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AN INTRODUCTION TO LEARNING

LEARNING OBJECTIVES

- 1.1 Define the term *learning*.
- 1.2 Describe the way instincts affect behavior according to functionalism.
- 1.3 Explain how associations are formed according to the British empiricists.
- 1.4 Recall the way Thorndike investigated the effect of rewards on behavior.
- 1.5 Explain how Pavlov showed that digestive responses could be conditioned.
- 1.6 Recount how Watson showed that emotions could be learned.
- 1.7 Discuss how to conduct ethical animal and human research.

THE GIFT OF KNOWLEDGE

Suzanne entered college 2 years ago with the intention to study biology and go to medical school. However, over the past year, she has found several psychology courses more exciting and challenging than her biology classes, and she now wants to become a clinical psychologist. Suzanne's concern over her younger brother Marcus's drug problems has stimulated this interest in psychology. Marcus, an excellent student before he began to experiment with drugs several years ago, is now addicted to heroin, has quit school, and has lost countless jobs. He has been in rehab several times and overdosed three times, only to be saved by the administration of Narcan by paramedics. Suzanne wants to understand the factors that can lead to drug addiction and why it is so hard to quit. She hopes to contribute someday to the development of an effective drug addiction therapy. Dr. Martinez, Suzanne's adviser, suggested that Suzanne enroll in a course on learning in

order to obtain a degree in psychology. However, spending endless hours reading about rats running through mazes or pigeons pecking at keys did not appeal to Suzanne. Interested in the human aspect of psychology, Suzanne wondered how this course would benefit her. In spite of this, she trusted Dr. Martinez's advice, so she enrolled in the class. Suzanne soon found out that her preconceived ideas about the learning course were incorrect and how understanding learning principles would benefit the student of clinical psychology.

As Suzanne discovered, learning involves the acquisition of behaviors that are needed to obtain reward or avoid punishment. It also involves an understanding of when and where these behaviors are appropriate. The principles that govern the learning process have been revealed with both human and nonhuman research. The experiments described in Suzanne's learning class were far from boring and made the learning principles described in class seem real.

Suzanne now thinks that the knowledge gained from the learning class will undoubtedly help in her search for an effective treatment of addictive behavior. You will learn from this book what Suzanne discovered about learning in her course. I hope your experience will be as positive as hers. We begin our exploration by defining learning.

A DEFINITION OF LEARNING

1.1 Define the term *learning*.

Learning can be defined as a relatively permanent change in behavior potential that results from experience. This definition of learning has two important components. First, learning reflects a change in the potential for a behavior to occur; it does not automatically lead to a change in behavior. We must be sufficiently motivated to translate learning into behavior. For example, although you may know the location of the campus cafeteria, you will not be motivated to go there until you are hungry. Also, we are sometimes unable to exhibit a particular behavior even though we have learned it and are sufficiently motivated to exhibit it. For example, you may learn from friends that a new movie has gotten great reviews, but you do not now have the money to go.

Second, the behavior changes that learning causes are not always permanent. As a result of new experiences, previously learned behavior may no longer be exhibited. For example, you may learn a new and faster route to class and no longer take the old route. Also, we sometimes forget a previously learned behavior and therefore are no longer able to exhibit that behavior. Forgetting the story line of a movie is one instance of the transient aspect of learning.

It is important to note that changes in behavior can be due to performance processes (e.g., maturation, motivation) rather than learning. Our behavior can change as the result of a motivational change rather than because of learning. For example, we eat when we are hungry or study when we are worried about an upcoming exam. However, eating or studying may not necessarily be due to learning. Motivational changes, rather than learning, could trigger eating or studying. You have already learned to eat, and your hunger motivates your eating behavior. Likewise, you have learned to study to prevent failure, and your **fear** motivates studying behavior. These behavior changes are temporary; when the motivational state changes again, the behavior will also change. Therefore, you will stop eating when you are no longer hungry and quit studying when you no longer fear failing the examination. Becoming full or unafraid and ceasing to eat or study is another instance when a temporary state, rather than learning, leads to a change in behavior.

Many behavioral changes are the result of maturation. For example, a young child may fear darkness, while an adult may not show an emotional reaction to the dark. The change

in emotionality could reflect a maturational process and may not be dependent on experiences with darkness. Another example of the impact of maturation is a child who cannot open a door at age 1 but can do so at age 2. The child may have learned that turning the doorknob opens the door, but physical growth of the child is necessary for the child to reach the doorknob.

Not all psychologists agree on the causes of behavior. Some even argue that instinct, rather than experience, determines behavior. We begin our discussion by examining the view that instinctive processes govern human actions. Later in the chapter, we explore the origins of behaviorism—the view that emphasizes the central role of experience in determining behavior. Throughout the rest of the text, we discuss what we now know about the nature of learning.

FUNCTIONALISM

1.2 Describe the way instincts affect behavior according to functionalism.

Functionalism was an early school of psychology that emphasized the instinctive origins and adaptive function of behavior. According to this theory, the function of behavior is to promote survival through adaptive behavior. The functionalists expressed various ideas concerning the mechanisms controlling human behavior. The father of functionalism, John Dewey (1886), suggested that, in humans, the mind replaced the reflexive behaviors of lower animals, and the mind has evolved as the primary mechanism for human survival. The mind enables the individual to adapt to the environment. The main idea in Dewey's functionalism was that the manner of human survival differs from that of lower animals.

In contrast to Dewey, William James, also a 19th-century psychologist, argued that the major difference between humans and lower animals lies in the character of their respective inborn or instinctual motives. According to James (1890), human beings possess a greater range of **instincts** that guide behavior (e.g., rivalry, sympathy, fear, sociability, cleanliness, modesty, and love) than do lower animals. These social instincts directly enhance (or reduce) our successful interaction with our environment and, thus, our survival. James also proposed that all instincts, both human and nonhuman, have a mentalist quality, possessing both purpose and direction. Unlike Dewey, James believed that instincts motivated the behavior of both humans and lower animals.

Some psychologists (see Troland, 1928) who opposed a mentalist concept of instinct argued that internal biochemical forces motivate behavior in all species. Concepts developed in physics and chemistry during the second half of the 19th century provided a framework for this mechanistic approach. Ernst Brücke (1874) stated in his *Lectures on Physiology* that “the living organism is a dynamic system to which the laws of chemistry and physics apply”—a view that led to great advances in physiology. This group of functionalists used a physiochemical approach to explain the causes of human and animal behavior.

A number of scientists strongly criticized the instinct concept that the functionalists proposed. First, anthropologists pointed to a variety of values, beliefs, and behaviors among different cultures, an observation inconsistent with the idea of universal human instincts. Second, some argued that the widespread and uncritical use of the instinct concept did not advance our understanding of the nature of human behavior. Bernard's (1924) analysis illustrates the weaknesses of the instinct theories of the 1920s. Bernard identified several thousand often-conflicting instincts the functionalists had proposed. For example, Bernard described one instinct as “with a glance of the eye we can estimate instinctively the age of a passerby” (p. 132). With this type of proposed “instinct,” it is not surprising that many psychologists reacted so negatively to the instinct concept.

In the 1920s, American psychology moved away from the instinct explanation of human behavior and began to emphasize the learning process. The psychologists who viewed experience as the major determinant of human actions were called behaviorists. Contemporary views suggest that behavior is traceable to both instinctive and experiential processes. In Chapter 2, we look at instinctive processes and how experience alters instinctive reactions. In this chapter, we briefly examine the behaviorists' ideas concerning the nature of the learning process. We discuss theories about the nature of the learning process throughout the text.

BEHAVIORISM

1.3 Explain how associations are formed according to the British empiricists.

Behaviorism is a school of thought that emphasizes the role of experience in governing behavior. According to behaviorists, the important processes governing our behavior are learned. We learn both the motives that initiate behavior and specific behaviors that occur in response to these motives through our interaction with the environment. A major goal of the behaviorists is to determine the laws governing learning. A number of ideas contributed to the behavioral view. The Greek philosopher Aristotle's concept of the association of ideas is one important origin of behaviorism.

The Importance of Associations

Suppose a friend approaches you after class and remarks that your party last week was terrific. This remark causes you to recall meeting a very attractive person at your party, which in turn reminds you to ask this person for a date. This whole thought process reflects the concept of the association of ideas: Two events become associated with each other; thus, when you think of one event, you automatically recall the other. Aristotle proposed that in order for an **association** to develop, the two events must be contiguous (temporally paired) and either similar to or opposite each other.

British Empiricism

During the 17th and 18th centuries, British empiricists described the association process in greater detail. John Locke (1690/1964) suggested that there are no innate ideas, but instead we form ideas as a result of experience. Locke distinguished simple from complex ideas. **Simple ideas** are passive impressions received by the senses, or the mind's representation of those sensory impressions. In contrast, **complex ideas** represent the combination of simple ideas, or the association of ideas. The following example illustrates the difference between simple and complex ideas. You approach a rose in a garden. Your senses detect the color, odor, and texture of the rose. Each of these sensory impressions represents a simple idea. Your mind also infers that the smell is pleasant, which also is a simple idea. The combination or association of these simple ideas creates the perception of a rose, which is a complex idea.

David Hume (1748/1955) hypothesized that three principles connect simple ideas into a complex idea. One of these principles is **resemblance**, the second is **contiguity** in time or place, and the third is **cause and effect**. Hume's (1748/1955) own words best illustrate these three principles, which, he proposed, are responsible for the association of ideas:

A picture naturally leads our thoughts to the original [resemblance]. The mention of the apartment in a building naturally introduces an inquiry . . . concerning the others [contiguity]; and if we think of a wound, we can scarcely forbear reflecting on the pain which follows it [cause and effect]. (p. 32)

Locke and Hume were philosophers, and it was left to later scientists to evaluate the validity of the principle of the association of ideas. One of these scientists was Edward Thorndike, whose work we discuss next.

THORNDIKE

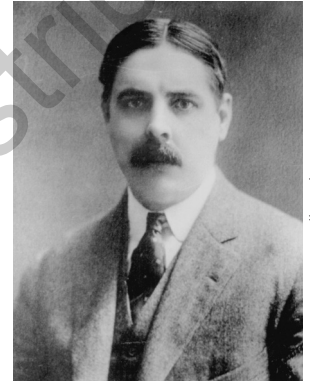
1.4 Recall the way Thorndike investigated the effect of rewards on behavior.

The work of Edward Thorndike had an important influence on the development of behaviorism. Thorndike's 1898 publication of his studies established that animal behavior could change as a consequence of experience. Thorndike's ideas on learning and motivation developed from his research with his famous puzzle boxes (see **Figures 1.1a and 1.1b**). He tested 13 kittens and young cats in 15 different puzzle boxes. In his studies, he placed a hungry cat in a locked box and put food just beyond its reach, outside the box. The cat could escape to obtain food by exhibiting one of a number of possible behaviors. A different response or sequence of responses was required to activate a release mechanism and escape from each box. For example, two effective behaviors were pulling on a string and pressing a pedal.

Thorndike (1898) observed that when a cat was initially placed into the puzzle box, the cat would engage in a number of behaviors, such as clawing, biting, meowing, and rubbing. Eventually, the cat would respond in a way that activated the release mechanism and opened the door to the puzzle box. The cat would then escape from the puzzle box and consume the food outside. On subsequent trials, the cat would engage in the other behaviors but eventually would respond in the manner needed to activate the release mechanism and escape from the puzzle box. Thorndike found that not only did the cats escape but with each successive trial, the time needed to activate the release decreased (see **Figure 1.2**). Further, Thorndike observed that the time the cat spent engaging in the other behaviors declined until the only behavior seen in the puzzle box was the one that activated the release mechanism.

Thorndike (1898) proposed that the cat formed an association between the stimulus (the box) and the effective response. Learning, according to Thorndike, reflects the development of a stimulus–response (S–R) association. As the result of learning, the presence of the stimulus elicits the appropriate response. Thorndike asserted that the animal is not conscious of this association but is instead exhibiting a mechanistic **habit** in response to a particular stimulus. The S–R connection developed because the cat received a **reward**: The effective response resulted in the cat obtaining a reward (food), which produced a satisfying state and strengthened the S–R bond. Thorndike labeled this strengthening of an S–R association by reward or a satisfying state the **law of effect**. Thus, the law of effect selects the appropriate response and connects it to the environment, thereby changing a chance act into a learned behavior.

Thorndike did not think that the law of effect applied only to animal behavior; he argued that it also describes the human learning process. Thorndike (1932) presented his human subjects with a concept to learn. Telling his subjects that they had responded correctly enabled the subjects to learn the appropriate response.

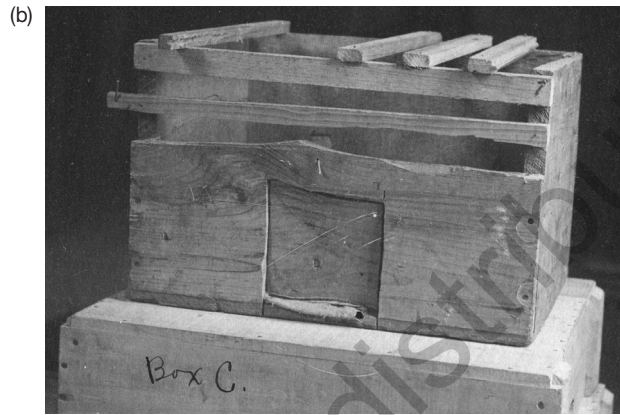
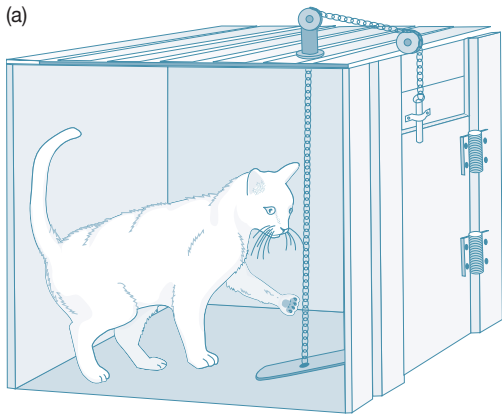


Edward Lee Thorndike (1912)/Wikimedia Commons

Edward Lee Thorndike (1874–1949)

Thorndike studied under William James at Harvard University. This began his research on associative learning in animals, in James's basement, when he was unable to secure research space at Harvard. He continued his animal learning studies at Columbia University, where he obtained his doctorate under the direction of James McKeen Cattell, who is considered one of the founding fathers of psychometrics. He then taught for 36 years at Teachers College, Columbia University. Considered a pioneer in the field of educational psychology, he applied the psychological principles to the teaching of reading, language acquisition, and intelligence testing. He served as president of the American Psychological Association in 1912.

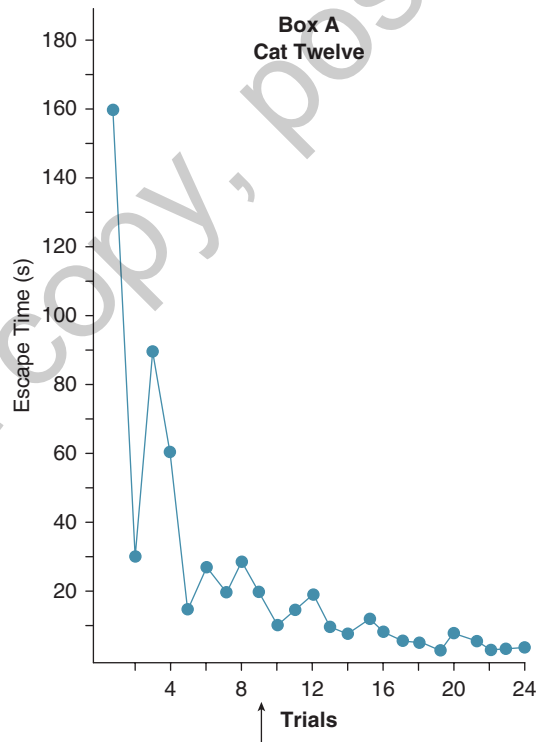
FIGURE 1.1 ■ Thorndike’s famous puzzle box: The hungry cat can escape and obtain access to food by exhibiting the appropriate response (a). Photograph of Thorndike’s puzzle box C (b).



Source: Adapted from Swenson, L. C. (1980). *Theories of learning: Traditional perspectives/contemporary developments*. Belmont, CA: Wadsworth. Copyright © Leland Swenson.

Source: Robert M. Yerkes Papers, Manuscripts and Archives, Yale University Library.

FIGURE 1.2 ■ The escape time of one cat declined over 24 trials in one of Thorndike’s puzzle boxes.



Source: From Thorndike, E. L. (1898) Animal intelligence: An experimental study of the associative process in animals. *Psychological Review Monograph*, 2 (Suppl. 8). Copyright 1898 by the American Psychological Association. Reprinted with permission.

The law of effect concept proposed by Thorndike became one of the central tenets of behaviorism. Reward definitely has a powerful influence on human behavior, whether it be studying to obtain a high score on the Graduate Record Examination (GRE) or the Law School Admission Test (LSAT) or a subpar score in a round of golf. We will have much more to say about the law of effect in Chapter 5.

Although Thorndike's views concerning the nature of the learning process were quite specific, his ideas on the motivational processes that determine behavior were vague. According to Thorndike (1898), learning occurs, or a previously learned behavior is exhibited, only if the animal or human is "ready." Thorndike's **law of readiness** proposes that the animal or human must be motivated to develop an association or to exhibit a previously established habit. Thorndike did not hypothesize about the nature of the motivation mechanism, leaving such endeavors to future psychologists. Indeed, the motivational basis of behavior became a critical concern of the behaviorists.

Thorndike (1913) suggested a second means by which learning can occur. According to Thorndike, associating the stimulus that elicited a response with another stimulus could result in the association of that response with the other stimulus. Thorndike referred to this learning process as **associative shifting**. To illustrate the associative shifting process, consider Thorndike's example of teaching a cat to stand up on command. At first, a piece of fish is placed in front of a cat; when the cat stands to reach the fish, the trainer says, "Stand up." After a number of trials, the trainer omits the fish stimulus, and the verbal stimulus alone can elicit the standing response, even though this S–R association has not been rewarded. Although Thorndike believed that conditioning, or the development of a new S–R association, could occur through associative shifting, he proposed that the law of effect, rather than associative shifting, explains the learning of most S–R associations. In the next section, we will discover that Thorndike's associative shifting process bears a striking resemblance to Pavlovian conditioning.

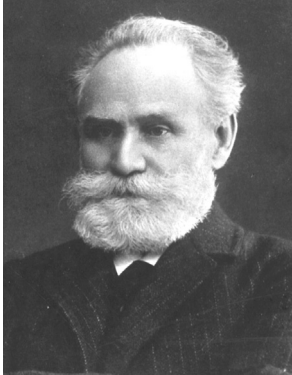
Before You Go On

- What could Suzanne learn about drug addiction from our discussion of behaviorism?
- How could Suzanne use Thorndike's law of effect to explain a possible cause of drug addiction?

Review

- Learning is a relatively permanent change in behavior potential that results from experience.
- The functionalists emphasized the instinctive character of human behavior but could not agree on the nature of instinctive processes or the number of instincts.
- The behaviorists' view is that most human behavior is due to experience.
- The British empiricists proposed that associations can be learned as a result of resemblance, contiguity, and cause and effect.
- Thorndike repeatedly placed hungry cats in a puzzle box and found that the cats increasingly used the behavior that enabled them to escape from the box and obtain food.

- Thorndike believed that the effect of the food reward was to strengthen the association between the stimulus of the puzzle box and the effective response.
- Thorndike's law of readiness proposed that motivation was necessary for learning to occur.
- Thorndike believed that association of a stimulus that elicited a response with another stimulus results in the other stimulus also eliciting the response through the associative shifting process.



Ivan Petrovich Pavlov
(1849–1936)

Pavlov received a doctorate in physiology from the University of Saint Petersburg and for 45 years directed the Department of Physiology at the Institute of Experimental Medicine, which became a leading center of physiological research. His early research was on the physiology of pancreatic nerves. He received the 1904 Nobel Prize in Physiology or Medicine for his work on physiology of digestion. He is most noted for his studies on the conditioning of digestive reflexes. Toward the end of his career, he turned his attention to the use of conditioning to induce experimental neurosis in animals by overtraining the excitatory or the inhibitory process, or by quickly alternating excitation and inhibition. He continued to work in his lab until the age of 87. His lectures are in the public domain and can be read at www.ivanpavlov.com.

PAVLOV

1.5 Explain how Pavlov showed that digestive responses could be conditioned.

How did the cat select the correct response in Thorndike's puzzle box studies? Thorndike explained the process as one of trial and error; the cat simply performed various behaviors until it discovered a correct one. Reward then functioned to strengthen the association of the stimulus environment with that response. However, the research of Ivan Pavlov (1927) suggests that the learning process is anything but trial and error. According to Pavlov, definite rules determine which behavior occurs in the learning situation.

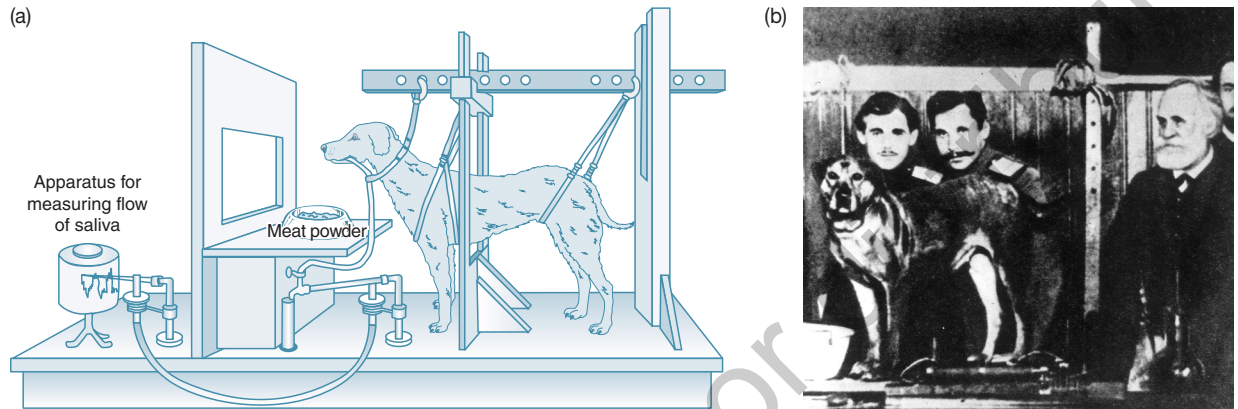
Pavlov was a physiologist, not a psychologist; his initial plan was to uncover the laws governing digestion. He observed that animals exhibit numerous reflexive responses when food is placed in their mouths (e.g., salivation, gastric secretion). The function of these responses is to aid in the digestion process.

Pavlov observed during the course of his research that his dogs began to secrete stomach juices when they saw food or when it was placed in their food dishes. He concluded that the dogs had learned a new behavior because he had not observed this response during their first exposure to the food. To explain his observation, he suggested that both humans and nonhuman animals possess innate or unconditioned reflexes. An **unconditioned reflex** consists of two components—an **unconditioned stimulus** (UCS; e.g., food), which involuntarily elicits the second component, the **unconditioned response** (UCR; e.g., release of saliva). A new or **conditioned reflex** develops when a neutral environmental event occurs along with the UCS. As conditioning progresses, the neutral stimulus becomes the **conditioned stimulus** (CS; e.g., the sight of food) and is able to elicit the learned or **conditioned response** (CR; e.g., the release of saliva).

The demonstration of a learned reflex in animals was an important discovery, illustrating not only an animal's ability to learn but the mechanism responsible for the learned behavior. According to Pavlov, any neutral stimulus paired with a UCS could, through conditioning, develop the capacity to elicit a CR. In his classic demonstration of the **Pavlovian conditioning** process, he first implanted a tube, called a fistula, into a dog's salivary glands to collect saliva (see **Figures 1.3a and 1.3b**). He then presented the CS (the sound of a metronome) and shortly thereafter placed the UCS (meat powder) into the dog's mouth. On the first presentation, only the meat powder produced saliva (UCR). However, with repeated pairings of the metronome with food, the metronome sound (CS) began to elicit saliva (CR), and the strength of the CR increased with increased pairings of the conditioned and unconditioned stimuli.

Pavlov conducted an extensive investigation of the conditioning process, identifying many procedures that influence an animal's learned behaviors. Many of his ideas are still accepted today. He observed that stimuli similar to the CS can also elicit the CR through a process

FIGURE 1.3 ■ Pavlov's salivary-conditioning apparatus. The experimenter can measure saliva output when either a conditioned stimulus (e.g., the tick of a metronome) or an unconditioned stimulus (e.g., meat powder) is presented to the dog. The dog is placed in a harness to minimize movement, thus ensuring an accurate measure of the salivary response (a). Pavlov and his colleagues demonstrating conditioning at the Military Academy in St. Petersburg, Russia, in 1905 (b).



Source: Adapted from Yerkes, R. M., & Margulis, S. (1909). The method of Pavlov in animal psychology. *Psychological Bulletin*, 6, 257–273. Copyright 1909 by the American Psychological Association. Reprinted with permission.

he called **generalization**; further, the more similar the stimulus is to the CS, the greater the generalization of the CR. Pavlov also showed that if, after conditioning, the CS is presented without the UCS, the strength of the CR diminishes. Pavlov named this process of eliminating a CR **extinction**.

Pavlov's observations had a profound influence on psychology. The conditioning process he described has been demonstrated in various animals, including humans. Many different responses can become CRs and most environmental stimuli can become conditioned stimuli. Most human emotions are acquired through Pavlovian conditioning, whether it is a positive emotion such as liking a friend or a negative emotion such as disliking the neighborhood bully. We will have much more to say about Pavlovian conditioning in Chapters 3 and 4.

WATSON

1.6 Recount how Watson showed that emotions could be learned.

The learning processes Thorndike and Pavlov described became the foundation of behaviorism. However, it was John B. Watson who was responsible for the emergence of behaviorism as the dominant point of view in American psychology. Watson's *Psychology from the Standpoint of a Behaviorist* was first published in 1919. His introductory psychology text presented a coherent S–R view of human behavior, which was extremely successful and provided the structure for later behavioral theories.

Although Pavlov's research excited Watson, the work of another Russian, Vladimir Bechterev, was an even greater influence. Whereas Pavlov used positive or pleasant UCSs,



**John Broadus Watson
(1878–1958)**

Watson studied under Jacques Loeb and John Dewey and received his doctorate from the University of Chicago. Considered the founder of the field of behaviorism, he taught at Johns Hopkins University for 13 years. At Johns Hopkins, he and his assistant Rosalie Rayner conducted his famous “Little Albert” study. He served as president of the American Psychological Association in 1915. In 1920, he was dismissed from Johns Hopkins due to his affair with Rosalie Rayner, whom he subsequently married. After leaving Johns Hopkins, he served as a vice president of the J. Walter Thompson advertising agency, where he applied behavioral principles to advertising, most notably with popularizing the “coffee break” during an ad campaign for Maxwell House coffee.

Source: Center for the History of Psychology, Archives of the History of American Psychology — The University of Akron.

Bechterev employed aversive or unpleasant stimuli (e.g., shock) to study the conditioning process. Bechterev found that a conditioned leg withdrawal response could be established in dogs by pairing a neutral stimulus with the shock. In his replication of Bechterev’s studies, Watson (1916) showed that after several pairings with electric shock, a previously neutral stimulus elicited a leg withdrawal response in dogs. Watson also was able to condition a toe or a finger withdrawal in human subjects. Further, Watson conditioned not only a toe or a finger withdrawal response but emotional arousal (revealed by increased breathing).

As we learned earlier, the functionalists assumed that emotions are innate. In contrast, Watson believed that abnormal, as well as normal, behavior is learned. He was particularly concerned with demonstrating that a human emotion like fear can be acquired through Pavlovian conditioning. To illustrate this point, Watson and his assistant Rosalie Rayner (1920) showed a white rat to a healthy 9-month-old child named Albert who was attending a day care center at Johns

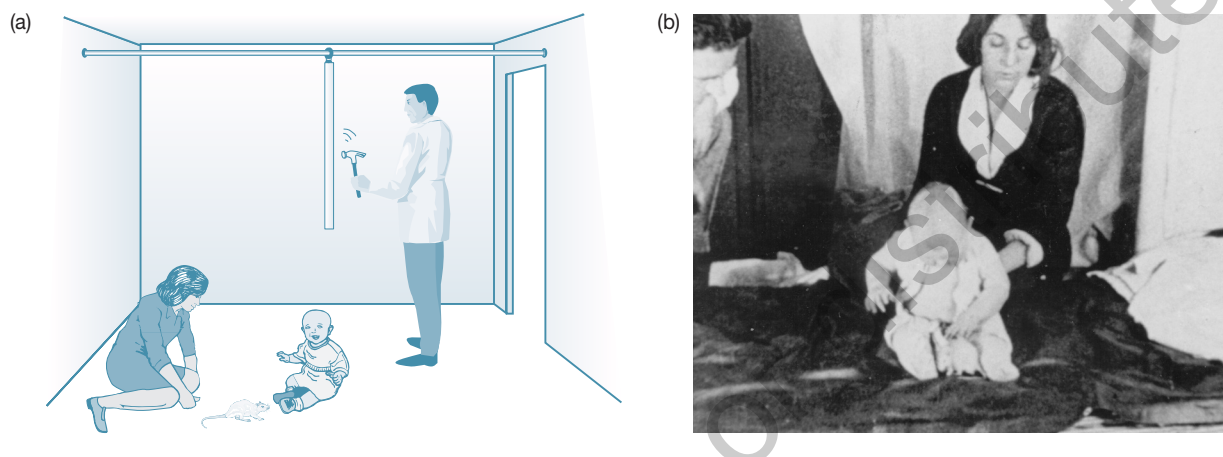
Hopkins University. As the child reached for the rat, he heard a loud sound (UCS) produced as Watson hit a heavy iron rail with a hammer (see **Figures 1.4a and 1.4b**). After three white rat (CS)–loud noise (UCS) pairings, Watson and Rayner observed that the presentation of the rat (CS) alone produced a fear response in the child. The rat elicited emotional arousal, as the child’s attempts to escape from it demonstrated, after six CS–UCS pairings. The authors observed a generalized response to similar objects: According to Watson and Rayner, the child also showed fear of a white rabbit and a white fur coat.

Although Watson had intended to extinguish Albert’s fear, Albert’s mother withdrew him from the day care center before Watson could eliminate the infant’s fear. There has been much speculation about what happened to Albert. Watson and Rayner (1920) suggested that fears like Albert’s were “likely to persist indefinitely, unless an accidental method for removing them is hit upon” (p. 12). Contemporary behaviorists have suggested that not only did Albert develop a phobia of white rats and indeed many furry animals (Eysenck, 1960) but that the “little boy Albert” investigation indicates “that it is quite possible for one experience to induce a phobia” (Wolpe & Rachman, 1960, p. 146). It would, however, be a mistake to base the idea that a phobia can develop after a single experience on the “Little Albert” study (Harris, 1979). Watson and Rayner used a single subject in their study; their accounts of Albert’s fears were very subjective, and they provided no reliable assessment of Albert’s emotional response (Sherman, 1927). Further, attempts to condition fears in children using loud noises have consistently been unsuccessful (Bregman, 1934; Valentine, 1930). Thus, it seems highly unlikely that the methodology Watson and Rayner employed was sufficient for Albert to develop a phobia of white rats. Yet, as we will discover in Chapter 3, there is substantial evidence that phobias in humans can be acquired through Pavlovian conditioning but probably not the kind of experience described in the Watson and Rayner study.

Before You Go On

- How might Pavlovian conditioning lead to test anxiety?
- What could Suzanne learn from Pavlov’s work about a potential way to eliminate test anxiety?

FIGURE 1.4 ■ While “little Albert” was playing with a white rat, Watson struck a suspended bar with a hammer. The loud sound disturbed the child, causing him to develop a conditioned fear of the white rat. Rosalie Rayner, Watson’s assistant, distracted little Albert as Watson approached the bar (a). Photograph of “little Albert” and white rat with Rosalie Rayner and John Watson (b).



Source: Adapted from Swenson, L. C. (1980). *Theories of learning*. Belmont, Calif.: Wadsworth. Copyright © Leland Swenson.

Source: Center for the History of Psychology, Archives of the History of American Psychology—The University of Akron.

Review

- Pavlov demonstrated that pairing a novel stimulus (the CS) with a biologically significant event (the UCS) results in the conditioning of a new reflex.
- Prior to conditioning, only the UCS elicited the UCR, while after the pairing of the conditioned and unconditioned stimuli, the CS elicited the CR.
- Watson suggested that emotional responses develop as a result of Pavlovian conditioning experiences in humans.
- Watson and Rayner observed that a young child would become frightened of a rat if the rat were paired with a loud noise.
- Watson and Rayner suggested that Albert’s fear could also generalize the fear to other white animals and objects.

Many different views of human nature developed during the early part of the 20th century. Some of these views stressed the mentalist aspect of our behavior; others presented human beings as automatically responding to events in our environment. The role of instincts was central to some theories of behavior; learning as the determinant of human action was the core of others. However, psychology was just in its infancy, and all these views remained essentially untested. Our understanding of the learning process has increased during the past century, as you will discover from the remainder of the text.

THE ETHICS OF CONDUCTING RESEARCH

1.7 Discuss how to conduct ethical animal and human research.

In this text, we discuss many studies that used both nonhuman animals and humans as subjects. There are limits to both types of research. Research must never violate principles of ethical conduct. This chapter ends by examining the research that is permissible.

Conducting Research With Human Subjects

Psychological research with human subjects must be conducted in accordance with the principles published by the American Psychological Association (2002) in the article titled “Ethical Principles of Psychologists and Code of Conduct.” Let’s briefly discuss the ethical principles a psychologist must follow when conducting research with humans.

When a psychologist plans to conduct research using human subjects, an ethics committee decides whether that research is permissible under the guidelines. The main principle that determines whether the ethics committee approves the research project is the demonstration that the planned study maximizes potential gain in knowledge and minimizes the costs and potential risks to human subjects. In conducting human research, the psychologist typically enters into an agreement with the subject. The subject learns the general purpose of the study and the potential risks of participating. It also is essential that no subject be coerced into participation in the study. For example, at many schools, students are required to participate in psychological experiments as a course requirement in general psychology. This requirement is permissible only if an alternative activity is available to the student. Students at other universities can volunteer to participate, but failing to volunteer cannot be counted against the student. The subject must also be free to withdraw from the study at any time.

As part of the agreement between the researcher and subject, the subject is informed that he or she will receive some tangible rewards (such as money), personal help (such as counseling), or information regarding the study (primarily results of the study). The researcher must live up to this agreement because it is a contract between the researcher and participant. After the study is completed, the experimenter **debriefs** the subject by providing information about the nature of the study. Further, the anonymity of the subject and confidentiality regarding the subject’s behavior in the study must be maintained. All of this information must be explained in a written agreement, and the subject must sign an **informed consent** agreement indicating that he or she is willing to participate in the study.

The Use of Nonhuman Animals in Research

Many of the studies described in this text used nonhuman animals as subjects, including mice, rats, birds, cats, dogs, and primates. Why do psychologists use nonhuman animals in their research? There are several reasons. One is the problem of documenting causal relationships. People differ greatly in terms of their behavior, which makes it difficult to obtain a representative sample. Because the behavior of animals is less variable, it is easier to show causal relationships in lower animals than in humans.

Another reason for using nonhuman animals is that some types of research cannot be ethically conducted with humans. For example, suppose that a psychologist suspects that damage to a certain area of the brain impairs memory storage. This idea may come from case histories of individuals with memory disorders who have tumors in this brain area. But these

case histories cannot be used to infer causality. The only way to demonstrate causality is to damage this area of the brain and see whether memory storage problems result. Obviously, we cannot do this type of research with humans; it would be unethical to expose a person to any treatment that would lead to behavior pathology. The use of animals provides a way to show that this brain area controls memory storage and that damage to this area leads to memory disorders.

Some people object to the use of animals for demonstrating that a certain area of the brain controls memory storage—or for any other reason. Several arguments have been offered in defense of the use of animals for psychological research. Humans suffer from many different behavior disorders, and animal research can provide us with knowledge concerning the causes of these disorders as well as treatments that can prevent or cure behavioral problems. As the noted psychologist Neal Miller (1985) pointed out, animal research has led to a variety of programs, including rehabilitation treatments for neuromuscular disorders and the development of drug and behavioral treatments for phobias, depression, schizophrenia, and other behavior pathologies.

Certainly, animals should not be harmed needlessly, and their discomfort should be minimized. Yet, when a great deal of human suffering may be prevented, the use of animals in studies seems appropriate (Feeney, 1987). Animal research also has led to significant advances in veterinary medicine, and far more animals are sacrificed for food, sport, or fur coats than for research and education (Nichols & Russell, 1990). Currently, animal research is conducted only when approved by a committee, such as an Institutional Animal Care and Use Committee (IACUC), that acts to ensure that animals are used humanely and in strict accordance with local, state, and federal guidelines.

Before You Go On

- What would Suzanne need to do to conduct a study using human subjects?
- How would Suzanne justify the use of animals to study addictive behavior?

Review

- Ethical principles established by the American Psychological Association govern the kind of research that is permissible with human subjects.
- A researcher must demonstrate to an ethics committee that the planned study maximizes the potential gain in psychological knowledge and minimizes the costs and potential risks to human subjects.
- Many psychologists use nonhuman animals as subjects in their research.
- One reason for using animal subjects is that causal relationships can be demonstrated with animals in certain types of studies that cannot be ethically conducted with humans.
- The discomfort experienced by the animals should be minimized; however, a great deal of human suffering can be prevented by conducting research with animals.
- Animal research must be approved by a committee, such as the IACUC, which acts to ensure that animals are used in accordance with local, state, and federal guidelines.

Critical Thinking Questions

1. Functionalism and behaviorism present quite different explanations for the causes of behavior. Explain the differences between functionalism and behaviorism. Then, select a behavior, and explain that behavior using both the functionalist and behaviorist perspectives.
2. Pavlov and Thorndike had a significant impact on our understanding of the learning process. Describe their work, and indicate why it is important for learning theory.
3. Many individuals object to the use of animals in psychological research. Discuss the basis of their objections. Explain why some psychologists use animals in their studies. Is there any way to reconcile these opposing perspectives?

Key Terms

association 4	debriefs 12	law of readiness 7
associative shifting 7	extinction 9	learning 2
behaviorism 4	fear 2	Pavlovian conditioning 8
cause and effect 4	functionalism 3	resemblance 4
complex ideas 4	generalization 9	reward 5
conditioned reflex 8	habit 5	simple ideas 4
conditioned response 8	informed consent 12	unconditioned reflex 8
conditioned stimulus 8	instincts 3	unconditioned response 8
contiguity 4	law of effect 5	unconditioned stimulus 8