, psychologists throughout the discipline value critical thinking and a commitment to scientific research methods as a mean of gaining knowledge about human behavior.

**multicultural research**

a body of studies designed to compare and contrast racial and ethnic minority groups within cultures.
Introducing Psychology and Its Methods

CHAPTER 1

IN TOMORROW’S WORLD, THE KEY TO SUCCESS IN LIFE WILL BE the same as it is today: understanding people. Psychology is a serious means of pursuing this understanding.

What Is Psychology?

Psychology can be defined as the scientific study of behavior and the mind.

HISTORICAL ROOTS

Psychology’s origins can be traced to ancient Greek philosophers and physicians. During the Renaissance, Descartes developed dualism, a theory that the mind is spiritual and the body physical. This theory implied that the mind could not be studied scientifically. Thomas Hobbes and others disagreed, arguing that thoughts and feelings are physical processes.

Modern experimental psychology began in 1879 when Wilhelm Wundt established his laboratory in Germany. Wundt used a method of introspection, in which trained observers described their reactions to stimuli. In the United States, William James wrote his classic Principles of Psychology, and in Vienna, Sigmund Freud developed psychoanalysis to examine the unconscious mind.

The emerging discipline faced a major controversy: Should psychologists speculate about the invisible mind, as Freud and Wundt did, or should they confine themselves to observable behavior? Behaviorism, as defined by John Watson, held that psychology should concentrate on what can be seen and measured. Studying the way organisms respond to stimuli, behaviorists such as B. F. Skinner refused to speculate about mental processes.

Behaviorism dominated American psychology from the 1920s through the 1960s. Then the focus shifted to cognition, the mental processes that intervene between a stimulus and response. The computer, which offers a model of the human mind, helped inspire this “cognitive revolution.” So did the child development theories of Jean Piaget and the linguistic theories of Noam Chomsky.

EXPANSION OF PSYCHOLOGY’S HORIZONS

Since its early days, psychology has expanded considerably. It now includes specialized areas of both basic research and applied research, it is more diversely represented, and it relies on sophisticated research methods.

The chapters of this textbook cover several broad areas of basic research. The biological perspective focuses on the links between the mind and body. The cognitive perspective considers whether human beings are generally competent in the way they learn, think, remember, and process information. The study of human development addresses changes from infancy through old age and tackles the nature–nurture debate. Social psychology considers the extent to which social situations overpower individuals. And clinical psychology deals with personality, disorders, treatment, and the question of whether people have the capacity for change.

Psychology is also a responsive science that has expanded in terms of its applications. Today, psychologists work in applied settings and use their theories and research to better understand such areas as health and medicine, education, business, law, sports, and current events.

A DIVERSITY OF PERSPECTIVES

Today there are more female, minority, and non-Western psychologists than in the past. This increased diversity within the professional ranks has strengthened psychology by providing new perspectives.

Scientific Methods

Connecting all strands of psychology is an emphasis on critical thinking and scientific methods.

THE RESEARCH PROCESS

Research is a multistep process that begins with a theory, an organized set of principles that describes, predicts, and explains an aspect of human behavior, and provides testable propositions known as
hypotheses and operational definitions of key variables. Investigators must then plan the study, collect data, analyze the results, and draw a conclusion. Psychological studies vary in their settings, their ways of measuring variables, and the types of conclusions the research is designed to reach.

**RESEARCH SETTINGS**

There are two types of research settings: laboratory research, valuable for its control and precision; and field research, conducted in real-world environments.

**PSYCHOLOGICAL MEASUREMENTS**

Self-reports are interviews or questionnaires in which people report on their own thoughts, feelings, or behavior. These are easy to administer but are sometimes misleading. The alternatives are direct behavioral observation and the archival research that uses records of past behavior such as medical files and public documents.

**RESEARCH DESIGNS**

No matter how the information is collected, researchers use statistics to analyze it and draw conclusions. The types of conclusions they reach depend on the research design.

There are three types of descriptive studies designed simply to describe a person, group, or phenomenon. Case studies collect detailed information about a particular person. Surveys use interviews or questionnaires to draw conclusions about an entire population. To make a survey as accurate as possible, researchers study a random sample, so that each individual in the group has an equal chance of being chosen. Epidemiology, the study of the distribution of illnesses in a population, is a particularly important form of survey research. The third type of descriptive study, naturalistic observation, involves the measurement of behavior in natural settings.

When description is not enough, researchers often employ correlational studies. A correlation is a statistical measure of the extent to which two factors are associated. In numerical terms, correlation coefficients range from +1 to −1 and can be shown on a scatterplot. Researchers use correlational studies to make predictions about one variable based on what they know about another variable. Correlation, however, does not prove causation.

To study causal links, researchers turn to the experiment, where the investigator manipulates an independent variable (the proposed cause) and measures a dependent variable (the proposed effect). Then the researcher compares the experimental group of participants to a control group that was not exposed to the independent variable. An effective experiment requires random assignment of participants, so that each participant has an equal chance of being in either group.

Finally, psychological research often includes reviews of the existing evidence. By summarizing the current state of knowledge, research reviews can help resolve the questions of replication (Would a new study produce the same results?) and generalizability (Is the finding applicable under other sets of conditions?). Various studies can be summarized through literature reviews and through meta-analysis, a set of statistical procedures for combining the results of individual studies.

**ETHICAL CONSIDERATIONS**

Like other professions, psychology faces ethical issues—questions, for example, about the use and treatment of research participants. For human participants, concerns include the subject’s right to privacy, the harm or discomfort that may be caused, and the use of deception. Research guidelines stress the need to obtain informed consent from participants, to let them know they can withdraw at any time, to minimize discomfort, to keep data confidential, and to debrief participants afterward. When the experimental participants are animals, researchers must treat them humanely and minimize their suffering.

**Psychology Today**

Because of the richness of psychological research and its many applications, there are more people in psychology today than ever before, and their work touches on many vital public policy topics.

**BIOLOGICAL PERSPECTIVES**

Triggered by advances in biomedical technology, biological perspectives are prominent. Evolutionary psychology considers possible ways in which evolutionary forces predispose us to behave in certain ways. Behavioral genetics examines the effects of genes on psychological makeup and behavior. Behavioral neuroscience examines the links between neural activity in the brain and behavior. Clinical neuroscience focuses on how abnormalities in the brain and nervous system can cause psychological disorders. And cognitive neuroscience examines the links between the brain and normal mental activities.

**SOCIOCULTURAL PERSPECTIVES**

Increasingly, psychologists are testing the universality of their principles in cross-cultural research all over the world. With increasing diversity in the populations in many countries, there is also an increase in multicultural research, studies of racial and ethnic groups within cultures.
4. Suppose you wanted to study school violence. Design three separate studies—one descriptive, one correlational, and one experimental—that would allow you to examine this issue. Would you use a case study, survey, or naturalistic observation for your descriptive study? What variables would you measure in your correlational study? What would be the independent and dependent variables in your experiment? What type of measurements would you collect in your studies? What sorts of conclusions about school violence would each study allow you to make?

5. Do you personally believe that research should use animal participants? What are the arguments for and against using animals as research participants?