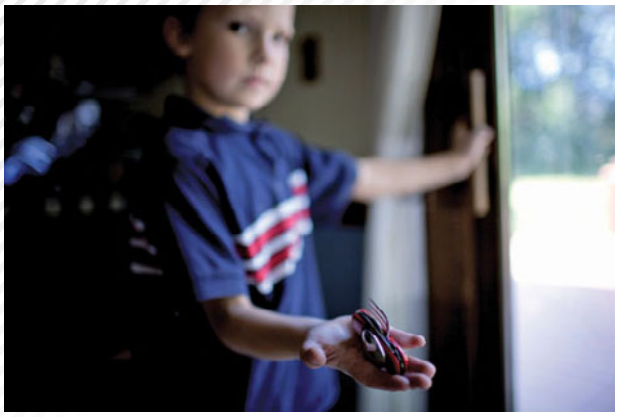
Psychology in the News

First Grader Suspended Over Camping Utensil

NEWARK, DE, October 12, 2009. Zachary Christie was so excited about joining the Cub Scouts and going on campouts that he brought his favorite camping utensil to school to use at lunch. The utensil is handy because it can serve as a knife, fork, and spoon. But school officials have decided that the 6-year-old boy violated their zero-tolerance policy on weapons—which would include the "knife" part of the multipurpose utensil—and have suspended him. He now faces 45 days in the district's reform school. "It just seems unfair," Zachary said, while practicing writing his lowercase letters at home.

In response to shooting incidents in schools, many districts have adopted zero-tolerance policies on the possession of weapons on school grounds. In Zachary's case, officials felt they had no choice but to suspend him because the district bans knives regardless of the possessor's intent, age, or character.



Zachary Christie with the camping utensil that got him in trouble.

"Zachary wears a suit and tie some days to school by his own choice because he takes school so seriously," said Debbie Christie, Zachary's mother. "He is not some sort of threat to his classmates." But George Evans, president of the school district's board, defended the decision. "There is no parent who wants to get a phone call where they hear that their child no longer has two good seeing eyes because there was a scuffle and someone pulls out a knife," he commented.

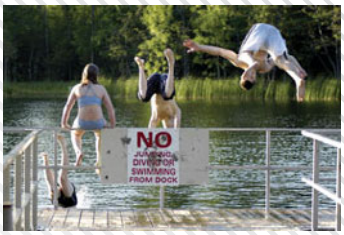
Critics argue that zero-tolerance policies like the one that landed Zachary in hot water have led to increased suspensions and expulsions, which results in kids spending time in places like the street, where their behavior only gets worse. Inflexible policies can also lead to heavy punishment for minor infractions. Last year, a third grader in Delaware was expelled for a year because her grandmother had sent a birthday cake to school along with a knife to cut it.

Zero-tolerance policies initially gave authorities more leeway in punishing students, but critics charged that they were being applied in a discriminatory manner against African-American children, who were more likely than white children to be suspended or expelled for committing the same offenses. As a result, many school districts have removed discretion in the application of the policies.

Zachary himself is reluctant to go back to school. "I just think the other kids may tease me for being in trouble," he said, and added, "but I think the rules are what is wrong, not me."

CHAPTER 9

Learning and Conditioning



Are zero-tolerance policies justified? Should children who commit minor infractions be punished as severely as those who commit serious ones? If not, how should school administrators treat children who are disruptive or violent? Should schools expel them or are there alternatives? In the home, how should parents correct their children's misbehavior? Is "a good spanking" the best recourse for parents, or should there be "zero tolerance" for parents who use any kind of corporal punishment?

The debate over how to discipline children has been with us for a long time. It is part of a larger issue: How can we change unwanted, self-defeating, or dangerous behavior? Many people want to fix their own bad habits, of course, and they are forever trying to improve or fix other people's behavior as well. We imprison criminals, spank children, shout at spouses, and give the finger to a driver who cuts us off. On the positive side, we give children gold stars for good work, give parents bumper stickers that praise their children's successes, give bonuses to employees, and give out trophies for top performance. Do any of these efforts get the results we hope for? Well, yes and no. Once you understand the laws of **learning**, you will realize that behavior, whether it's your own or other people's, *can* change for the better. And you will also understand why often it does not.

Research on learning has been heavily influenced by **behaviorism**, the school of psychology that accounts for behavior in terms of observable acts and events, without reference to mental entities such as "mind" or "will" (see Chapter 1). Behaviorists focus on **conditioning**, which involves associations between environmental stimuli and responses. They have shown that two types of conditioning, *classical conditioning* and *operant conditioning*, can explain a great deal of behavior both in animals and in people. But other approaches, including *social-cognitive learning theories*, hold that omitting mental processes from explanations of human learning is like omitting passion from descriptions of sex:

learning A relatively permanent change in behavior (or behavioral potential) due to experience.

behaviorism An approach to psychology that emphasizes the study of observable behavior and the role of the environment as a determinant of behavior.

conditioning A basic kind of learning that involves associations between environmental stimuli and the organism's responses.

unconditioned stimulus (US) The classical-conditioning term for a stimulus that elicits a reflexive response in the absence of learning.

You may explain the form, but you miss its essence. To social-cognitive theorists, learning includes not only changes in behavior but also changes in thoughts, expectations, and knowledge, which in turn influence behavior in a reciprocal, or two-way, process.

As you read about the principles of conditioning and learning in this chapter, ask yourself what they can teach us about the use of punishment to control undesirable behavior. What happens when punishment is used inappropriately? What is the best way to modify other people's behavior—and our own?

YOU are about to learn...

- how classical conditioning explains why a dog might salivate when it sees a lightbulb or hears a buzzer.
- four important features of classical conditioning.
- what is actually learned in classical conditioning.

Classical Conditioning

At the turn of the twentieth century, the great Russian physiologist Ivan Pavlov (1849–1936) was studying salivation in dogs as part of a research program on digestion. One of his procedures was to make a surgical opening in a dog's cheek and insert a tube that conducted saliva away from the animal's salivary gland so that the saliva could be measured. To stimulate the reflexive flow of saliva, Pavlov placed meat powder or other food in the dog's mouth (see Figure 9.1).

Pavlov was a truly dedicated scientific observer. Many years later, as he lay dying, he even dictated his sensations for posterity! And he instilled in his students and assistants the same passion for detail. During his salivation studies, one of the assistants noticed something that most people would have overlooked or dismissed as trivial. After a dog had been brought to the laboratory a few times, it would start to salivate *before* the food was placed in its mouth. The sight or smell of the food, the dish in which the food was kept, and even the sight of the person who delivered the food were enough to start the dog's mouth watering. These new salivary responses clearly were not inborn, so they must have been acquired through experience.

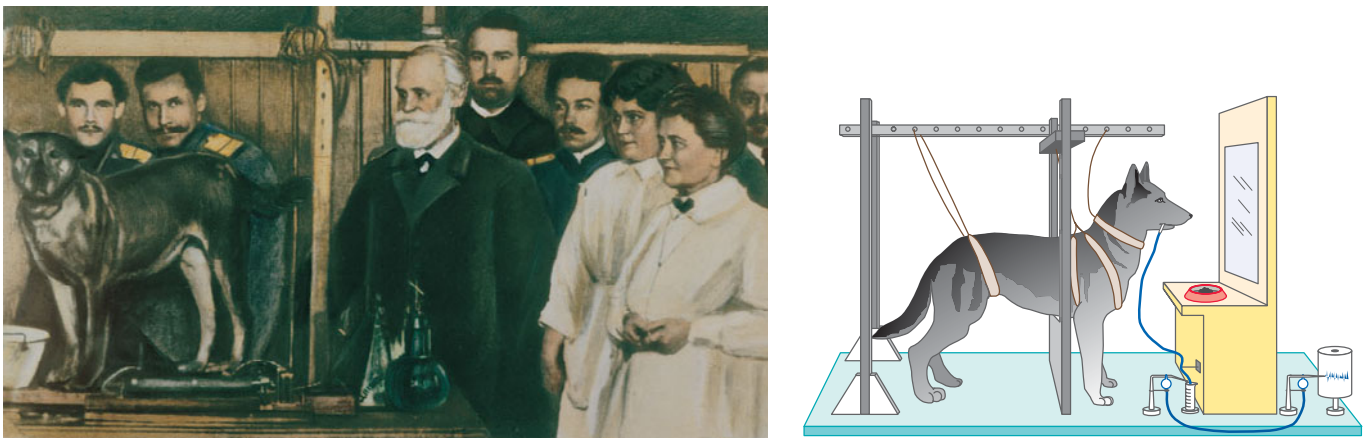
At first, Pavlov treated the dog's drooling as just an annoying secretion. But he quickly realized that his assistant had stumbled onto an important phenomenon, one that Pavlov came to believe was the basis of most learning in human beings and other animals (Pavlov, 1927). He called that phenomenon a "conditional" reflex because it depended on environmental conditions. Later, an error in the translation of his writings transformed "conditional" into "conditioned," the word most commonly used today.

Pavlov soon dropped what he had been doing and turned to the study of conditioned reflexes, to which he devoted the last three decades of his life. Why were his dogs salivating to things other than food?

New Reflexes from Old

Pavlov initially speculated about what his dogs might be thinking and feeling when they drooled before getting their food. Was the doggy equivalent of "Oh boy, this means chow time" going through their minds? He soon decided, however, that such speculation was pointless. Instead, he focused on analyzing the environment in which the conditioned reflex arose.

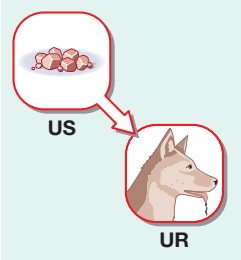
The original salivary reflex, according to Pavlov, consisted of an **unconditioned stimulus (US)**,



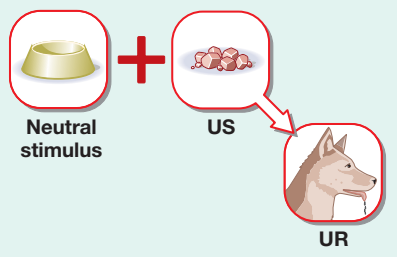
A B

FIGURE 9.1
Pavlov's Method
The photo shows Ivan Pavlov (in the white beard), flanked by his students and a canine subject. The drawing depicts an apparatus similar to the one he used; saliva from a dog's cheek flowed down a tube and was measured by the movement of a needle on a revolving drum.

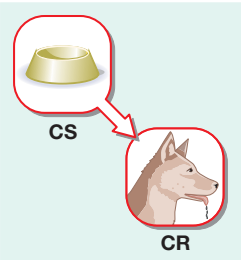
food in the dog's mouth, and an **unconditioned response (UR)**, salivation. By an unconditioned stimulus, Pavlov meant an event or thing that elicits a response automatically or reflexively. By an unconditioned response, he meant the response that is automatically produced:



Learning occurs, said Pavlov, when a neutral stimulus (one that does not yet produce a particular response, such as salivation) is regularly paired with an unconditioned stimulus:



The neutral stimulus then becomes a **conditioned stimulus (CS)**, which elicits a learned or **conditioned response (CR)** that is usually similar or related to the original, unlearned one. In Pavlov's laboratory, the sight of the food dish, which had not previously elicited salivation, became a CS for salivation:



The procedure by which a neutral stimulus becomes a conditioned stimulus eventually became known as **classical conditioning**, and is sometimes also called *Pavlovian* or *respondent* conditioning. Pavlov and his students went on to show that all sorts of things can become conditioned stimuli for salivation if they are paired with food: the ticking of a metronome, the musical tone of a bell, the vibrating sound of a buzzer, a touch on the leg, even a pinprick or an electric shock. And since Pavlov's day, many automatic, involuntary responses besides salivation have been classically conditioned, including heartbeat, stomach secretions, blood pressure, reflexive movements, blinking, and muscle contractions. In the laboratory, the optimal interval between the presentation of the neutral stimulus and the presentation of the US is often quite short, sometimes less than a second.

Principles of Classical Conditioning

Classical conditioning occurs in all species, from one-celled amoebas to *Homo sapiens*. Let us look more closely at some important features of this process: extinction, higher-order conditioning, and stimulus generalization and discrimination.

Extinction Conditioned responses do not necessarily last forever. If, after conditioning, the conditioned stimulus is repeatedly presented without the unconditioned stimulus, the conditioned response eventually disappears and **extinction** is said to have occurred (see Figure 9.2 on the next page). Suppose that you train your dog Milo to salivate to the sound of a bell, but then you ring the bell every five minutes and do *not* follow it with food. Milo will salivate less and less to the bell and will soon stop salivating altogether; salivation will have been extinguished. Extinction is not the same as unlearning or forgetting, however. If you come back the next day and ring the bell, Milo may salivate again for a few trials, although the response will probably be weaker. The reappearance of the response, called **spontaneous recovery**, explains why completely eliminating a conditioned response often requires more than one extinction session.

Higher-Order Conditioning Sometimes a neutral stimulus can become a conditioned stimulus by being paired with an already-established CS, a procedure known as **higher-order conditioning**. Say Milo has learned to salivate to the sight of his food dish. Now you flash a bright light before presenting

unconditioned response (UR) The classical-conditioning term for a reflexive response elicited by a stimulus in the absence of learning.

conditioned stimulus (CS) The classical-conditioning term for an initially neutral stimulus that comes to elicit a conditioned response after being associated with an unconditioned stimulus.

conditioned response (CR) The classical-conditioning term for a response that is elicited by a conditioned stimulus; it occurs after the conditioned stimulus is associated with an unconditioned stimulus.

classical conditioning The process by which a previously neutral stimulus acquires the capacity to elicit a response through association with a stimulus that already elicits a similar or related response. Also called *Pavlovian* or *respondent* conditioning.

extinction The weakening and eventual disappearance of a learned response; in classical conditioning, it occurs when the conditioned stimulus is no longer paired with the unconditioned stimulus.

spontaneous recovery The reappearance of a learned response after its apparent extinction.

higher-order conditioning In classical conditioning, a procedure in which a neutral stimulus becomes a conditioned stimulus through association with an already established conditioned stimulus.

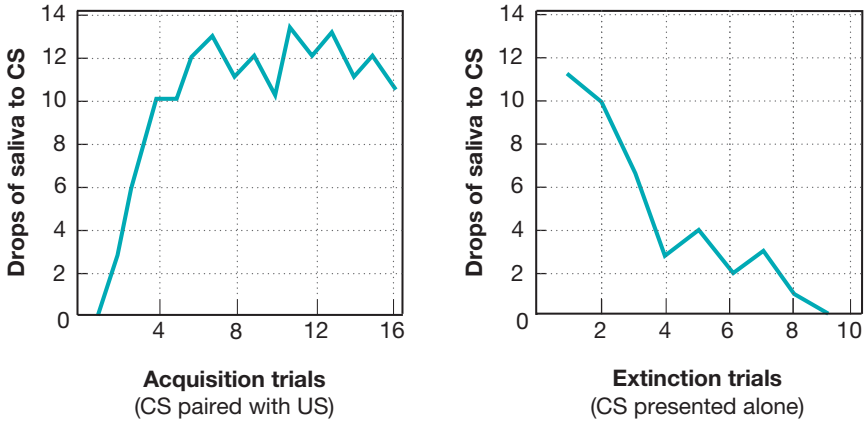


FIGURE 9.2
Acquisition and Extinction of a Salivary Response
A neutral stimulus that is consistently followed by an unconditioned stimulus for salivation will become a conditioned stimulus for salivation (left). But when this conditioned stimulus is then repeatedly presented without the unconditioned stimulus, the conditioned salivary response will weaken and eventually disappear (right); it has been extinguished.

stimulus generalization After conditioning, the tendency to respond to a stimulus that resembles one involved in the original conditioning; in classical conditioning, it occurs when a stimulus that resembles the CS elicits the CR.

stimulus discrimination The tendency to respond differently to two or more similar stimuli; in classical conditioning, it occurs when a stimulus similar to the CS fails to evoke the CR.

the dish. With repeated pairings of the light and the dish, Milo may learn to salivate to the light. The procedure for higher-order conditioning is illustrated in Figure 9.3.

Higher-order conditioning may explain why some words trigger emotional responses in us—why they can inflame us to anger or evoke warm, sentimental feelings. When words are paired with objects or other words that already elicit some emotional response, they too may come to elicit that response (Staats & Staats, 1957). A child may learn a positive response to the word *birthday* because of its association with gifts and attention. Conversely, the child may learn a negative response to ethnic or national labels if the labels are paired with words that the child has already learned are disagreeable, such as *dumb* or *dirty*. Higher-order conditioning, in other words, may contribute to the formation of prejudices.

Stimulus Generalization and Discrimination After a stimulus becomes a conditioned stimulus for some response, other, similar stimuli may produce a similar reaction—a phenomenon known as **stimulus generalization**. If you condition your patient pooch Milo to salivate to middle C on the piano, Milo may also salivate to D, which is one tone above C, even though you did not pair D with food. Stimulus generalization is described nicely by an old English proverb: "He who hath been bitten by a snake fears a rope."

The mirror image of stimulus generalization is **stimulus discrimination**, in which *different* responses are made to stimuli that resemble the conditioned stimulus in some way. Suppose that you have conditioned Milo to salivate to middle C on the piano by repeatedly pairing the sound with food. Now you play middle C on a guitar, *without* following it by food (but you continue to follow C on the piano by food). Eventually, Milo will learn to salivate to a C on the piano and not to salivate to the same note on the guitar; that is, he will discriminate between the two sounds. If you keep at this long enough, you could train Milo to be a pretty discriminating drooler!

What Is Actually Learned in Classical Conditioning?

For classical conditioning to be most effective, the stimulus to be conditioned should *precede* the unconditioned stimulus rather than follow it or occur simultaneously with it. This makes sense because, in classical conditioning, the conditioned stimulus becomes a *signal* for the unconditioned stimulus. Classical conditioning is in fact an evolutionary

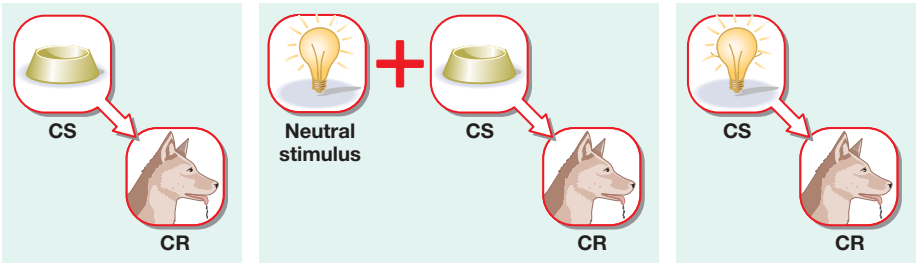


FIGURE 9.3
Higher-Order Conditioning
In this illustration of higher-order conditioning, the food dish is a previously conditioned stimulus for salivation (left). When the light, a neutral stimulus, is paired with the dish (center), the light also becomes a conditioned stimulus for salivation (right).

Get Involved! Conditioning an Eye-Blink Response

Try out your behavioral skills by conditioning an eye-blink response in a willing friend, using classical-conditioning procedures. You will need a drinking straw and something to make a ringing sound; a spoon tapped on a water glass works well. Tell your friend that you are going to use the straw to blow air in his or her eye, but do not say why. Immediately before each puff of air, make the ringing sound. Repeat this procedure ten times. Then make the ringing sound but *don't* puff. Your friend will probably blink anyway, and may continue to do so for one or two more repetitions of the sound before the response extinguishes. Can you identify the US, the UR, the CS, and the CR in this exercise?

adaptation, one that enables the organism to anticipate and prepare for a biologically important event that is about to happen. In Pavlov's studies, for instance, a bell, buzzer, or other stimulus was a signal that meat was coming, and the dog's salivation was preparation for digesting food. Today, therefore, many psychologists contend that what an animal or person actually learns in classical conditioning is not merely an association between two paired stimuli that occur close together in time, but rather *information* conveyed by one stimulus about another: "If a tone sounds, food is likely to follow."

This view is supported by the research of Robert Rescorla (1988), who showed, in a series of imaginative studies, that the mere pairing of an unconditioned stimulus and a neutral stimulus is not enough to produce learning. To become a conditioned stimulus, the neutral stimulus must reliably signal, or *predict*, the unconditioned stimulus. If food occurs just as often *without* a preceding tone as with it, the tone is unlikely to become a conditioned stimulus for salivation, because the tone does not provide any information about the probability of getting food. Think of it this way: If every phone call you got brought bad news that made your heart race, your heart might soon start pounding every time the phone rang—a conditioned response. Ordinarily, though, upsetting calls occur randomly among a far greater number of routine ones. The ringtone may sometimes be paired with a racing heart, but it doesn't always signal disaster, so no conditioned heart-rate response occurs.

Rescorla concluded that "Pavlovian conditioning is not a stupid process by which the organism willy-nilly forms associations between any two stimuli that happen to co-occur. Rather, the organism is better seen as an information seeker using logical and perceptual relations among events, along with its own preconceptions, to form a sophisticated representation of its world." Not all learning theorists agree; an orthodox behaviorist would say that it is silly to talk about the preconceptions of a rat. The important point, however, is that concepts such as "information seeking," "preconceptions," and "representations of the world" open the door to a more cognitive view of classical conditioning. Explore

Explore **Three Stages of Classical Conditioning** on **mypsychlab.com**

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Quick Quiz

Classical-conditioning terms can be hard to learn, so be sure to take this quiz before going on.

A. Name the unconditioned stimulus, unconditioned response, conditioned stimulus, and conditioned response in these two situations.

1. Five-year-old Samantha is watching a storm from her window. A huge bolt of lightning is followed by a tremendous thunderclap, and Samantha jumps at the noise. This happens several more times. There is a brief lull and then another lightning bolt. Samantha jumps in response to the bolt.
2. Gregory's mouth waters whenever he eats anything with lemon in it. One day, while reading an ad that shows a big glass of lemonade, Gregory finds that his mouth has started to water.

B. In the view of many learning theorists, pairing a neutral and unconditioned stimulus is not enough to produce classical conditioning; the neutral stimulus must _____ the unconditioned stimulus.

Answers:

A. 1. US = the thunderclap; UR = jumping elicited by the noise; CS = the sight of the lightning; CR = jumping elicited by the lightning **2.** US = the taste of lemon; UR = salivation elicited by the taste of lemon; CS = the picture of a glass of lemonade; CR = salivation elicited by the picture **B.** signal or predict

YOU are about to learn...

- why advertisers often include pleasant music and gorgeous scenery in ads for their products.
- how classical conditioning might explain your irrational fear of heights or mice.
- how you might be conditioned to like certain tastes and odors and be turned off by others.
- how sitting in a doctor's office can make you feel sick and placebos can make you feel better.
- how technology is helping researchers study the biological basis of classical conditioning.

Classical Conditioning in Real Life

If a dog can learn to salivate to the ringing of a bell, so can you. In fact, you probably have learned to salivate to the sound of a lunch bell, the phrase *hot fudge sundae*, and "mouth-watering" pictures of food. But classical conditioning affects us every day in many other ways.

One of the first psychologists to recognize the real-life implications of Pavlovian theory was John B. Watson, who founded American behaviorism and enthusiastically promoted Pavlov's ideas. Watson believed that the whole rich array of human emotion and behavior could be accounted for by conditioning principles. He even suggested that we learn to love another person when that person is paired with stroking and cuddling. Watson was wrong about love, which is a lot more complicated than he thought (see Chapter 14). But he was right about the power of classical conditioning to affect our emotions, preferences, and tastes.

Why do most people fear snakes, and why do some even develop a snake phobia?

Learning to Like

Classical conditioning plays a big role in our emotional responses to objects, people, symbols, events, and places. It can explain why sentimental feelings sweep over us when we see a school mascot, a national flag, or the logo of the Olympic games. These objects have been associated in the past with positive feelings.

Many advertising techniques take advantage of classical conditioning's role in emotional responses. When you see ads, notice how many of them pair a product with music the advertiser thinks you'll like, with good-looking people, with idyllic scenery, or with celebrities you admire or think are funny. In classical-conditioning terms, the music, attractive person, or celebrity is an unconditioned stimulus for internal responses associated with pleasure, and the advertiser hopes that the product in the ad will become a conditioned stimulus, evoking similar responses in you.

Learning to Fear

Positive emotions are not the only ones that can be classically conditioned; so can dislikes and fears. A person can learn to fear just about anything if it is paired with something that elicits pain, surprise, or embarrassment. Human beings, however, are biologically primed to acquire some kinds of fears more readily than others. It is far easier to establish a conditioned fear of spiders, snakes, and heights than of butterflies, flowers, and toasters. The former can be dangerous to your health, so in the process of evolution, human beings acquired a tendency to learn quickly to be wary of them and to retain this fear (LoBue & DeLoache, 2008; Öhman & Mineka, 2001). Some theorists believe that evolution has also instilled in humans a readiness to learn to fear unfamiliar members of ethnic groups other than their own, and that this tendency too resists extinction and may contribute to the emotional underpinnings of prejudice (Navarrete et al., 2009; Olsson et al., 2005).

The Birth of a Phobia When fear of an object or situation becomes irrational and interferes with normal activities, it qualifies as a *phobia* (see Chapter 11). To demonstrate how a phobia might be learned, John Watson and Rosalie Rayner (1920/2000) deliberately established a rat phobia in an 11-month-old boy named Albert. Their goal was to demonstrate how an inborn reaction of fear could transfer to a wide range of stimuli; today we call this stimulus generalization. They also wanted to demonstrate that adult emotional responses, such as specific fears, could originate in early childhood. The research procedures that Watson and Rayner used had some flaws, and for ethical reasons, no psychologist today would attempt to do such a thing to a child. Nevertheless, the study's main conclusion, that fears can be conditioned, is still well accepted.

"Little Albert" was a placid child who rarely cried. (Watson and Rayner deliberately chose such a child because they thought their demonstration would do him relatively little harm.) When Watson and Rayner gave Albert a live, furry rat to play with,

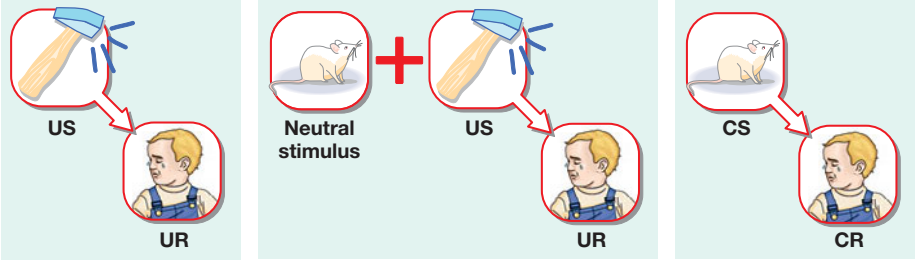


FIGURE 9.4
The Creation of a Fear
In the Little Albert study, noise from a hammer striking a steel bar was an unconditioned stimulus for fear (left). When a white rat, a neutral stimulus, was paired with the noise (center), the rat then became a conditioned stimulus for fear (right).

he showed no fear; in fact, he was delighted. The same was true when they showed him a variety of other objects, including a rabbit and some cotton wool. However, like most children, Albert was innately afraid of loud noises. When the researchers made a loud noise behind his head by striking a steel bar with a hammer, he would jump and fall sideways onto the mattress where he was sitting. The noise made by the hammer was an unconditioned stimulus for the unconditioned response of fear.

Having established that Albert liked rats, Watson and Rayner set about teaching him to fear them. Again they offered him a rat, but this time, as he reached for it, one of the researchers struck the steel bar. Startled, Albert fell onto the mattress. A week later, the researchers repeated this procedure several times. Albert began to whimper and tremble. Finally, they held out the rat to him without making the noise. Albert fell over, cried, and crawled away so quickly that he almost reached the edge of the table he was sitting on before an adult caught him; the rat had become a conditioned stimulus for fear (see Figure 9.4). Tests done a few days later showed that Albert's fear had generalized to other hairy or furry objects, including a white rabbit, cotton wool, a Santa Claus mask, and even John Watson's hair. Explore

Unfortunately, Watson and Rayner lost access to Little Albert, so we do not know how long the child's fears lasted. Further, because the study ended early, Watson and Rayner had no opportunity to reverse the conditioning. However, Watson and Mary Cover Jones did reverse another child's conditioned fear—one that was, as Watson put it, "homegrown" rather than psychologist-induced (Jones, 1924). A 3-year-old named Peter was deathly afraid of rabbits. Watson and Jones eliminated his fear with a method called **counterconditioning**, in which a conditioned stimulus is paired with some other stimulus that elicits a response incompatible with the unwanted response (see Figure 9.5).

At first, the researchers kept the rabbit some distance from Peter, so that his fear would remain at a low level. Otherwise, Peter might have learned to fear milk and crackers! Then gradually, over

counterconditioning
In classical conditioning, the process of pairing a conditioned stimulus with a stimulus that elicits a response that is incompatible with an unwanted conditioned response.

Explore **Classical Conditioning of Little Albert** on **mypsychlab.com**

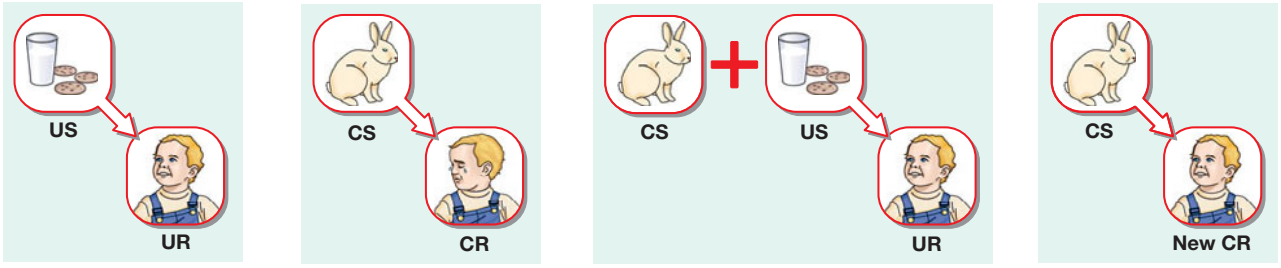


FIGURE 9.5
The Counterconditioning of a Fear
Three-year-old Peter had acquired a conditioned response of fear of rabbits. To countercondition this fear, the researchers paired a rabbit (the CS) with a snack of milk and crackers (a US), which produced pleasant feelings that were incompatible with the conditioned response of fear. Eventually, Peter felt as comfortable with the rabbit as with the crackers.

several days, they brought the rabbit closer and closer. Eventually Peter learned to like rabbits and Peter was even able to sit with the rabbit in his lap, playing with it with one hand while he ate with the other. A variation of this procedure, called *systematic desensitization*, was later devised for treating phobias in adults (see Chapter 12).

Biology and Conditioned Fears Researchers today are exploring the biological basis of fear conditioning and fear extinction. The acquisition of a conditioned fear appears to involve a receptor in the amygdala for the neurotransmitter glutamate. Giving rats a drug that blocks this receptor prevents extinction of a conditioned fear, whereas giving a drug that enhances the receptor's activity speeds up extinction (Walker et al., 2002). Inspired by these results, researchers set out to learn whether the receptor-enhancing drug (which is safe in humans) could help people with a phobic fear of heights (Davis et al., 2005). Using a double-blind procedure, they gave the drug to 15 such people and a placebo to 15 others. The participants then underwent two therapy sessions in which they donned virtual reality goggles and "rode" a glass elevator to progressively higher floors in a virtual hotel—an incredibly scary thing to do if you're terrified of heights! They could also "walk" out on a bridge and look down on a fountain in the hotel lobby. During each session, and again at one-week and three-month follow-up sessions, the participants rated their discomfort at each "floor." Combining the therapy with the drug reduced symptoms far more than combining it with the placebo. Further, in their everyday lives, people who got the drug were less likely than the control subjects to avoid heights.

Genetic differences might explain why some people are more likely than others to become anxious and fearful. In a study done in Sweden, researchers conditioned university students to startle in response to pictures of faces. Only those students who had a particular gene associated with reactivity in the amygdala acquired the conditioned startle response. And those students who carried a gene associated with impaired cognitive control in the prefrontal cortex showed resistance to extinction of the response (Lonsdorf et al., 2009). Such research helps us to understand the biological mechanisms that underlie our innate and conditioned fears.

Accounting for Taste

Classical conditioning can also explain learned reactions to many foods and odors. In the laboratory, researchers have taught animals to dislike foods or odors by pairing them with drugs that cause nausea or other unpleasant symptoms. One research team trained slugs to associate the smell of carrots, which slugs normally like, with a bitter-tasting chemical they detest. Soon the slugs were avoiding the smell of carrots. The researchers then demonstrated higher-order conditioning by pairing the smell of carrots with the smell of potato. Sure enough, the slugs began to avoid the smell of potato as well (Sahley, Rudy, & Gelperin, 1981).

Whether we say "yuck" or "yum" to a food may depend on a past experience involving classical conditioning.

Many people have learned to dislike a food after eating it and then falling ill, even when the two events were unrelated. The food, previously a neutral stimulus, becomes a conditioned stimulus for nausea or other symptoms produced by the illness. Psychologist Martin Seligman once told how he himself was conditioned to hate béarnaise sauce. One night, shortly after he and his wife ate a delicious filet mignon with béarnaise sauce, he came down with the flu. Naturally, he felt wretched. His misery had nothing to do with the béarnaise sauce, of course, yet the next time he tried it, he found to his annoyance that he disliked the taste (Seligman & Hager, 1972).

Notice that, unlike conditioning in the laboratory, Seligman's aversion to the sauce occurred after only one pairing of the sauce with illness and with a considerable delay between the conditioned and unconditioned stimuli. Moreover, Seligman's wife did not become a conditioned stimulus for nausea, and neither did his dinner plate or the waiter, even though they also had been paired with illness. Why? In earlier work with rats, John Garcia and Robert Koelling (1966) had provided the answer: the existence of a greater biological readiness to

associate sickness with taste than with sights or sounds. Like the tendency to acquire certain fears, this biological tendency probably evolved because it enhanced survival. Eating bad food, after all, is more likely to be followed by illness than are sights or sounds.

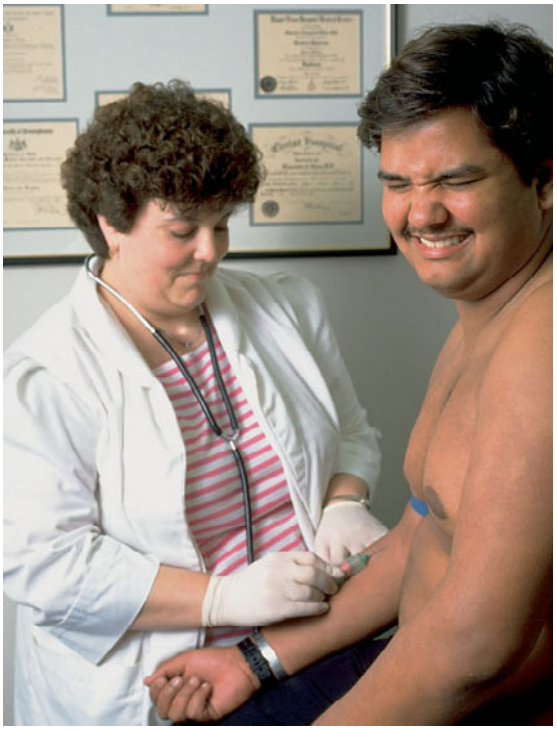
Psychologists have taken advantage of this phenomenon to develop humane ways of discouraging predators from preying on livestock, using conditioned taste aversions instead of traps and poisons. In one classic study, researchers laced sheep meat with a nausea-inducing chemical. Coyotes and wolves fell for the bait, and as a result they developed a conditioned aversion to sheep (Gustavson et al., 1974). Similar techniques have been used to deter raccoons from killing chickens, and ravens and crows from eating crane eggs (Garcia & Gustavson, 1997).

Reacting to Medical Treatments

Because of classical conditioning, medical treatments can create unexpected misery, because reactions to treatment may generalize to stimuli that are entirely unrelated to the treatment itself. A particular problem for cancer patients is that the nausea and vomiting resulting from chemotherapy often generalize to the place where the therapy takes place, the waiting room, the sound of a nurse's voice, or the smell of rubbing alcohol. The drug treatment is an unconditioned stimulus for nausea and vomiting, and through association, the other previously neutral stimuli become conditioned stimuli for these responses. Even *mental images* of the sights and smells of the clinic can become conditioned stimuli for nausea (Dadds et al., 1997; Redd et al., 1993).

Some cancer patients also acquire a classically conditioned anxiety response to anything associated with their chemotherapy. In one study, patients who drank lemon-lime Kool-Aid before their therapy sessions developed an anxiety response to the drink—an example of higher-order conditioning. They continued to feel anxious even when the drink was offered in their homes rather than at the clinic (Jacobsen et al., 1995).

Conversely, patients may have *reduced* pain and anxiety when they receive *placebos*, pills and injections that have no active ingredients or treatments that have no direct physical effect on the problem. Placebos can be amazingly powerful, especially when they take the form of an injection, a large pill, or a pill with a brand name (Benedetti & Levi-Montalcini, 2001). Why do they work? Biological psychologists have shown that placebos can actually affect the brain in much the same way as real treatments do (see Chapter 6). Cognitive psychologists emphasize the role of expectations of getting better, which may reduce anxiety and thus boost the immune system, or simply encourage people to cope better with their symptoms. But behaviorists argue that the doctor's white coat, the doctor's office, and pills or injections all become conditioned stimuli for relief from symptoms because these stimuli have been associated in the past with *real* drugs (Ader, 2000). The real drugs are the unconditioned stimuli, and the relief they bring is the unconditioned response. Placebos acquire the ability to elicit similar reactions, thereby becoming conditioned stimuli.



The anxiety that many people feel about having blood drawn can generalize to the nurse, the room, the sight of needles . . . .

The expectancy explanation of placebo effects and the classical-conditioning explanation are not mutually exclusive (Kirsch, 2004; Stewart-Williams & Podd, 2004). As we saw earlier, many researchers now accept the view that classical conditioning itself involves the expectation that the conditioned stimulus will be followed by the unconditioned stimulus. Thus, at least some classically conditioned placebo effects may involve the patient's expectations. In fact, the patient's previous conditioning history may be what created those expectations to begin with.

Study and Review on mypsychlab.com

Quick Quiz

We hope you have not acquired a classically conditioned fear of quizzes.

A. See whether you can supply the correct term to describe the outcome in each of these situations.

1. After a child learns to fear spiders, he also responds with fear to ants, beetles, and other crawling bugs.
2. A toddler is afraid of the bath, so her father puts just a little water in the tub and gives the child a lollipop to suck on while she is being washed. Soon the little girl loses her fear of the bath.
3. A factory worker's mouth waters whenever a noontime bell signals the beginning of his lunch break. One day, the bell goes haywire and rings every half hour. By the end of the day, the worker has stopped salivating to the bell.

B. A boy who gets weekly allergy shots starts to feel anxious as soon as he enters the doctor's waiting room. What is the behavioral explanation?

Answers:

A. 1. stimulus generalization **2.** counterconditioning **3.** extinction **B.** The sight and smells of the waiting room have become a conditioned stimulus for the anxiety and discomfort provoked by the shots.

YOU are about to learn...

- how the consequences of your actions affect your future behavior.
- what praising a child and quitting your nagging have in common.

Operant Conditioning

At the end of the nineteenth century, in the first known scientific study of anger, G. Stanley Hall (1899) asked people to describe angry episodes they had experienced or observed. One person told of a 3-year-old girl who broke out in seemingly uncontrollable sobs when she was kept home from a ride. In the middle of her outburst, the child suddenly stopped and asked her nanny in a perfectly calm voice if her father was in. Told no, and realizing that he was not around to put a stop to her tantrum, she immediately resumed her sobbing.

Children, of course, cry for many valid reasons—pain, discomfort, fear, illness, fatigue—and these cries deserve an adult's sympathy and attention. The child in Hall's study, however, was crying because she had learned from prior experience that an outburst of sobbing would pay off by bringing her attention and possibly the ride she wanted. Her tantrum illustrates one of the most basic laws of learning: *Behavior becomes more likely or less likely depending on its consequences.*

This principle is at the heart of **operant conditioning** (also called *instrumental conditioning*), the second type of conditioning studied by behaviorists.

operant conditioning The process by which a response becomes more likely to occur or less so, depending on its consequences.

In classical conditioning, it does not matter whether an animal's or person's behavior has consequences. In Pavlov's procedure, the dog learned an association between two events that were not under its control (e.g., a tone and the delivery of food), and the animal got food whether or not it salivated. But in operant conditioning, the organism's response (such as the little girl's sobbing) *operates* or produces effects on the environment. These effects, in turn, influence whether the response will occur again.

Classical conditioning and operant conditioning also tend to differ in the types of responses they

An instantaneous learning experience.

involve. In classical conditioning, the response is typically reflexive, an automatic reaction to something happening in the environment, such as the sight of food or the sound of a bell. Generally, responses in operant conditioning are complex and are not reflexive—for instance, riding a bicycle, writing a letter, climbing a mountain, . . . or throwing a tantrum.

The Birth of Radical Behaviorism

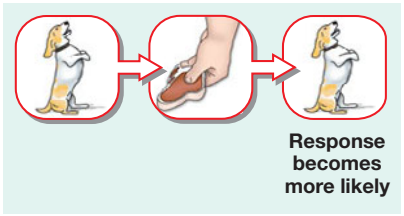
Operant conditioning has been studied since the start of the twentieth century, although it was not called that until later. Edward Thorndike (1898), then a young doctoral candidate, set the stage by observing cats as they tried to escape from a complex "puzzle box" to reach a scrap of fish located just outside the box. At first, the cat would scratch, bite, or swat at parts of the box in an unorganized way. Then, after a few minutes, it would chance on the successful response (loosening a bolt, pulling a string, or hitting a button) and rush out to get the reward. Placed in the box again, the cat now took a little less time to escape, and after several trials, the animal immediately made the correct response. According to Thorndike, this response had been "stamped in" by the satisfying result of getting the food. In contrast, annoying or unsatisfying results "stamped out" behavior. Behavior, said Thorndike, is controlled by its consequences.

This general principle was elaborated and extended to more complex forms of behavior by B. F. (Burrhus Frederic) Skinner (1904–1990). Skinner called his approach "radical behaviorism" to distinguish it from the behaviorism of John Watson, who emphasized classical conditioning. Skinner argued that to understand behavior we should focus on the external causes of an action and the action's consequences. He avoided terms that Thorndike used, such as "satisfying" and "annoying," which reflect assumptions about what an organism feels and wants. To explain behavior, he said, we should look outside the individual, not inside.

The Consequences of Behavior

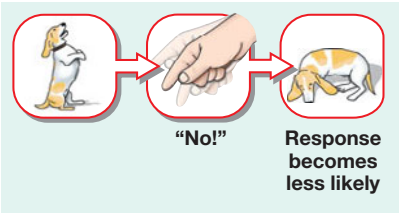
In Skinner's analysis, which has inspired an immense body of research, a response ("operant") can be influenced by two types of consequences:

1 Reinforcement strengthens the response or makes it more likely to recur. When your dog begs for food at the table, and you give her the lamb chop off your plate, her begging is likely to increase:



Reinforcers are roughly equivalent to rewards, and many psychologists use *reward* and *reinforcer* as approximate synonyms. However, strict behaviorists avoid the word *reward* because it implies that something has been earned that results in happiness or satisfaction. To a behaviorist, a stimulus is a reinforcer if it strengthens the preceding behavior, whether or not the organism experiences pleasure or a positive emotion. Conversely, no matter how pleasurable a reward is, it is not a reinforcer if it does not increase the likelihood of a response. It's great to get a paycheck, but if you get paid regardless of the effort you put into your work, the money will not reinforce "hard-work behavior."

2 Punishment weakens the response or makes it less likely to recur. Any aversive (unpleasant) stimulus or event may be a *punisher*. If your dog begs for a lamb chop off your plate, and you lightly swat her nose and shout "No," her begging is likely to decrease—as long as you don't feel guilty and then give her the lamb chop anyway:



Parents, employers, and governments resort to reinforcers and punishers all the time—to get kids to behave well, employees to work hard, and constituents to pay taxes—but they do not always use them effectively. Often, they wait too long to deliver the reinforcer or punisher. In general, the sooner a consequence follows a response, the greater its effect; you are likely to respond more reliably when you do not have to wait ages for a grade, a smile, or a compliment. When there is a delay, other responses occur in the interval, and the connection between the desired or undesired response and the consequence may not be made.

reinforcement The process by which a stimulus or event strengthens or increases the probability of the response that it follows.

punishment The process by which a stimulus or event weakens or reduces the probability of the response that it follows.

primary reinforcer A stimulus that is inherently reinforcing, typically satisfying a physiological need; an example is food.

primary punisher A stimulus that is inherently punishing; an example is electric shock.

secondary reinforcer A stimulus that has acquired reinforcing properties through association with other reinforcers.

secondary punisher A stimulus that has acquired punishing properties through association with other punishers.

positive reinforcement A reinforcement procedure in which a response is followed by the presentation of, or increase in intensity of, a reinforcing stimulus; as a result, the response becomes stronger or more likely to occur.

negative reinforcement A reinforcement procedure in which a response is followed by the removal, delay, or decrease in intensity of an unpleasant stimulus; as a result, the response becomes stronger or more likely to occur.

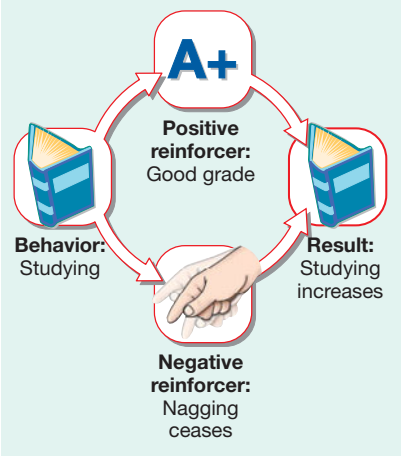
Primary and Secondary Reinforcers and Punishers

Food, water, light stroking of the skin, and a comfortable air temperature are naturally reinforcing because they satisfy biological needs. They are therefore known as **primary reinforcers.** Similarly, pain and extreme heat or cold are inherently punishing and are therefore known as **primary punishers**. Primary reinforcers and punishers can be powerful, but they have some drawbacks, both in real life and in research. For one thing, a primary reinforcer may be ineffective if an animal or person is not in a deprived state; a glass of water is not much of a reward if you just drank three glasses. Also, for obvious ethical reasons, psychologists cannot go around using primary punishers (say, by hitting the people in their study) or taking away primary reinforcers (say, by starving their volunteers).

Fortunately, behavior can be controlled just as effectively by **secondary reinforcers** and **secondary punishers**, which are learned. Money, praise, applause, good grades, awards, and gold stars are common secondary reinforcers. Criticism, demerits, scolding, fines, and bad grades are common secondary punishers. Most behaviorists believe that secondary reinforcers and punishers acquire their ability to influence behavior by being paired with primary reinforcers and punishers. (If that reminds you of classical conditioning, reinforce your excellent thinking with a pat on the head! Indeed, secondary reinforcers and punishers are often called *conditioned* reinforcers and punishers.) As a secondary reinforcer, money has considerable power over most people's behavior because it can be exchanged for primary reinforcers such as food and shelter. It is also associated with other secondary reinforcers, such as praise and respect.

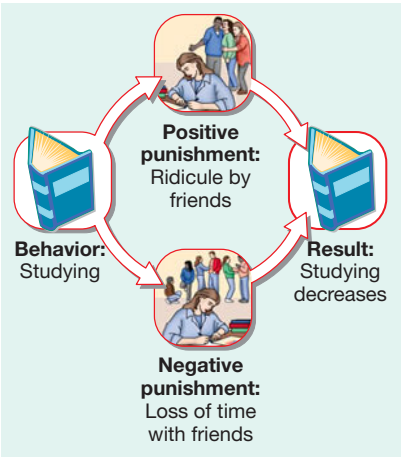
Positive and Negative Reinforcers and Punishers

In our example of the begging dog, something pleasant (getting the lamb chop) followed the dog's begging response, so the response increased. Similarly, if you get a good grade after studying, your efforts to study are likely to continue or increase. This kind of process, in which a pleasant consequence makes a response more likely, is known as **positive reinforcement**. But there is another type of reinforcement, **negative reinforcement**, which involves the *removal* of something *unpleasant*. Negative reinforcement occurs when you *escape* from something aversive or *avoid* it by preventing it from ever occurring. For example, if someone nags you to study but stops nagging when you comply, your studying is likely to increase because you will then avoid the nagging:



Likewise, negative reinforcement occurs when taking a pill eliminates your pain or when you take a certain route across campus to avoid a rude person.

The positive–negative distinction can also be applied to punishment: Something unpleasant may occur following some behavior (positive punishment), or something *pleasant* may be *removed* (negative punishment). For example, if your friends tease you for being an egghead (positive punishment) or if studying makes you lose time with your friends (negative punishment), you may stop studying:



The distinction between positive and negative reinforcement and punishment has been a source of confusion for generations of students, turning many strong minds to mush. You will master these terms more quickly if you understand that "positive" and "negative" have nothing to do with "good" or "bad." They refer to whether something is given or taken away. In the case of reinforcement, think of a positive reinforcer as something that is added or obtained (imagine a plus sign) and a

negative reinforcer as avoidance of, or escape from, something unpleasant (imagine a minus sign). *In either case, a response becomes more likely*. Do you recall what happened when Little Albert learned to fear rats through a process of classical conditioning? After he acquired this fear, crawling away was negatively reinforced by escape from the now-fearsome rodent. The negative reinforcement that results from escaping or avoiding something unpleasant explains why so many fears are long-lasting. When you avoid a feared object or situation, you also cut off all opportunities to extinguish your fear.

Understandably, people often confuse negative reinforcement with positive punishment, because both involve an unpleasant stimulus. With punishment, you are subjected to the unpleasant stimulus; with negative reinforcement, you escape from it or avoid it. To keep these terms straight, remember that punishment, whether positive or negative, *decreases* the likelihood of a response; and reinforcement, whether positive or negative, *increases* it. In real life, punishment and negative reinforcement often go hand in hand. If you use a chain collar to teach your dog to heel, a brief tug on the collar punishes the act of walking; release of the collar negatively reinforces the act of standing by your side.

You can positively reinforce your studying of this material by taking a short break. As you master the material, a decrease in your anxiety will negatively reinforce studying. But we hope you won't punish your efforts by telling yourself "I'll never get it" or "It's too hard"! Listen

Listen to the **Podcast** on **Punishment and Reinforcement** on **mypsychlab.com**

Study and **Review** on **mypsychlab.com**

Quick Quiz

What kind of consequence will follow if you can't answer these questions?

1. A child nags her father for a cookie; he keeps refusing. Finally, unable to stand the nagging any longer, he hands over the cookie. For him, the ending of the child's pleading is a _____. For the child, the cookie is a _____.
2. An able-bodied driver is careful not to park in a handicapped space anymore after paying a large fine for doing so. The loss of money is a _____.
3. Identify which of the following are commonly used as secondary reinforcers: quarters spilling from a slot machine, a winner's blue ribbon, a piece of candy, an A on an exam, frequent-flyer miles.
4. During late afternoon "happy hours," bars and restaurants sell drinks at a reduced price and appetizers are often free. What undesirable behavior may be rewarded by this practice?

Answers:

1. negative reinforcer; positive reinforcer **2.** punisher—or more precisely, a negative punisher (because something desirable was taken away) **3.** All but the candy are secondary reinforcers. **4.** One possible answer: The reduced prices, free appetizers, and cheerful atmosphere all reinforce heavy alcohol consumption just before rush hour, thus possibly contributing to binge drinking and drunk driving.

YOU are about to learn...

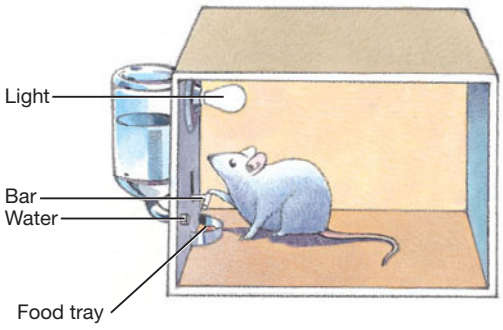
- **four important features of operant conditioning.**
- **why it's not always a good idea to reinforce a response every time it occurs.**
- **how operant principles help explain superstitious behavior.**
- **what it means to "shape" behavior.**
- **some biological limits on operant conditioning.**

Principles of Operant Conditioning

Thousands of operant conditioning studies have been done, many using animals. A favorite experimental tool is the *Skinner box*, a chamber equipped with a device that delivers a reinforcer, usually food, when an animal makes a desired response, or a punisher, such as a brief shock, when the animal makes an undesired response (see Figure 9.6). In modern versions, a computer records responses and charts the rate of responding and cumulative responses across time.

Early in his career, Skinner (1938) used the Skinner box for a classic demonstration of operant conditioning. A rat that had previously learned to eat from the pellet-releasing device was placed in the box. The animal proceeded to scurry about the box, sniffing here and there, and randomly touching parts of the floor and walls. Quite by accident, it happened to press a lever mounted on one wall, and immediately a pellet of tasty rat food fell into the food dish. The rat continued its movements and again happened to press the bar, causing another

FIGURE 9.6
The Skinner Box
When a rat in a Skinner box presses a bar, a food pellet or drop of water is automatically released. The photo shows Skinner at work on one of the boxes.



extinction The weakening and eventual disappearance of a learned response; in operant conditioning, it occurs when a response is no longer followed by a reinforcer.

stimulus generalization In operant conditioning, the tendency for a response that has been reinforced (or punished) in the presence of one stimulus to occur (or be suppressed) in the presence of other similar stimuli.

stimulus discrimination In operant conditioning, the tendency of a response to occur in the presence of one stimulus but not in the presence of other, similar stimuli that differ from it on some dimension.

discriminative stimulus A stimulus that signals when a particular response is likely to be followed by a certain type of consequence.

continuous reinforcement A reinforcement schedule in which a particular response is always reinforced.

pellet to fall into the dish. With additional repetitions of bar pressing followed by food, the animal began to behave less randomly and to press the bar more consistently. Eventually, Skinner had the rat pressing the bar as fast as it could.

Extinction In operant conditioning, as in classical, **extinction** is a procedure that causes a previously learned response to stop. In operant conditioning, extinction takes place when the reinforcer that maintained the response is withheld or is no longer available. At first, there may be a spurt of responding, but then the responses gradually taper off and eventually cease. Suppose you put a coin in a vending machine and get nothing back. You may throw in another coin, or perhaps even two, but then you will probably stop trying. The next day, you may put in yet another coin, an example of *spontaneous recovery*. Eventually, however, you will give up on that machine. Your response will have been extinguished.

Stimulus Generalization and Discrimination In operant conditioning, as in classical, **stimulus generalization** may occur. That is, responses may generalize to stimuli that were not present during the original learning situation but resemble the original stimuli in some way; a pigeon that has been trained to peck at a picture of a circle may also peck at a slightly oval figure. But if you wanted to train the bird to discriminate between the two shapes, you would present both the circle and the oval, giving reinforcers whenever the bird pecked at the circle and withholding reinforcers when it pecked at the oval. Eventually, **stimulus discrimination** would occur. Pigeons, in fact, have learned to make some extraordinary discriminations. They even learned to discriminate between two paintings by different artists, such as Vincent Van Gogh and Marc Chagall (Watanabe, 2001). And then, when presented with a new pair of paintings by those same two artists, they were able to tell the difference between them!

Sometimes an animal or person learns to respond to a stimulus only when some other stimulus, called a **discriminative stimulus**, is present. The discriminative stimulus signals whether a response, if made, will pay off. In a Skinner box containing a pigeon, a light may serve as a discriminative stimulus for pecking at a circle. When the light is on, pecking brings a reward; when it is off, pecking is futile. Human behavior is controlled by many discriminative stimuli, both verbal ("Store hours are 9 to 5") and nonverbal (traffic lights, doorbells, the ring of your cell phone, other people's facial expressions). Learning to respond correctly when such stimuli are present allows us to get through the day efficiently and to get along with others.

Learning on Schedule When a response is first acquired, learning is usually most rapid if the response is reinforced each time it occurs; this procedure is called **continuous reinforcement**. However, once a response has become reliable, it will be more resistant to extinction if it is rewarded on an **intermittent (partial) schedule of reinforcement**, which involves reinforcing only some responses, not all of them. Skinner (1956) happened on this fact when he ran short of food pellets for his rats and was forced to deliver reinforcers less often. (Not all scientific discoveries are planned!) On intermittent schedules, a reinforcer is delivered only

after a certain number of responses occur or after a certain amount of time has passed since a response was last reinforced; these patterns affect the rate, form, and timing of behavior. (The details are beyond the scope of this book.)

Intermittent reinforcement helps explain why people often get attached to "lucky" hats, charms, and rituals. A batter pulls his earlobe, gets a home run, and from then on always pulls his earlobe before each pitch. A student takes an exam with a purple pen and gets an A, and from then on will not take an exam without a purple pen. Such rituals persist because sometimes they are followed purely coincidentally by a reinforcer—a home run, a good grade—and so they become resistant to extinction.

Thinking Critically about Superstitions

Skinner (1948/1976) once demonstrated this phenomenon by creating eight "superstitious" pigeons in his laboratory. He rigged the pigeons' cages so that food was delivered every 15 seconds, even if the birds didn't lift a feather. Pigeons are often in motion, so when the food came, each animal was likely to be doing something. That something was then reinforced by delivery of the food. The behavior, of course, was reinforced entirely by chance, but it still became more likely to occur and thus to be reinforced again. Within a short time, six of the pigeons were practicing some sort of consistent ritual: turning in counterclockwise circles, bobbing their heads up and down, or swinging their heads to and fro. None of these activities had the least effect on the delivery of the reinforcer; the birds were behaving "superstitiously," as if they thought their movements were responsible for bringing the food.

Now listen up, because here comes one of the most useful things to know about operant conditioning: If you want a response to persist after it has been learned, you should reinforce it *intermittently*, not continuously. If you are giving Harry, your hamster, a treat every time he pushes a ball with his nose, and then you suddenly stop the reinforcement, Harry will soon stop pushing that ball. Because the change in reinforcement is large, from continuous to none at all, Harry will easily discern the change. But if you have been reinforcing Harry's behavior only every so often, the change will not be so dramatic, and your hungry hamster will keep responding for quite a while. Pigeons, rats, and people on intermittent schedules of reinforcement have responded in the laboratory thousands of times without reinforcement before throwing in the towel, especially when the timing of the reinforcer varies. Animals will sometimes work so hard for an unpredictable, infrequent bit of food that the energy they expend is greater than that gained from the reward; theoretically, they could actually work themselves to death.

"Maybe you're right, maybe it won't ward off evil spirits, but maybe it will, and these days who wants to take a chance?"

It follows that if you want to get rid of a response, whether it's your own or someone else's, you should be careful *not* to reinforce it intermittently. If you are going to extinguish undesirable behavior by ignoring it—a child's tantrums, a friend's midnight phone calls, a parent's unwanted advice—you must be absolutely consistent in withholding reinforcement (your attention). Otherwise, the other person will learn that if he or she keeps up the screaming, calling, or advice giving long enough, it will eventually be rewarded. One of the most common errors people make is to reward intermittently the very responses that they would like to eliminate.

intermittent (partial) schedule of reinforcement A reinforcement schedule in which a particular response is sometimes but not always reinforced.

shaping An operant-conditioning procedure in which successive approximations of a desired response are reinforced.

successive approximations In the operant-conditioning procedure of shaping, behaviors that are ordered in terms of increasing similarity or closeness to the desired response.

Shaping

For a response to be reinforced, it must first occur. But suppose you want to train Harry the hamster to pick up a marble, a child to use a knife and fork properly, or a friend to play terrific tennis. Such behaviors, and most others in everyday life, have almost no probability of appearing spontaneously. You could grow old and gray waiting for them to occur so that you could reinforce them. The operant solution is a procedure called **shaping**.

In shaping, you start by reinforcing a tendency in the right direction, and then you gradually require responses that are more and more similar to the final desired response. The responses that you reinforce on the way to the final one are called **successive approximations**. In the case of Harry and the marble, you might deliver a food pellet if the hamster merely turned toward the marble. Once this response was established, you might then reward the hamster for taking a step toward the marble. After that, you could reward him for approaching the marble, then for touching the marble, then for putting both paws on the marble,

Simulate **Shaping** on **mypsychlab.com**

Behavioral techniques such as shaping have many useful applications. Monkeys have been trained to assist their paralyzed owners by opening doors, helping with feeding, and turning the pages of books. Miniature guide horses help blind people navigate city streets and subways. Note the horse's cool protective sneakers!

and finally for holding it. With the achievement of each approximation, the next one would become more likely, making it available for reinforcement.

Using shaping and other techniques, Skinner was able to train pigeons to play Ping-Pong with their beaks and to "bowl" in a miniature alley, complete with a wooden ball and tiny bowling pins. (Skinner had a great sense of humor.) Animal trainers routinely use shaping to teach animals to act as the "eyes" of the blind and to act as the "limbs" of people with spinal cord injuries; these talented companions learn to turn on light switches, open refrigerator doors, and reach for boxes on shelves.

Biological Limits on Learning All principles of operant conditioning, like those of classical conditioning, are limited by an animal's genetic dispositions and physical characteristics; if you try to teach a fish to dance the samba, you're going to get pretty frustrated (and wear out the fish). Operant conditioning procedures always work best when they capitalize on inborn tendencies.

instinctive drift During operant learning, the tendency for an organism to revert to instinctive behavior.

"Why? You cross the road because it's in the script—that's why!"

Years ago, two psychologists who became animal trainers, Keller and Marian Breland (1961), learned what happens when you ignore biological constraints on learning. They found that their animals were having trouble learning tasks that should have been easy. One animal, a pig, was supposed to drop large wooden coins in a box. Instead, the animal would drop the coin, push at it with its snout, throw it in the air, and push at it some more. This odd behavior actually delayed delivery of the reinforcer (food, which is *very* reinforcing to a pig), so it was hard to explain in terms of operant principles. The Brelands finally realized that the pig's rooting instinct—using its snout to uncover and dig up edible roots—was keeping it from learning the task. They called such a reversion to instinctive behavior **instinctive drift**.

In human beings, too, operant learning is affected by genetics, biology, and the evolutionary history of our species. As we saw in Chapter 3, human children are biologically disposed to learn language without much effort, and even young infants appear to have a rudimentary understanding of number (Izard et al., 2009). Further, temperaments and other inborn dispositions may affect how a person responds to reinforcers and punishments. It will be easier to shape belly-dancing behavior if a person is temperamentally disposed to be outgoing and extroverted than if the person is by nature shy.

Skinner: The Man and the Myth

Because of his groundbreaking work on operant conditioning, B. F. Skinner is one of the best known of American psychologists. He is also one of the most misunderstood. Many people (even some psychologists) think that Skinner denied the existence of human consciousness and the value of studying it. In reality, Skinner (1972, 1990) maintained that

Get Involved! Shape Up!

Would you like to improve your study habits? Start exercising? Learn to play a musical instrument? Here are a few guidelines for shaping your own behavior: (1) Set goals that are achievable and specific. "I am going to jog ten minutes and increase the time by five minutes each day" will be far more effective than the vague goal to "get in shape." (2) Track your progress on a graph or in a diary; evidence of progress serves as a secondary reinforcer. (3) Avoid punishing yourself with self-defeating thoughts such as "I'll never be a good student" or "I'm a food addict." (4) Reinforce small improvements (successive approximations) instead of expecting perfection. By the way, a reinforcer does not have to be a thing; it can be something you like to do, like watching a movie. Above all, be patient. New habits are not built in a day.

private internal events—what we call perceptions, emotions, and thoughts—are as real as any others, and we can study them by examining our own sensory responses, the verbal reports of others, and the conditions under which such events occur. But he insisted that thoughts and feelings cannot *explain* behavior. These components of consciousness, he said, are themselves simply behaviors that occur because of reinforcement and punishment.

Skinner aroused strong passions in both his supporters and his detractors. Perhaps the issue that most provoked and angered people was his insistence that free will is an illusion. In contrast to humanist and some religious doctrines that human beings have the power to shape their own destinies, his philosophy promoted the *determinist view* that our actions are determined by our environments and our genetic heritage.

Because Skinner thought the environment should be manipulated to alter behavior, some critics have portrayed him as cold-blooded. One famous controversy regarding Skinner occurred when he invented an enclosed living space, the Air Crib, for his younger daughter Deborah when she was an infant. This "baby box," as it came to be known, had temperature and humidity controls to eliminate the usual discomforts that babies suffer: heat, cold, wetness, and confinement by blankets and clothing. Skinner believed that to reduce a baby's cries of discomfort and make infant care easier for the parents, you should fix the environment. But people imagined, incorrectly, that the Skinners were leaving their child in the baby box all the time without cuddling and holding her, and rumors circulated for years (and still do from time to time) that she had sued her father, gone insane, or killed herself. Actually, both of Skinner's daughters were cuddled and doted on, loved their parents deeply, and turned out to be successful, perfectly well adjusted adults.

Skinner, who was a kind and mild-mannered man, felt that it would be unethical *not* to try to improve human behavior by applying behavioral principles. And he practiced what he preached, proposing many ways to improve society and reduce human suffering. At the height of public criticism of Skinner's supposedly cold and inhumane approach to understanding behavior, the American Humanist Association recognized his efforts on behalf of humanity by honoring him with its Humanist of the Year Award. Watch

Watch B. F. Skinner Biography on mypsychlab.com

Quick Quiz

Study and Review on mypsychlab.com

We hope you won't think we're cold or inhumane if we advise you to take this quiz.

In each of the following situations, choose the best alternative and give your reason for choosing it.

1. You want your 2-year-old to ask for water with a word instead of a grunt. Should you give him water when he says "wa-wa" or wait until his pronunciation improves?
2. Your roommate keeps interrupting your studying even though you have asked her to stop. Should you ignore her completely or occasionally respond for the sake of good manners?
3. Your father, who rarely calls you, has finally left a voice-mail message. Should you reply quickly, or wait a while so he will know how it feels to be ignored?

Answers:

1. You should reinforce "wa-wa," an approximation of *water*, because complex behaviors need to be shaped. 2. From a behavioral view, you should ignore her completely because intermittent reinforcement (attention) could cause her interruptions to persist. 3. If you want to encourage communication, you should reply quickly because immediate reinforcement is more effective than delayed reinforcement.

YOU are about to learn...

- how the use of operant principles through behavior modification is being applied to many real-world problems.
- when punishment works in real life and why it often does not.
- some effective alternatives to punishment.
- how reinforcement can be misused.
- why paying children for good grades sometimes backfires.

Operant Conditioning in Real Life

Operant principles can clear up many mysteries about why people behave as they do. They can also explain why people have trouble changing when they want to, in spite of all the motivational seminars they attend or resolutions they make. If life remains full of the same old reinforcers, punishers, and discriminative stimuli (a grumpy boss, an unresponsive roommate, a refrigerator stocked with high-fat goodies), any new responses that have been acquired may fail to generalize.

To help people change unwanted, dangerous, or self-defeating habits, behaviorists have carried operant principles out of the laboratory and into the wider world of the classroom, athletic field, prison, mental hospital, nursing home, rehabilitation ward, child care center, factory, and office. The use of operant techniques in such real-world settings is called **behavior modification** (also known as *applied behavior analysis*).

Behavior modification has had some enormous successes (Kazdin, 2001; Martin & Pear, 2007). Behaviorists have taught parents how to toilet train their children in only a few sessions. They have trained disturbed and intellectually impaired adults to communicate, dress themselves, mingle socially with others, and earn a living. They have taught brain-damaged patients to control inappropriate behavior, focus their attention, and improve their language abilities. They have helped autistic children improve their social and language skills. And they have helped ordinary folk get rid of unwanted habits, such as smoking and nail biting, or acquire desired ones, such as practicing the piano or studying.

Yet when nonpsychologists try to apply the principles of conditioning to commonplace problems without thoroughly understanding those principles, their efforts sometimes miss the mark, as we are about to see.

behavior modification
The application of operant conditioning techniques to teach new responses or to reduce or eliminate maladaptive or problematic behavior; also called *applied behavior analysis*.

The Pros and Cons of Punishment

In a novel called *Walden Two* (1948/1976), Skinner imagined a utopia in which reinforcers were used so wisely that undesirable behavior was rare. Unfortunately, we do not live in a utopia; bad habits and antisocial acts abound.

Punishment might seem to be an obvious solution. Almost all Western countries have banned the physical punishment of schoolchildren by principals and teachers, but many American states still permit it for disruptiveness, vandalism, and other misbehavior. The United States is also far more likely than any other developed country to jail its citizens for nonviolent crimes such as drug use, and to enact the ultimate punishment—the death penalty—for violent crimes. And, of course, in their relationships, people punish one another frequently by yelling, scolding, and sulking. Does all this punishment work?

When Punishment Works

Sometimes punishment is unquestionably effective. For example, punishment can deter some young criminals from repeating their offenses. A study of the criminal records of all Danish men born between 1944 and 1947 (nearly 29,000 men) examined repeat arrests (recidivism) through age 26 (Brennan & Mednick, 1994). After any given arrest, punishment reduced rates of subsequent arrests for both minor and serious crimes, though recidivism still remained fairly high. Contrary to the researchers' expectations, however, the severity of punishment made no difference: Fines and probation were about as effective as jail time. What mattered most was the *consistency* of the punishment. This is understandable in behavioral terms: When lawbreakers sometimes get away with their crimes, their behavior is intermittently reinforced and therefore becomes resistant to extinction.

Thinking Critically about Punishment

Unfortunately, that is often the situation in the United States. Young offenders are punished less consistently than in Denmark, in part because prosecutors, juries, and judges do not want to condemn them to mandatory prison terms. This helps to explain why harsh sentencing laws and simplistic efforts to crack down on wrongdoers often fail or even backfire. Because many things influence crime rates—the proportion of young versus older people in the population, poverty levels, drug policies, discriminatory arrest patterns—the relationship

between incarceration rates and crime rates in the United States varies considerably from state to state (King, Maurer, & Young, 2005). But international surveys find that, overall, the United States has a high rate of violent crime compared to many other industrialized countries, in spite of its extremely high incarceration rates.

When Punishment Fails What about punishment that occurs every day in families, schools, and workplaces? Laboratory and field studies find that it, too, often fails, for several reasons:

1 People often administer punishment inappropriately or mindlessly. They swing in a blind rage or shout things they don't mean, use harsh methods with toddlers, apply punishment so broadly that it covers all sorts of irrelevant behaviors, or misunderstand the proper application of punishment. One student told us his parents used to punish their children before leaving them alone for the evening because of all the naughty things they were *going* to do. Naturally, the children did not bother to behave like angels.

2 The recipient of harsh or frequent punishment often responds with anxiety, fear, or rage. Through a process of classical conditioning, these emotional side effects may then generalize to the entire situation in which the punishment occurs—the place, the person delivering the punishment, and the circumstances. These negative emotional reactions can create more problems than the punishment solves. A teenager who has been severely punished may strike back or run away. A spouse who is constantly insulted, belittled, and criticized will feel bitter and resentful and is likely to retaliate with small acts of hostility. And extreme punishment—physical abuse—is a risk factor, especially in children, for the development of depression, low self-esteem, violent behavior, and many other problems (Gershoff, 2002; Widom, DuMont, & Czaja, 2007).

3 The effectiveness of punishment is often temporary, depending heavily on the presence of the punishing person or circumstances. All of us can probably remember some transgressions of childhood that we never dared commit when our parents were around but that we promptly resumed as soon as they were gone and reinforcers were once again available. All we learned was not to get caught.

4 Most misbehavior is hard to punish immediately. Punishment, like reward, works best if it quickly follows a response. But outside the laboratory, rapid punishment is often hard to achieve, and during the delay, the behavior may be reinforced many times. If you punish your dog when you get home for getting into the doggie biscuits and eating them all up, the punishment will not do any good because you are too late: Your pet's misbehavior has already been reinforced by all those delicious treats.

As we all know, people often do things they're not supposed to. Have you ever wondered why so many people ignore warnings and threats of punishment?

5 Punishment conveys little information. It may tell the recipient what *not* to do, but it does not communicate what the person (or animal) *should* do. Spanking a toddler for messing in her pants will not teach her to use the potty chair, and scolding a student for learning slowly will not teach him to learn more quickly.

6 An action intended to punish may instead be reinforcing because it brings attention. Indeed, in some cases, angry attention may be just what the offender is after. If a mother yells at a child who is throwing a tantrum, the very act of yelling may give him what he wants: a reaction from her. In the schoolroom, teachers who scold children in front of other students, thus putting them in the limelight, may unwittingly reward the very misbehavior they are trying to eliminate.

Because of these drawbacks, most psychologists believe that punishment, especially when it's severe, is a poor way to eliminate unwanted behavior. In special cases, as when mentally disabled children are in immediate danger of seriously injuring themselves or a school bully is about to beat up a classmate, temporary physical restraint may be necessary. But even then, alternatives are often available. School programs have successfully reduced school violence by teaching kids problem-solving skills, emotional control, and conflict resolution, and by rewarding good behavior (Hahn et al., 2008; Wilson & Lipsey, 2007). And in some cases, the

Many harried parents habitually resort to physical punishment without being aware of its many negative consequences. Based on your reading of this chapter, what alternatives does this parent have?

best way to discourage a behavior—a child's nagging for a cookie before dinner, a roommate's interruptions when you're studying—is to extinguish it by ignoring it.

Of course, ignoring a behavior requires patience and is not always feasible. A dog owner who ignores Fido's backyard barking may soon hear "barking" of another sort from the neighbors. A parent whose child is a video-game addict cannot ignore the behavior because playing video games is rewarding to the child. One solution: Combine extinction of undesirable acts with reinforcement of alternative ones. The parent of a video-game addict might ignore the child's pleas for "just one more game" and at the same time praise the child for doing something else that is incompatible with video-game playing, such as reading or playing basketball.

Finally, when punishment must be applied, these guidelines should be kept in mind: (1) It should not involve physical abuse; instead, parents can use time-outs and loss of privileges (negative punishers); (2) it should be consistent; (3) it should be accompanied by information about the kind of behavior that would be appropriate; and (4) it should be followed, whenever possible, by the reinforcement of desirable behavior.

The Problems with Reward

So far, we have been praising the virtues of praise and other reinforcers. But like punishers, rewards do not always work as expected. Let's look at two complications that arise when people try to use them.

Misuse of Rewards Suppose you are a fourth grade teacher, and a student has just turned in a paper full of grammatical and punctuation errors. This child has little self-confidence and is easily discouraged. What should you do? Many people think you should give the paper a high mark anyway, to bolster the child's self-esteem. Teachers everywhere are handing out lavish praise, happy-face stickers, and high grades in hopes that students' performance will improve as they learn to "feel good about themselves." Scientifically speaking, however, there are two things wrong with this approach. First, study after study finds that high self-esteem does not improve academic performance (Baumeister et al., 2003). Second, genuine self-esteem emerges from effort, persistence, and the gradual acquisition of skills. It is nurtured by a teacher's honest appreciation of the content of a student's work combined with constructive feedback on how to correct mistakes or fix weaknesses (Damon, 1995).

Thinking Critically about Rewards

One obvious result of the misuse of rewards in schools has been grade inflation at all levels of education. In many colleges and universities, Cs, which once meant average or satisfactory, are nearly extinct. One study found that a third of college students expected Bs just for showing up to class, and 40 percent felt they were entitled to a B merely for doing the required reading (Greenberger et al., 2008). We have talked to students who feel that hard work should even be enough for an A. If you yourself have benefited from grade inflation, you may feel it's a good thing—but remember that critical thinking requires us to separate feelings from facts! The problem is that rewards, including grades, serve as effective reinforcers only when they are tied to the behavior one is trying to increase, not when they are dispensed indiscriminately. Getting a good grade for "showing-up-in-class behavior" reinforces going to class, but not necessarily for learning much once you are there. Would you want to be treated by a doctor, represented by a lawyer, or have your taxes done by an accountant who got through school just by showing up for class?

Why Rewards Can Backfire Most of our examples of operant conditioning have involved **extrinsic reinforcers**, which come from an outside source and are not inherently related to the activity being reinforced. Money, praise, gold stars, applause, hugs, and thumbs-up signs are all extrinsic reinforcers. But people (and probably some other animals as well) also work for **intrinsic reinforcers**, such as enjoyment of the task and the satisfaction of accomplishment. As psychologists have applied operant conditioning in real-world settings, they have found that extrinsic reinforcement sometimes becomes too much of a good thing: If you focus on it exclusively, it can kill the pleasure of doing something for its own sake.

Consider what happened in a classic study of how praise affects children's intrinsic motivation (Lepper, Greene, & Nisbett, 1973). Researchers gave nursery school children the chance to draw with felt-tipped pens during free play and recorded how long each child spontaneously played with the pens. The children clearly enjoyed this activity. Then the researchers told some of the children that

extrinsic reinforcers Reinforcers that are not inherently related to the activity being reinforced.

intrinsic reinforcers Reinforcers that are inherently related to the activity being reinforced.

if they would draw with felt-tipped pens they would get a "Good Player Award," complete with gold seal and red ribbon. After drawing for six minutes, each child got the award as promised. Other children did not expect an award and were not given one. A week later, the researchers again observed the children's free play. Those children who had expected and received an award spent much less time with the pens than they had before the start of the experiment. In contrast, children who had neither expected nor received an award continued to show as much interest in playing with the pens as they had initially, as you can see in Figure 9.7. Similar results have occurred in other studies when children have been offered a reward for doing something they already enjoy.

Why should extrinsic rewards undermine the pleasure of doing something for its own sake? The researchers who did the felt-tipped pen study suggested that when we are paid for an activity, we interpret it as work. We see our actions as the result of external factors instead of our own interests, skills, and efforts. It is as if we say to ourselves, "Since I'm being paid, it must be something I wouldn't do if I didn't have to." Then, when the reward is withdrawn, we refuse to "work" any longer. Another possibility is that we tend to regard extrinsic rewards as controlling, so they make us feel pressured and reduce our sense of autonomy and choice ("I guess I have to do what I'm told to do, but *only* what I'm told to do") (Deci et al., 1999). A third, more behavioral explanation is that extrinsic reinforcement sometimes raises the rate of responding above some optimal, enjoyable level, such as by causing the children in the felt-tipped-pen study to play with the pens longer than they would have on their

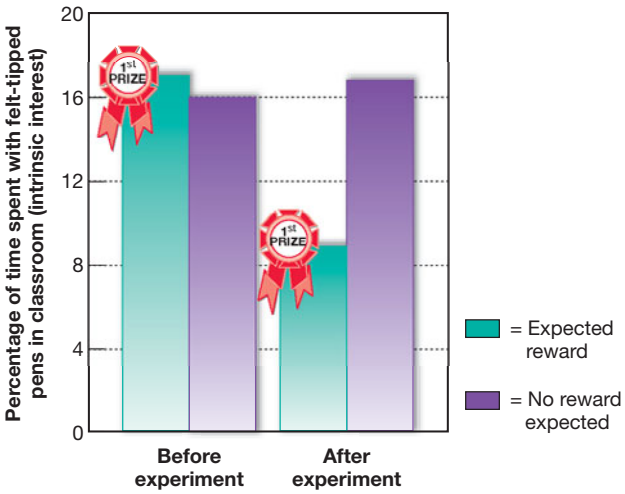


FIGURE 9.7
Turning Play into Work
Extrinsic rewards can sometimes reduce the intrinsic pleasure of an activity. When preschoolers were promised a prize for drawing with felt-tipped pens, the behavior temporarily increased. But after they got their prizes, they spent less time with the pens than they had before the study began.

Get Involved! What's Reinforcing Your Behavior?

For each activity that you do, indicate whether the reinforcers controlling your behavior are primarily extrinsic or intrinsic.

Activity	Reinforcers mostly extrinsic	Reinforcers mostly intrinsic	Reinforcers about equally extrinsic and intrinsic
Studying	_____	_____	_____
Housework	_____	_____	_____
Worship	_____	_____	_____
Grooming	_____	_____	_____
Job	_____	_____	_____
Dating	_____	_____	_____
Attending class	_____	_____	_____
Reading unrelated to school	_____	_____	_____
Sports	_____	_____	_____
Cooking	_____	_____	_____

Is there an area of your life in which you would like intrinsic reinforcement to play a larger role? What can you do to make that happen?

"That is the correct answer, Billy, but I'm afraid you don't win anything for it."

own. Then the activity really does become work.

Findings on extrinsic versus intrinsic reinforcements have wide-ranging implications. Economists have shown that financial rewards can undermine ethical and moral norms like honesty, hard work, and fairness toward others, and can decrease people's willingness to contribute to the common good (e.g., by paying taxes and giving to charity). In other words, an emphasis solely on money encourages selfishness (Bowles, 2008).

We must be careful, however, not to oversimplify this issue. The effects of extrinsic rewards depend on many factors, including a person's initial motivation, the context in which rewards are achieved, and in the case of praise, the sincerity of the praiser (Henderlong & Lepper, 2002). If you get praise, money, a high grade, or a trophy for doing a task *well*, for achieving a certain level of performance, or for improving your performance rather than for just doing the task, your intrinsic motivation is not likely to decline. In fact, it may increase (Cameron, Banko, & Pierce, 2001; Pierce et al., 2003). Such rewards are apt to make you feel competent rather than controlled. And if you have always been crazy about reading or about playing the banjo, you will keep reading or playing even when you do not happen to be getting a grade or applause for doing so. In such cases, you will probably attribute your continued involvement in the activity to your own intrinsic interests and motivation rather than to the reward.

So what is the take-home message about extrinsic rewards? First, they are often useful or necessary: Few people would trudge off to work every morning if they never got paid; and in the classroom, teachers may need to offer incentives to unmotivated students. But extrinsic rewards should be used carefully and should not be overdone, so that intrinsic pleasure in an activity can blossom. Educators, employers, and policy makers can avoid the trap of either–or thinking by recognizing that most people do their best when they get tangible rewards for real achievement *and* when they have interesting, challenging, and varied kinds of work to do.

Study and **Review** on **mypsychlab.com**

Quick Quiz

Is the art of mastering quizzes intrinsically reinforcing yet?

A. According to behavioral principles, what is happening here?

1. An adolescent whose parents have hit him for minor transgressions since he was small runs away from home.
2. A young woman whose parents paid her to clean her room while she was growing up is a slob when she moves to her own apartment.
3. Two parents scold their young daughter every time they catch her sucking her thumb. The thumb sucking continues anyway.

B. In cities across America, public school systems are rewarding students for perfect attendance by giving them money, shopping sprees, laptops, and video games. What are the pros and cons of such practices?

Answers:

A. 1. The physical punishment was painful, and through a process of classical conditioning, the situation in which it occurred also became unpleasant. Because escape from an unpleasant stimulus is negatively reinforcing, the boy ran away. **2.** Extrinsic reinforcers are no longer available, and room-cleaning behavior has been extinguished. Also, extrinsic rewards may have displaced the intrinsic satisfaction of having a tidy room. **3.** Punishment has failed, possibly because it rewards thumb sucking with attention or because thumb sucking still brings the child pleasure whenever the parents are not around.

B. The rewards may improve attendance (they have in some schools), and students who attend more regularly may become more interested in their studies and do better in school. But extrinsic rewards can also decrease intrinsic motivation, and when they are withdrawn (e.g., when the student goes to another school or to college), attendance may plummet ("If there's no reward, why should I attend?"). Further, students may come to expect bigger and bigger rewards, upping the ante. In some schools, especially those that have deemphasized penalties for *poor* attendance, the rewards have backfired and attendance has actually fallen.

YOU are about to learn...

- how you can learn something without any obvious reinforcement.
- why two people can learn different lessons from exactly the same experience.
- how we often learn not by doing but by watching.

Learning and the Mind

For half a century, most American learning theories held that learning could be explained by specifying the behavioral ABCs: *antecedents* (events preceding behavior), *behaviors*, and *consequences*. Behaviorists liked to compare the mind to an engineer's hypothetical "black box," a device whose workings must be inferred because they cannot be observed directly. To them, the box contained irrelevant wiring; it was enough to know that pushing a button on the box would produce a predictable response. But even as early as the 1930s, a few behaviorists could not resist peeking into that black box.

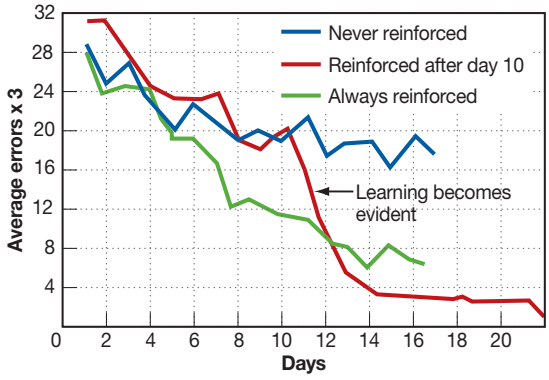


FIGURE 9.8
Latent Learning
In a classic experiment, rats that always found food in a maze made fewer and fewer errors in reaching the food (green curve). In contrast, rats that received no food showed little improvement (blue curve). But rats that got no food for ten days and then found food on the eleventh day showed rapid improvement from then on (red curve). This result suggests that learning involves cognitive changes that can occur in the absence of reinforcement and that may not be acted on until a reinforcer becomes available (Tolman & Honzik, 1930).

Latent Learning

Behaviorist Edward Tolman (1938) committed virtual heresy at the time by noting that his rats, when pausing at turning points in a maze, seemed to be *deciding* which way to go. Moreover, the animals sometimes seemed to be learning even without any reinforcement. What, he wondered, was going on in their little rat brains that might account for this puzzle?

In a classic experiment, Tolman and C. H. Honzik (1930) placed three groups of rats in mazes and observed their behavior daily for more than two weeks. The rats in Group 1 always found food at the end of the maze and quickly learned to find it without going down blind alleys. The rats in Group 2 never found food and, as you would expect, they followed no particular route. Group 3 was the interesting group. These rats found no food for ten days and seemed to wander aimlessly, but on the eleventh day they received food, and then they quickly learned to run to the end of the maze. By the following day, they were doing as well as Group 1, which had been rewarded from the beginning (see Figure 9.8).

Group 3 had demonstrated **latent learning**, learning that is not immediately expressed in performance. A great deal of human learning also remains latent until circumstances allow or require it to be expressed. A driver gets out of a traffic jam and finds her way to Fourth and Kumquat Streets using a route she has never used before (without GPS!). A little boy observes a parent setting the table or tightening a screw but does not act on this learning for years; then he finds he knows how to do these things.

Latent learning raises questions about what, exactly, is learned during operant learning. In the Tolman and Honzik study, the rats that did not get any food until the eleventh day seemed to have acquired a mental representation of the maze. They had been learning the whole time; they simply had no reason to act on that learning until they began to find food. Similarly, the driver taking a new route can do so because she already knows how the city is laid out. What seems to be acquired in latent learning, therefore, is not a specific response, but *knowledge* about responses and their consequences. We learn how the world is organized, which paths lead to which places, and which actions can produce which payoffs. This knowledge permits us to be creative and flexible in reaching our goals.

Social-Cognitive Learning Theories

During the 1960s and 1970s, many learning theorists concluded that human behavior could not be understood without taking into account the human

latent learning A form of learning that is not immediately expressed in an overt response; it occurs without obvious reinforcement.

Social-cognitive theorists emphasize the influence of thoughts and perceptions on behavior (at least in humans).

capacity for higher-level cognitive processes. They agreed with behaviorists that human beings, along with the rat and the rabbit, are subject to the laws of operant and classical conditioning. But they added that human beings, unlike the rat or the rabbit, are full of attitudes, beliefs, and expectations that affect the way they acquire information, make decisions, reason, and solve problems. This view became very influential.

We will use the term **social-cognitive theories** for all theories that combine behavioral principles with cognitive ones to explain behavior (Bandura, 1986; Mischel, 1973; Mischel & Shoda, 1995). These theories share an emphasis on the importance of beliefs, perceptions, and observations of other peoples' behavior in determining what we learn, what we do at any given moment, and the personality traits we develop (see Chapter 2). To a social-cognitive theorist, differences in beliefs and perceptions help explain why two people who live through the same event may come away with entirely different lessons from it (Bandura, 2001). All siblings know this. One sibling may regard being grounded by their father as evidence of his all-around meanness, whereas another may see the same behavior as evidence of his care and concern for his children. For these siblings, being grounded is likely to affect their behavior very differently.

social-cognitive theories Theories that emphasize how behavior is learned and maintained through observation and imitation of others, positive consequences, and cognitive processes such as plans, expectations, and beliefs.

observational learning A process in which an individual learns new responses by observing the behavior of another (a model) rather than through direct experience; sometimes called *vicarious conditioning*.

Learning by Observing

Late one night, a friend living in a rural area was awakened by a loud clattering noise. A raccoon had knocked over a "raccoon-proof" garbage can and seemed to be demonstrating to an assembly of other raccoons how to open it: If you jump up and down on the can's side, the lid will pop off. According to our friend, the observing raccoons learned from this episode how to open stubborn garbage cans, and the observing humans learned how smart raccoons can be. In short, they all benefited from **observational learning**: learning by watching what others do and what happens to them for doing it.

The behavior learned by the raccoons through observation was an operant one, but observational learning also plays an important role in the acquisition of automatic, reflexive responses, such as fears and phobias (Mineka & Zinbarg, 2006; Olsson & Phelps, 2004). Thus, in addition to learning to be frightened of rats directly through classical conditioning, as Little Albert did, you might also learn to fear rats by observing the emotional expressions of other people when they see or touch one. The perception of someone else's reaction serves as an unconditioned stimulus for your own fear, and the learning that results may be as strong as it would be if you had had a direct encounter with the rat yourself. Children often learn to fear things in this way, for example, by observing a parent's fearful reaction whenever a dog approaches. Adults can acquire fears even by watching suspenseful movies. After seeing the classic horror film *Psycho*, in which a character is knifed to death in a shower, some viewers became nervous about taking a shower. Similarly, after seeing *Jaws*, with its horrific scenes of shark attacks and its gripping music, some people became afraid to swim in the ocean.

Like father, like daughter. Observational learning starts early.

Behaviorists refer to observational learning as *vicarious conditioning*, and believe it can be explained in stimulus–response terms. But social-cognitive theorists believe that observational learning in human beings cannot be fully understood without taking into account the thought processes of the learner (Meltzoff & Gopnik, 1993). They emphasize the knowledge that results when a person sees a *model*—another person—behaving in certain ways and experiencing the consequences (Bandura, 1977).

None of us would last long without observational learning. Learning would be both inefficient and dangerous. We would have to learn to avoid oncoming cars by walking into traffic and suffering the consequences, or learn to swim by jumping into a deep pool and flailing around. Parents and teachers would be busy 24 hours a day shaping children's behavior. Bosses would have to stand over their employees' desks, rewarding every little link in the complex behavioral chains we call typing, report writing, and accounting. But observational learning has its dark side as well. People often imitate antisocial or unethical actions (they observe a friend cheating and decide they can get away with it too) or self-defeating and harmful ones (they watch a film star smoking and take up the habit in an effort to look just as cool).

Many years ago, Albert Bandura and his colleagues showed just how important observational learning is for children who are learning the rules of social behavior (Bandura, Ross, & Ross, 1963). The researchers had nursery school children watch a short film of two men, Rocky and Johnny, playing with toys. (Apparently the children did not think this behavior was the least bit odd.) In the film, Johnny refuses to share his toys, and Rocky responds by clobbering him. Rocky's aggressive actions are rewarded because he winds up with all the toys. Poor Johnny sits dejectedly in the corner, while Rocky marches off with a sack full of loot and a hobbyhorse under his arm.

After viewing the film, each child was left alone for 20 minutes in a playroom full of toys, including some of the items shown in the film. Watching through a one-way mirror, the researchers found that the children were much more aggressive in their play than a control group that had not seen the film. Some children imitated Rocky almost exactly. At the end of the session, one little girl even asked the experimenter for a sack! Explore

Of course, people imitate positive activities that they observe, too. Matt Groening, the creator of the cartoon show *The Simpsons*, decided it would be funny if the Simpsons' 8-year-old daughter Lisa played the baritone sax. Sure enough, little girls across the country began imitating her. Cynthia Sikes, a saxophone teacher in New York, told *The New York Times*, "When the show started, I got an influx of girls coming up to me saying, 'I want to play the saxophone because Lisa Simpson plays the saxophone.'"

Findings on latent learning, observational learning, and the role of cognition in learning can help us evaluate arguments in the passionate debate about the effects of media violence. Children and teenagers in America and many other countries see countless acts of violence on television, in films, and in video games. Does all this mayhem of blood and guts affect them? Do you think it has affected *you*? In "Taking Psychology with You," we offer evidence that bears on these questions, and suggest ways of resolving them without oversimplifying the issues.

Explore Bandura's Study on Observational Learning on mypsychlab.com

Quick Quiz

Does your perception of quizzes make you eager to answer them?

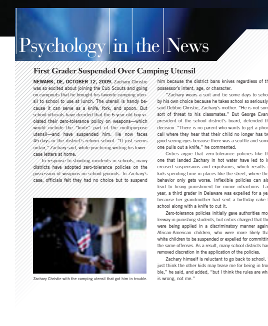
1. A friend asks you to meet her at a new restaurant across town. You have never been to this specific address, but you find your way there anyway because you have experienced _____ learning.
2. To a social-cognitive theorist, the fact that we can learn without being reinforced for any obvious responses shows that we do not learn specific responses but rather _____.
3. After watching her teenage sister put on lipstick, a little girl takes a lipstick and applies it to her own lips. She has acquired this behavior through a process of _____.

Answers:

1. latent 2. knowledge about responses and their consequences 3. observational learning

Study and Review on mypsychlab.com

Psychology in the News REVISITED



Psychology in the News

First Grader Suspended Over Camping Utensil

NEWARK, DE, OCTOBER 12, 2009. Zachary Christie was so excited about joining the Cub Scouts and going on campouts that he brought his favorite camping utensil to school to use at lunch. The utensil is handy because it can serve as a knife, fork, and spoon. But school officials have decided that the 6-year-old boy violated their zero-tolerance policy on weapons—which would include the "knife" part of the multipurpose utensil—and have suspended him. He now faces 45 days in the district's reform school. "It just seems unfair," Zachary said, while practicing writing his lowercase letters at home.

In response to shooting incidents in schools, many districts have adopted zero-tolerance policies on the possession of weapons on school grounds. In Zachary's case, officials felt they had no choice but to suspend him because the district bans knives regardless of the possessor's intent, age, or character.

"Zachary wears a suit and tie some days to school by his own choice because he takes school so seriously," said Debbie Christie, Zachary's mother. "He is not some sort of threat to his classmates." But George Evans, president of the school district's board, defended the decision. "There is no parent who wants to get a phone call where they hear that their child no longer has two good seeing eyes because there was a scuffle and someone pulls out a knife," he commented.

Critics argue that zero-tolerance policies like the one that landed Zachary in hot water have led to increased suspensions and expulsions, which results in kids spending time in places like the street, where their behavior only gets worse. Inflexible policies can also lead to heavy punishment for minor infractions. Last year, a third grader in Delaware was expelled for a year because her grandmother had sent a birthday cake to school along with a knife to cut it.

Zero-tolerance policies initially gave authorities more leeway in punishing students, but critics charged that they were being applied in a discriminatory manner against African-American children, who were more likely than white children to be suspended or expelled for committing the same offenses. As a result, many school districts have removed discretion in the application of the policies.

Zachary himself is reluctant to go back to school. "I just think the other kids may tease me for being in trouble," he said, and added, "but I think the rules are what is wrong, not me."

Zachary Christie with the camping utensil that got him in trouble.

How can the behavioral and social-cognitive learning principles covered in this chapter help us think about our opening story, in which Zachary Christie was expelled for carrying a camping utensil to school?

As we've seen, findings on learning do not rule out all use of punishment when children misbehave. Certainly, when children or teenagers bring weapons to school, authorities cannot simply ignore the behavior in hopes of extinguishing it; they have an obligation to protect the other students. But when severe penalties are imposed inappropriately for minor infractions, as in Zachary's case, punishment can make the recipient feel betrayed and angry at the injustice of it. As Zachary said, "It just seems unfair." Social-cognitive theorists remind us that human beings, including children, bring their minds to their experiences, and if they perceive a punishment for breaking a rule as being undeserved or overly harsh, they may continue to break that rule as an act of defiance. Undeserved severe punishment may also bring attention from peers, with the same result—defiance and persistence.

Fortunately, in Zachary's case, school district officials realized the inappropriateness of their rigid zero-tolerance policy, and reversed themselves the very next day. Recognizing the importance of taking age into account, the school board voted to reduce the punishment for kindergartners and first graders to a suspension ranging from three to five days, and 6-year-old Zachary got a reprieve. Zachary's mother thanked the board, but noted that it was only the first step toward making necessary changes in the district's code of conduct.

What about punishment of children at home? Some psychologists believe that occasional, moderate punishment, even spanking, has no long-term detrimental outcomes for most middle-class children, so long as it occurs in an otherwise loving context or as a last resort (Baumrind, Larzelere, & Cowan, 2002). But, as we saw, punishment does not teach the child *good* behavior, and has all the drawbacks listed in this chapter. And when parents insult, humiliate, or ridicule a child, the results are often devastating. Humiliation and shame can last for years.

What, then, should parents and teachers do when a child's behavior is seriously disruptive or dangerous? First, from a learning perspective, other punishments (time-outs, loss of privileges, and so forth) are preferable to physical punishment, as long as the adult is consistent (no intermittent reinforcement of bad behavior!), applies the punishment as soon as possible after the behavior occurs, and, most important, remembers to reinforce successive approximations toward desirable behavior. It is also important to know *why* a child is misbehaving: Is the child angry, worried, or frightened? Parents and teachers can help children identify their feelings while teaching them how to control their emotions and find nonaggressive, constructive ways to resolve conflicts. In this way, they can learn that they are being punished not for feeling bad, but for acting inappropriately or harming others: "It is all right to be upset but not to hit or bite."

Finally, a learning theorist would emphasize the role of the environment in causing or maintaining a child's misbehavior. Is the child bored? Does the child have trouble keeping still in the controlled environment of a classroom? From a learning perspective, it may be more effective to change the child's environment than the child, for example by instituting more breaks for physical activities.

Skinner himself never wavered in his determination to apply learning principles to fashion better, healthier environments for everyone. In 1990, just a week before his death, ailing and frail, he addressed an overflow crowd at the annual meeting of the American Psychological Association, making the case one last time for the approach he was convinced could create a better society. When you see the world as the learning theorist views it, Skinner was saying, you see the folly of human behavior, but you also see the possibility of improving it.

Taking Psychology with You

Does Media Violence Make You Violent?

In a $5 billion lawsuit against video-game manufacturers, the families of victims shot by two fellow students at a high school claimed that the tragedy would never have happened had the killers not played video games that were full of violence and bloodshed. When another gunman went on a murderous rampage at a university, several commentators immediately assumed that video games must have spurred him to kill. How should we evaluate such claims? Does violence depicted in films, on TV, and in video games lead to violent crime?

Psychologists are strongly divided in their answers to this question. As one group of researchers concluded, "Research on violent television and films, video games, and music reveals unequivocal evidence that media violence increases the likelihood of aggressive and violent behavior," both in the short term and long term (Anderson et al., 2003). Their meta-analyses find that the greater the exposure to violence in movies and on television, the stronger the likelihood of a person's behaving aggressively, and this correlation holds for both sexes and across cultures, from Japan to England (Anderson et al., 2010). Video games that directly reward violence, as by awarding points or moving the player to the next level after a "kill," increase feelings of hostility, aggressive thinking, and aggressive behavior (Carnagey & Anderson, 2005). Moreover, when grade school children cut back on time spent watching TV or playing violent video games, the children's aggressiveness declines (Robinson et al., 2001).

Does playing violent video games make children and teenagers more aggressive? The answer is more complicated than "yes" or "no."

Violent media may also desensitize people to the pain or distress of others. In a field study, people who had just seen a violent movie took longer to come to the aid of a woman struggling to pick up her crutches than did people who had seen a nonviolent movie or people still waiting to see one of the two movies (Bushman & Anderson, 2009).

However, an opposing group of psychologists believes that the effects of video games have been exaggerated and sensationalized (Ferguson & Kilburn, 2010). The correlation between playing violent video games and behaving aggressively is, they maintain, too small to worry about (Ferguson, 2007; Sherry, 2001). Other factors that are correlated with violent criminality are far more powerful; they include genetic influences (.75), perceptions of criminal opportunity (.58), owning a gun (.35), poverty (.25), and childhood physical abuse (.22). In these researchers' calculations, watching violent video games has the lowest correlation, only .04 (Ferguson, 2009; Ferguson & Kilburn, 2010). Besides, they observe, rates of teenage violence *declined* significantly throughout the 1990s, a period in which the number of violent video games was *increasing* astronomically.

In the social-cognitive view, both conclusions about the relationship of media violence to violent behavior have merit. Repeated acts of aggression in the media *do* model behavior and responses to conflict that a few people may imitate, just as media ads influence what many people buy and what many people think the ideal male or female body should look like. However, children and teens watch many different programs and movies and have many models to observe besides those they see in the media, including parents and peers. For every teenager who is obsessed with playing *Resident Evil* and who entertains grim fantasies of blowing up the world, hundreds more think the game is just plain fun and then go off to do their homework.

Moreover, perceptions and interpretations of events, personality dispositions such as aggressiveness and sociability, and the social context in which the violence is viewed can all affect how a person responds (Feshbach & Tangney, 2008). One person may learn from seeing people being blown away in a film that violence is cool and masculine; another may decide that the violent images are ugly and stupid; a third may conclude that they don't mean anything at all, that they are just part of the story.

What should be done, if anything, about media violence? Even if only a small percentage of viewers learn to be aggressive from observing all that violence, the social consequences can be serious, because the total audiences for TV, movies, and video games are immense. But censorship, which some people think is the answer, brings its own set of problems, quite apart from constitutional issues of free speech: Should we ban *Hamlet*? Bloody graphic comics? Funny martial arts films? Special-effects action films where the bad guys get blown to bits? Films that truthfully depict the realities of war, murder, and torture?

Consider, too, that it's not just video games and other visual media that can increase aggression. In two studies, students read a violent passage from the Bible, with two sentences inserted in which God sanctions the violence. Later, in what they thought was a different study, they played a competitive reaction-time game with a partner. In the game, they were more willing to blast their competitor with a loud noise than were students who had been told the violent passage was from an ancient scroll or students who had read a passage that did not mention God (Bushman et al., 2007). Participants who believed in God were most affected by the passage in which God condones the violence, but many nonbelievers were affected too. Although the general message of the scriptures is one of peace and reconciliation, the Bible is also full of violence, some of it sanctioned by God. Yet few people would be willing to ban the Bible or censure its violent parts.

As you can see, determining a fair and equitable policy regarding media violence will not be easy. It will demand good evidence—and good thinking.

Summary

- Research on *learning* has been heavily influenced by *behaviorism*, which accounts for behavior in terms of observable events without reference to mental entities such as "mind" or "will." Behaviorists have focused on two types of *conditioning:* classical and operant.

Classical Conditioning

- *Classical conditioning* was first studied by Russian physiologist Ivan Pavlov. In this type of learning, when a neutral stimulus is paired with an *unconditioned stimulus* (*US*) that elicits some reflexive *unconditioned response* (*UR*), the neutral stimulus comes to elicit a similar or related response. The neutral stimulus then becomes a *conditioned stimulus* (*CS*), and the response it elicits is a *conditioned response* (*CR*). Nearly any kind of involuntary response can become a CR.
- In *extinction*, the conditioned stimulus is repeatedly presented without the unconditioned stimulus, and the conditioned response eventually disappears, although later it may reappear (*spontaneous recovery*). In *higher-order conditioning*, a neutral stimulus becomes a conditioned stimulus by being paired with an already-established conditioned stimulus. In *stimulus generalization*, after a stimulus becomes a conditioned stimulus for some response, other similar stimuli may produce the same reaction. In *stimulus discrimination*, different responses are made to stimuli that resemble the conditioned stimulus in some way.
- Many theorists believe that what an animal or person learns in classical conditioning is not just an association between the unconditioned and conditioned stimulus, but also information conveyed by one stimulus about another. Indeed, classical conditioning appears to be an evolutionary adaptation that allows an organism to prepare for a biologically important event. Considerable evidence exists to show that a neutral stimulus does not become a CS unless it reliably signals or predicts the US.

Classical Conditioning in Real Life

- Classical conditioning helps account for positive emotional responses to particular objects and events, fears and phobias, reactions to particular foods and odors, and reactions to medical treatments and placebos. John Watson showed how fears may be learned and then may be unlearned through a process of *counterconditioning*. Because of evolutionary adaptations, human beings (and many other species) are biologically primed to acquire some classically conditioned responses easily, such as conditioned taste aversions and certain fears.

Operant Conditioning

- In *operant conditioning*, behavior becomes more likely to occur or less so depending on its consequences. Responses in operant conditioning are generally not reflexive and are more complex than in classical conditioning. Research in this area is closely associated with B. F. Skinner, who called his approach "radical behaviorism."
- In the Skinnerian analysis, *reinforcement* strengthens or increases the probability of a response, and *punishment* weakens or decreases the probability of a response. Immediate consequences usually have a greater effect on a response than do delayed consequences.
- Reinforcers are called *primary* when they are naturally reinforcing because they satisfy a biological need. They are called *secondary* when they have acquired their ability to strengthen a response through association with other reinforcers. A similar distinction is made for punishers.
- Reinforcement and punishment may be either positive or negative, depending on whether the consequence involves a stimulus that is presented or one that is removed or avoided. In *positive reinforcement*, something pleasant follows a response; in *negative reinforcement*, something unpleasant is removed. In *positive punishment*, something unpleasant follows the response; in *negative punishment*, something pleasant is removed.
- Using the Skinner box and similar devices, behaviorists have shown that *extinction, stimulus generalization*, and *stimulus discrimination* occur in operant conditioning as well as in classical conditioning. A *discriminative stimulus* signals that a response is likely to be followed by a certain type of consequence.
- *Continuous reinforcement* leads to the most rapid learning. However, *intermittent* (*partial*) *reinforcement* makes a response resistant to extinction (and, therefore, helps account for the persistence of superstitious rituals). One of the most common errors people make is to reward intermittently the responses they would like to eliminate.
- *Shaping* is used to train behaviors with a low probability of occurring spontaneously. Reinforcers are given for *successive approximations* to the desired response until the desired response is achieved.
- Biology places limits on what an animal or person can learn through operant conditioning or how easily a behavior is learned. Animals may have trouble learning a task because of *instinctive drift*.

Operant Conditioning in Real Life

- *Behavior modification*, the application of operant conditioning principles, has been used successfully in many settings, but when used inappropriately or incorrectly, reinforcement and punishment both have their pitfalls.

- Punishment, when used properly, can discourage undesirable behavior, including criminal behavior. But it is frequently misused and can have unintended consequences. It is often administered inappropriately because of the emotion of the moment; it may produce rage and fear; its effects are often only temporary; it is hard to administer immediately; it conveys little information about the kind of behavior that is desired; and it may provide attention that is rewarding. Extinction of undesirable behavior, combined with reinforcement of desired behavior, is generally preferable to the use of punishment.
- Reinforcers can also be misused. Rewards that are given out indiscriminately, as in efforts to raise children's self-esteem, do not reinforce desirable behavior. And an exclusive reliance on *extrinsic reinforcement* can sometimes undermine the power of *intrinsic reinforcement*. But money and praise do not usually interfere with intrinsic pleasure when a person is rewarded for succeeding or making progress rather than for merely participating in an activity, or when a person is already highly interested in the activity.

Learning and the Mind

- Even during behaviorism's heyday, some researchers were probing the "black box" of the mind. In the 1930s, Edward Tolman studied *latent learning*, in which no obvious reinforcer is present during learning and a response is not expressed until later on, when reinforcement does become available. What appears to be acquired in latent learning is not a specific response but rather knowledge about responses and their consequences.
- The 1960s and 1970s saw the increased influence of *social-cognitive theories* of learning, which focus on *observational learning* and the role played by beliefs, interpretations of events, and other cognitions in determining behavior. Social-cognitive theorists argue that, in both observational learning and latent learning, what is acquired is knowledge rather than a specific response. Perceptions, personality traits, and the social context all influence how people respond to what they see and the different lessons they take from any experience.

Psychology in the News, Revisited

- Behavioral and social-cognitive learning theories help us understand when punishment might be constructive and appropriate, and also when it backfires, causing resentment and other undesirable results. The learning perspective also offers good alternatives to physical punishment, and helps us appreciate the role of the environment in promoting "bad" behavior. Learning techniques can be enormously helpful for individuals and institutions, so long as they are applied wisely and carefully.

Taking Psychology with You

- Because people differ in their perceptions and beliefs, some people become more aggressive after exposure to violent images in the media, but most people do not.

Key Terms

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behaviorism **299**
conditioning **299**
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- **Learning** is any relatively permanent change in behavior resulting from experience.
- **Behaviorism** explains learning as the result of observable acts and events without reference to mental entities, such as "mind" or "will."
- **Conditioning** involves associations between environmental stimuli and responses.

Classical Conditioning

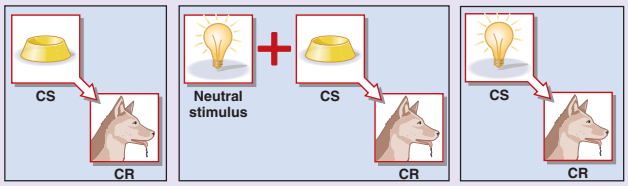
New Reflexes from Old

Classical conditioning is the process by which a previously neutral stimulus acquires the capacity to elicit a response through association with a stimulus that already elicits a similar or related response (first studied by Ivan Pavlov).

- **Unconditioned stimulus (US)**: stimulus that elicits a reflexive response in the absence of learning
- **Unconditioned response (UR)**: reflexive response elicited by a stimulus in the absence of learning
- **Conditioned stimulus (CS)**: initially neutral stimulus that comes to elicit a conditioned response after being associated with an unconditioned stimulus
- **Conditioned response (CR)**: response that is elicited by a conditioned stimulus

Principles of Classical Conditioning

- **Extinction**: gradual disappearance of CR after CS is repeatedly presented without US.
- **Counterconditioning:** gradual disappearance of a CR produced by pairing a CS with another stimulus that elicits an incompatible response.
- **Higher-order conditioning:** a neutral stimulus becomes a CS after being associated with another CS.



- **Stimulus generalization:** a CR occurs upon presentation of a stimulus similar to the CS.
- **Stimulus discrimination:** stimuli similar to the CS produce different responses.

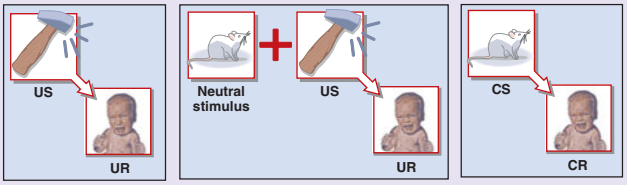
What is Learned in Classical Conditioning?

- Many psychologists argue that classical conditioning involves information conveyed by one stimulus about another, that the CS becomes a signal for the US.
- Classical conditioning appears to be an evolutionary adaptation that allows an organism to prepare for a biologically important event.

Classical Conditioning in Real Life

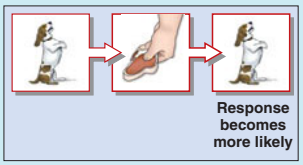
Classical conditioning plays an important role in:

- Positive emotional responses to particular objects and events
- Learned fears and phobias (as demonstrated in the Little Albert study)
- Acquired tastes: likes and dislikes for particular foods and odors
- Unpleasant reactions to stimuli associated with medical treatments and reduced pain or anxiety in response to placebos

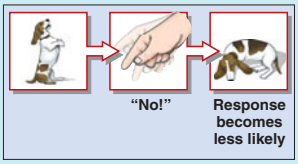


The Consequences of Behavior

- **Reinforcement** strengthens a response or makes it more likely to recur.



- **Punishment** weakens a response or makes it less likely to recur.



Primary and Secondary Reinforcers and Punishers

- A **primary reinforcer** strengthens responses because it satisfies a biological need.
- A **secondary reinforcer** strengthens a response because of its association with another reinforcer.
- A **primary punisher** is a stimulus that produces discomfort.
- A **secondary punisher** is a stimulus that has acquired punishing properties through association with a another reinforcer.

Positive and Negative Reinforcers and Punishers

- **Positive reinforcement**: response is followed by the presentation of, or increase in intensity of, a reinforcing stimulus.
- **Negative reinforcement**: response is followed by the removal, delay, or decrease in intensity of an unpleasant stimulus.
- In *positive punishment*, something unpleasant follows the response; in *negative punishment*, something pleasant is removed.

Operant Conditioning

Operant conditioning is the process by which a response becomes more likely or less likely to occur, depending on its consequences; associated with the work of B. F. Skinner.

Principles of Operant Conditioning

- **Extinction:** occurs when the behavior is no longer followed by the consequence that reinforced it.
- **Stimulus generalization:** responses occur to stimuli that resemble those present during original learning.
- **Stimulus discrimination:** responses occur in the presence of one stimulus but not to stimuli that resemble the ones originally present but differ from them on some dimension.
- Schedules of reinforcement:
  - **Continuous reinforcement** leads to fastest learning.
  - **Intermittent (partial) schedule of reinforcement** makes a response resistant to extinction.
- **Shaping:** used to train behaviors through reinforcement of **successive approximations** until the desired behavior occurs.
- **Instinctive drift:** the tendency for an organism to revert to instinctive behavior.

Operant Conditioning in Real Life

Behavior modification (also known as *applied behavior analysis*): the application of conditioning techniques to teach new responses or eliminate behavior problems.

The Pros and Cons of Punishment

Punishment can effectively discourage undesirable behavior. However, as a method of correcting behavior, it often fails, for these reasons:

- It is often administered inappropriately or mindlessly.
- Recipients often respond with anxiety, fear, or anger.
- Effectiveness is only temporary, depending on presence of punishing person.
- Because most misbehavior is hard to punish immediately, punishment is often too delayed to be effective.
- Punishment does not convey what the person or animal *should* do that is correct or appropriate.
- Punishment sometimes inadvertently rewards the unwanted behavior because it brings attention.

The Problems with Reward

- Rewards are often misused by being given indiscriminately, unrelated to desired behavior.
- Exclusive reliance on **extrinsic reinforcement** can sometimes undermine the power of **intrinsic reinforcement**, such as enjoyment of the task. However, the effects of extrinsic reinforcers depend on many factors, such as a person's initial motivation, the context, and whether improvement at a task is reinforced.

Learning and the Mind

Latent Learning

- **Latent learning** is not immediately expressed in performance.
- It can occur without obvious reinforcers.
- It involves acquiring knowledge about responses and their consequences, which permits flexibility in reaching goals.

Social-Cognitive Learning Theories

- **Social-cognitive theories** focus on **observational learning** and the role played by beliefs, interpretations of events, and other cognitions.

- Social-cognitive theorists argue that because people differ in their perceptions and beliefs, they may learn different lessons from the same situations, as in the case of media violence.