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CHAPTER ONE

Psychology: The Evolution of a Science

A LOT WAS HAPPENING IN 1860. Abraham Lincoln had just been elected president, the Pony Express had just begun to deliver mail between Missouri and California, and a woman named Anne Kellogg had just given birth to a child who would one day grow up to invent the cornflake. But none of this mattered very much to William James, a bright, taciturn, 18-year-old who had no idea what to do with his life. He loved to paint and draw but worried that he wasn't talented enough to become a serious artist. He had enjoyed studying biology in school but doubted that a naturalist's salary would ever allow him to get married and have a family of his own. And so like many young people who are faced with difficult decisions about their futures, William abandoned his dreams and chose to do something in which he had little interest but of which his family heartily approved. Alas, within a few months of arriving at Harvard Medical School, his initial disinterest in medicine blossomed into a troubling lack of enthusiasm. With a bit of encouragement from the faculty, he put his medical studies on hold to join a biological expedition to the Amazon. When he returned to medical school, both his physical and mental health began to deteriorate. It was clear to everyone that William James was not the sort of person who should be put in charge of a scalpel and a bag of drugs.

James became so depressed that he was once again forced to leave medical school. He decided to travel around Europe, where he learned about a new science called *psychology* (from a combination of the Greek *psyche,* which means "soul," and *logos,* which means "to study"), which was just beginning to develop. As William read about psychology and talked with those who were developing it, he began to see that this new field was taking a modern, scientific approach to age-old questions about human nature—questions that had become painfully familiar to him during his personal search for meaning, but questions to which only poets and philosophers had ever before offered answers (Bjork, 1983; Simon, 1998). Excited about the new discipline, William returned to America and quickly finished his medical degree. But he never practiced medicine. Rather, he became a professor at Harvard University and devoted the rest of his life to psychology. His landmark book—*The Principles of Psychology*—is still widely read and remains one of the most influential books ever written on the subject (James, 1890). ■

Over the years, many young people, like this happy pair, have turned to travel as they considered their next step in life. Thankfully, for the young William James, his travels led him to psychology.

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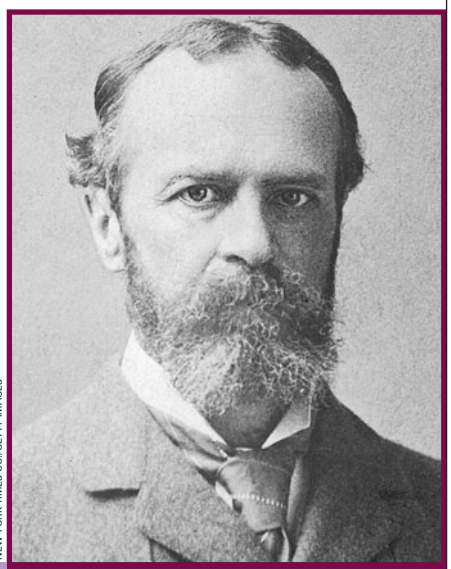

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William James (1842–1910) was excited by the new field of psychology, which allowed him to apply a scientific approach to age-old questions about the nature of human beings.

A lot has happened since then. Abraham Lincoln has become the face on a penny, the Pony Express has been replaced by a somewhat slower mail system, and the Kellogg Company sells about $9 billion worth of cornflakes every year. If William James (1842–1910) were alive today, he would be amazed by all of these things. But he would probably be even more amazed by the intellectual advances that have taken place in the science that he helped create. Indeed, the sophistication and diversity of modern psychology are nothing short of staggering: Psychologists today are exploring perception, memory, creativity, consciousness, love, anxiety, addictions, and more. They use state-of-the-art technologies to examine what happens in the brain when people feel anger, recall a past experience, undergo hypnosis, or take an intelligence test. They examine the impact of culture on individuals, the origins and uses of language, the ways in which groups form and dissolve, and the similarities and differences between people from different backgrounds. Their research advances the frontiers of basic knowledge and has practical applications as well—from new treatments for depression and anxiety to new systems that allow organizations to function more effectively.

Psychology is *the scientific study of* ***mind*** *and* ***behavior.*** The **mind** refers to our *private inner experience,* the ever-flowing stream of consciousness that is made of perceptions, thoughts, memories, and feelings. **Behavior** refers to *observable actions of human beings and nonhuman animals,* the things that we do in the world, by ourselves or with others. As you will see in the chapters to come, psychology is an attempt to use scientific methods to address fundamental questions about mind and behavior that have puzzled people for millennia. For example, psychologists would like to understand how the mind usually functions so effectively in the world, allowing us to accomplish tasks as mundane as tying our shoes, as extraordinary as sending astronauts to the moon, or as sublime as painting the *Mona Lisa*. Psychologists also want to understand why the mind occasionally functions so *in*effectively in the world, causing us to experience illusions in perception and gaps in memory. Let's take a look at some examples:

- *What are the bases of perceptions, thoughts, memories, and feelings, or our subjective sense of self?* For thousands of years, philosophers tried to understand how the objective, physical world of the body was related to the subjective, psychological world of the mind, and some philosophers even suggested that the pineal gland in the brain might function as the magic tunnel between these two worlds. Today, psychologists know that there is no magic tunnel, and no need for one, because all of our subjective experiences arise from the electrical and chemical activities of our brains.

What are the bases of perceptions, thoughts, memories, and feelings, or our subjective sense of self?

As you will see throughout this book, some of the most exciting developments in psychological research focus on how our perceptions, thoughts, memories, and feelings are related to activity in the brain. Psychologists and neuroscientists are using new technologies to explore this relationship in ways that would have seemed like science fiction only 20 years ago. For example, the technique known as *functional magnetic resonance imaging,* or fMRI, allows scientists to "scan" a living brain and see which parts are active when a person reads a word, sees a face, learns a new skill, or remembers a personal experience. What William James could only ponder, modern psychologists can observe.

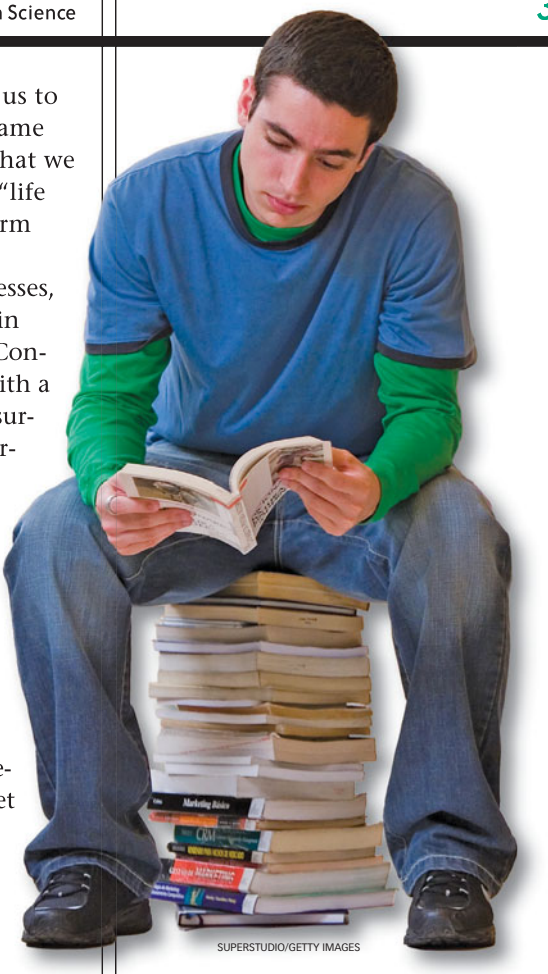
- *How does the mind usually allow us to function effectively in the world?* Scientists sometimes say that form follows function; that is, if we want to understand *how* something works (e.g., an engine or a thermometer), we need to know what it is working *for* (e.g., powering vehicles or measuring temperature). Psychological processes are said to be *adaptive,* which means that they promote the welfare and reproduction of organisms that engage in those processes.

For instance, perception allows us to recognize our families, see predators before they see us, and avoid stumbling into oncoming traffic. Language allows us

psychology The scientific study of mind and behavior.

mind Our private inner experience of perceptions, thoughts, memories, and feelings.

behavior Observable actions of human beings and nonhuman animals.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to organize our thoughts and communicate them to others, which enables us to form social groups and cooperate. Memory allows us to avoid solving the same problems over again every time we encounter them and to keep in mind what we are doing and why. Emotions allow us to react quickly to events that have "life or death" significance, and they enable us to form strong social bonds. The list goes on and on.

How does the mind usually allow us to function effectively in the world?

Given the adaptiveness of psychological processes, it is not surprising that people with deficiencies in those processes often have a pretty tough time. Consider Elliot, a middle-aged husband and father with a good job, whose life was forever changed when surgeons discovered a tumor in the middle of his brain (Damasio, 1994). The surgeons were able to remove the tumor and save his life, but as time went on, Elliot started having trouble making decisions—and the decisions he did make were increasingly bad. He couldn't prioritize tasks at work because he couldn't decide what to do first, and when he did, he got it wrong. Eventually he was fired, so he pursued a series of risky business ventures—all of which failed, and he lost his life's savings. His wife divorced him, he married again, and his second wife divorced him. too. So what ruined Elliot's life? Elliot's brain had been damaged in a way that left him no longer able to experience emotions. For example, Elliot didn't experience anxiety when he poured his entire bank account into a foolish business venture, he didn't experience any sorrow when his wives left him, and he didn't experience any regret or anger when his boss showed him the door. Most of us have wished from time to time that we could be as stoic and unflappable as that; after all, who needs anxiety, sorrow, regret, and anger? The answer is that we all do. Emotions are adaptive because they function as signals that tell us when we are putting ourselves in harm's way. If you felt no anxiety when you thought about taking an upcoming exam, about borrowing your friend's car without permission, or about cheating on your taxes, you would probably make a string of poor decisions that would leave you without a degree and without a friend, except perhaps for your cellmate. Elliot didn't have those feelings, and he paid a big price for it.

- *Why does the mind occasionally function so ineffectively in the world?* The mind is an amazing machine that can do a great many things quickly. We can drive a car while talking to a passenger while recognizing the street address while remembering the name of the song that just came on the radio. But like all machines, the mind often trades accuracy for speed and versatility. This can produce "bugs" in the system, such as when a doughnut-making machine occasionally spews out gobs of gooey mush rather than dozens of delicious doughnuts. Our mental life is just as susceptible to *mindbugs,* or occasional malfunctions in our otherwise-efficient mental processing. One of the most fascinating aspects of psychology is that we are *all* prone to a variety of errors and illusions. Indeed, if thoughts, feelings, and actions were error free, then human behavior would be orderly, predictable, and dull, which it clearly is not. Rather, it is endlessly surprising, and its surprises often derive from our ability to do precisely the wrong thing at the wrong time. Consider a few examples from diaries of people who took part in a study concerning mindbugs in everyday life (Reason & Mycielska, 1982, pp. 70–73):

Why does the mind occasionally function so ineffectively in the world?

  - *I meant to get my car out, but as I passed the back porch on my way to the garage, I stopped to put on my boots and gardening jacket as if to work in the yard.*
  - *I put some money into a machine to get a stamp. When the stamp appeared, I took it and said, "Thank you."*
  - *On leaving the room to go to the kitchen, I turned the light off, although several people were there.*

If these lapses seem amusing, it is because, in fact, they are. But they are also potentially important as clues to human nature. For example, notice that the person who bought a stamp said, "Thank you," to the machine and not, "How do I find the subway?" In other words, the person did not just do *any* wrong thing; rather, he did something that would have been perfectly right in a real social interaction. As each of these examples suggest, people often operate on "autopilot," or behave automatically, relying on well-learned habits that they execute without really thinking. When we are not actively focused on what we are saying or doing, these habits may be triggered inappropriately. William James thought that the influence of habit could help explain the seemingly bizarre actions of "absentminded" people: "Very absent-minded persons," he wrote in *The Principles of Psychology,* "on going into their bedroom to dress for dinner have been known to take off one garment after another and finally get into bed."

James understood that the mind's mistakes are as instructive as they are intriguing, and modern psychology has found it quite useful to study such mindbugs. Cars that are whole and unbroken cruise along nicely while leaving no clue about how they do their jobs. It is only when they break down that we learn about their engines, water pumps, and other fine pieces and processes that normally work together to produce the ride. In the same way, understanding lapses, errors, mistakes, and the occasionally buggy nature of human behavior provides a vantage point for understanding the normal operation of mental life and behavior. The story of Elliot, whose behavior broke down after he had brain surgery, is an example that highlights the role that emotions play in guiding normal judgment and behavior.

Psychology is exciting because it addresses fundamental questions about human experience and behavior, and the three questions we've just considered are merely the tip of the iceberg. Think of this book as a guide to exploring the rest of the iceberg. But before we don our parkas and grab our pick axes, we need to understand how the iceberg got here in the first place. To understand psychology in the 21st century, we need to become familiar with the psychology of the past.

Psychology's Roots: The Path to a Science of Mind

When the young William James interrupted his medical studies to travel in Europe during the late 1860s, he wanted to learn about human nature. But he confronted a very different situation than a similarly curious student would confront today, largely because psychology did not yet exist as an independent field of study. As James cheekily wrote, "The first lecture in psychology that I ever heard was the first I ever gave." Of course, that doesn't mean no one had ever thought about human nature before. For 2,000 years, philosophers had pondered such questions.

Psychology's Ancestors: The Great Philosophers

The desire to understand ourselves is not new. Greek thinkers such as Plato (428 BC–347 BC) and Aristotle (384 BC–322 BC) were among the first to struggle with fundamental questions about how the mind works (Robinson, 1995). For example, are cognitive abilities and knowledge inborn, or are they acquired only through experience? Plato argued in favor of **nativism**, which maintains that *certain kinds of knowledge are innate or inborn.* Children in every culture figure out early on that sounds can have meanings that can be arranged into words, which then can be arranged into sentences. Is the propensity to learn language "hardwired"—something that children are born with—or does the ability to learn language depend on the child's experience? Aristotle believed that the child's mind was

● **What fundamental question has puzzled philosophers ever since humans began thinking about behavior?**

nativism The philosophical view that certain kinds of knowledge are innate or inborn.

philosophical empiricism The philosophical view that all knowledge is acquired through experience.

phrenology A now defunct theory that specific mental abilities and characteristics, ranging from memory to the capacity for happiness, are localized in specific regions of the brain.

a *"tabula rasa"* (a blank slate) on which experiences were written, and he argued for **philosophical empiricism**, which holds that *all knowledge is acquired through experience.*

Although few modern psychologists believe that nativism or empiricism is entirely correct, the issue of just how much "nature" and "nurture" explain any given behavior is still a matter of controversy. In some ways, it is quite amazing that ancient philosophers were able to articulate so many of the important questions in psychology and offer many excellent insights into their answers without any access to scientific evidence. Their ideas came from personal observations, intuition, and speculation. Unfortunately, their approach provided no means of settling disputes, such as the nativism-empiricism debate, because they had no way of testing their theories. As you will see in Chapter 2, the ability to test a theory is the cornerstone of the scientific approach and the basis for reaching conclusions in modern psychology.

GEO MARTINEZ/FEATURE PICS

How do young children learn about the world? Plato believed that certain kinds of knowledge are innate, whereas Aristotle believed that the mind is a blank slate on which experiences are written.

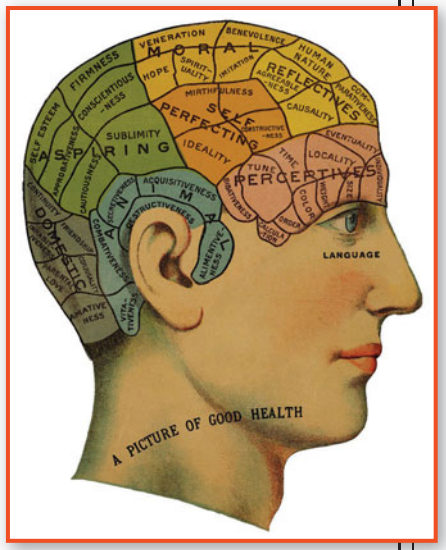
From the Brain to the Mind: The French Connection

We all know that the brain and the body are physical objects that we can see and touch and that the subjective contents of our minds—our perceptions, thoughts, and feelings—are not. The French philosopher René Descartes (1596–1650) argued that body and mind are fundamentally different things—that the body is made of a material substance, whereas the mind (or soul) is made of an immaterial or spiritual substance. But if the mind and the body are different things made of different substances, then how do they interact? This is the problem of *dualism,* or how mental activity can be reconciled and coordinated with physical behavior.

Other philosophers, such as the British philosopher Thomas Hobbes (1588–1679), argued that the mind and body aren't different things at all; rather, the mind *is* what the brain *does*. From this perspective, looking for a place in the brain where the mind meets the body is like looking for the place in a television where the picture meets the flat panel display.

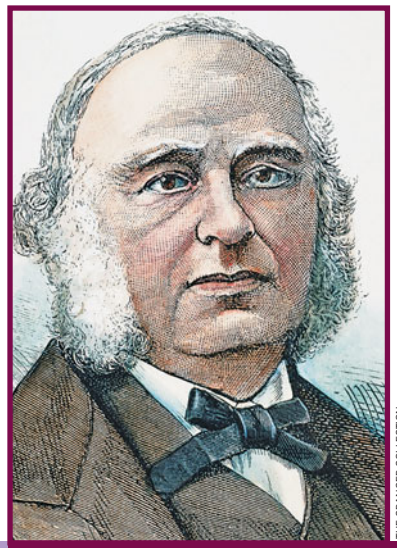
The French physician Franz Joseph Gall (1758–1828) also thought that brains and minds were linked. He examined the brains of animals and of people who had died of disease, or as healthy adults, or as children, and observed that mental ability often increases with larger brain size and decreases with damage to the brain. These aspects of Gall's findings were generally accepted (and the part about brain damage still is today). But Gall went far beyond his evidence to develop a psychological theory known as **phrenology,** which held that *specific mental abilities and characteristics, ranging from memory to the capacity for happiness, are localized in specific regions of the brain* (**FIGURE 1.1**). The idea that different parts of the brain are specialized for specific psychological functions turned out to be right; as you'll learn later in the book, a part of the brain called the hippocampus is intimately involved in memory, just as a structure called the amygdala is intimately involved in fear. But phrenology took this idea to an absurd extreme. Gall asserted that the size of bumps or indentations on the skull reflected the size of the brain regions beneath them and that by feeling those bumps, one could tell whether a person was friendly, cautious, assertive, idealistic, and so on. What Gall didn't realize was that bumps on the skull do not necessarily reveal anything about the shape of the brain underneath.

Phrenology made for a nice parlor game and gave young people a good excuse for touching each other, but in the end it amounted to a series of strong claims based on weak evidence and was quickly discredited (Fancher, 1979).



MARY EVANS PICTURE LIBRARY/THE IMAGE WORKS

FIGURE 1.1 Phrenology *Francis Gall (1758–1828) developed a theory called phrenology, which suggested that psychological capacities (e.g., the capacity for friendship) and traits (e.g., cautiousness and mirth) were located in particular parts of the brain. The more of these capacities and traits a person had, the larger the corresponding bumps on the skull.*



THE GRANGER COLLECTION

Surgeon Paul Broca (1824–1880) worked with a brain-damaged person who could comprehend but not produce spoken language. Broca suggested that the mind is grounded in the material processes of the brain.

While Gall was busy playing bumpologist, other French scientists were beginning to link the brain and the mind in a more convincing manner. Biologists began to conduct experiments in which they surgically removed specific parts of the brain from dogs, birds, and other animals and found (not surprisingly!) that their actions and movements differed from those of animals with intact brains. Although no one conducted similar experiments on humans, clues were emerging on that front as well. The surgeon Paul Broca (1825–1880) worked with a patient who had suffered damage to a small part of the left side of the brain (now known as Broca's area). The patient was virtually unable to speak and could utter only the single syllable "tan." Yet the patient understood everything that was said to him and was able to communicate using gestures. Broca had the crucial insight that damage to a specific part of the brain impaired a specific mental function, clearly demonstrating that the brain and mind are closely linked. This was important in the 19th century because at that time many people accepted Descartes' idea that the mind is separate from, but interacts with, the brain and the body. These studies were beginning to demonstrate that the mind is grounded in a material substance; namely, the brain. Their work jump-started the scientific investigation of mental processes.

How did work involving patients with brain damage help demonstrate the mind-brain connection?

From Physiology to Psychology: A New Science Is Born

In the middle of the 19th century, psychology benefited from the work of German scientists who were trained in the field of **physiology**, which is *the study of biological processes, especially in the human body.* Physiologists had developed methods that allowed them to measure such things as the speed of nerve impulses, and some of them had begun to use these methods to measure mental abilities. William James was drawn to the work of two such physiologists: Hermann von Helmholtz (1821–1894) and Wilhelm Wundt (1832–1920). "It seems to me that perhaps the time has come for psychology to begin to be a science," wrote James in a letter written in 1867 during his visit to Berlin. "Helmholtz and a man called Wundt at Heidelberg are working at it."

The first of these men, Helmholtz, had developed a method for measuring the speed of nerve impulses in a frog's leg, a technique that he then adapted to the study of human beings. Helmholtz trained participants to respond when he applied a **stimulus**—*sensory input from the environment*—to different parts of the leg, and recorded his participants' **reaction time**, or *the amount of time taken to respond to a specific stimulus*. Helmholtz found that people generally took longer to respond when their toe was stimulated than when their thigh was stimulated, and the difference between these reaction times allowed him to estimate how long it took a nerve impulse to travel to the brain. These results were astonishing to 19th-century scientists because at that time just about everyone thought that mental processes occurred instantaneously. Helmholtz showed that this wasn't true; in fact, the neurological processes underlying mental events are not instantaneous, just very fast—so fast that no one before Helmholtz had been able to measure their speed.

Although Helmholtz's contributions were important, historians generally credit the official emergence of psychology to Helmholtz's research assistant, Wilhelm Wundt (Rieber, 1980). In 1867, Wundt taught what was probably the first university-level course in physiological psychology. A decade later, Wundt opened the first university laboratory ever to be exclusively devoted to psychological studies, and this event marked the official birth of psychology as an independent field of study. The new lab was full of graduate students carrying out research on topics assigned by Wundt, and it soon attracted young scholars from all over the world who were eager to learn about the new science that Wundt had developed.

Wundt believed that scientific psychology should focus on analyzing **consciousness**, *a person's subjective experience of the world and the mind.* Consciousness encompasses a broad range of subjective experiences. We may be conscious of sights, sounds, tastes, smells, bodily sensations, thoughts, or feelings.

physiology The study of biological processes, especially in the human body.

stimulus Sensory input from the environment.

reaction time The amount of time taken to respond to a specific stimulus.

consciousness A person's subjective experience of the world and the mind.

As Wundt tried to figure out a way to study consciousness scientifically, he noted that chemists try to understand the structure of matter by breaking down natural substances into basic elements. So he and his students adopted an approach called **structuralism**, or *the analysis of the basic elements that constitute the mind.* This approach involved breaking consciousness down into elemental sensations and feelings. Some of Wundt's studies involved **introspection**, which involves *the subjective observation of one's own experience.* In these studies, observers would be presented with a stimulus and asked to report their own introspections, or sensory experience.

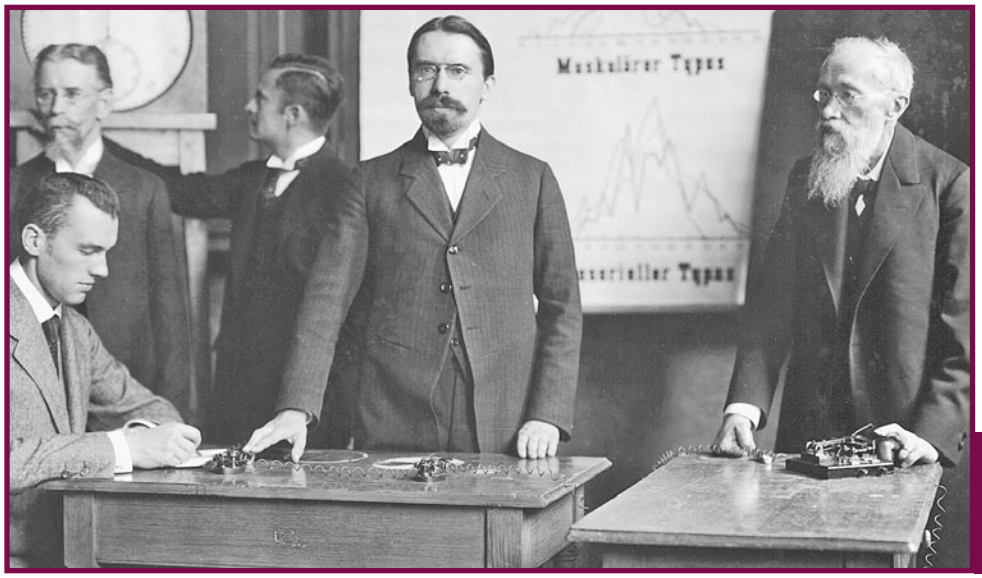
structuralism The analysis of the basic elements that constitute the mind.

introspection The subjective observation of one's own experience.

Wundt also tried to provide objective measurements of conscious processes by using reaction time techniques similar to those first developed by Helmholtz. His research participants were instructed to press a button as soon as a tone sounded. Some participants were told to concentrate on perceiving the tone before pressing the button, whereas others were told to concentrate only on pressing the button. Those people who concentrated on the tone responded about one tenth of a second more slowly than those told to concentrate only on pressing the button. Wundt reasoned that both fast and slow participants had to register the tone in consciousness (perception), but only the slower participants had to also interpret the significance of the tone. The faster research participants, focusing only on the response they were to make, could respond automatically to the tone because they didn't have to engage in the additional step of interpretation (Fancher, 1979). This type of experimentation broke new ground by showing that psychologists could use scientific techniques to disentangle even subtle conscious processes. In fact, as you'll see in later chapters, reaction time procedures have proven extremely useful in modern research.

How did the work of chemists influence early psychology?

The pioneering efforts of Wundt's laboratory launched psychology as an independent science and profoundly influenced the field for the remainder of the 19th century. Many psychologists journeyed to Leipzig to study with Wundt. Among the most eminent was the British-born Edward Titchener (1867–1927), who studied with Wundt and then came to the United States and set up a psychology laboratory at Cornell University (where, if you'd like to see it, his brain is still on display in the psychology department). Titchener brought some parts of Wundt's approach to America, but whereas Wundt emphasized the relationship between elements of consciousness, Titchener focused on identifying the basic elements themselves. Titchener put forward a list of more than 44,000 elemental qualities of conscious experience, most of them visual (32,820) or auditory (11,600) (Schultz & Schultz, 1987).



ARCHIVES OF THE HISTORY OF AMERICAN PSYCHOLOGY

Wilhelm Wundt (1832–1920), far right, founded the first laboratory devoted exclusively to psychology at the University of Leipzig in Germany.

The influence of the structuralist approach gradually faded, due mostly to the introspective method. Science requires replicable observations; we could never determine the structure of DNA or the life span of a dust mite if every scientist who looked through a microscope saw something different. Alas, even trained observers provided conflicting introspections about their conscious experiences ("I see a cloud that looks like a duck"—"No, *I* think that cloud looks like a horse"), thus making it difficult for different psychologists to agree on the basic elements of conscious experience. Indeed, some psychologists had doubts about whether it was even possible to identify such elements through introspection alone. One of the most prominent skeptics was someone you've already met—a young man with a bad attitude and a useless medical degree—William James.

James and the Functional Approach

By the time James returned from his European tour, he was inspired by the idea of approaching psychological issues from a scientific perspective. He received a teaching appointment at Harvard (primarily because the president of the university was a neighbor and family friend) and taught the first course at an American university to draw on the new experimental psychology developed by Wundt and his German followers (Schultz & Schultz, 1987). These courses and experiments led James to write his masterpiece, *The Principles of Psychology* (James, 1890).

James disagreed with Wundt's claim that consciousness could be broken down into separate elements. James believed that trying to isolate and analyze a particular moment of consciousness (as the structuralists did) distorted the essential nature of consciousness. Consciousness, he argued, was more like a flowing stream than a bundle of separate elements. So James decided to approach psychology from a different perspective entirely, and he developed an approach known as **functionalism:** *the study of the purpose mental processes serve in enabling people to adapt to their environment.* In contrast to structuralism, which examined the structure of mental processes, functionalism set out to understand the functions those mental processes served. (See the Real World box for some strategies to enhance one of those functions—learning.)

James's thinking was inspired by the ideas in Charles Darwin's (1809–1882) recently published book on biological evolution, *The Origin of Species* (1859). Darwin proposed the principle of **natural selection**, which states that *the features of an organism that help it survive and reproduce are more likely than other features to be passed on to subsequent generations*. From this perspective, James reasoned, mental abilities must have evolved because they were adaptive—that is, because they helped people solve problems and increased their chances of survival. Like other animals, people have always needed to avoid predators, locate food, build shelters, and attract mates. Applying Darwin's principle of natural selection, James (1890) reasoned that consciousness must serve an important biological function and the task for psychologists was to understand what those functions are. Wundt and the other structuralists worked in laboratories, and James felt that such work was limited in its ability to tell us how consciousness functioned in the natural environment. Wundt, in turn, felt that James did not focus enough on new findings from the laboratory that he and the structuralists had begun to produce. Commenting on *The Principles of Psychology,* Wundt conceded that James was a topflight writer but disapproved of his approach: "It is literature, it is beautiful, but it is not psychology" (Bjork, 1983, p. 12).

● How does functionalism relate to Darwin's theory of natural selection?

The rest of the world did not agree, and James's functionalist psychology quickly gained followers, especially in North America, where Darwin's ideas were influencing many thinkers.

functionalism The study of the purpose mental processes serve in enabling people to adapt to their environment.

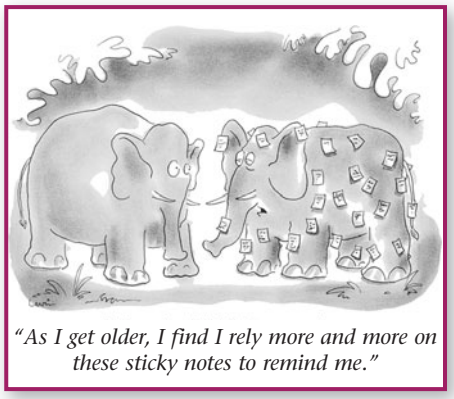
natural selection Charles Darwin's theory that the features of an organism that help it survive and reproduce are more likely than other features to be passed on to subsequent generations.

[THE REAL WORLD]

Improving Study Skills

Psychologists have progressed a great deal in understanding how we remember and learn. We'll explore the science of memory and learning in Chapters 5 and 6, but here we focus on the practical implications of psychological research for everyday life: how you can use psychology to improve your study skills. Such knowledge should help you perform your best in this course and others, but perhaps more importantly, it can help prepare you for challenges after graduation. With the rapid pace of technological change in our society, learning and memory skills are more important than ever. Experts estimate that the knowledge and skills required for success in a job will change completely every 3 to 7 years during an individual's career (Herrmann, Raybeck, & Gruneberg, 2002). Enhancing your learning and memory skills now should pay off for you later in life in ways we can't even yet predict.

Psychologists have focused on mental strategies that can enhance your ability to *acquire* information, to *retain* it over time, and to *retrieve* what you have acquired and retained. Let's begin with the process of acquiring information—that is, transforming what you see and hear into an enduring memory. Our minds don't work like video cameras, passively recording everything that happens around us. To acquire information effectively, you need to actively manipulate it. A particularly effective strategy is called *spaced rehearsal,* where you repeat information to yourself at increasingly long intervals. For example, suppose that you want to learn the name of a person you've just met named Eric. Repeat the name to yourself right away, wait a few seconds and think of it again, wait for a bit longer (maybe 30 seconds) and bring the name to mind once more, and then rehearse the name again after a minute and once more after 2 or 3 minutes. Studies show that this type of rehearsal improves long-term learning more than rehearsing the name without any spacing between rehearsals (Landauer & Bjork, 1978). You can apply this technique to names, dates, definitions, and many other kinds of information, including concepts presented in this textbook.



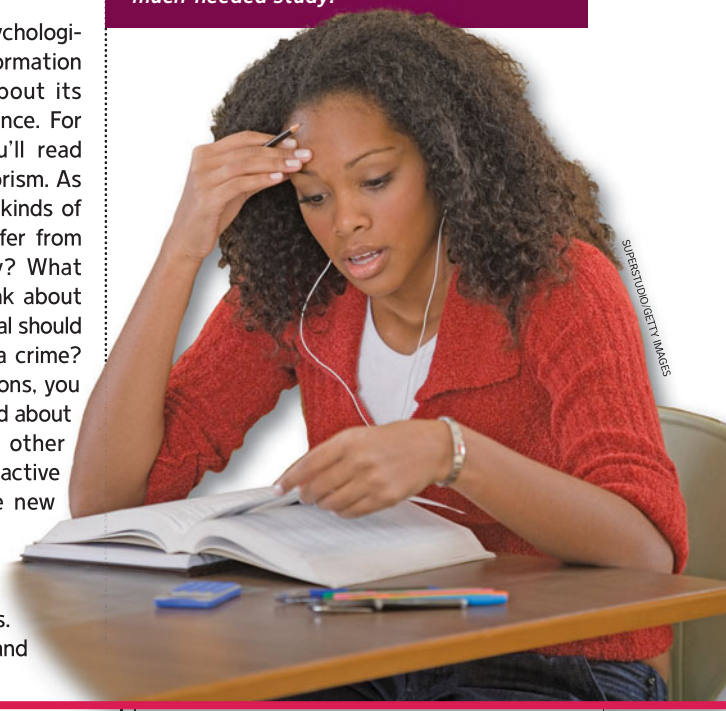
ARNIE LEVIN/CARTOONBANK.COM

"As I get older, I find I rely more and more on these sticky notes to remind me."

Another important lesson from psychological research is that we acquire information most effectively when we think about its meaning and reflect on its significance. For example, later in this chapter you'll read about Skinner's approach to behaviorism. As you read, ask yourself the following kinds of questions: How did behaviorism differ from previous approaches in psychology? What would a behaviorist like Skinner think about whether a mentally disturbed individual should be held responsible for committing a crime? In attempting to answer such questions, you will need to review what you've learned about behaviorism and then relate it to other things you already know about. This active review will help you remember the new information.

Another tip is to take some of the load off your memory by developing effective note-taking and outlining skills. Students often scribble down vague and fragmentary notes during lectures, figuring that the notes will be good enough to jog memory later. But when the time comes to study, the notes are no longer clear. Realize that you can't write down everything an instructor says, and try to focus on making detailed notes about the main ideas, facts, and people mentioned in the lecture. Then, after the lecture, organize your notes into an outline that clearly highlights the major concepts. The act of organizing an outline will force you to reflect on the information in a way that promotes retention and will also provide you with a helpful study guide to promote self-testing and review.

Anxious feelings about an upcoming exam may be unpleasant, but as you've probably experienced yourself, they can motivate much-needed study.



SUPERSTUDIO/GETTY IMAGES

The stage was set for functionalism to develop as a major school of psychological thought in North America. Psychology departments that embraced a functionalist approach started to spring up at many major American universities, and in a struggle for survival that would have made Darwin proud, functionalism became more influential than structuralism had ever been. By the time Wundt and Titchener died in the 1920s, functionalism was the dominant approach to psychology in North America.

summary quiz [1.1]

1. The notion that all knowledge is acquired through experience was proposed by
   a. Aristotle.
   b. Plato.
   c. Descartes.
   d. Hobbes.

2. Methods for measuring reaction time were first developed by
   a. Gall.
   b. Helmholtz.
   c. Wundt.
   d. Titchener.

3. The analysis of the basic elements that constitute the mind is called
   a. philosophical empiricism.
   b. phrenology.
   c. introspection.
   d. structuralism.

4. The study of how mental processes help people adapt to their environment is called
   a. nativism.
   b. structuralism.
   c. functionalism.
   d. natural selection.

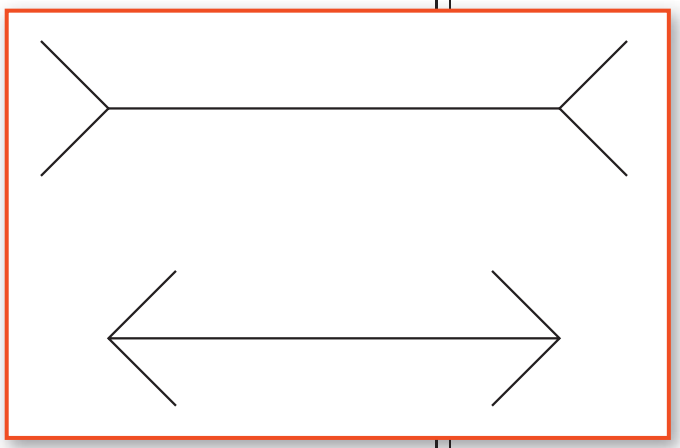


FIGURE 1.2
The Mueller-Lyer Line Illusion
Although they do not appear to be, these two horizontal lines are actually the same length. The Gestalt psychologists used illusions like this to show how the perception of a whole object or scene can influence judgments about its individual elements.

Errors and Illusions Reveal Psychology

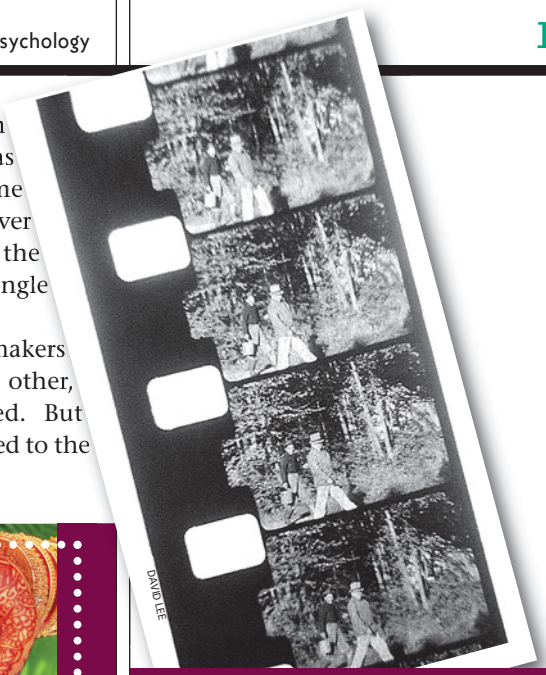
At about the same time that some psychologists were developing structuralism and functionalism, other psychologists were beginning to think about how illusions and disorders might illuminate psychological functioning. They began to realize that one can often understand how something works by examining how it breaks. A careful examination of some mindbugs led to a clearer understanding of human mental functioning.

Illusions of Movement and the Birth of Gestalt Psychology

Magicians and artists could not earn a living unless people were susceptible to **illusions**—that is, *errors of perception, memory, or judgment in which subjective experience differs from objective reality.* For example, if you measure the dark horizontal lines shown in FIGURE 1.2 with a ruler, you'll see that they are of equal length. And yet, for most of us, the top line appears longer than the bottom one. As you'll learn in Chapter 4, this is because the surrounding vertical lines influence your perception of the horizontal lines. A similar visual illusion fired the imagination of a German psychologist named Max Wertheimer (1880–1943), who was enjoying a train ride during his vacation when he had a sudden insight

into the nature of visual perception. In Wertheimer's illusion, a person was shown two lines that flashed quickly on a screen, one after the other. One light was flashed through a vertical slit, the other through a diagonal slit. When the time between two flashes was relatively long (one fifth of a second or more), an observer would see two lights flashing in alternation. But when Wertheimer reduced the time between flashes to around one twentieth of a second, observers saw a single flash of light moving back and forth (Fancher, 1979; Sarris, 1989).

Creating the illusion of motion was not new. Turn-of-the-century moviemakers already understood that quickly flashing a series of still images, one after the other, could fool people into perceiving motion where none actually existed. But Wertheimer's *interpretation* of this illusion was the novel element that contributed to the



Max Wertheimer's (1880–1943) insights about the perception of motion offered a scientific explanation of why we see movement when viewing a series of rapidly flashed still pictures, a method used by moviemakers in the early 1900s.

Culture & Community

Why Is It That Most of Us, but Not All of Us, See the Top Line in Figure 1.2 as Longer Than the Bottom Line?

In the classic study, two groups of people classified culturally as European and non-European were asked to evaluate the length of the Mueller-Lyer lines (Segall, Campbell, & Herskovits, 1963). Europeans came to the wrong conclusion that the lines are of different lengths considerably more times than non-Europeans. The authors of the study inferred that people living in cities built of primarily rectangular shapes, as in European cities, see acute and obtuse angles drawn on paper as representative of three-dimensional space. The non-Europeans in this study, primarily from rural hunting and gathering groups from southern Africa, did not make this mental leap, and so were more likely to see the lines as they truly are: of the same length.

The rectangular architecture so prominent in European cities such as London appears to influence how Europeans perceive lines and space, compared with non-Europeans such as rural Africans.

illusions Errors of perception, memory, or judgment in which subjective experience differs from objective reality.

growth of psychology (Benjamin, 1988; Steinman, Pizlo, & Pizlo, 2000). He reasoned that the perceived motion could not be explained in terms of the separate elements that cause the illusion (the two flashing lights) but instead that the moving flash of light is perceived as a *whole* rather than as the sum of its two parts. This unified whole, which in German is called *Gestalt,* makes up the perceptual experience. Wertheimer's interpretation of the illusion led to the development of **Gestalt psychology**, *a psychological approach that emphasizes that we often perceive the whole rather than the sum of the parts.*

● How did the earliest movies influence Gestalt psychology?

In other words, the mind imposes organization on what it perceives, so people don't see what the experimenter actually shows them (two separate lights); instead, they see the elements as a unified whole (one moving light). This analysis provides an excellent illustration of how illusions can offer clues about the basic principles of the mind.

The Gestaltists' claim was diametrically opposed to the structuralists' claim that experience can be broken down into separate elements. Although Gestalt psychology no longer exists today as a distinct school of thought, its basic claims have influenced the modern study of object perception (as you'll see in Chapter 4) as well as social perception (as you'll see in Chapter 16). Indeed, the notion that the mind imposes structure and organization remains one of modern psychology's most widely accepted principles.

Mental Disorders and Multiple Selves

While the Gestalt psychologists were discovering that illusions in visual perception can help us understand how the eye and the brain normally work so well, other psychologists were discovering how the bizarre behaviors of patients with psychological disorders could shed light on the workings of the ordinary mind. For example, French physicians Jean-Martin Charcot (1825–1893) and Pierre Janet (1859–1947) interviewed patients who had developed a condition known then as **hysteria**, or a *temporary loss of cognitive or motor functions, usually as a result of emotionally upsetting experiences.* Hysterical patients became blind, paralyzed, or lost their memories, even though there was no known physical cause of their problems. However, when the patients were put into a trancelike state through the use of hypnosis (an altered state of consciousness characterized by suggestibility), their symptoms disappeared: Blind patients could see, paralyzed patients could walk, and forgetful patients could remember. After coming out of the hypnotic trance, however, the patients forgot what had happened under hypnosis and again showed their symptoms. In short, the patients behaved like two different people in the waking versus hypnotic states.

Such psychological disorders were ignored by Wundt, Titchener, and other laboratory scientists, who did not consider them a proper subject for scientific psychology (Bjork, 1983). But William James believed such mental disruptions reflected mindbugs at work, which had important implications for understanding the nature of the mind (Taylor, 2001). During our ordinary conscious experience, we are only aware of a single " or "self," but the aberrations described by Charcot, Janet, and others suggested that the brain can create many conscious selves that are not aware of each other's existence (James, 1890, p. 400). These striking observations also fueled the imagination of a young physician from Vienna, Austria, who studied with Charcot in Paris in 1885. His name was Sigmund Freud (1856–1939).

● What do mindbugs teach us about the mind?

Freud and Psychoanalytic Theory

After his visit to Charcot's clinic in Paris, Freud returned to Vienna, where he continued his work with hysteric patients. (The word *hysteria,* by the way, comes from the Latin word *hyster,* which means "womb." It was once thought that only women suffered from

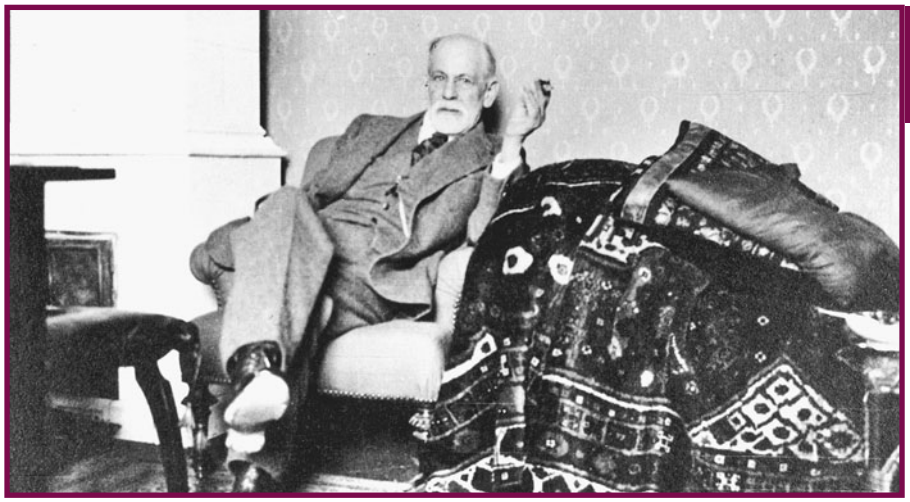
Gestalt psychology A psychological approach that emphasizes that we often perceive the whole rather than the sum of the parts.

hysteria A temporary loss of cognitive or motor functions, usually as a result of emotionally upsetting experiences.

unconscious The part of the mind that operates outside of conscious awareness but influences conscious thoughts, feelings, and actions.

psychoanalytic theory Sigmund Freud's approach to understanding human behavior that emphasizes the importance of unconscious mental processes in shaping feelings, thoughts, and behaviors.

psychoanalysis A therapeutic approach that focuses on bringing unconscious material into conscious awareness to better understand psychological disorders.



FREUD MUSEUM

In this photograph, Sigmund Freud (1856—1939) sits by the couch reserved for his psychoanalytic patients.

hysteria, which was thought to be caused by a "wandering womb.") Freud began to make his own observations of hysteric patients and develop theories to explain their strange behaviors and symptoms. Freud theorized that many of the patients' problems could be traced to the effects of painful childhood experiences that the person could not remember, and he suggested that the powerful influence of these seemingly lost memories revealed the presence of an unconscious mind. According to Freud, the **unconscious** is *the part of the mind that operates outside conscious awareness but influences conscious thoughts, feelings, and actions*. This idea led Freud to develop **psychoanalytic theory**, *an approach that emphasizes the importance of unconscious mental processes in shaping feelings, thoughts, and behaviors*. From a psychoanalytic perspective, it is important to uncover a person's early experiences and to illuminate a person's unconscious anxieties, conflicts, and desires. Psychoanalytic theory formed the basis for a therapy that Freud called **psychoanalysis**, which focuses on *bringing unconscious material into conscious awareness*. During psychoanalysis, patients recalled past experiences ("When I was a toddler, I was frightened by a masked man on a black horse") and related their dreams and fantasies ("Sometimes I close my eyes and imagine not having to pay for this session"). Psychoanalysts used Freud's theoretical approach to interpret what their patients said. In the early 1900s, Freud and a growing number of followers formed a psychoanalytic movement. Carl Gustav Jung (1875–1961) and Alfred Adler (1870–1937) were prominent in the movement, but both were independent thinkers, and Freud apparently had little tolerance for individuals who challenged his ideas. Soon enough, Freud broke off his relationships with both men so that he could shape the psychoanalytic movement himself (Sulloway, 1992). Psychoanalytic theory became quite controversial because it suggested that understanding a person's thoughts, feelings, and behavior required a thorough exploration of the person's early sexual experiences and unconscious sexual desires. In those days these topics were considered far too racy for scientific discussion.

DANNY SHANAHAN/CARTOONBANK.COM

Freud, and most of his early followers, were trained as physicians and did not conduct psychological experiments in the laboratory (though early in his career, Freud did do some nice laboratory work on the sexual organs of eels). By and large, psychoanalysts did not hold positions in universities and developed their ideas in isolation from the research-based approaches of James and others. Although James worked in an academic setting and Freud worked with clinical patients, both men believed that mental aberrations provide important clues into the nature of mind. Each thinker, in his own way, recognized the value of pursuing mindbugs as a clue to human functioning.

humanistic psychology An approach to understanding human nature that emphasizes the positive potential of human beings.

Influence of Psychoanalysis and the Humanistic Response

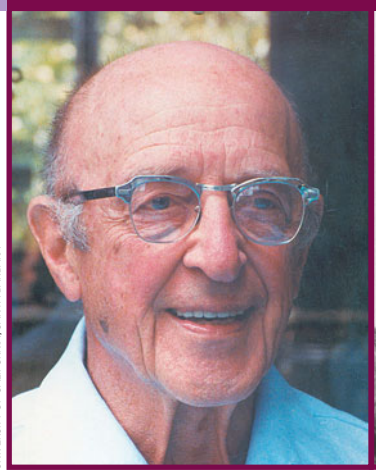
Most historians consider Freud to be one of the most influential thinkers of the 20th century, and the psychoanalytic movement influenced everything from literature and history to politics and art. Within psychology, psychoanalysis had its greatest impact on clinical practice, but that influence has been considerably diminished over the past 40 years.

This is partly because Freud's vision of human nature was a dark one, emphasizing limitations and problems rather than possibilities and potentials. He saw people as hostages to their forgotten childhood experiences and primitive sexual impulses, and the inherent pessimism of his perspective frustrated those psychologists who had a more optimistic view of human nature. Freud's ideas were also difficult to test, and a theory that can't be tested is of limited use in psychology or other sciences. Though Freud's emphasis on unconscious processes has had an enduring impact on psychology, psychologists began to have serious misgivings about many aspects of Freud's theory.

● Why are Freud's ideas less influential today?

In the years after World War II, psychologists such as Abraham Maslow (1908–1970) and Carl Rogers (1902–1987) pioneered a new movement called **humanistic psychology**, *an approach to understanding human nature that emphasizes the positive potential of human beings*. Humanistic psychologists focused on the highest aspirations that people had for themselves. Rather than viewing people as prisoners of events in their remote pasts, humanistic psychologists viewed people as free agents who have an inherent need to develop, grow, and attain their full potential. This movement reached its peak in the 1960s when a generation of "flower children" found it easy to see psychological life as a kind of blossoming of the spirit. Humanistic therapists sought to help people realize their full potential; in fact, they called them "clients" rather than "patients." In this relationship, the therapist and the client (unlike the psychoanalyst and the patient) were on equal footing. In fact, the development of the humanistic perspective was one more reason why Freud's ideas became less influential.

Carl Rogers (1902–1987) (left) and Abraham Maslow (1908–1970) (right) introduced a positive, humanistic psychology in response to what they viewed as the overly pessimistic view of psychoanalysis.



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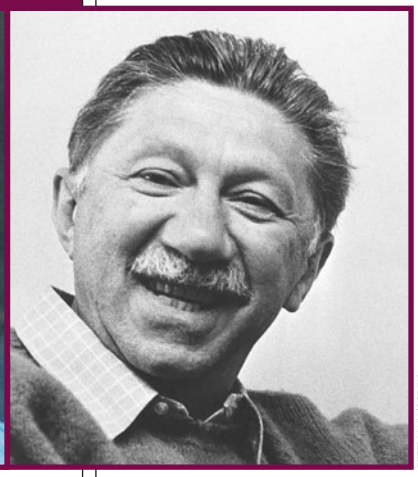

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summary quiz [1.2]

5. The approach that emphasizes that we often perceive the whole rather than the sum of its parts is called
   a. introspection.
   b. humanistic psychology.
   c. psychoanalytic theory.
   d. gestalt psychology.

6. The temporary loss of cognitive or motor function, usually resulting from emotional upsetting experiences, is called
   a. reaction time.
   b. the unconscious.
   c. hysteria.
   d. split personality.

7. Which psychological theory emphasizes the importance of the unconscious in determining behavior?
   a. psychoanalytic theory
   b. humanistic psychology
   c. Gestalt psychology
   d. functionalism

8. The psychological theory that emphasizes the positive potential of human beings is known as
   a. psychoanalytic theory.
   b. humanistic psychology.
   c. Gestalt psychology.
   d. structuralism.

Psychology in the 20th Century: Behaviorism Takes Center Stage

The schools of psychological thought that had developed by the early 20th century—structuralism, functionalism, psychoanalysis, Gestalt psychology, and humanism—differed substantially from one another. But they shared an important similarity: Each tried to understand the inner workings of the mind by examining conscious perceptions, thoughts, memories, and feelings or by trying to elicit previously unconscious material, all of which were reported by participants in experiments or patients in a clinical setting. In each case, it proved difficult to establish with much certainty just what was going on in people's minds, due to the unreliable nature of the methodology. As the 20th century unfolded, a new approach developed as psychologists challenged the idea that psychology should focus on mental life at all. This new approach was called **behaviorism**, which advocated that psychologists should restrict themselves to *the scientific study of objectively observable behavior.* Behaviorism represented a dramatic departure from previous schools of thought.

● How did behaviorism help psychology advance as a science?

behaviorism An approach that advocates that psychologists restrict themselves to the scientific study of objectively observable behavior.

Watson and the Emergence of Behaviorism

John Watson (1878–1958) believed that private experience was too idiosyncratic and vague to be an object of scientific inquiry. Science required replicable, objective measurements of phenomena that were accessible to all observers, and the introspective methods used by structuralists and functionalists were far too subjective for that. So instead of describing conscious experiences, Watson proposed that psychologists focus entirely on the study of behavior—what people *do,* rather than what people *experience*—because behavior can be observed by anyone and can be measured objectively.

At the time, animal behavior specialists such as Margaret Floy Washburn were arguing that nonhuman animals, much like human animals, have conscious mental experiences (Scarborough & Furumoto, 1987). Watson reacted to this claim with venom. Because we cannot ask pigeons about their private, inner experiences (well, we can *ask,* but they never tell us), Watson decided that the only way to understand how animals learn and adapt was to focus solely on their behavior, and he suggested that the study of human beings should proceed on the same basis. Watson was influenced by the work of the Russian physiologist Ivan Pavlov (1849–1936), who carried out pioneering research on the physiology of digestion. In the course of this work, Pavlov noticed something interesting about the dogs he was studying (Fancher, 1979). Not only did the dogs salivate at the sight of food; they also salivated at the sight of the person who fed them.

In 1894, Margaret Floy Washburn (1871–1939), a student of Edward Titchener at Cornell, became the first woman to receive a PhD degree in psychology. Washburn went on to a highly distinguished career, spent mainly in teaching and research at Vassar College in Poughkeepsie, New York. Washburn wrote an influential book, The Animal Mind, *developed a theory of consciousness, and contributed to the development of psychology as a profession.*

ARCHIVES OF THE HISTORY OF AMERICAN PSYCHOLOGY

The feeders were not dressed in Alpo suits, so why should the mere sight of them trigger a basic digestive response in the dogs? To answer this question, Pavlov developed a procedure in which he sounded a tone every time he fed the dogs, and after a while he observed that the dogs would salivate when they heard the tone alone. In Pavlov's experiments, the sound of the tone was a stimulus—sensory input from the environment—that influenced the salivation of the dogs, which was a **response**—*an action or physiological change elicited by a stimulus*. Watson and other behaviorists made these two notions the building blocks of their theories, which is why behaviorism is sometimes called "stimulus-response" or "S-R" psychology.

ONLY HUMAN

"A" TRAIN FROM THE COOP TO HEATHROW A full page of letters from readers in an issue of *New Scientist* magazine reported sightings by London, England, subway riders of pigeons boarding, and disembarking from, subway cars in "purposeful" ways that suggest they have figured out where they are going.

B. F. Skinner and the Development of Behaviorism

In 1926, Burrhus Frederick Skinner (1904–1990) graduated from Hamilton College. Like William James, Skinner couldn't decide what to do with his life. He aspired to become a writer and wondered whether a novelist could portray a character without understanding why the character behaved as he or she did. When he came across Watson's books, he knew he had the answer. Skinner completed his PhD studies in psychology at Harvard (Wiener, 1996) and began to develop a new kind of behaviorism. In Pavlov's experiments, the dogs had been passive participants that stood around, listened to tones, and drooled. Skinner recognized that in everyday life, animals don't just stand there—they do something! Animals *act* on their environments in order to find shelter, food, or mates, and. Skinner wondered if he could develop behaviorist principles that would explain how they *learned* to act in those situations.

Skinner built what he called a "conditioning chamber" but what the rest of the world would forever call a "Skinner box." The box has a lever and a food tray, and a hungry rat could get food delivered to the tray by pressing the lever. Skinner observed that when a rat was put in the box, it would wander around, sniffing and exploring, and would usually press the bar by accident, at which point a food pellet would drop into the tray. After that happened, the rate of bar pressing would increase dramatically and remain high until the rat was no longer hungry. Skinner saw evidence for what he called the principle of **reinforcement**, which states that *the consequences of a behavior determine whether it will be more or less likely to occur again*. The concept of reinforcement became the foundation for Skinner's new approach to behaviorism (see Chapter 6), which he formulated in a landmark book, *The Behavior of Organisms* (Skinner, 1938).

Inspired by Watson's behaviorism, B. F. Skinner (1904—1990) investigated the way an animal learns by interacting with its environment. Here, he demonstrates the "Skinner box," in which rats learn to press a lever to receive food.

NINA LEEN/TIME LIFE PICTURES/GETTY IMAGES

Skinner set out to use his ideas about reinforcement to help improve the quality of everyday life. He was visiting his daughter's fourth-grade class when he realized that he might be able to improve classroom instruction by breaking a complicated task into small bits and then using the principle of reinforcement to teach children each bit (Bjork, 1993). He developed automatic devices known as "teaching machines" that did exactly that (Skinner, 1958). The teaching machine asked a series of increasingly difficult questions that built on the students' answers to the simpler ones. To learn a complicated math problem, for instance, students would first be asked an easy question about the simplest part of the problem. They would then be told whether the answer was right or wrong, and if a correct response was made, the machine would move on to a more difficult question. Skinner thought that the satisfaction of knowing they were correct would be reinforcing and help students learn.

Which of Skinner's claims provoked an outcry?

If fourth graders and rats could be successfully trained, then why stop there? In the controversial books *Beyond Freedom and Dignity* (1971) and *Walden II* (1948/1986), Skinner put forth the simple but stunning claim that our subjective sense of free will is an illusion and that when we think we are exercising free will, we are actually responding to present and past patterns of reinforcement. We do things in the present that have been rewarding in the past, and our sense of "choosing" to do them is nothing more than an illusion. Not surprisingly, Skinner's claims sparked an outcry from critics who believed that Skinner

was giving away one of our most cherished attributes—free will—and calling for a repressive society that manipulated people for its own ends. Given the nature of Skinner's ideas, the critics' attacks were understandable—he had seriously underestimated how much people cherish the idea of free will—but in the sober light of hindsight, the attacks were clearly overblown. Skinner did not want to turn society into a "dog obedience school" or strip people of their personal freedoms. Rather, he argued that an understanding of the principles by which behavior is generated could be used to increase the social welfare, which is precisely what happens when a government launches advertisements to encourage citizens to drink milk or quit smoking. The result of all the controversy, however, was that Skinner's fame reached a level rarely attained by psychologists. A popular magazine that listed the 100 most important people who ever lived ranked Skinner just 39 points below Jesus Christ (Herrnstein, 1977).

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Skinner's well-publicized questioning of such cherished notions as free will led to a rumor that he had raised his own daughter in a Skinner box. This urban legend, while untrue, likely originated from the climate-controlled, glass-encased crib that he invented to protect his daughter from the cold Minnesota winter. Skinner marketed the crib under various names, including the "Air-crib" and the "Heir Conditioner," but it failed to catch on with parents.

summary quiz [1.3]

9. The approach that stresses the scientific study of objectively observable behavior is known as
a. conditioning.
b. reinforcement.
c. behaviorism.
d. stimulus-reaction time theory.

10. The person who studied why dogs salivate at the sight of the person who feeds them was
a. John Watson.
b. Ivan Pavlov.
c. Margaret Floy Washburn.
d. B. F. Skinner.

11. The notion that the consequences of a behavior determine whether it will be likely to occur again was formulated by
a. B. F. Skinner.
b. Margaret Floy Washburn.
c. Ivan Pavlov.
d. John Watson.

Beyond Behaviorism: Psychology Expands

Watson, Skinner, and the behaviorists dominated psychology from the 1930s to the 1950s. The psychologist Ulric Neisser recalled the atmosphere when he was a student at Swarthmore in the early 1950s:

> Behaviorism was the basic framework for almost all of psychology at the time. It was what you had to learn. That was the age when it was supposed that no psychological phenomenon was real unless you could demonstrate it in a rat (quoted in Baars, 1986, p. 275).

But although behaviorism allowed psychologists to measure, predict, and control behavior, it did this by ignoring some important things. First, it ignored the mental processes that had fascinated psychologists such as Wundt and James and, in so doing, found itself unable to explain some very important phenomena, such as how children learn language. Second, it ignored the evolutionary history of the organisms it studied and was thus unable to explain why, for example, a rat could learn to associate nausea with food much more quickly than it could learn to associate nausea with a tone or a light.

response An action or physiological change elicited by a stimulus.

reinforcement The consequences of a behavior that determine whether it will be more likely that the behavior will occur again.

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"What about that! His brain still uses the old vacuum tubes."

The Emergence of Cognitive Psychology

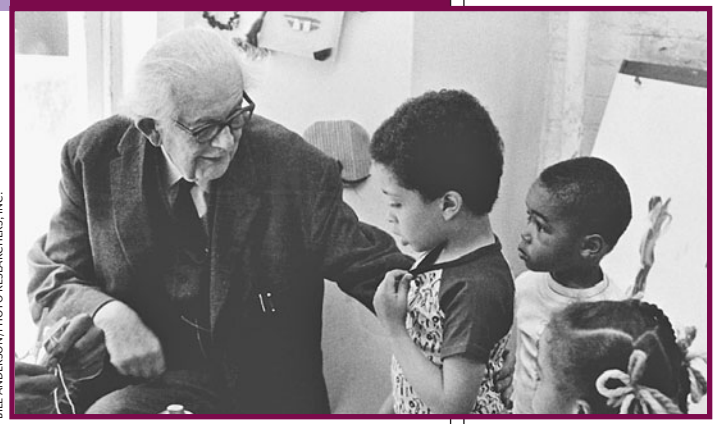
Even at the height of behaviorist domination, there were a few quiet revolutionaries whose research and writings were focused on mental processes. For example, Sir Frederic Bartlett (1886–1969) was a British psychologist interested in memory. Dissatisfied with existing research, he believed that it was more important to examine memory for the kinds of information people actually encounter in everyday life. Bartlett gave people stories to remember and carefully observed the kinds of errors they made when they tried to recall them some time later (Bartlett, 1932). Bartlett discovered that research participants often remembered what *should* have happened or what they *expected* to happen rather than what actually *did* happen. These and other errors led Bartlett to suggest that memory is not a photographic reproduction of past experience and that our attempts to recall the past are powerfully influenced by our knowledge, beliefs, hopes, aspirations, and desires.

Another researcher who focused on mental processes was Jean Piaget (1896–1980), who studied the perceptual and cognitive errors of children in order to gain insight into the nature and development of the human mind. For example, in one of his tasks, Piaget would give a 3-year-old child a large and a small mound of clay and tell the child to make the two mounds equal. Then Piaget would break one of the clay mounds into smaller pieces and ask the child which mound now had more clay. Although the amount of clay remained the same, of course, 3-year-old children usually said that the mound that was broken into smaller pieces was bigger, but by the age of 6 or 7, they no longer made this error. As you'll see in Chapter 9, Piaget theorized that younger children lack a particular cognitive ability that allows older children to appreciate the fact that the mass of an object remains constant even when it is divided. For Piaget, mindbugs such as these provided key insights into the mental world of the child (Piaget & Inhelder, 1969).

The German psychologist Kurt Lewin (1890–1947) was also a pioneer in the study of thought at a time when thought had been banished from psychology. Lewin (1936) argued that one could best predict a person's behavior in the world by understanding the person's subjective experience of the world. A television soap opera is a meaningless series of unrelated physical movements unless one thinks about the characters' experiences—how Karen feels about Bruce; what Van was planning to say to Kathy about Emily; and whether Linda's sister, Nancy, will always hate their mother for meddling in the marriage. Lewin realized that it was not the stimulus, but rather the person's *construal* of the stimulus, that determined the person's subsequent behavior. A pinch on the cheek can be pleasant or unpleasant depending on who administers it, under what circumstances, and to which set of cheeks. Lewin used a special kind of mathematics called *topology* to model the person's subjective experience, and although his topological theories were not particularly influential, his attempts to model mental life and his insistence that psychologists study how people construe their worlds would have a lasting impact on psychology.

How did computers influence the study of psychology?

Jean Piaget (1896—1980) studied and theorized about the developing mental lives of children, a marked departure from the observations of external behavior dictated by the methods of the behaviorists.



BILL ANDERSON/PHOTO RESEARCHERS, INC.

But, aside from a handful of pioneers such as these, most psychologists happily ignored mental processes until the 1950s, when something important happened: the computer. The advent of computers had enormous practical impact, of course, but it also had a giant conceptual impact on psychology. People and computers differ in many ways, but both seem to register, store, and retrieve information, leading psychologists to wonder whether the computer might be used as a model for the human mind. Computers are information-processing systems, and the flow of information through their circuits is clearly no fairy tale. If psychologists could think of mental events—such as remembering, attending, thinking, believing, evaluating,

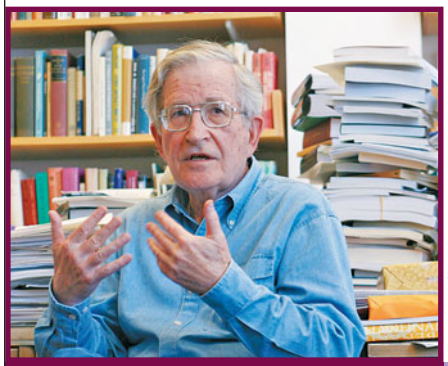
BETTMANN/CORBIS

This 1950s computer was among the first generation of digital computers. Although different in many ways, computers and the human brain both process and store information, which led many psychologists at the time to think of the mind as a computer. Researchers currently adopt a more sophisticated view of the mind and the brain, but the computer analogy was helpful in the early days of cognitive psychology.

feeling, and assessing—as the flow of information through the mind, then they might be able to study the mind scientifically after all. The emergence of the computer led to a reemergence of interest in mental processes all across the discipline of psychology, and it spawned a new approach called **cognitive psychology**, which is *the scientific study of mental processes, including perception, thought, memory, and reasoning*.

Ironically, the emergence of cognitive psychology was also energized by the appearance of a book by B. F. Skinner called *Verbal Behavior,* which offered a behaviorist analysis of language (Skinner, 1957). A linguist at the Massachusetts Institute of Technology (MIT), Noam Chomsky (b. 1928), published a devastating critique of the book in which he argued that Skinner's insistence on observable behavior had caused him to miss some of the most important features of language. According to Chomsky, language relies on mental rules that allow people to understand and produce novel words and sentences. The ability of even the youngest child to generate new sentences that he or she had never heard before flew in the face of the behaviorist claim that children learn to use language by reinforcement. Chomsky provided a clever, detailed, and thoroughly cognitive account of language that could explain many of the phenomena that the behaviorist account could not (Chomsky, 1959).

These developments during the 1950s set the stage for an explosion of cognitive studies during the 1960s. Cognitive psychologists did not return to the old introspective procedures used during the 19th century, but instead they developed new and ingenious methods that allowed them to study cognitive processes.



RICK FRIEDMAN/CORBIS

Noam Chomsky's (b. 1928) critique of Skinner's theory of language signaled the end of behaviorism's dominance in psychology and helped spark the development of cognitive psychology.

The Brain Meets the Mind: The Rise of Cognitive Neuroscience

If cognitive psychologists studied the software of the mind, they had little to say about the hardware of the brain. And yet, as any computer scientist knows, the relationship between software and hardware is crucial: Our mental activities depend on intricate operations carried out by the brain. This dependence is revealed by dramatic cases in which damage to a particular part of the brain causes a person to lose a specific cognitive ability. Recall Broca's patient who, after damage to a limited area in the left side of the brain, could not produce words—even though he could understand them perfectly well. As you'll see later in the book, damage to other parts of the brain can also result in syndromes that are characterized by the loss of specific mental abilities (e.g.,

cognitive psychology The scientific study of mental processes, including perception, thought, memory, and reasoning.

behavioral neuroscience An approach to psychology that links psychological processes to activities in the nervous system and other bodily processes.

cognitive neuroscience A field that attempts to understand the links between cognitive processes and brain activity.

evolutionary psychology A psychological approach that explains mind and behavior in terms of the adaptive value of abilities that are preserved over time by natural selection.

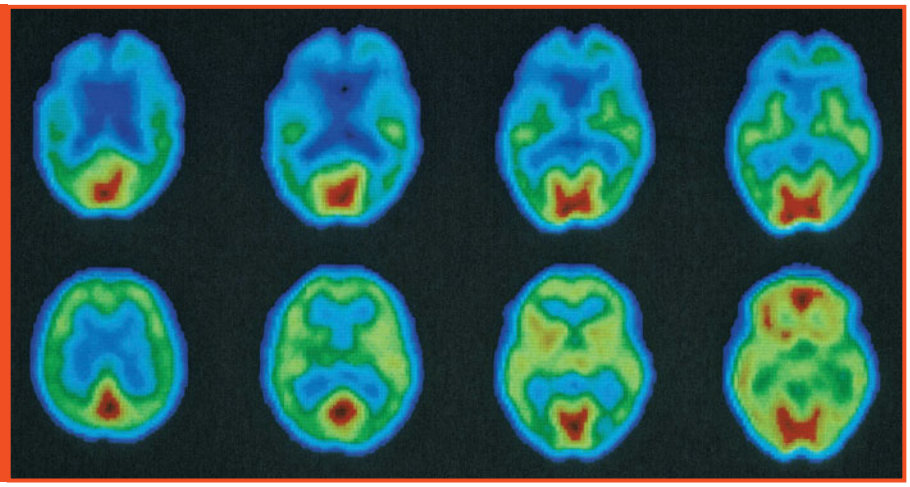
prosopagnosia, in which the person cannot recognize human faces) or by the emergence of bizarre behavior or beliefs (e.g., Capgras syndrome, in which the person believes that a close family member has been replaced by an imposter). These striking—sometimes startling—cases remind us that even the simplest cognitive processes depend on the brain.

Karl Lashley (1890–1958), a psychologist who studied with Watson, conducted a famous series of studies in which he trained rats to run mazes, surgically removed parts of their brains, and then measured how well they could run the maze again. Lashley hoped to find the precise spot in the brain where the rat's memories for how to navigate through the maze were stored. Alas, no one spot seemed to uniquely and reliably eliminate memory (Lashley, 1960). Rather, Lashley simply found that the more of the rat's brain he removed, the more poorly the rat ran the maze. Lashley was frustrated by his inability to identify a specific site of learning, but his efforts inspired other scientists to take up the challenge. They developed a research area called *physiological psychology*. Today, this area has grown into **behavioral neuroscience**, which *links psychological processes to activities in the nervous system and other bodily processes*. To learn about the relationship between brain and behavior, behavioral neuroscientists observe animals' responses as the animals perform specially constructed tasks, such as running through a maze to obtain food rewards. The neuroscientists can record electrical or chemical responses in the brain as the task is being performed or remove specific parts of the brain to see how performance is affected (**FIGURE 1.3**).

Of course, experimental brain surgery cannot ethically be performed on human beings, and thus psychologists who want to study how damage affects the human brain have to rely on nature's cruel and inexact experiments. Birth defects, accidents, and illnesses often cause damage to particular brain regions, and if this damage disrupts a particular ability, then psychologists deduce that the damaged region is involved in producing the ability. (Broca's patient, about whom you read earlier, and whose brain damage devastated the ability to use language, was one such example.) But in the late 1980s, technological breakthroughs led to the development of noninvasive "brain-scanning" techniques that made it possible for psychologists to watch what happens inside a human brain as a person performs a task such as reading, imagining, listening, or remembering. Brain scanning is an invaluable tool because it allows us to observe the brain in action and to see which parts are involved in which operations (see Chapter 3).

What have we learned by watching the brain at work?

For example, researchers used scanning technology to identify the parts of the brain in the left hemisphere that are involved in specific aspects of language, such as understanding or producing words (Peterson et al., 1989). Later scanning studies showed that people who are deaf from birth but who learn to communicate using American



ROGER RESSMEYER/CORBIS

FIGURE 1.3
PET Scans of Healthy and Alzheimer's Brains
PET scans are one of a variety of brain-imaging technologies that psychologists use to observe the living brain. The four brain images on the top each come from a person suffering from Alzheimer's disease; the four on the bottom each come from a healthy person of similar age. The red and green areas reflect higher levels of brain activity compared to the blue areas, which reflect lower levels of activity. In each image, the front of the brain is on the top, and the back of the brain is on the bottom. You can see that the patient with Alzheimer's disease, compared with the healthy person, shows more extensive areas of lowered activity toward the front of the brain.

Sign Language (ASL) rely on regions in the right hemisphere (as well as the left) when using ASL. In contrast, people with normal hearing who learned ASL after puberty seem to rely only on the left hemisphere when using ASL (Newman et al., 2002). These findings suggest that although both spoken and signed language usually rely on the left hemisphere, the right hemisphere also can become involved—but only for a limited period (perhaps until puberty). The findings also provide a nice example of how psychologists can now use scanning techniques to observe people with various kinds of cognitive capacities and use their observations to unravel the mysteries of the mind and the brain (**FIGURE 1.4**). In fact, there's a name for this area of research. **Cognitive neuroscience** is the *field that attempts to understand the links between cognitive processes and brain activity* (Gazzaniga, 2000).

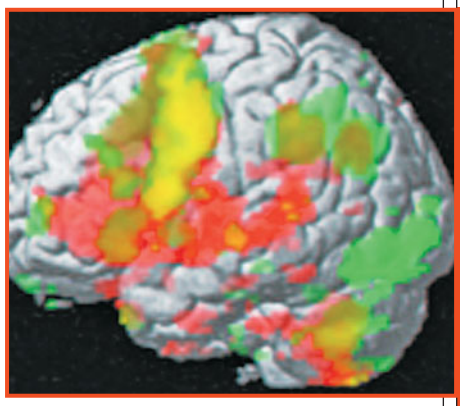

COURTESY OF MATTHEW KIRSCHEN

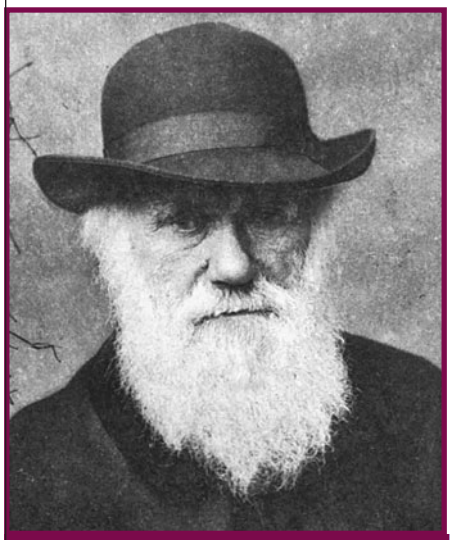
FIGURE 1.4
More Ways to Scan a Brain fMRI scanners produce more precise images than PET scans, allowing researchers to more accurately localize brain activity. fMRIs are also quicker at capturing images, allowing researchers to measure brain activity over briefer periods. Here, green areas of the brain were active when research participants remembered information presented visually, and red areas were active when they remembered information presented aurally. Yellow areas were active during both types of presentations.

The Adaptive Mind: The Emergence of Evolutionary Psychology

Psychology's renewed interest in mental processes and its growing interest in the brain were two developments that led psychologists away from behaviorism. A third development also pointed them in a different direction. Recall that one of behaviorism's key claims was that organisms are blank slates on which experience writes its lessons, and hence any one lesson should be as easily written as another. But in experiments conducted during the 1960s and 1970s, the psychologist John Garcia and his colleagues showed that rats can learn to associate nausea with the smell of food much more quickly than they can learn to associate nausea with a flashing light (Garcia, 1981). Why should this be? In the real world of forests, sewers, and garbage cans, nausea is usually caused by spoiled food and not by lightning, and although these particular rats had been born in a laboratory and had never left their cages, millions of years of evolution had "prepared" their brains to learn the natural association more quickly than the artificial one. In other words, it was not only the rat's learning history but the rat's *ancestors'* learning histories that determined the rat's ability to learn. Although that fact was at odds with the behaviorist doctrine, it was the credo for a new kind of psychology.

Evolutionary psychology *explains mind and behavior in terms of the adaptive value of abilities that are preserved over time by natural selection.* Evolutionary psychology has its roots in Charles Darwin's theory of natural selection, which inspired William James's functionalist approach. But it is only since the publication in 1975 of *Sociobiology,* by the biologist E. O. Wilson, that evolutionary thinking has had an identifiable presence in psychology. That presence is steadily increasing (Buss, 1999; Pinker, 1997b; Tooby & Cosmides, 2000). Evolutionary psychologists think of the mind as a collection of specialized "modules" that are designed to solve the problems our ancestors faced as they attempted to eat, mate, and reproduce over millions of years. According to evolutionary psychology, the brain is not an all-purpose computer that can do or learn one thing just as easily as it can do or learn another; rather, it is a computer that was built to do a few things well and everything else not at all. It is a computer that comes with a small suite of built-in applications that are designed to do the things that previous versions of that computer needed to have done.

Consider, for example, how evolutionary psychology treats the emotion of jealousy. All of us who have been in romantic relationships have been jealous, if only because we noticed our partner noticing someone else. Jealousy can be a powerful, overwhelming emotion that we might wish to avoid, but according to evolutionary


TIME LIFE PICTURES/GETTY IMAGES

Today's evolutionary psychologists embrace Charles Darwin's (1809–1882) ideas, just as William James did 100 years ago. Darwin's theories of evolution, adaptation, and natural selection have provided insight into why brains and minds work the way they do.

psychology, it exists today because it once served an adaptive function. If some of our hominid ancestors experienced jealousy and others did not, then the ones who experienced it might have been more likely to guard their mates and aggress against their rivals and thus may have been more likely to reproduce their "jealous genes" (Buss, 2000).

● Why might so many of us have inherited "jealous genes"?

Critics of the evolutionary approach point out that many current traits of people and other animals probably evolved to serve different functions than those they currently serve. For example, biologists believe that the feathers of birds probably evolved initially to perform such functions as regulating body temperature or capturing prey and only later served the entirely different function of flight. Likewise, people are reasonably adept at learning to drive a car, but nobody would argue that such an ability is the result of natural selection; the learning abilities that allow us to become skilled car drivers must have evolved for purposes other than driving cars.

Complications like these have led the critics to wonder how evolutionary hypotheses can ever be tested (Coyne, 2000; Sterelny & Griffiths, 1999). We don't have a record of our ancestors' thoughts, feelings, and actions, and fossils won't provide much information about the evolution of mind and behavior. Testing ideas about the evolutionary origins of psychological phenomena is indeed a challenging task, but not an impossible one (Buss et al., 1998; Pinker, 1997a). Start with the assumption that evolutionary adaptations should also increase reproductive success. So, if a specific trait or feature has been favored by natural selection, it should be possible to find some evidence of this in the numbers of offspring that are produced by the trait's bearers. Consider, for instance, the hypothesis that men tend to be tall because women prefer to mate with tall men. To investigate this hypothesis, researchers conducted a study in which they compared the numbers of offspring from short and tall men. They did their best to equate other factors that might affect the results, such as the level of education attained by short and tall men. Consistent with the evolutionary hypothesis, they found that tall men do indeed bear more offspring than short men (Pawlowski, Dunbar, & Lipowicz, 2000). This kind of study provides evidence that allows evolutionary psychologists to test their ideas. Not every evolutionary hypothesis can be tested, of course, but evolutionary psychologists are becoming increasingly inventive in their attempts.

Beyond the Individual: The Development of Social Psychology

The psychological approaches discussed so far may vaguely suggest a scene from some 1950s science-fiction film in which the protagonist is a living brain that thinks, feels, hopes, and worries while suspended in a vat of pink jelly in a basement laboratory. Although psychologists often do focus on the brain and the mind of the individual, they have not lost sight of the fact that human beings are fundamentally social animals who are part of a vast network of family, friends, teachers, and coworkers. Trying to understand people in the absence of that fact is a bit like trying to understand an ant or a bee without considering the function and influence of the colony or hive. People are the most important and most complex objects that we ever encounter, and thus it is not surprising that our behavior is strongly influenced by their presence—or their absence.

Social psychology is *the study of the causes and consequences of interpersonal behavior.* This broad definition allows social psychologists to address a remarkable variety of topics. Historians trace the birth of social psychology to an experiment conducted in 1895 by the psychologist and bicycle enthusiast, Norman Triplett, who noticed that cyclists seemed to ride faster when they rode with others. Intrigued by this observation, he conducted an experiment that showed that children reeled in a fishing line faster when tested in the presence of other children than when tested alone. Triplett was not trying to improve the fishing abilities of American children, of course, but rather was trying to show that the mere presence of other people can influence performance on even the most mundane kinds of tasks.

social psychology A subfield of psychology that studies the causes and consequences of interpersonal behavior.

AHN YOUNG-JOON/AP PHOTO

Social psychology studies how the thoughts, feelings, and behaviors of individuals can be influenced by the presence of others. Members of Reverend Sun Myung Moon's Unification Church are often married to one another in ceremonies of 10,000 people or more; in some cases, couples don't know each other before the wedding begins. Social movements such as this have the power to sway individuals.

Social psychology's development began in earnest in the 1930s, and was strongly influenced by Gestalt psychology. You'll recall that Gestalt psychologists held that "the whole is greater than the sum of its parts," and though the Gestaltists had been talking about the visual perception of objects, social psychologists felt that the phrase also captured a basic truth about the relationship between social groups and the individuals who constitute them. Philosophers had speculated about the nature of sociality for thousands of years, and political scientists, economists, anthropologists, and sociologists had been studying social life scientifically for some time. But social psychologists began to generate theories of social behavior that resembled the theories generated by natural scientists, and more importantly, they were the first to conduct experiments to test their social theories.

Historical events also shaped social psychology in its early years. The rise of Nazism in Germany in the 1930s, and the Holocaust in which millions of Jews and others were killed, brought the problems of conformity and obedience into sharp focus, leading psychologists to examine the conditions under which people can influence each other to think and act in inhuman or irrational ways. The civil rights movement of the 1960s and the rising tensions between Black and White Americans led psychologists such as Gordon Allport (1897–1967) to study stereotyping, prejudice, and racism and to shock the world of psychology by suggesting that prejudice was the result of a perceptual error that was every bit as natural and unavoidable as an optical illusion (Allport, 1954). Allport identified a mindbug at work: The same perceptual processes that allow us to efficiently categorize elements of our social and physical world allow us to erroneously categorize entire groups of people. Social psychologists today study a wider variety of topics (from social memory to social relationships) and use a wider variety of techniques (from opinion polls to neuroimaging) than did their forebears, but this field of psychology remains dedicated to understanding the brain as a social organ, the mind as a social adaptation, and the individual as a social creature.

The Emergence of Cultural Psychology

North Americans and Western Europeans are sometimes surprised to realize that most of the people on the planet are members of neither culture. Although we're all more alike than we are different, there is nonetheless considerable diversity within

cultural psychology The study of how cultures reflect and shape the psychological processes of their members.

the human species in social practices, customs, and ways of living. *Culture* refers to the values, traditions, and beliefs that are shared by a particular group of people. Although we usually think of culture in terms of nationality and ethnic groups, cultures can also be defined by age (youth culture), sexual orientation (gay culture), religion (Jewish culture), or occupation (academic culture). **Cultural psychology** is *the study of how cultures reflect and shape the psychological processes of their members* (Shweder & Sullivan, 1993). Cultural psychologists study a wide range of phenomena, ranging from visual perception to social interaction, as they seek to understand which of these phenomena are universal and which vary from place to place and time to time.

Why are psychological conclusions so often relative to the person, place or culture described?

Perhaps surprisingly, one of the first psychologists to pay attention to the influence of culture was someone recognized today for pioneering the development of experimental psychology: Wilhelm Wundt. He believed that a complete psychology would have to combine a laboratory approach with a broader cultural perspective. But Wundt's ideas failed to spark much interest from other psychologists, who had their hands full trying to make sense of results from laboratory experiments and formulating general laws of human behavior. Outside psychology, anthropologists such as Margaret Mead (1901–1978) and Gregory Bateson (1904–1980) attempted to understand the workings of culture by traveling to far-flung regions of the world and carefully observing child-rearing patterns, rituals, religious ceremonies, and the like. Such studies revealed practices—some bizarre from a North American perspective—that served important functions in a culture, such as the painful ritual of violent body mutilation and bloodletting in mountain tribes of New Guinea, which initiates young boys into training to become warriors (Mead, 1935/1968; Read, 1965). Yet at the time, most anthropologists paid as little attention to psychology as psychologists did to anthropology. Cultural psychology only began to emerge as a strong force in psychology during the 1980s and 1990s, when psychologists and anthropologists began to communicate with each other about their ideas and methods (Stigler, Shweder, & Herdt, 1990).

The laws of physics and chemistry are assumed to be universal: water is made of hydrogen and oxygen whether that water is located in Cleveland, Moscow, or the Orion Nebula. For much of psychology's history, the same assumption was made about the principles that govern human behavior (Shweder, 1991). *Absolutism* holds that culture makes little or no difference for most psychological phenomena—that "honesty is honesty

The Namgay family from Shingkhey, Bhutan (left), and the Skeen family from Texas, United States (right), display their respective family possessions in these two photos, both taken in 1993. Cultural psychology studies the similarities and differences in psychological processes that arise between people living in different cultures.

and depression is depression, no matter where one observes it" (Segall, Lonner, & Berry, 1998, p. 1103). And yet, as any world traveler knows, cultures differ in exciting, delicious, and frightening ways, and things that are true of people in one culture are not necessarily true of people in another. *Relativism* holds that psychological phenomena are likely to vary considerably across cultures and should be viewed only in the context of a specific culture (Berry et al., 1992). Although depression is observed in nearly every culture, the symptoms associated with it vary dramatically from one place to another. For example, in Western cultures, depressed people tend to devalue themselves, whereas depressed people in Eastern cultures do not (Draguns, 1980).

Today, most cultural psychologists fall somewhere between these two extremes. Most psychological phenomena can be influenced by culture, some are completely determined by it, and others seem to be entirely unaffected. For example, the age of a person's earliest memory differs dramatically across cultures (MacDonald, Uesiliana, & Hayne, 2000), whereas judgments of facial attractiveness do not (Cunningham et al., 1995).

As noted when we discussed evolutionary psychology, it seems likely that the most universal phenomena are those that are closely associated with the basic biology that all human beings share. Conversely, the least universal phenomena are those rooted in the varied socialization practices that different cultures evolve. Of course, the only way to determine whether a phenomenon is variable or constant across cultures is to design research to investigate these possibilities, and cultural psychologists do just that (Cole, 1996; Segall et al., 1998).

summary quiz [1.4]

12. The scientific study of mental processes, including perception, thought, memory, and reasoning is called
a. social psychology.
b. evolutionary.
c. cognitive psychology.
d. cultural psychology.

13. The explanation of mind and behavior that focuses on the adaptive value of abilities that are preserved over time by natural selection is called
a. cultural psychology.
b. evolutionary psychology.
c. functionalism.
d. cognitive neuroscience.

14. The field that studies causes and consequences of people interacting with each other is known as
a. social psychology.
b. cognitive psychology.
c. cultural psychology.
d. Gestalt psychology.

15. The field that studies how behaviors vary among people of different ethnicities, nationalities, religions, and so on, is known as _____ psychology.
a. relativistic
b. evolutionary
c. social
d. cultural

The Profession of Psychology: Past and Present

You'll recall that when we last saw William James, he was wandering around the greater Boston area, expounding the virtues of the new science of psychology. In July 1892, James and five other psychologists traveled to Clark University to attend a meeting. Each worked at a large university where they taught psychology courses, performed research, and wrote textbooks. Although they were too few to make up a jury or even a respectable hockey team, these men decided that it was time to form an organization that represented psychology as a profession, and on that day the American Psychological Association (APA) was born. The psychologists could scarcely have imagined that today their little club would have more than 150,000 members—approximately the population of a decent-sized city in the United States. Although all of the original members were employed by universities or colleges, today academic psychologists make up only 20% of the membership, while nearly 70% of the members work in clinical and health-related settings. Because the APA is no longer as focused on academic psychology as it once was, the American Psychological Society (APS) was formed in 1988 by academic psychologists who wanted an organization that focused specifically on the needs of psychologists carrying out scientific research. The APS, renamed the Association for Psychological Science in 2006, grew quickly; today it comprises nearly 12,000 psychologists.

The Growing Role of Women and Minorities

In 1892, APA had 31 members, all of whom were White and all of whom were male. Today, about half of all APA members are women, and the percentage of non-White members continues to grow. Surveys of recent PhD recipients reveal a picture of increasing diversification in the field. The proportion of women receiving PhDs in psychology increased nearly 20% between the mid-1980s and mid-1990s, and the proportion of minorities receiving PhDs in psychology nearly doubled during that same period. Clearly, psychology is increasingly reflecting the diversity of American society.

How has the face of psychology changed as the field has evolved?

The current involvement of women and minorities in the APA, and psychology more generally, can be traced to early pioneers who blazed a trail that others followed. One such pioneer was Mary Calkins (1863–1930), who studied with William James at Harvard and later became a professor of psychology at Wellesley College. In 1905, Calkins became the first woman to serve as president of the APA. In her presidential address, Calkins described her theory of the role of the "self" in psychological function. Arguing against Wundt's and Titchener's structuralist ideas that the mind can be dissected into components, Calkins claimed that the self is a single unit that cannot be broken down into individual parts. She wrote four books and published over 100 articles during her illustrious career (Calkins, 1930; Scarborough & Furumoto, 1987; Stevens & Gardner, 1982).

WELLESLEY COLLEGE ARCHIVES—MARGARET CLAPP LIBRARY

Mary Whiton Calkins (1863–1930), the first woman elected APA president, suffered from the sex discrimination that was common during her lifetime. Despite academic setbacks (e.g., Harvard University refusing to grant women an official PhD), Calkins went on to a distinguished career in research and teaching at Wellesley College.

Today, women play leading roles in all areas of psychology. Some of the men who formed the APA might have been surprised by the prominence of women in the field today, but we suspect that William James, a strong supporter of Mary Calkins, would not be one of them.

Just as there were no women at the first meeting of the APA, there weren't any non-White people, either. The first member of a minority group to become president of the

APA was Kenneth Clark (1914–2005), who was elected in 1970. Clark worked extensively on the self-image of African American children and argued that segregation of the races creates great psychological harm. Clark's conclusions had a large influence on public policy, and his research contributed to the Supreme Court's 1954 ruling (*Brown v. Board of Education*) to outlaw segregation in public schools (Guthrie, 2000). Clark's interest in psychology was sparked as an undergraduate at Howard University when he took a course from Francis Cecil Sumner (1895–1954), who was the first African American to receive a PhD in psychology (from Clark University, in 1920). Little known today, Sumner's work focused on the education of African American youth (Sawyer, 2000).

WILLIAM E. SAURO/NEW YORK TIMES CO./GETTY IMAGES

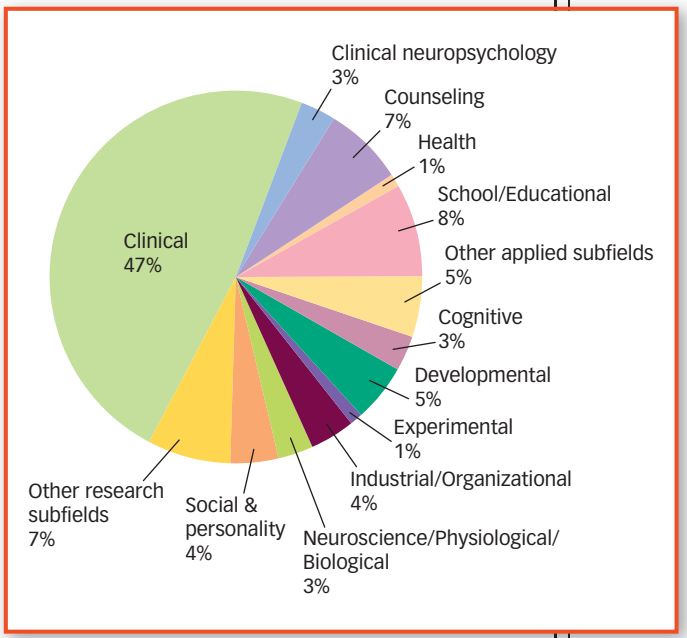
A student of Francis Cecil Sumner's, Kenneth B. Clark (1914—2005) studied the developmental effects of prejudice, discrimination, and segregation on children. In one classic study from the 1950s, he found that African American preschoolers preferred white dolls to black ones. Clark's research was cited by the U.S. Supreme Court in its decision for the landmark Brown v. Board of Education *case that ended school segregation.*

What Psychologists Do

So what should you do if you want to become a psychologist and conduct research in the tradition of James, Wundt, Calkins, and Clark? You can become "a psychologist" by a variety of routes, and the people who call themselves psychologists may hold a variety of different degrees. Typically, students finish college and enter graduate school to obtain a PhD (or doctor of philosophy) degree in some particular area of psychology (e.g., social, cognitive, developmental). During graduate school, students gain exposure to the field by taking classes and learn to conduct research by collaborating with their professors. Although William James was able to master every area of psychology because the areas were so small during his lifetime, today a student can spend the better part of a decade mastering just one.

After receiving a PhD, you can go on for more specialized research training by pursuing a postdoctoral fellowship under the supervision of an established researcher in their area or apply for a faculty position at a college or university or a research position in government or industry. Academic careers usually involve a combination of teaching and research, whereas careers in government or industry are typically dedicated to research alone.

But research is not the only career option for a psychologist (**FIGURE 1.5**). Most of the people who call themselves psychologists neither teach nor do research; rather, they assess or treat people with psychological problems. Such *clinical psychologists* hold a doctorate with a specialization in clinical psychology (a PhD or PsyD); this degree provides extensive training in assessment and treatment of clinical disorders. Clinical psychologists



SOURCE: 2004 GRADUATE STUDY IN PSYCHOLOGY, COMPILED BY APA RESEARCH OFFICE.

FIGURE 1.5
The Major Subfields in Psychology
Psychologists are drawn to many different subfields in psychology. Here are the percentages of people receiving PhDs in various subfields. Clinical psychology makes up almost half of the doctorates awarded in psychology.

ONLY HUMAN

A TREASURY OF THERAPEUTIC TECHNIQUES The *Austin American-Statesman* reported that then Texas treasurer Martha Whitehead had hired a psychologist, for $1,000, to counsel several employees of her office who were despondent about Whitehead's recommendation to abolish her agency.

must then be licensed by the state; most states require 2 years of supervised practical training and a competency exam. Most clinical psychologists work in private practice, but some work in hospitals or medical schools, some have faculty positions at universities or colleges, and some combine private practice with an academic job. Many clinical psychologists focus on specific problems or disorders, such as depression or anxiety, whereas others focus on specific populations, such as children, ethnic minority groups, or elderly adults.

Just over 10% of APA members are counseling psychologists, who assist people in dealing with work or career issues and changes or help people deal with common crises such as divorce, the loss of a job, or the death of a loved one. Counseling psychologists may have a PhD or an MA (master's degree) in counseling psychology or an MSW (master of social work).

Psychologists are also quite active in educational settings. About 5% of APA members are *school psychologists,* who offer guidance to students, parents, and teachers. A similar proportion of APA members, known as *industrial/organizational psychologists,* focus on issues in the workplace. These psychologists typically work in business or industry and may be involved in assessing potential employees, finding ways to improve productivity, or helping staff and management to develop effective planning strategies for coping with change or anticipated future developments.

● **In what ways does psychology contribute to society?**

Even this brief and incomplete survey of the APA membership provides a sense of the wide variety of contexts in which psychologists operate. You can think of psychology as an international community of professionals devoted to advancing scientific knowledge; assisting people with psychological problems and disorders; and trying to enhance the quality of life in work, school, and other everyday settings.

summary quiz [1.5]

16. The largest organization of psychologists in the United States is the
- a. American Psychological Society.
- b. American Psychological Association.
- c. Association for Psychological Science.
- d. Psychonomic Society.

17. Mary Calkins
- a. studied with Wilhelm Wundt in the first psychology laboratory.
- b. did research on the self-image of African American children.
- c. was present at the first meeting of the APA.
- d. became the first woman president of the APA.

18. Kenneth Clark
- a. did research that influenced the Supreme Court decision to ban segregation in public schools.
- b. was one of the founders of the American Psychological Society.
- c. was a student of William James.
- d. did research that focused on the education of African American youth.

WhereDoYouStand?

The Perils of Procrastination

As you've read in this chapter, the human mind and behavior are fascinating in part because they are not error free. Mindbugs interest us primarily as paths to achieving a better understanding of mental activity and behavior, but they also have practical consequences. Let's consider a mindbug that can have significant consequences in your own life: procrastination.

At one time or another, most of us have avoided carrying out a task or put it off to a later time. The task may be unpleasant, difficult, or just less entertaining than other things we could be doing at the moment. Over 70% of college students report that they engage in some form of procrastination, such as putting off writing a term paper or preparing for a test (Schouwenburg, 1995). Procrastination can be thought of as a mindbug because it prevents the completion of tasks in a timely manner.

Some procrastinators defend the practice by claiming that they tend to work best under pressure or by noting that as long as a task gets done, it doesn't matter all that much if it is completed just before the deadline. Is there any merit to such claims, or are they just feeble excuses for counterproductive behavior?

A study of 60 undergraduate psychology college students provides some intriguing answers (Tice & Baumeister, 1997). At the beginning of the semester, the instructor announced a due date for the term paper and told students that if they could not meet the date, they would receive an extension to a later date. About a month later, students completed a scale that measures tendencies toward procrastination. At that same time, and then again during the last week of class, students recorded health symptoms they had experienced during the past week, the amount of stress they had experienced during that week, and the number of visits they had made to a health care center during the previous month.

Students who scored high on the procrastination scale tended to turn in their papers late. One month into the semester, these procrastinators reported less stress and fewer symptoms of physical illness than did nonprocrastinators. But at the end of the semester, the procrastinators reported *more* stress and *more* health symptoms than did the nonprocrastinators and also reported more visits to the health center. Furthermore, the study found no evidence to support the idea that procrastinators do their "best work under pressure," since procrastinators received lower grades on their papers and on course exams.

Where do you stand on procrastination? Calculate your procrastination score by rating the following statements on a scale of 1-5, where

1 = not at all;
2 = incidentally;
3 = sometimes;
4 = most of the time;
5 = always.

How frequently last week did you engage in the following behaviors or thoughts?

1. Drifted off into daydreams while studying
2. Studied the subject matter that you had planned to do
3. Had no energy to study
4. Prepared to study at some point but did not get any further
5. Gave up when studying was not going well
6. Gave up studying early in order to do more pleasant things
7. Put off the completion of a task
8. Allowed yourself to be distracted from your work
9. Experienced concentration problems when studying
10. Interrupted studying for a while in order to do other things
11. Forgot to prepare things for studying
12. Did so many other things that there was insufficient time left for studying
13. Thought that you had enough time left, so that there was really no need to start studying

CHAPTER REVIEW

Summary

Psychology's Roots: The Path to a Science of Mind

- Early philosophers pondered ideas about human nature, but their approach did not allow them to provide empirical evidence to support their claims.
- Some of the earliest successful efforts to develop a *science* linking mind and behavior came from studies showing that damage to the brain can result in impairments in behavior and mental functions.
- Helmholtz furthered the science of the mind by developing methods for measuring reaction time; he and his followers (including Wundt, who is credited with the founding of psychology as a scientific discipline) espoused structuralism—the idea that the mind could be studied by understanding its basic elements.
- James and his followers emphasized the functions of consciousness and applied Darwin's theory of natural selection to the study of the mind.

Errors and Illusions Reveal Psychology

- Psychologists have often focused on mindbugs as a way of understanding human behavior.

- Gestalt psychology examines illusions that cause us to see the whole instead of its parts.
- Clinicians studying unusual cases in which patients act like different people under hypnosis raise the possibility that each of us has more than one self.
- Freud developed psychoanalysis, which emphasized the importance of unconscious influences and childhood experiences in shaping thoughts, feelings, and behavior.
- Humanistic psychologists suggest that people are inherently disposed toward growth and can reach their full potential with a little help from their friends.

Psychology in the 20th Century: Behaviorism Takes Center Stage

- For much of the early 20th century, the dominant approach in psychology was behaviorism, which advocated that psychologists should restrict themselves to the scientific study of observable behavior.
- Watson and Pavlov studied how organisms learn associations between a stimulus and a response.
- Skinner formulated the principle of reinforcement, which states that the consequences of a behavior determine whether it will be likely to occur again.

Beyond Behaviorism: Psychology Expands

- Cognitive psychologists defied the behavioral doctrine and studied inner mental processes such as perception, attention, memory, and reasoning.
- Cognitive neuroscience attempts to link the brain with the mind through studies of brain-damaged and healthy people.
- Evolutionary psychology focuses on the adaptive function that minds and brains serve, and it seeks to understand the nature and origin of psychological processes in terms of natural selection.
- Social psychology recognizes that people exist as part of a network of other people, examining how individuals influence and interact with one another.
- Cultural psychology is concerned with the effects of broader culture on individuals and studies similarities and differences among people in different cultures.

The Profession of Psychology: Past and Present

- The American Psychological Association (APA) was formed in 1892 by James and others, and it now includes over 150,000 members working in clinical, academic, and applied settings.
- Through the efforts of pioneers such as Calkins, women are now as well represented in the field as men. Minority involvement took longer, but the efforts of Sumner, Clark, and others have led to increased participation of minorities in psychology.
- Psychologists prepare for careers through graduate and postgraduate training, and thy work in a variety of settings, including research, clinical settings, schools, and industry.

Key Terms

psychology (p. 2)
mind (p. 2)
behavior (p. 2)
nativism (p. 4)
philosophical empiricism (p. 5)
phrenology (p. 5)
physiology (p. 6)
stimulus (p. 6)
reaction time (p. 6)
consciousness (p. 6)
structuralism (p. 7)
introspection (p. 7)
functionalism (p. 8)
natural selection (p. 8)
illusions (p. 10)
Gestalt psychology (p. 12)
hysteria (p. 12)
unconscious (p. 13)
psychoanalytic theory (p. 13)
psychoanalysis (p. 13)
humanistic psychology (p. 14)
behaviorism (p. 15)
response (p. 16)
reinforcement (p. 16)
cognitive psychology (p. 19)
behavioral neuroscience (p. 20)
cognitive neuroscience (p. 21)
evolutionary psychology (p. 21)
social psychology (p. 22)
cultural psychology (p. 24)

Critical Thinking Questions

1. William James thought Darwin's theory of natural selection might explain how mental abilities evolve, by conferring survival advantages on individuals who were better able to solve problems.

   How might a specific mental ability, such as the ability to recognize the facial expressions of others as signaling their emotional state, help an individual survive longer and produce more offspring?

2. Behaviorists explain behavior in terms of organisms learning to make particular responses that are paired with reinforcement (and to avoid responses that are paired with punishment). Evolutionary psychology focuses on how abilities are preserved over time if they contribute to an organism's ability to survive and reproduce.

   How might a proponent of each approach explain the fact that a rat placed in an unfamiliar environment will tend to stay in dark corners and to avoid brightly lit open areas?

Answers to Summary Quizzes

Summary Quiz 1.1
1. a; 2. b; 3. d; 4. c

Summary Quiz 1.2
5. d; 6. c; 7. a; 8. b

Summary Quiz 1.3
9. c; 10. b; 11. a

Summary Quiz 1.4
12. c; 13. b; 14. a; 15. d

Summary Quiz 1.5
6. b; 17. d; 18. a