Little Albert's newfound fear, however, did not stop with the rat. It spread, or generalized, to objects similar in appearance to the rat. For example, when the researchers later showed Albert a rabbit, a furry dog, and a fur coat, he showed fear toward each of them. Because of his experiences with the rat and the steel bars, Albert had learned to fear other objects that were white and furry. Shortly after the experiment was conducted, Little Albert was removed from the study.

Was it ethical for Watson and Rayner to conduct their experiment on such a small child—especially when the experiment involved repeatedly frightening him and teaching him to fear something that had previously given him pleasure? Today psychologists would say no, the Little Albert experiment was very unethical. For one thing, the researchers repeatedly frightened a very small child. For this reason and for others, the ethical standards followed by Watson and Rayner fall far short of the current standards used today by the American Psychological Association (APA). As a result, the experiment would never be duplicated today.

Despite these ethical questions, however, the Little Albert experiment does illustrate some important concepts of learning. The experiment showed that through the principles of classical conditioning, a person can be taught to fear something based on association and can generalize that fear to other similar objects.

What do you think?

1. How did Watson and Rayner condition Little Albert to fear white rats?

2. Do you think you have learned to fear or enjoy certain things because of conditioning or association? Explain.

Chapter at a Glance

SECTION 1: Classical Conditioning

■ Russian physiologist Ivan Pavlov pioneered research into a form of learning known as classical conditioning. In classical conditioning, one stimulus causes a response that is usually caused by another stimulus.

■ Classical conditioning can help people adapt to the environment and can help eliminate troubling fears or other behaviors.

SECTION 2: Operant Conditioning

■ Psychologist B. F. Skinner helped pioneer research into a form of learning known as operant conditioning, in which individuals learn from the consequences of their actions.

■ Operant conditioning depends on the use of reinforcements and a schedule to execute them.

■ The principles of operant conditioning can be applied to help people or animals learn to combine a series of simple steps or actions to form complex behaviors.

SECTION 3: Cognitive Factors in Learning

■ Cognitive psychologists focus on the mental aspects of learning and are interested in what people or animals know, not just what they do.

■ Cognitive learning is based on the idea that people and animals can learn by thinking or by watching others.

■ Some techniques for behavioral modification are based on the ideas of operant conditioning and cognitive factors.

SECTION 4: The PQ4R Method: Learning to Learn

■ The PQ4R method is a study method based on the work of educational psychologist Francis P. Robinson. Robinson believed that students will learn more when they take an active approach to learning.

■ The PQ4R method includes these six steps: preview, question, read, reflect, recite, and review.

Classical Conditioning

Main Idea

Classical conditioning is a form of learning that involves the use of a stimulus to generate a specific response.

Reading Focus

1. What are the basic principles of classical conditioning?

2. How might classical conditioning help people or animals adapt to the environment?

3. What are some applications of classical conditioning?

Vocabulary

conditioning
classical conditioning
unconditioned stimulus
unconditioned response
conditioned response
conditioned stimulus
taste aversion
extinction
spontaneous recovery
generalization
discrimination
flooding
systematic desensitization
counterconditioning

TAKING NOTES Use a graphic organizer like this one to take notes on classical conditioning.

```
        Classical Conditioning
          /          \
   Principles      Applications
```
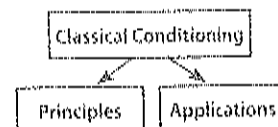
Makes My Mouth Water

PSYCHOLOGY CLOSE UP *Why do people have an immediate, physical response to a picture of pizza?* If you are like most other people, this photograph of a pizza can make your mouth water. It may even cause a rumble in your stomach. But why? After all, it is just a picture.

Your response to the picture is a learned response based on your experience. If you had never tasted pizza, you almost certainly would not have the same reaction. But since you have eaten pizza before, just the thought of it can trigger a physical reaction in you. You have learned to associate the thought of a pizza with the actual experience you would have eating it. This reaction is part of a learning experience called classical conditioning, which you will learn about in this section.

There are many examples of classical conditioning. For example, if you have a dog or cat, it may come running into the kitchen whenever it hears a can opener. That is because your pet has learned to associate the sound of the can opener with food. People have also learned to respond to certain stimuli through association. For example, when the bell rings at school, what do you do? 🖾

Looking at a photograph of pizza can cause us to react as if it was real.
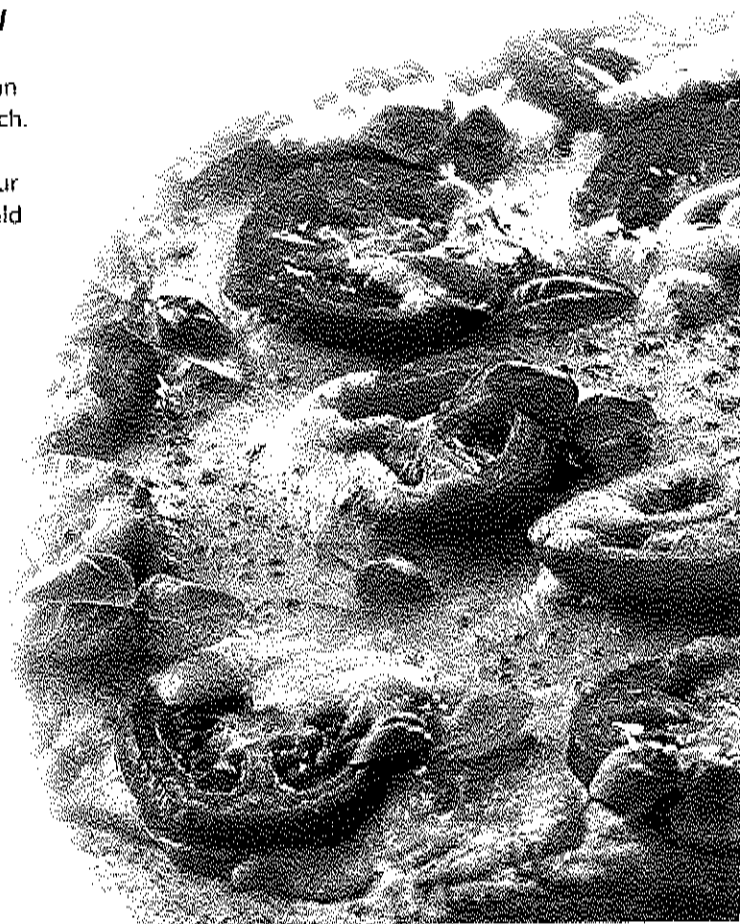
Principles of Classical Conditioning

Have you ever heard a song that you really liked that was popular a few years ago? Did the song "take you back" and make you feel a rush of sensations that you used to feel when the song was popular? If so, this reaction was probably a result of associations between the song and events in your life at the time the song was popular. In other words, the song served as a stimulus. A stimulus is something that produces a reaction, or a response, from a person or an animal. In this case, the response consisted of the feelings brought about by hearing the song.

Here is a simple experiment that also demonstrates associations. Think of a food you especially like. Is your mouth watering? If it is, you are experiencing the results of **conditioning,** a type of learning that involves stimulus-response connections. In particular, your reaction demonstrates a type of conditioning known as classical conditioning. **Classical conditioning** is a simple form of learning in which one stimulus (in this case, the thought of the food) calls forth the response (your mouth watering) that is usually called forth by another stimulus (the actual food). This occurs when the two stimuli have been associated with each other.

Pavlov's Dogs Some of the earliest findings about classical conditioning resulted from research somewhat similar to your own experiences in thinking of food. However, the early research was with dogs, not people. Russian physiologist Ivan Pavlov (1849–1936) discovered that dogs, too, learn to associate one thing with another when food is involved.

Pavlov did not set out to learn about learning. Rather, he was interested in the relationship between the nervous system and digestion. In particular, Pavlov was studying salivation, or mouth-watering, in dogs. He knew that dogs would salivate if meat was placed on their tongues because saliva aids in the eating and digestion of the meat. In other words, meat on the tongue is a stimulus for the production of saliva.

But Pavlov discovered that the dogs did not always wait until they had received meat to start salivating. For example, they salivated in response to the clinking of food trays brought into the laboratory. Why? Because
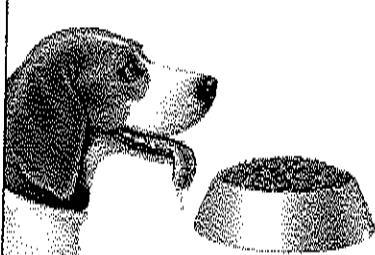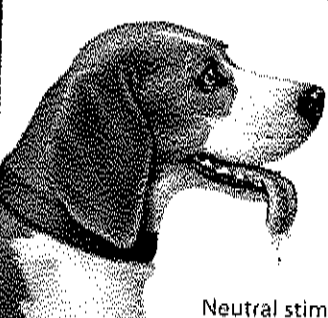
BEFORE CONDITIONING
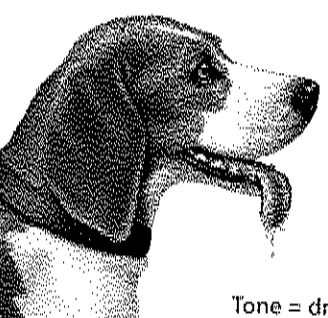
Tone = no drooling

Food = drooling

DURING CONDITIONING

Neutral stimulus (tone)

AFTER CONDITIONING

Tone = drooling

By pairing a neutral stimulus with food, Pavlov was able to condition dogs to respond to a tone as if it were food.

Skills Focus **INTERPRETING VISUALS** What did this experiment indicate about the learning abilities of dogs?

the dogs had learned from experience that this event—the clinking of the trays—meant that food was coming.

Pavlov decided that the salivation was worth looking into. If dogs could learn to salivate in response to clinking food trays because they were associated with the bringing of meat, could dogs also learn to salivate in response to any stimulus that signaled meat? Pavlov predicted that they could. He set out to show that he could train his dogs to salivate in response to any stimulus he chose.

Pavlov strapped the dogs into harnesses and used a ringing bell as the stimulus. About half a second after the bell rang, meat powder was placed on the dogs' tongues. As expected, the dogs salivated in response to the meat powder. Pavlov repeated this process several times.

After several pairings of the meat and the bell, Pavlov changed the procedure: he sounded the bell but did not follow the bell with the meat. The dogs salivated anyway—they had learned to salivate in response to the bell alone. The dogs' salivation in response to the bell demonstrates classical conditioning.

Stimulus and Response The meat in Pavlov's research was an example of an unconditioned stimulus. An **unconditioned stimulus** (US) is a stimulus that causes a response that is automatic, not learned. That automatic response, in turn, is called an **unconditioned response** (UR). Salivation in response to the meat was an unconditioned response. In other words, the dogs did not *learn* to salivate in response to the meat—they did so naturally, by instinct.

On the other hand, the dogs' salivation in response to the bell was a conditioned response. A **conditioned response** (CR) is a learned response to a stimulus that was previously neutral, or meaningless. In Pavlov's research, the bell was a neutral stimulus (NS).

That is, before Pavlov associated it with the meat, it might have made the dogs' ears perk up, but it would not have made the dogs salivate because it had nothing to do with food. Through repeated association with meat, however, the bell became a learned stimulus, or a **conditioned stimulus** (CS), for the response of salivation.

The Little Albert experiment is another example of classical conditioning. The clanging of the steel bars was the unconditioned stimulus (US) that led to the unconditioned response (UR) of fear. The rat was the conditioned stimulus (CS) that, through association with the clanging of bars, also led to fear, now the conditioned response (CR).

Reading Check Summarize How does classical conditioning occur?

Adapting to the Environment

Classical conditioning helps animals and people adapt to their environment. For example, a bear cub may learn to associate a particular scent (CS) with the appearance of a dangerous animal (US). The cub can then hide or run away (CR) when it catches the scent.

Taste Aversions One form of classical conditioning that is useful to people is called a taste aversion. A **taste aversion** is a learned avoidance of a particular food. Have you ever eaten a food that made you ill? You probably stayed away from that food for a long time. If so, you developed a taste aversion to it.

Taste aversion is an example of one-trial learning. With other forms of classical conditioning, an association must be made several times before the conditioned response occurs. For example, Pavlov had to pair the bell with meat several times before the dogs began to salivate at the sound of the bell. In taste aversions, however, just one pairing of food and illness may be all that is necessary to create the aversion.

Extinction When conditions in the environment change, responses may also change. For example, an animal threatening to a bear cub may lose its menace once the bear matures.

When a conditioned stimulus (such as the scent of an animal) is no longer followed by an unconditioned stimulus (a dangerous animal), it loses its ability to bring about a

KEY CONCEPTS OF CLASSICAL CONDITIONING

QUICK FACTS

Before conditioning begins, an unconditioned stimulus (US) brings forth an unconditioned response (UR). During conditioning, a neutral stimulus (NS) is paired with the unconditioned stimulus (US). In the resulting conditioning, the neutral stimulus becomes a conditioned stimulus (CS). The conditioned stimulus then brings forth a conditioned response (CR).

Unconditioned Stimulus (US) causes an automatic response

Unconditioned Response (UR) an automatic response to a stimulus

Neutral Stimulus (NS) does not cause a response

Conditioned Stimulus (CS) a learned stimulus

Conditioned Response (CR) learned response to a neutral stimulus

conditioned response. This process is called **extinction.** Extinction occurs when the conditioned stimulus (CS) is disconnected from the unconditioned stimulus (US). As a result, the conditioned stimulus (CS) no longer causes the conditioned response (CR) to occur.

Pavlov found that with repeated ringing of the bell (CS) not followed by meat (US), the dogs eventually stopped salivating (CR) when they heard the bell (CS). The dogs had learned that the bell no longer meant that food was on the way. The conditioned response of salivating at the sound of the bell was extinguished.

Spontaneous Recovery An extinguished response, however, is not necessarily gone forever. With **spontaneous recovery,** organisms sometimes display responses that were extinguished earlier. The revival of the response follows a period in which the conditioned stimulus does not occur. For example, after the response of salivating at the sound of the bell had been extinguished in Pavlov's dogs, a day or two passed during which the dogs did not hear the bell at all. Then after this rest period, the bell was rung again. Even though the salivation response had previously been extinguished, it was now back in a bit weaker form—the dogs still produced saliva, but they produced less of it.

Think again of the song that brought back old feelings. If the song became popular again and you started hearing it every day, you probably would no longer experience the same rush of feelings when you heard it. But if a month passed without your hearing the song at all, the next time you heard it, those old feelings would probably return.

Generalization and Discrimination The act of responding in the same ways to stimuli that seem to be similar is called **generalization.** In a demonstration of generalization, Pavlov first conditioned a dog to salivate when it was shown a circle. The dog was shown a circle (CS) and was then given meat (US). After several pairings, the dog salivated when presented with only the circle. Pavlov next demonstrated that the dog would also salivate in response to the sight of other geometric figures, including ellipses and squares. The more closely the figure resembled a circle, the more drops of saliva flowed.

The dog's weaker response to figures that looked less like a circle was an example of discrimination. **Discrimination** is the act of responding differently to stimuli that are not similar to each other. Both generalization and discrimination help people and animals adapt to their environments. For example, a bear cub who has a bad experience with a wolf may generalize from that experience that all big furry animals that growl (other than adult bears) should be avoided. On the other hand, the bear cub probably discriminates between the wolf and a mouse. The mouse might be furry, but it is not big and does not growl. Thus, it is not a danger. A child who has been frightened by a dog may generalize and stay away from all dogs. But because of discrimination, the child continues to play with his or her stuffed animals, even if they are dogs.

Reading Check Describe Give three examples of ways that classical conditioning can help people adapt to their environment.

Applications of Classical Conditioning

Classical conditioning can help people learn to overcome their fears of different objects and situations. Many fears—such as a fear of heights or of snakes—are out of proportion to the actual risk of danger that they present. Some people fear looking out of windows in tall buildings, even though they cannot fall.
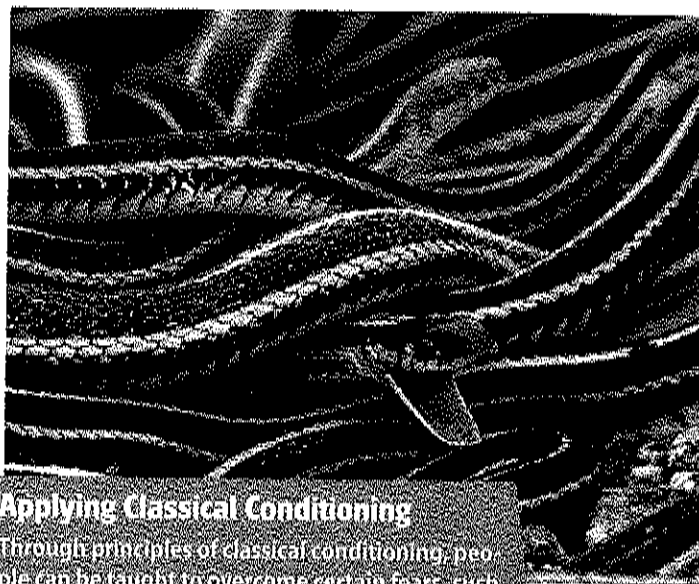
Applying Classical Conditioning
Through principles of classical conditioning, people can be taught to overcome certain fears, such as the fear of snakes.

Many people fear snakes, even snakes that are small and nonpoisonous. Two methods of reducing fears are based on the principle of extinction. These methods are known as flooding and systematic desensitization.

Flooding and Systematic Desensitization
In the method called **flooding,** a person is exposed to the harmless stimulus until fear responses to that stimulus are extinguished. For example, a person with a fear of snakes might be put in a room with lots of harmless snakes crawling around. A person with a fear of heights might be taken to the tops of tall buildings.

Although flooding is usually effective, it tends to be quite unpleasant. When people fear something, forced exposure to it is the last thing they want. For this reason, psychologists prefer to use a different method, known as systematic desensitization, to help people overcome their fears. With **systematic desensitization,** people are taught relaxation techniques and then, while they are relaxed, they are exposed gradually to the stimulus they fear. The goal of systematic desensitization is to teach the individual how to cope with their fears as they are gradually exposed to the stimulus.

For example, someone who fears snakes is shown pictures of snakes while in a relaxed state. Once the person can view pictures of snakes without losing the feeling of relaxation, he or she might then be shown some real snakes from a distance. Then, after some more time, the snakes are brought closer and closer, and eventually the person no longer fears snakes. Although systematic desensitization usually takes longer to work than flooding, it is not as unpleasant for the person experiencing it.

Counterconditioning Can cookies help children overcome their fears? In the 1920s, University of California professors Mary Cover Jones and Harold Jones reasoned that if fears could be conditioned by painful experiences, perhaps they could be treated by pleasant ones. In **counterconditioning,** a pleasant stimulus is paired repeatedly with a fearful one, counteracting the fear.

The Joneses tried out their idea with a two-year-old boy named Peter who feared rabbits. The Joneses gradually brought a rabbit closer to Peter while they fed Peter candy and cookies. Peter seemed nervous about the rabbit, but he continued to eat his treats. Gradually, the animal was brought even closer. Eventually, Peter ate treats and petted the rabbit at the same time. Apparently, his pleasure at eating the sweets canceled out his fear of rabbits.

Reading Check Identify What are three applications of classical conditioning?

ACADEMIC VOCABULARY
**relaxation technique** any method or activity that helps a person to relax

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SECTION 1 Assessment

Reviewing Main Ideas and Vocabulary

1. **Contrast** How are an unconditioned stimulus and a neutral stimulus different?

2. **Explain** What is meant by extinction and spontaneous recovery?

3. **Describe** Give an example of discrimination in classical conditioning.

Thinking Critically

4. **Compare and Contrast** How are flooding, systematic desensitization, and counterconditioning similar? How are they different?

5. **Develop** In what ways are students classically conditioned in school settings?

6. **Draw Conclusions** Describe and explain learning as an adaptation to the environment.

7. **Sequence** Using your notes and a graphic organizer like the one below, show how classical conditioning takes place.

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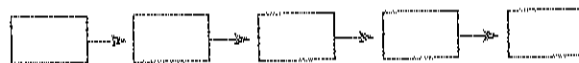
FOCUS ON WRITING

8. **Descriptive** Review the basic concepts of classical conditioning. Then think about an example of classical conditioning in your life, and write a paragraph describing how you became conditioned. Be sure to identify the stimuli and the responses.

Learning from a Virtual Rat

To research learning and conditioning, psychologists often design laboratory experiments with animals such as rats. But experiments with live animals can be costly and time-consuming. Why not take advantage of computer technology and use a virtual rat?

"Sniffy the Virtual Rat" is a computer program designed by psychologists Tom Alloway and Jeff Graham and computer programmer Greg Wilson. The program allows students to design realistic laboratory experiments in a virtual environment with a virtual rat. In the process, students not only learn how to design a sound experiment, they also learn the principles of classical conditioning.

Why use a virtual rat instead of real one? A virtual rat has several advantages. First, maintaining a laboratory with animals is too costly for many schools and colleges. Second, virtual rats never get tired and are always hungry. As a result, they can save researchers and students time and effort. Finally, one study showed that using a virtual rat significantly enhanced students' understanding (Venneman and Knowles, 2005).

To create "Sniffy," the researchers first studied live rats carefully. They found that a rat has about 80 individual moves. Out of that number, the researchers chose 30 moves for their virtual rat. Next, they studied how rats learn and created a computer program that mimicked a rat's intelligence. After several months of work, they had a trainable electronic rat—Sniffy.

The Sniffy computer program allows students to design and conduct classical conditioning experiments. Students can gain firsthand experience with the techniques and procedures used by psychologists in animal psychology experiments. In addition to receiving basic classical conditioning, Sniffy can be trained to perform several different tricks. For example, he can learn to sit up, beg, and groom his face.

Another advantage that Sniffy has over real rats is that he has been programmed to "learn" more quickly than a live animal. As a result, research time can be artificially sped up, so the results of an experiment can be analyzed quickly.

It generally takes beginner rat trainers between 40 minutes and an hour to get Sniffy to do what they want. Then students can analyze the behavioral data from their experiment, draw inferences and conclusions from it, and report on their findings. But here is the best part—there is no cleanup involved!

Thinking Critically

1. **Explain** What are some advantages to using a virtual rat like Sniffy?
2. **Discuss** What drawbacks might there be to using a virtual rat in an experiment instead of a real one?

Operant Conditioning
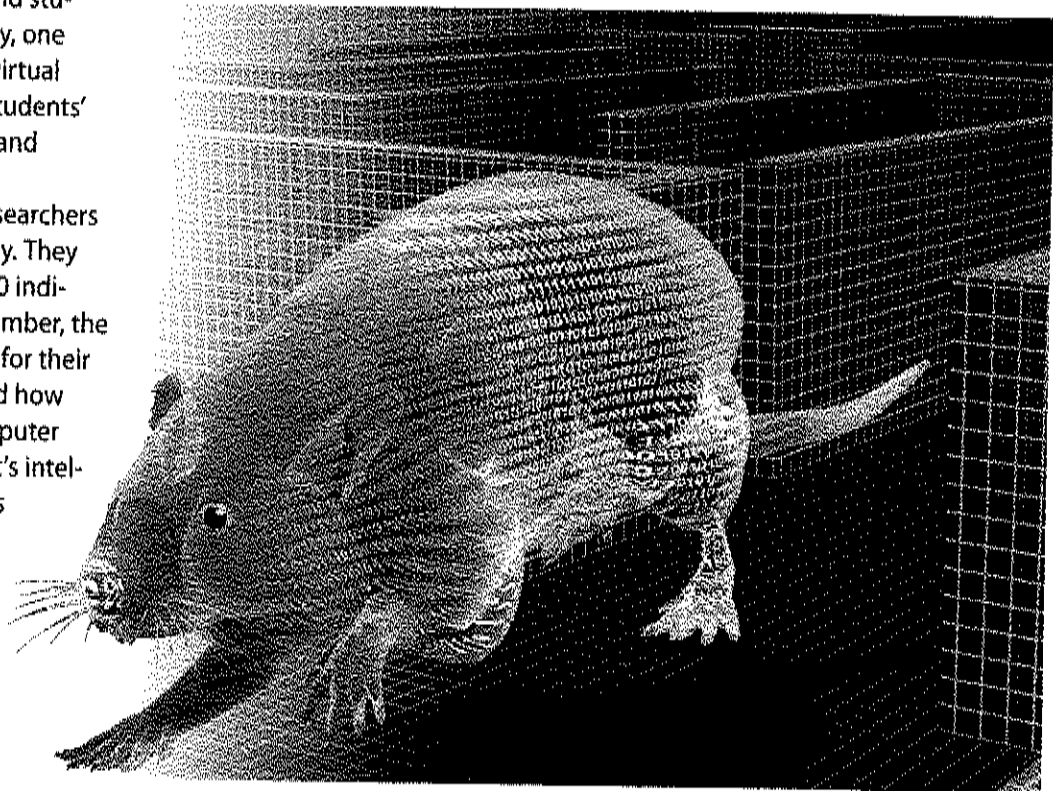
Use a graphic organizer like this one to take notes on operant conditioning.

Before You Read

Main Idea
Operant conditioning occurs when people or animals have learned to respond to a certain situation with specific behaviors.
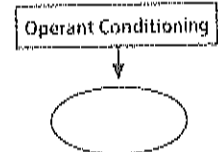
Reading Focus
1. How are operant conditioning and reinforcement related?
2. What are the main types of reinforcers?
3. How do rewards and punishments shape learning?
4. How do schedules of reinforcement influence learning?
5. What are some applications of operant conditioning?

Vocabulary
operant conditioning
reinforcement
primary reinforcers
secondary reinforcers
positive reinforcers
negative reinforcers
schedule of reinforcement
continuous reinforcement
partial reinforcement
shaping
chaining

Operant Conditioning

TWIGGY
## the Water-Skiing Squirrel

PSYCHOLOGY CLOSE UP

How can a squirrel learn how to water ski? Twiggy the squirrel is a world-famous novelty act. Twiggy is a Florida gray squirrel that learned how to water ski behind a remote-controlled toy powerboat. The original Twiggy was found by Chuck and Lou Ann Best after a hurricane in 1978. The Best family raised the squirrel as a pet. As they played in their swimming pool, Twiggy would ride on their shoulders. One day, Chuck jokingly suggested that they teach Twiggy to water ski.

First, Twiggy was trained to balance on little foam blocks. Then, the squirrel learned how to hold onto a miniature set of handlebars. Eventually, Twiggy would hold on even while being pulled. Lou Ann Best has trained several squirrels, all named Twiggy, to water ski. According to Lou Ann, "You really can't discipline them. It's a lot of love and repetition that gets them to where they are supposed to know what to do."

The type of training used to teach Twiggy to water ski is called operant conditioning. With operant conditioning, a complex behavior can be broken down into a series of small steps that are eventually linked together in one larger behavior. Humans and animals participate in this kind of learning to acquire important skills.
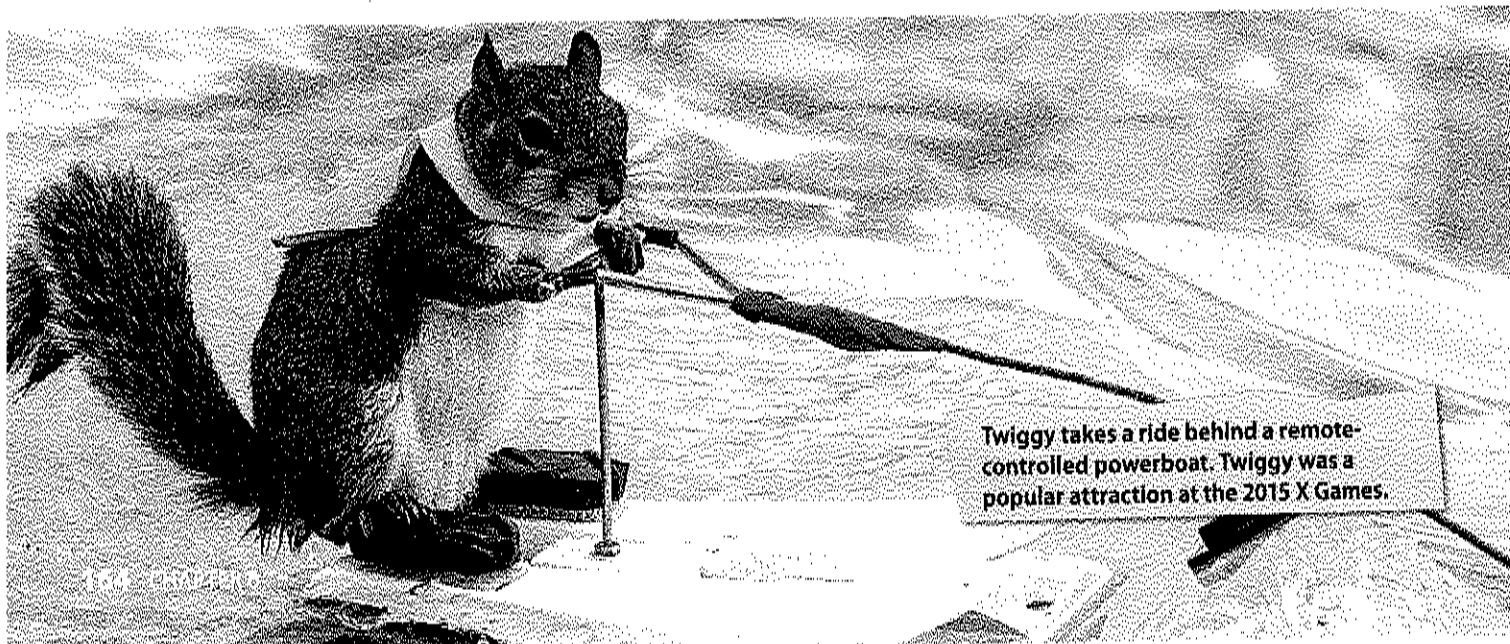
Twiggy takes a ride behind a remote-controlled powerboat. Twiggy was a popular attraction at the 2015 X Games.

Operant Conditioning and Reinforcement

In classical conditioning, we learn to associate one stimulus with another. Pavlov's dogs learned to associate a ringing bell with food. Because of classical conditioning, the response made to one stimulus (for example, food) is then made in response to the other (for example, the bell).

Classical conditioning, however, is only one type of learning. Another type of learning is operant conditioning. In **operant conditioning,** people and animals learn to do certain things—and not to do others—because of the results of what they do. In other words, they learn from the consequences of their actions. They may learn to engage in behavior that results in desirable consequences, such as receiving food or social approval. Or they might learn to avoid behaviors that result in negative consequences, such as pain or failure.

In classical conditioning, the conditioned responses are often involuntary biological behaviors, such as salivation or eye blinks. In operant conditioning, however, voluntary responses—behaviors that people and animals have more control over, such as studying—are conditioned. In operant conditioning, an organism learns to do something because of its effects or consequences.

To study operant conditioning, psychologist B. F. Skinner devised an animal cage that has been dubbed the "Skinner box." A Skinner box is ideal for laboratory experimentation. Treatments can be introduced and removed, and the results can be carefully observed.

In a classic experiment, a rat in a Skinner box was deprived of food. The box was designed so that when a lever inside was pressed, some food pellets would drop into the box. At first, the rat sniffed its way around the box and engaged in random behavior. The rat's first pressing of the lever was accidental. But food appeared.

Soon the rat began to press the lever more frequently. It had learned that pressing the lever would make the food pellets appear. The pellets reinforced the lever-pressing behavior. **Reinforcement** is the process by which a stimulus (in this case, the food) increases the chances that the preceding behavior (in this case, the lever pressing) will occur again.

After several reinforced responses, the rat pressed the lever quickly and frequently, until it was no longer hungry.

In operant conditioning, it matters little why the person or animal makes the first response that is reinforced. It can be by chance, as with the rat in the Skinner box, or the person or animal can be physically guided into the response. In training a dog to sit on command, the dog's owner may say, "Sit!" and then push the dog's rear end down. Once the dog is sitting, its response can be reinforced with a pat on the head or a food treat.

People can simply be told what they need to do when they are learning how to do things such as boot up a computer. In order for the behavior to be reinforced, however, people need to know whether they have made the correct response. If the computer does not start up the learner will probably think he or she has made a mistake and will not repeat the response. But if the computer does start up, the response will appear to be correct, and the learner will repeat it. Knowledge of results is often all the reinforcement that people need to learn new skills.

Reading Check **Describe** How does reinforcement result in operant conditioning?
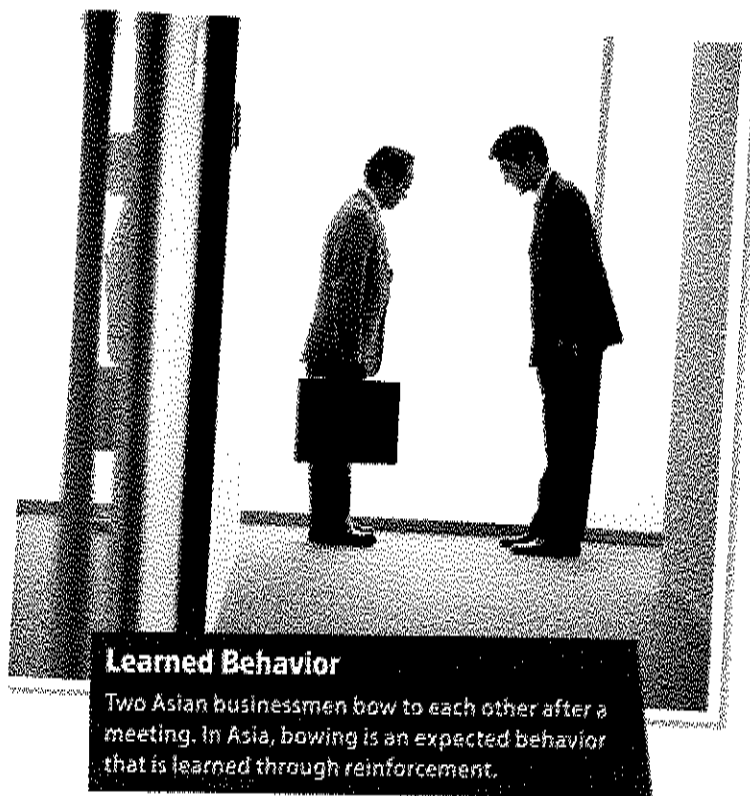
Learned Behavior
Two Asian businessmen bow to each other after a meeting. In Asia, bowing is an expected behavior that is learned through reinforcement.

Types of Reinforcers

The stimulus that encourages a behavior to occur again is called a reinforcer. There are several different types of reinforcers. Reinforcers can be primary or secondary. They can also be positive or negative.

Primary and Secondary Reinforcers Reinforcers that function due to the biological makeup of an organism are called **primary reinforcers.** For example, food, water, and adequate warmth are all primary reinforcers. People and animals do not need to be taught to value food, water, and warmth.

The value of **secondary reinforcers,** however, must be learned. Secondary reinforcers initially acquire their value through being paired with established reinforcers. Money, attention, and social approval are usually all secondary reinforcers. Money, for example, is a secondary reinforcer because we have learned that it may be exchanged for primary reinforcers such as food and shelter.

Secondary reinforcers may acquire their value through a long chain of associations. For example, good grades can lead to a good college, which can lead to a good job, which can lead to more money and social approval. As a result, good grades may come to be desired in and of themselves.

Positive and Negative Reinforcers Reinforcers can also be positive or negative. **Positive reinforcers** increase the frequency of the behavior they follow when they are applied. Food, fun activities, and social approval are good examples of positive reinforcers. In positive reinforcement, a behavior is reinforced because a person (or an animal) receives something he or she wants following the behavior.

Different reinforcers work with different people. For people who enjoy sports, for example, the opportunity to participate in a sport is a positive reinforcer. For people who do not enjoy sports, however, the opportunity to participate in a sport would not be an effective reinforcer. Similarly, what serves as a reinforcer at one time for a person may not be as effective at another time for that same person. When a person is hungry, food will work well as a positive reinforcer. But once the person has eaten and is full, food will no longer have an effect.

Unlike positive reinforcement, with negative reinforcement a behavior is reinforced because something unwanted *stops* happening or is removed following the behavior. **Negative reinforcers** increase the frequency of the behavior that follows when they are removed. Negative reinforcers are unpleasant in some way. Discomfort, fear, and social disapproval are negative reinforcers.

Daily life is filled with examples of negative reinforcement. When we become too warm in the sun, we move into the shade. When a food particle is stuck between our teeth, we floss to remove it. Both of these situations involve some uncomfortable stimulus—a negative reinforcer—that we act on to make the discomfort disappear. When a specific behavior reduces or removes the discomfort, that behavior is reinforced, or strengthened. For example, if a child does not want to perform a certain activity, he or she may scream, yell, or whine until the parent relents. The child's action has been reinforced and likely the behavior will be repeated when the child refuses to do something else demanded by the parent.

Reading Check Summarize Describe the four main types of reinforcers.

KEY CONCEPTS OF OPERANT CONDITIONING

QUICK FACTS

Operant conditioning occurs when a learner's behavior is followed by a consequence, or reinforcement.

Positive Reinforcement
- Increases the frequency of a behavior when applied
- Example: if you finish your homework early, you get to go to the movies as a reward

Negative Reinforcement
- Increases the frequency of a behavior when removed
- Example: to stop the buzzing sound in your car, you have to roll up the window

Punishment
- Decreases the frequency of a behavior
- Example: your parents take your cell phone away for one day each week to lower your phone bill

Rewards and Punishments

Many people believe that being positively reinforced is the same as being rewarded and that being negatively reinforced is the same as being punished. There are some differences, however, particularly between negative reinforcement and punishment.

Rewards Rewards, like reinforcers, increase the frequency of a behavior, and some psychologists do use the term *reward* interchangeably with the term *positive reinforcement*. But Skinner preferred the concept of reinforcement to that of reward because the concept of reinforcement can be explained without trying to "get inside the head" of an organism to guess what it will find rewarding. A list of reinforcers is arrived at by observing what kinds of stimuli increase the frequency of a behavior.

Punishments While rewards and positive reinforcers are similar, punishments are quite different from negative reinforcers. Both negative reinforcers and punishments are usually unpleasant. But negative reinforcers increase the frequency of a behavior by being removed. Punishments, on the other hand, are unwanted events that, when they are applied, decrease the frequency of the behavior they follow.

Some school districts tie participation in athletic programs to academic grades, and both punishment and negative reinforcement are involved. To the athlete on the team who does not achieve the required grades, being removed from the team is a punishment. But once the student is off the team, the disappointment over being banned from participation is a negative reinforcer. The student may work harder to raise his or her class grades in order to rejoin the team, thus ending the disappointment.

Strong punishment can rapidly end undesirable behavior. But punishment tends to work only when it is guaranteed. If a behavior is punished some of the time but goes unnoticed the rest of the time, the behavior will probably continue.

Most psychologists feel it is preferable to reward children for desirable behavior rather than punish them for unwanted behavior.
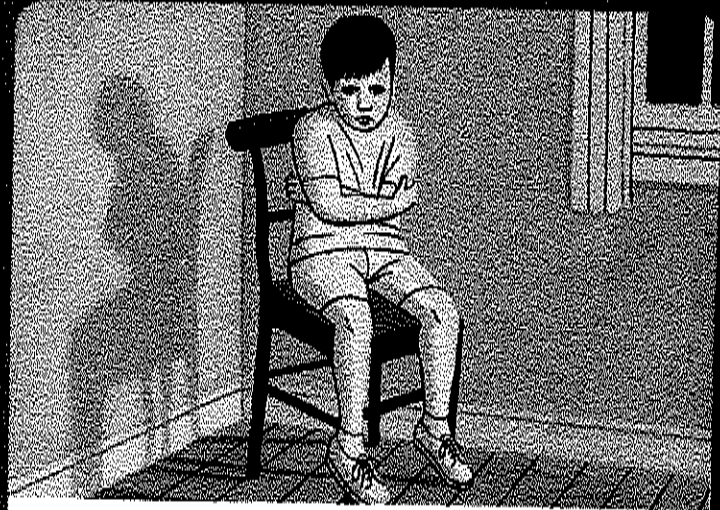
When Punishment Is a Problem

Psychologists point to several reasons for minimizing the use of punishment. They believe that in most cases, punishment is not the best way to deal with a problem.

Punishment can create anger and hostility. Children who are punished may take out their anger on others.

Punishment does not in itself teach alternative acceptable behavior. A child may learn what not to do in a particular situation, but not what to do instead.

Severely punished people may try to leave the situation rather than change their behavior. A child who is often punished may respond by simply running away.

Punishment may have broader effects than desired. This can occur when people do not know why they are being punished and what is wanted of them.

Punishment is sometimes accompanied by unseen benefits that make the behavior more, not less, likely to be repeated. For instance, some children may learn that the most effective way to get attention from their parents is to misbehave.

Punishment may be imitated as a way of solving problems. For example, children hit by angry parents may learn not only that they have done something wrong but also that people hit other people when they are upset.

Skills Focus **INTERPRETING CHARTS**

Which of these reasons do you feel is the strongest for not using punishment to shape behavior?

For example, parents and other authority figures should pay attention to children and praise them when the children are behaving well. If good behavior is taken for granted, and only misbehavior receives attention, misbehavior may get reinforced.

Psychologists also point out that children need to be aware of the desired behavior. In addition, they need to be capable of performing it. For example, consider a situation in which parents punish a child for not listening to directions only to find out much later that the child has a hearing problem and could not hear the directions.

Reading Check Contrast Explain how punishments are different from negative reinforcers.

Schedules of Reinforcement

A major factor in determining just how effective a reinforcement will be in bringing about a behavior has to do with the **schedule of reinforcement**—when and how often the reinforcement occurs.

Continuous and Partial Reinforcement We have been discussing **continuous reinforcement,** or the reinforcement of a behavior every time the behavior occurs. For example, the rats in the Skinner box received food every time they pressed the lever. If you go to a friend's house and your friend is there every time, you will probably continue to go to that same location each time you want to see your friend because you have always been reinforced for going there. New behaviors are usually learned most rapidly through continuous reinforcement.

It is not, however, always practical or even possible to reinforce a person or an animal for a behavior every single time the behavior occurs. Moreover, a person or animal who is continuously reinforced for a behavior tends to maintain that behavior only as long as the reinforcement is still there. If for some reason the reinforcement stops occurring, the behavior disappears very quickly. For example, if you go to your friend's house only to be told that your friend no longer lives there, you almost certainly will not return to that house again in search of your friend.

The alternative to continuous reinforcement is called partial reinforcement.

In **partial reinforcement,** a behavior is not reinforced every time it occurs. People who regularly go to the movies, for example, may not enjoy every movie they see, but they continue to go because they enjoy at least some of the movies. Behaviors learned through partial reinforcement tend to last longer after they are no longer being reinforced at all than do behaviors learned through continuous reinforcement.

There are two basic categories of partial reinforcement schedules. The first category concerns the amount of time (or interval) that must occur between the reinforcements of a behavior. The second category concerns the number of correct responses that must be made before reinforcement occurs (the ratio of responses to reinforcers).

Interval Schedules If the amount of time—the interval—that must elapse between reinforcements of a behavior is greater than zero seconds, the behavior is on an interval schedule of reinforcement. There are two different types of interval schedules: fixed-interval schedules and variable-interval schedules. These schedules affect how people allocate the persistence and effort they apply to certain tasks.

In a fixed-interval schedule, a fixed amount of time—say, five minutes—must elapse between reinforcements. Suppose a behavior is reinforced at 10:00. If the behavior is performed at 10:02, it will not be reinforced at that time. However, at 10:05, reinforcement again becomes available and will occur as soon as the behavior is performed. Then the next reinforcement is not available until five minutes later, and so on. Regardless of whether or how often the desired behavior is performed during the interval, it will not be reinforced again until five minutes have elapsed.

The response rate falls off after each reinforcement on a fixed-interval schedule. It then picks up as the time when reinforcement will be dispensed draws near. For example, in a one-minute fixed-interval schedule, a rat may be reinforced with food the first time it presses the lever after a minute has elapsed since the previous reinforcement. After each reinforcement, the rat's rate of lever pressing slows down, but as a minute approaches, lever pressing increases in frequency. It is as if the rat

QUICK FACTS

INTERVAL SCHEDULES

Schedule	Examples
Fixed-Interval Schedule An exact amount of time passes between each reinforcement.	• Studying for a weekly quiz • Getting your paycheck every two weeks
Variable-Interval Schedule A varying amount of time passes between each reinforcement.	• Checking e-mail • Winning a video game

RATIO SCHEDULES

Schedule	Examples
Fixed-Ratio Schedule Reinforcement occurs after a fixed number of responses.	• Getting one free meal after the purchase of ten • Losing your driver's license after five violations
Variable-Ratio Schedule Reinforcement occurs after a varying number of responses.	• Playing the lottery • The number of shots to score a goal in a soccer game

Partial reinforcement schedules can be based on time (interval) or response rate (ratio).

has learned that it must wait a while before reinforcement is available. Similarly, if you know that your teacher gives a quiz every Friday, you might study only on Thursday nights. After each quiz, you might not study again until the following Thursday. You are on a one-week fixed-interval schedule.

Farmers and gardeners are quite familiar with one-year fixed-interval schedules. If a particular type of fruit ripens only in the spring, for example, the farmer probably will not check to see if the fruit is ripe in the autumn or winter. However, as spring begins, the farmer will probably check more and more frequently to see if the fruit is ripe. Once all the fruit has ripened and been picked, the farmer will stop checking until the next spring.

In a variable-interval schedule, varying amounts of time go by between reinforcements. For example, a reinforcement may occur at 10:00, then not again until 10:07 (7-minute interval), then not again until 10:08 (1-minute interval), and then not again until 10:20 (12-minute interval).

In variable-interval schedules, the timing of the next reinforcement is unpredictable. Therefore, the response rate is steadier than with fixed-interval schedules. For example, if your teacher gives unpredictable pop quizzes, you are likely to do at least some studying fairly regularly because you do not know when the next quiz will be. And since there is always the chance that it could be tomorrow, you want to be prepared.

Ratio Schedules If a desired response is reinforced every time the response occurs, there is a one-to-one (1:1) <u>ratio</u> of response to reinforcement (one response, one reinforcement). If, however, the response must occur more than once in order to be reinforced, there is a higher response-to-reinforcement ratio. For example, if a response must occur five times before being reinforced, the ratio is 5:1. As with interval schedules, there are fixed-ratio schedules and variable-ratio schedules.

In a fixed-ratio schedule, reinforcement is provided after a fixed number of correct responses have been made. The rat in the box would have to press the lever, say, five times, and always exactly five times, in order to receive the food. Some stores use fixed-ratio schedules to encourage people to buy more. A video rental store, for instance, may promise customers a free video rental after payment for five rentals.

With a fixed-ratio schedule, the person or animal tends to try to get its fixed number of responses "out of the way" as quickly as it can to get to the reward. With the free video rental offer, for example, a customer may rent the five required videos as soon as possible to get the free one sooner. If the ratio is very high, however, it is often less effective, particularly with people.

With a variable-ratio schedule, reinforcement can come at any time. Sometimes the rat might have to press the lever 5 times to get the food; at other times, 8 or even 14 times.

ACADEMIC VOCABULARY
ratio the relationship in quantity, amount, or size between two or more things

The rat cannot predict how many times the lever must be pressed because the number changes each time.

This unpredictability maintains a high response rate. Slot machines tend to work on variable-ratio schedules. Even though the players do not know when (or even if) they will win, they continue to drop coins into the machines. And when the players do win, they often continue to play because the next winnings might be just a few lever-pulls away.

Extinction in Operant Conditioning In operant conditioning, as in classical conditioning, extinction sometimes occurs. In both types of conditioning, extinction occurs because the events that had previously followed a stimulus no longer occur.

In operant conditioning, the extinction of a learned response results from repeated performance of the response without reinforcement. In Skinner's experiment with the rats, lever pressing was followed by—and reinforced

by—food. But if a rat presses a lever repeatedly and no food follows, it will eventually stop pressing the lever. The lever-pressing behavior will have been extinguished.

Reading Check **Infer** Why are both variable-interval schedules and variable-ratio schedules successful?

Applications of Operant Conditioning

As we have seen, even people who have never had a course in psychology use operant conditioning every day to influence other people. For example, parents frequently use rewards, such as a trip to the park or ice cream, to encourage children to perform certain tasks, such as cleaning their rooms. Some specific applications of operant conditioning in education include shaping, chaining, and programmed learning.

Shaping and Chaining If you have ever tried to teach someone how to do a complex or difficult task, you probably know that the best way to teach the task is to break it up into parts and teach each part separately. When all the parts have been mastered, they can be put together to form the whole task. Psychologists call this shaping. **Shaping** is a way of teaching complex behaviors in which one first reinforces small steps in the total activity.

Learning to ride a bicycle, for example, involves the learning of a complex sequence of behaviors and can be accomplished through shaping and chaining. In **chaining,** each step of a sequence must be learned and must lead to the next until the final action is achieved. The steps create a response chain. Sometimes several response chains must be learned to complete a desired action. For example, in learning to ride a bike a person must learn to move the bike forward by using the pedals. You may have seen a parent help a young child by holding the seat as the child learns to pedal. Then they must learn to balance the bicycle, and then to steer it. At first, each of these steps seems difficult, and people must pay close attention to each one. After many repetitions, though, and much praise and reassurance from the instructor, each step—and eventually bicycle riding itself—becomes habitual.
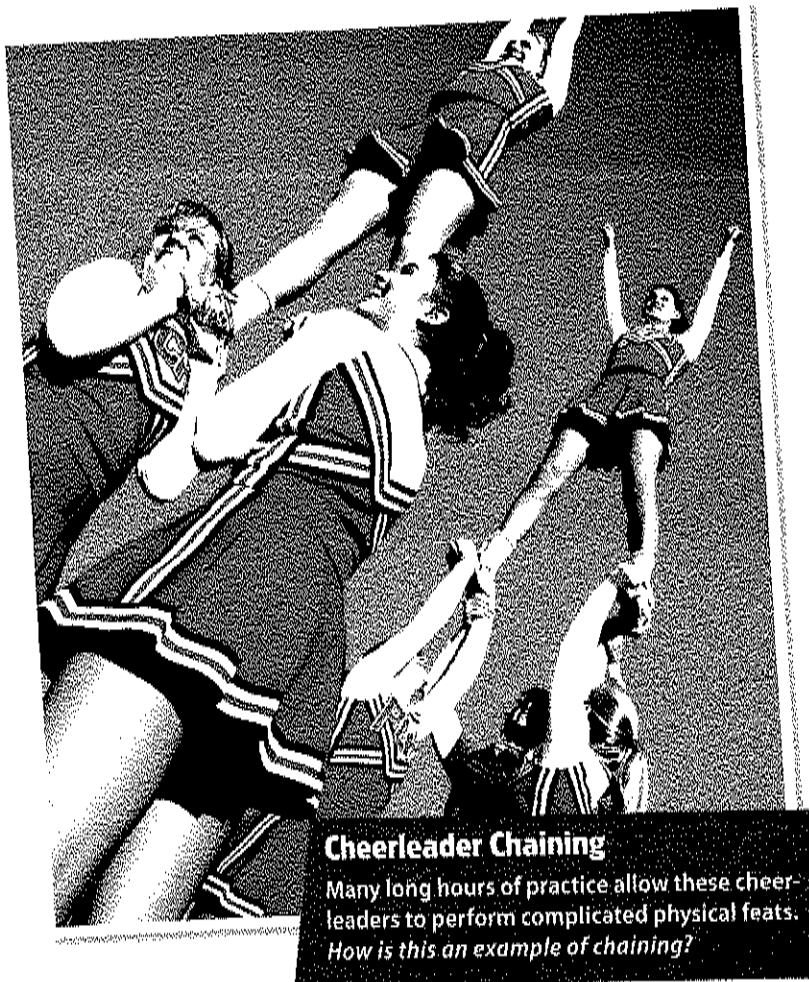
Cheerleader Chaining
Many long hours of practice allow these cheerleaders to perform complicated physical feats. *How is this an example of chaining?*

Chaining can occur either in a forward or backward response chain. In a forward chain, each step leads to a final goal. If you are learning to tie your shoes you eventually reach the point at which you have performed all the tasks in the chain and your shoes are tied. In backward chaining, you start with the final action and dissect each step it takes to get to that point. For example, suppose you want to know the steps in putting on a jacket. In backward chaining, you start with the jacket on and go backward through the steps necessary to put on the jacket.

Psychologists have used chaining to teach complex behavior patterns to animals. For example, they have trained rats to pedal toy cars by first reinforcing the rats' behavior of turning toward the cars. Next they wait until the rats approach the cars before providing further reinforcement. Then they wait until the rats touch the cars, and so on. In this way, rats have been trained to run up ramps, cross bridges, and climb ladders. This type of learning has also been used to train service animals to help people with disabilities.

Programmed Learning B. F. Skinner developed an educational method called programmed learning that is based on shaping and chaining. Programmed learning assumes that any task, no matter how complex, can be broken down into small steps. Each step can be shaped individually and combined to form the more complicated whole.

In programmed learning, a device called a teaching machine presents the student with the subject matter in a series of steps, each of which is called a frame. Each frame requires the student to make some kind of response, such as answering a question. The student is immediately informed whether the response is correct. If it is correct, the student goes on to the next frame. If the response is incorrect, however, the student goes back over that step until he or she learns it correctly.

These days, teaching machines are most likely to be computers that are programmed so that the material can branch off in several different directions, depending on where the student needs instruction and practice. The use of computers in learning is called computer-assisted instruction.

Programmed learning does not punish students for making errors. Instead, it reinforces correct responses. Teaching machines are infinitely patient with the learner. They are also highly efficient. Eventually, all students who finish the program earn "100 percent"—but they do so by learning in small steps at their own pace.

Reading Check Identify Supporting Details
What are three examples of applications of operant conditioning?

SECTION 2 Assessment

Reviewing Main Ideas and Vocabulary

1. **Identify** What are the basic types of reinforcers?
2. **Recall** What factors determine how effective a reinforcement will be?
3. **Contrast** What is the difference between interval schedules and ratio schedules?
4. **Explain** How are shaping and chaining linked?

Thinking Critically

5. **Contrast** How are negative reinforcers and punishment different?
6. **Analyze** What roles do reinforcement and punishment play in determining one's persistence and effort?

7. **Compare** Using your notes and a graphic organizer like this one, compare the different types of reinforcers that can be used in operant conditioning.

Reinforcer	Characteristics

FOCUS ON WRITING

8. **Descriptive** Choose a task that you would like to teach someone using shaping and chaining. Then write a description of each of the steps involved in the entire process.

Cognitive Factors in Learning

Before You Read

Main Idea
Cognitive learning focuses on the mental aspects of learning, such as obtaining, processing, and organizing information. Cognitive psychologists are interested not only in what people do, but also what they know.
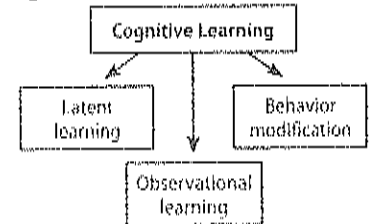
Reading Focus
1. What is latent learning?
2. In what situations does observational learning take place?
3. What learning principles are involved in behavior modification?

Vocabulary
latent learning
observational learning

TAKING NOTES Use a graphic organizer like this one to take notes on cognitive learning.

```
            Cognitive Learning
          /         |         \
      Latent               Behavior
     learning             modification
                 |
            Observational
              learning
```


It's Not **Christmas** WITHOUT **Tamales**

Several generations prepare tamales for a holiday celebration.

PSYCHOLOGY CLOSE UP *What do tamales have to do with Christmas?* In some parts of Texas, Hispanic families celebrate the December holiday season by making tamales, a tradition that has been handed down for many years. To prepare the tamales, family members gather for the day. Generally, grandmothers and mothers are the chief tamale makers, and younger women are the assistants. The young people observe the whole process, including cooking the meat, preparing the dough, assembling the tamales, and then cooking them. This insures that when the assistants are older, they will know exactly how to make the tamales. In this way, a family tradition is passed down from generation to generation.

Tamale making is a good example of what psychologists call observational learning, or learning that is acquired by observing and imitating others. Observational learning is common in our everyday lives. If you think about it, you have probably learned many things by observing and imitating others, from how to hold a fork or brush your teeth to more specialized tasks such as how to text message, access your e-mail, or behave at a social event. Psychologists have studied exactly how we learn through observation.

Latent Learning

For B. F. Skinner, what was important was what organisms actually do, not what they say or think they might do. Skinner was interested only in organisms' behaviors.

Cognitive psychologists, however, prefer to speak about what people and animals *know* because of learning—not just what they do. Cognitive psychologists see learning as purposeful, not mechanical. They contend that a person can learn something simply by thinking about it or by watching others. They view people and even some animals as searching for information, weighing evidence, and making decisions. One kind of cognitive learning is called **latent learning**—learning that remains hidden until it is needed.

How do you know where objects are in your home, in your school, or in your neighborhood? You probably have a mental picture, or "cognitive map," of the area. Because you are familiar with your school, for example, you know the location of your locker, the main office, the cafeteria, the gym, and your psychology classroom. Chances are that no one has reinforced your creation of a mental picture of the school's layout; you have simply created it on your own.

In the past, many psychologists argued that organisms only learn behaviors that are reinforced. Today, however, most psychologists believe that much learning occurs without reinforcement. Support for this view comes from the work of E. C. Tolman. Tolman showed that rats will learn about their environments even in the absence of reinforcement. He trained some rats to run through mazes to reach food. Other rats were simply permitted to explore the mazes. They received no food or other rewards. After the unrewarded rats had run around in the mazes for 10 days, food was placed in a box at the far end of the mazes. After only one or two reinforced efforts, the previously unrewarded rats reached the food as quickly as the rewarded rats.

Tolman determined that the rats had learned about the layouts of the mazes even when they were not rewarded for their learning. Tolman distinguished between what organisms learn and what they do. Rats would learn about the mazes even when they roamed about without a goal. However, they had no reason to run efficient routes to the far end of the mazes until they were rewarded for doing so. Therefore, even though they had knowledge of the most rapid routes all along, this knowledge had been hidden, or latent, until the rats had reason to use it—when there was food at the end.

On your way to school each morning, you may pass a particular street corner at which you have never had any reason to stop. But if a friend wants to meet you at that corner on Saturday, you will know how to get there, even though you may never have stopped there before. This is another example of latent learning.

Reading Check Recall When is latent learning revealed?

Observational Learning

How many things have you learned from observing other people, from reading books, and from watching films and television? No doubt you have picked up a few ideas about how to act in certain situations. Certainly, cooking programs on television are based on the premise that people learn by watching or being told how others do things. People also learn to predict likely outcomes of actions by watching others.

In his research on social learning, psychologist Albert Bandura (1925–2011) showed that people acquire knowledge and skills by observing and imitating others. Such learning is called **observational learning.**

Modeling One type of observational learning is modeling. Modeling is basically a type of imitation. A person will observe a certain behavior and later be able to reproduce it. For example, suppose you did not know how to get a bottle of water from a vending machine. You could observe people at a vending machine and determine what actions are needed to get a bottle of water from the machine. Or, suppose you are a new student in a class. You might model your behavior after other students. For example, you might learn that it is acceptable behavior to speak up in class by watching other students. In learning that classroom discussion is encouraged, you would have demonstrated the ability to learn by a process known as <u>vicarious</u> reinforcement.

ACADEMIC VOCABULARY
vicarious experienced indirectly through the experience of another

Observational learning and modeling account for much human learning. Children learn to speak, eat, and play at least partly by observing their parents and others do these things. Modern advertising also uses elements of observational learning—people often decide what products to purchase based on advertisements they have seen. You learn to pronounce words in your foreign-language class by hearing your teacher pronounce them. We may not always be able to do something perfectly the first time we try it, but if we have watched others do it first, we probably have a head start over people who are coming into it without any previous exposure.

The Effects of Media Violence One example of observational learning—and its effects— has to do with media violence. Television is one of our major sources of informal observational learning, and children are routinely exposed to scenes of violence just by turning on the TV set. If a child watches two to four hours of TV a day, she or he will have seen 8,000 murders and another 100,000 acts of violence by the time she or he has finished elementary school. Are G-rated movies safe? Perhaps not. One study found that virtually all G-rated animated films have scenes of violence, with a mean duration of 9 to 10 minutes per film. Many video games are also full of violent activity.

Most health professionals agree that media violence contributes to aggression. A joint statement issued by the American Psychological Association (APA) and several medical associations made the following points:

- Media violence supplies models of aggressive "skills" which children may learn by watching. Media violence also provides viewers with aggressive scripts—that is, ideas about how to behave in situations like those they have observed.
- Children who see a lot of violence are more likely to view violence as an effective and acceptable way of settling personal conflicts.

Statistically Speaking...
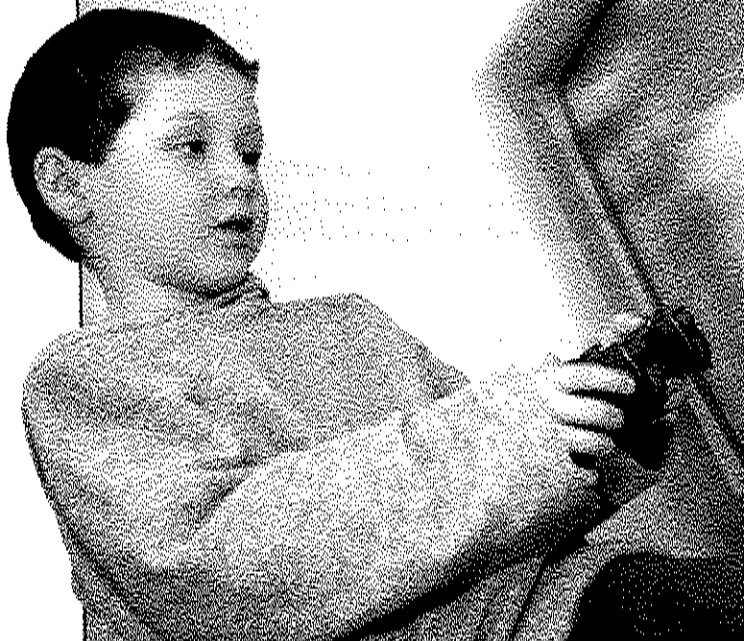
Video Game Violence and Children

Children and adolescents view violence not only on television but also in movies, music videos, and video games. Some studies have examined the impact of video games and violence on children and adolescents.

91% Percentage of school-age children who own video game equipment and play an average of nearly two hours per day

85% Percentage of video games that contain some kind of violence

17% Percentage of video games where violence is the primary focus

10–15% Estimated increase in violent behavior of adolescents due to playing violent video games

Skills Focus **INTERPRETING DATA** Why do you think so many video games contain violence?

Sources: National Youth Violence Prevention Resource Center; American Academy of Pediatrics; American Psychological Association

- Viewing violence can lead to emotional desensitization toward violence in real life. It can decrease the likelihood that one will take action on behalf of a victim of violence.
- Viewing violence may lead to real-life violence. Children exposed to violent programming at a young age have a higher tendency for violent and aggressive behavior later in life.

Just as observational learning may contribute to violent behavior, it may also be used to prevent it. Television networks, for example, have recently made some attempts to limit the amount of violence in programs intended for children. But it is probably not practical to hope to shield children from all violence—after all, even religious texts, the evening news, and classic works such as Shakespeare's *Macbeth* contain scenes of violence. Instead, young people can be informed that most people resolve their conflicts without resorting to violence. Children also can be told that the violence they see on TV shows is not real; it usually involves camera tricks, special effects, and stunts.

A person who has observed a behavior in others does not necessarily begin to display that behavior. There is a difference between what people learn and what they do. Of all the children who are exposed to media violence, only a few of them become violent. Furthermore, it may be that people who choose to watch violent television programs are more likely to be violent in the first place. It is difficult to prove a cause-and-effect relationship based only on correlation. If young people consider violence wrong for them, they will probably not be violent, even if they know how to be violent. The same applies to other behaviors as well.

Reading Check **Describe** What are three examples of observational learning?

Behavior Modification

The principles of cognitive learning can be used to change or modify people's behaviors. Psychologists and others have used these principles to encourage classroom discipline, create token economies, and use personal contracts to change behavior.

Classroom Discipline Sometimes when we think we are reinforcing one behavior, we are actually unknowingly reinforcing the opposite behavior. For example, teachers who pay attention to students who misbehave may unintentionally give these students greater status in the eyes of some of their classmates. Some teacher training programs show teachers how to use principles of learning to change students' negative patterns of behavior. Teachers are taught to pay attention to students when they are behaving appropriately and to ignore misbehavior that is not harmful to themselves or to others. If misbehavior is ignored, or unreinforced, it should become extinct, according to the theory.

Teacher attention and approval may have more influence in elementary school than in high school. Among adolescents, peer approval can be more powerful than teacher approval and may reinforce misbehavior.

Moreover, ignoring adolescents' misbehavior may only encourage other students to become disruptive also.

Instead of ignoring misbehaving students, teachers may decide to separate them from the rest of the class or group. Teachers and parents frequently use a technique called time-out to discourage misbehavior. Time-out involves placing students in dull, confining environments for a short period of time, such as 10 minutes, when they misbehave. Students who are isolated cannot obtain the attention of peers or teachers, and no reinforcing activities are available.

Token Economies Another method of behavior modification involves the use of token economies. In token economies, people are "paid" to act correctly by earning rewards such as points, plastic chips, or other tokens that can be cashed in for treats, merchandise, or privileges the individual wants. As a result, people may stop doing a certain behavior, or they might begin to perform a desired behavior. For example, a child might receive points for gaining good grades in school, staying out of fights, or arriving at school on time. The points can then be traded for snacks, clothing, or special privileges such as extra computer time. These rewards are the reinforcers. The desired behaviors are rewarded and hopefully result in changes in behavior.

Token economies have been used in schools, prisons, and public housing complexes to change an overall atmosphere and reinforce desired behaviors. Critics of token economies, however, argue that the technique does not effectively change behaviors and that when the token system ends, the unwanted behaviors reappear.

Personal Contracts It is also possible to set up your own behavior modification program by using a personal contract. First, you will need to identify a behavior that you want to change. For example, maybe when you are nervous you tap your foot repeatedly, or perhaps you are always late when meeting friends. Next, set a goal for a new behavior. Finally, create a system of rewards or punishments for yourself to encourage the new behavior.

For example, suppose you tap your foot too much and want to stop that behavior. You might decide to place a rubber band around your wrist. Then, each time you become aware of tapping your foot you snap the rubber band against your wrist. The snapping makes you aware of your behavior, stings a little, and may lead you to tap your foot less often. In this case you have used a punishment to change your behavior. You could also use a reward. Suppose you decide that if you promptly meet your friends five consecutive times you can buy yourself a new shirt. This is behavior modification by using a reward. By using either rewards or punishments, you can alter your behavior.

Reading Check Explain How are learning principles used to modify behavior?


Reviewing Main Ideas and Vocabulary

1. **Describe** What is modeling?
2. **Define** What are token economies?
3. **Explain** Why does observational learning account for much human learning?

Thinking Critically

4. **Elaborate** Give an example of an event in your life in which you applied latent learning.
5. **Develop** What is your opinion about violence in video games and its effect on young people?
6. **Predict** Which technique of behavior modification—reward or punishment—do you think would have the most success?

7. **Make Generalizations** Using your notes and a graphic organizer like the one here, briefly explain the basic techniques used in cognitive learning.

Cognitive Learning
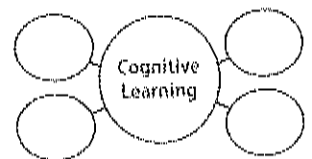
FOCUS ON WRITING

8. **Descriptive** Think of a student behavior that exists at your school and that a teacher or the principal might want to change. Then devise a way to change that behavior by using behavior modification techniques. Write out your plan in a short paper.

Pathways to Rewards

Pathways to Rewards was a program that sought to help improve the lives of public housing residents in Chicago. The program used the principles of token economies and proved to be highly successful in helping people modify their behavior through a system of individual goals and rewards.

The Pathways to Rewards program for residents of Henry Horner Homes, a public housing project in Chicago, was devised to provide structure, support, and incentive for family members of all ages to set and work toward individual goals. These goals included things like finding a new job, learning new skills, taking part in extracurricular activities like art or sports, or simply getting more involved and active in the community.

Each month, individuals met with staff members of the Pathways to Rewards program to set their personal goals and to establish the steps needed to reach those goals.

For example, if someone's goal was to find a new job, the plan might include preparing a résumé and submitting five job applications during the month. For a teenager, a goal might have been to improve academic grades. The plan might have specified getting at least a B on the next math test, spending more time studying, or going to an after-school tutoring program. For younger children, a goal might have been to attend an after-school music class.

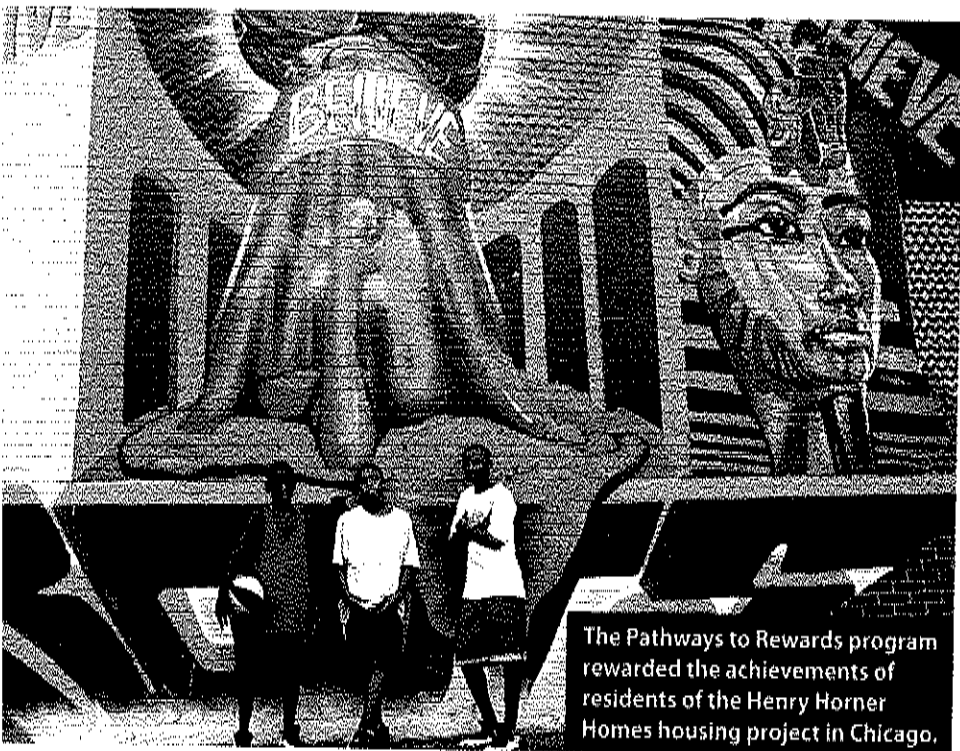The program worked like a frequent flyer program—participants accrued points for achieving their monthly goals. As individuals met their goals, they earned points toward rewards of their choice. Points could be used for small rewards or accumulated over time for a larger reward. Rewards included items such as assistance paying utility bills, health club memberships, DVD players, bicycles, and gift cards. To keep earning points, individuals had to continually set new and more challenging goals.

Each quarter, program participants celebrated the successful achievement of their goals at a community rewards banquet. These banquets provided public recognition and praise for the success of individuals participating in the program. The Pathways to Rewards staff handed out certificates to each adult and each child who had reached a goal since the last banquet. By celebrating individual achievement, the gathering provided social modeling for the entire community.

In addition to motivating people with the points program, Pathways to Rewards tried to translate individual achievement into community-wide "norms of progress." The program worked to establish a new set of community-valued behaviors based on the expectation that everyone can take steps to improve their lives. And it worked. As of the end of 2007, 58 percent of those eligible to participate had chosen to enroll and had met 5,371 separate goals.

The Pathways to Rewards program rewarded the achievements of residents of the Henry Horner Homes housing project in Chicago.

Thinking Critically

1. **Infer** Why do you think this program was successful?

2. **Discuss** Some people have criticized the Pathways to Rewards program as being bribes for good behavior. How do you view this criticism?

The PQ4R Method: Learning to Learn

Before You Read

Main Idea
The PQ4R method for studying is a system of active learning based on the work of an educational psychologist.

Reading Focus
1. When should you preview and question new material?
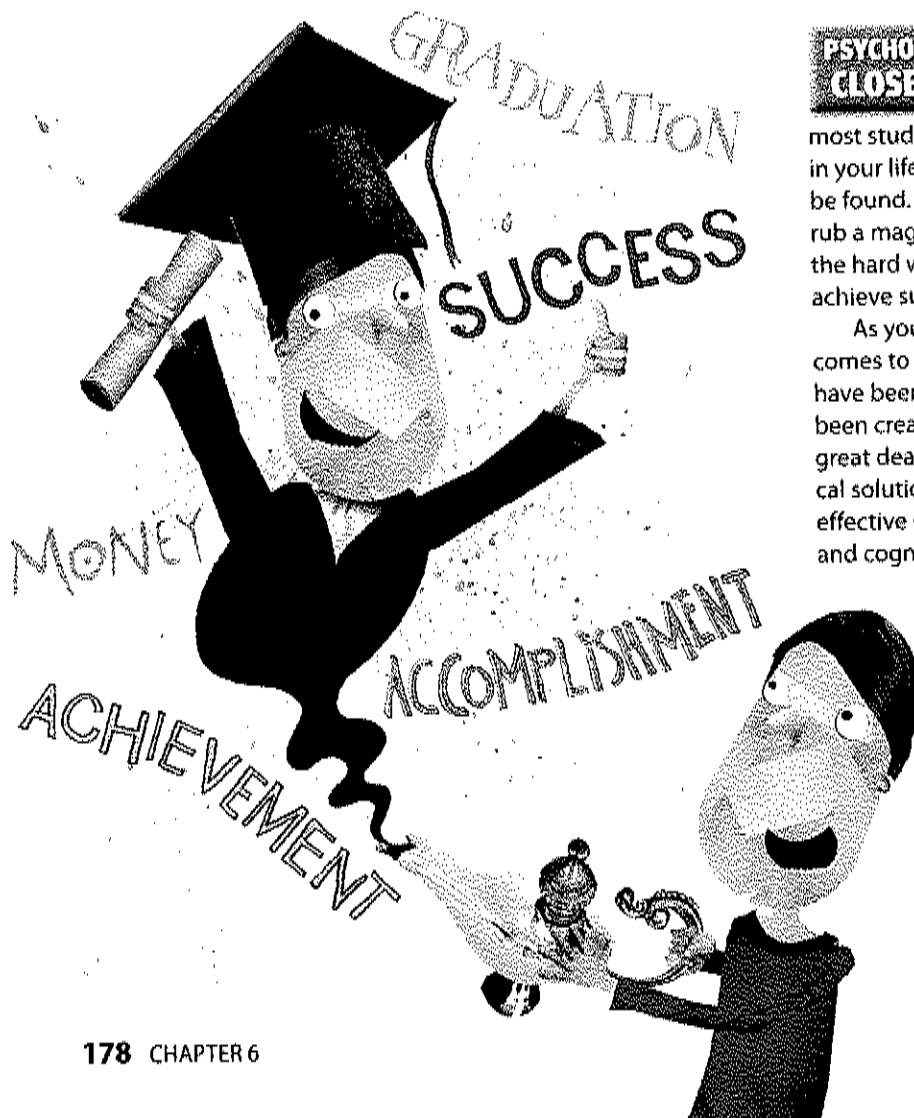2. Why is it important to read, review, recite, and reflect on material?

Vocabulary
distributed learning
massed learning

TAKING NOTES Use a graphic organizer like this one to take notes on the PQ4R method.

The PQ4R Method	
Step	Actions
1.	
2.	
3.	
4.	
5.	
6.	

The Easy Way Out?

PSYCHOLOGY CLOSE UP

Have educational psychologists created an easy way to study and learn new material? If you are like most students, you have probably wished at some point in your life that a quick and easy way of studying could be found. After all, wouldn't it be great if you could just rub a magic lamp, wish for success, and then skip all of the hard work that it takes to graduate from school and achieve success?

As you well know, there is no easy way out when it comes to studying and learning. Lots of study methods have been devised, and special machines have even been created to help students learn, but it still requires a great deal of time and effort. Although there is no magical solution, educational psychologists have created an effective study method based on principles of operant and cognitive learning. It is called the PQ4R method. 🖳

Preview and Question

If you put a sponge in a bathtub, it will soak up water. Many students assume that simply by attending class they will somehow soak up the subject matter of that course. Not so. Students are not sponges, and subjects are not water.

Students learn more when they take an active approach to learning. One such active approach is called the PQ4R method. Based on the work of educational psychologist Francis P. Robinson, the PQ4R method has six steps, previewing, questioning, reading, reflecting, reciting, and reviewing, which you can see on the chart on this page.

Following the steps of the PQ4R method can help you get the most from your textbooks. The first two steps, preview and question, take place before you even start reading.

Preview Previewing the subject matter in a textbook means getting a general picture of what is covered before you begin reading a chapter. If you are in the library or the bookstore looking at books to decide what to read, you may flip rapidly through the pages to get some idea of what the books are about. Thumbing through the pages is one way of previewing the material.

Many textbooks are designed to encourage students to preview chapters before reading them. This book, for instance, has Main Ideas, Reading Focus questions, Vocabulary terms, note-taking activities, section headings and subheadings, Reading Check questions, section assessments, and chapter reviews. If drama and suspense are your goals, read each chapter page by page. But if learning the material and retaining it is your goal, it may be more effective to first read the opening questions, skim the pages, and glance at the questions in the section assessments and chapter reviews.

Familiarity with the overall picture will give you a cognitive map of a chapter. Your map will have many blank areas, but it will have an overall structure. You can fill in the details of the map as you read through the chapter page by page.

Question Learning is made easier when we have goals in mind. When we want to learn something, we become active learners.

THE PQ4R METHOD

The PQ4R method is a system of active learning that has six steps.

1. Preview
Get a general picture of the material before you begin.

2. Question
Change headings into questions.

3. Read
Look for the answers to your questions as you read.

4. Reflect
Try to relate the material to past learning or to personal experience.

5. Recite
Speak the answers to your questions aloud to solidify the information in your mind.

6. Review
Review the material regularly.

One way to create goals is to phrase questions about the subject matter in each chapter. You may wonder what is a good way to come up with questions without reading the chapter first. Look at each heading. Write down all the headings in a notebook. If the book you are reading does not have helpful headings, you might try looking at the first sentence of each paragraph instead. Phrase questions as you proceed. With practice, you will develop questioning skills, and your questions will help you grasp the subject matter.

These sample questions are based on the major and minor headings in the first section of this chapter: What is classical conditioning? What are the basic principles of classical conditioning? You may have come up with different questions after reading the headings. There is always more than one "right" question. As you study, you will learn what works for you.

Reading Check **Compare** How are the steps of previewing and questioning similar?

Read, Reflect, Recite, and Review

After you have previewed the material and questioned what the learning goals are, it is time to read the material and study it more closely. To do that, you can follow the next four steps of the PQ4R method.

Distributed Learning

Studying regularly with others is an example of distributed learning, which distributes the time spent learning so you are not trying to learn everything at once.
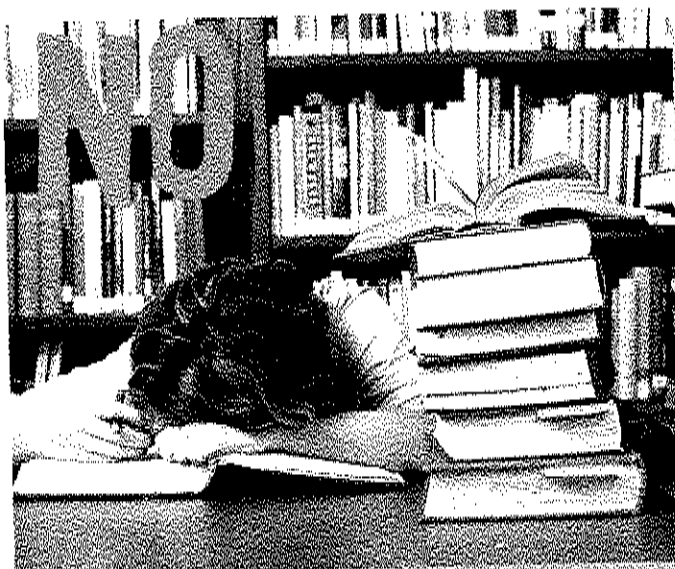
Massed Learning

Cramming for a test is not an effective way to study. Studies show that massed learning, or cramming, is rarely successful.

Read Once you have formulated your questions, read the chapter with the purpose of answering them. Doing this will help you focus on the key points of the material. As you answer each question, jot down a few key words in your notebook that will remind you of the answer when you recite and review later. You may find it helpful to keep two columns in your notebook: one column for the questions themselves and the other column for the key words that relate to the answer to each question.

Reflect Reflecting on subject matter is an important way to understand and remember it. As you are reading, think of examples or create mental images of the subject matter.

One way to reflect is to relate new information to old information. For example, you may remember some facts about B. F. Skinner from the first chapter in this textbook. What you learned about him there can serve as a springboard for you to learn about him and about his work in greater detail in this chapter. Take advantage of what you already know.

Another way to reflect is to relate new information to events in your personal life. For instance, you can reflect on classical conditioning by thinking of times when you have experienced it. Then you will find it easier to remember that classical conditioning involves learning through the association of stimuli with each other.

Even if you cannot think of any way to relate the material to your own life, you probably know other people who provide examples of the kinds of behavior discussed throughout this book. To help yourself understand and remember the subject matter of psychology, think of ways in which the behavior of people described in the text and by your teacher is similar to—or different from—the behavior of people you know.

Recite Do you remember when you learned the alphabet? If you were like many children, you probably learned it by saying it—or singing it to the tune of the "Alphabet Song"—over and over again. This is an example of how reciting something can help a person learn. The same thing can work with your textbook. (You will have to make up your own song, however.)

Once you have read a section and answered your questions, reciting the answers will help you understand and remember them.

You can recite aloud or repeat words silently to yourself. You can do your reciting alone or with others. Many students learn by participating in study groups. They quiz each other with their questions, taking turns reciting the answers. Study groups may help you understand new material by having classmates explain it to you in a way that you easily understand. Study partners may share some of their personal reflections with you, which might help you make clearer associations with the material.

Review Learning takes time. As a result, we usually have to repeat or re-read things before we know them well.

To review something effectively, you can use "distributed" learning. **Distributed learning** means studying something regularly so the learning is distributed over several days or weeks. Distributed learning is more effective than **massed learning,** or trying to learn something all at once. Massed learning is also known as "cramming." Distributed learning usually takes no more work than cramming, but it means that you have to plan ahead and try to stick to some sort of schedule.

Review the material you are studying according to a reasonably regular schedule, such as once a week. Reviewing leads to relearning, and relearning on a regular schedule is easier than learning something the first time. By reviewing material regularly, we understand and remember it better.

It may seem like a large time commitment to study regularly when there is no apparent immediate need to do so, but it will reduce the amount of time you need to study right before a test. It may also help reduce the amount of anxiety you feel about the test the day before (negative reinforcement) because you know that you have already mastered at least some of the material. And it also helps keep you prepared for pop quizzes.

Once you have set aside enough time to review the material, you will need to figure out what techniques will help you most. One way to review the material is to go back to the questions and key words in your notebook. Cover up the answer column and read the questions in the left column as though they were a quiz. Recite your answers and check them against the key words in the right column. When you forget an answer or get an answer wrong, go back and re-read the subject matter in the textbook.

Another way of reviewing the subject matter, as already mentioned, is for you and your classmates to quiz each other. Reviewing the material as a group can help everyone understand the material on a deeper level. By taking a more active approach to learning, you may find that you are earning higher grades and gaining more enjoyment from the learning process.

Reading Check **Summarize** What are the "four Rs" in the PQ4R method?


SECTION 4 Assessment

Reviewing Main Ideas and Vocabulary

1. **Recall** Why should you use the PQ4R method to create questions from your chapter headings?
2. **Identify** Which of the steps in the PQ4R method helps you relate new information to old information?

Thinking Critically

3. **Explain** Why is distributed learning better than massed learning?
4. **Develop** Prepare a learning and studying schedule based on the PQ4R method for yourself for one of your classes.
5. **Analyze** Which parts of the PQ4R method are examples of types of operant conditioning?

6. **Sequence** Using your notes and a graphic organizer like the one below, explain the process of studying using the PQ4R method. Then circle the step that you think is the most critical to learning and retaining information.

[diagram: six boxes connected by arrows in a sequence]
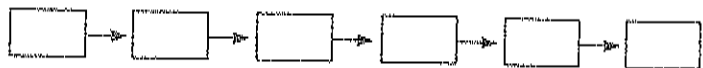
FOCUS ON WRITING

7. **Expository** Suppose you have been asked to write a summary of effective study methods for new students at your school. Write a short summary that includes information from this section.

Reinforcement and Discouragement

How can positive reinforcement and discouragement affect people's behavior and performance?

Use the workbook to complete this experiment.

1. Introduction

In this experiment, you will study the effects of positive reinforcement and discouragement on behavior. You will work with your classmates to conduct an experiment on the number of sit-ups that students complete in three different situations: with no feedback; with positive reinforcement; and with discouragement. After you have completed the experiment, you will analyze the data and discuss the results as a class. To complete this experiment, follow the steps below.

- With your classmates, review the steps of the scientific method. Then review the material in this chapter on operant conditioning. Write down the definition of positive reinforcement, along with a few main points about it.

- For this experiment, the research question has been established for you: what effects do positive reinforcement and discouragement have on behavior? Discuss this question with your classmates.

- Next, form a hypothesis. The hypothesis in this experiment might be that positive reinforcement will increase the number of sit-ups that students complete and discouragement will decrease the number. Or, it might be that positive reinforcement and discouragement will have no significant effect on the number of sit-ups students are able to perform. As a class, determine what your hypothesis is and write it down.

2. Preparing for the Experiment

In preparation, you and your teacher will need to find research subjects, assign roles, find a location, and create a schedule for conducting the experiment.

- With your teacher, identify about 30 students from another class to serve as research subjects. The research subjects must commit to participate for about one hour on three separate days. You might want to find a physical education class that will agree to participate.

- For the experiment to be valid, the participants must not be told its purpose. Instead, tell them that the purpose of the experiment is to analyze how someone's heart rate increases immediately after exercising. (At the conclusion of the experiment, participants will be informed of the real purpose and results of the experiment.)

- Once you have enough participants, assign them randomly to three different groups—Group A, Group B, and Group C. In addition, give each participant a unique number for the study, such as Participant 1, Participant 2, and so on.

- Next, assign roles for you and your classmates to fill during the experiment. The chart below shows the roles that are needed. There will be three stations for the experiment each day, and you will need one Timer, Assistant, Recorder, and Pulsetaker for each station. You will also need several Encouragers for one station and several Discouragers for another.

ROLES AND RESPONSIBILITIES

Role	Task
Timers	Call "start" and "stop" as participants complete sit-ups
Assistants	Help hold participants' feet down as they complete sit-ups
Recorders	Count and record the number of sit-ups each participant completes
Pulsetakers	Pretend to take each participant's pulse before and after sit-ups
Encouragers	Give encouragement and positive reinforcement during sit-ups
Discouragers	Give discouragement to participants as they complete sit-ups