Chapter 5
Learning

Yoshiko’s first-grade teacher started a reading contest. For every book read, a child would get a gold star on the reading chart, and at the end of one month the child with the most stars would get a prize. Yoshiko went to the library and checked out several books each week. At the end of the month, Yoshiko had the most gold stars and got to stand in front of her classmates to receive her prize. Would it be candy? A toy? She was so excited! Imagine her surprise and mild disappointment when the big prize turned out to be another book! Disappointing prize aside, Yoshiko’s teacher had made use of a key technique of learning called reinforcement. Reinforcement is anything that, when following a response, increases the likelihood that the response will occur again. The reinforcers of gold stars and a prize caused Yoshiko’s reading to increase.

How have you used reinforcement to modify your own behavior or the behavior of others?
Why study learning?

If we had not been able to learn, we would have died out as a species long ago. Learning is the process that allows us to adapt to the changing conditions of the world around us. We can alter our actions until we find the behavior that leads us to survival and rewards, and we can eliminate actions that have been unsuccessful in the past. Without learning, there would be no buildings, no agriculture, no lifesaving medicines, and no human civilization.

Learning Objectives

5.1 Discuss the meaning of the term learning.
5.2 Describe and explain the origins of classical conditioning and its important elements.
5.3 Define conditioned emotional responses, and explain conditioned taste aversions.
5.4 Describe the theory of operant conditioning and how it differs from classical conditioning, and explain the contributions of Thorndike and Skinner.
5.5 Differentiate between primary and secondary reinforcers and the processes of positive and negative reinforcement.
5.6 Distinguish among the schedules of reinforcement.
5.7 Compare and contrast punishment with reinforcement, and list some of the problems associated with using punishment.
5.8 Describe the role of operant stimuli in controlling behavior as well as other concepts that can enhance or limit operant conditioning.
5.9 Describe how operant conditioning is used to change animal and human behavior, and identify some limitations to its use.
5.10 Define and explain the concept of latent learning.
5.11 Explain the concept of insight learning.
5.12 Explain the concept of learned helplessness.
5.13 Describe the process of observational learning.
5.14 List the four elements of observational learning.
5.15 Provide and describe an example of conditioning in the real world.
**Definition of Learning**

5.1 Discuss the meaning of the term *learning*.

The term *learning* is one of those concepts whose meaning is crystal clear until one has to put it into actual words. “Learning is when you learn something.” “Learning is learning how to do something.” A more useful definition is as follows: *Learning* is any relatively permanent change in behavior brought about by experience or practice.

What does “relatively permanent” mean? And how does experience change what we do?

The “relatively permanent” part of the definition refers to the fact that when people learn anything, some part of their brain is physically changed to record what they’ve learned. This is actually a process of memory, for without the ability to remember what happens, people cannot learn anything. Although there is no conclusive proof as yet, research suggests strongly that once people learn something, it is always present somewhere in memory (Barsalou, 1992; Smolen et al., 2008). They may be unable to “get” to it, but it’s there. [Link to Learning Objective 6.5](#).

As for the inclusion of experience or practice, think about the last time you did something that caused you a lot of pain. Did you do it again? You didn’t want to experience that pain again, so you changed your behavior to avoid the painful consequence.* This is how children learn not to touch hot stoves. In contrast, if a person does something resulting in a very pleasurable experience, that person is more likely to do that same thing again. This is another change in behavior and is explained by the law of effect, a topic we will discuss later in this chapter.

Not all change is accomplished through learning. Changes like an increase in height or the size of the brain are another kind of change controlled by a genetic blueprint. This kind of change is called *maturation* and is due to biology, not experience. For example, children learn to walk when they do because their nervous systems, muscle strength, and sense of balance have reached the point where walking is possible for them—all factors controlled by maturation, not by how much practice those children have had in trying to walk. No amount of experience or practice will help that child walk before maturation makes it possible—in spite of what some eager parents might wish.

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*consequence: an end result of some action.*
It Makes Your Mouth Water: Classical Conditioning

In the early 1900s, research scientists were unhappy with psychology’s focus on mental activity. Many were looking for a way to bring some kind of objectivity and scientific research to the field. It was a Russian physiologist (a person who studies the workings of the body) named Ivan Pavlov (1849–1936) who pioneered the empirical study of the basic principles of a particular kind of learning (Pavlov, 1906, 1926).

**PAVLov AND THE SALIVATING DOGS**

Describe and explain the origins of classical conditioning and its important elements.

Studying the digestive system in his dogs, Pavlov had built a device that would accurately measure the amount of saliva produced by the dogs when they were fed a measured amount of food. Normally, when food is placed in the mouth of any animal, the salivary glands automatically start releasing saliva to help with chewing and digestion. This is a normal reflex—an unlearned, involuntary* response that is not under personal control or choice—one of many that occur in both animals and humans. The food causes the particular reaction of salivation. A stimulus can be defined as any object, event, or experience that causes a response, the reaction of an organism. In the case of Pavlov’s dogs, the food is the stimulus and salivation is the response.

Pavlov soon discovered that his dogs began salivating when they weren’t supposed to be salivating. Some dogs would start salivating when they saw the lab assistant bringing their food, others when they heard the clatter of the food bowl from the kitchen, and still others when it was the time of day they were usually fed. Pavlov spent the rest of his career studying what eventually he termed classical conditioning, learning to elicit* involuntary: not under personal control or choice.

*elicit: to draw forth.

**Practice Quiz** How much do you remember?  ANSWERS ON PAGE AK-1.

Pick the best answer.

1. Learning can best be described as
   a. a relatively permanent change in behavior.
   b. a permanent change in behavior.
   c. due primarily to unconscious motives.
   d. momentary changes that require biological changes from within.

2. Which of the following statements regarding learning is not true?
   a. Learning can be the result of experience.
   b. Learning, once established in the brain, is a permanent change that cannot be undone, but can only be altered.
   c. Learning can be the result of practice.
   d. The brain physically changes when a person undergoes learning.

3. Which of the following statements on the relationship between learning and memory is true?
   a. One need not learn a piece of information in order to remember it.
   b. Memory can exist independent of learning, and learning can exist independent of memory.
   c. Once a person learns something, it is always present somewhere in memory.
   d. Memory skills develop far earlier in life than learning skills, and there is evidence that we actually have memories from as far back as the moment we are conceived.

4. Changes in our lives that result from heredity rather than our personal experiences are called __________.
   a. development
   b. learning
   c. typographic changes
   d. maturation

*elicit: to draw forth.
an involuntary, reflex-like response to a stimulus other than the original, natural stimulus that normally produces it.

Pavlov eventually identified several key elements that must be present and experienced in a particular way for conditioning to take place.

**Unconditioned Stimulus** The original, naturally occurring stimulus mentioned in the preceding paragraph is called the **unconditioned stimulus (UCS)**. The term *unconditioned* means “unlearned” or “naturally occurring.” This is the stimulus that ordinarily leads to the involuntary response. In the case of Pavlov’s dogs, the food is the unconditioned stimulus.

**Unconditioned Response** The automatic and involuntary response to the unconditioned stimulus is called the **unconditioned response (UCR)** for much the same reason. It is unlearned and occurs because of genetic “wiring” in the nervous system. For example, in Pavlov’s experiment, the salivation to that food is the UCR (unconditioned response).

**Conditioned Stimulus** Pavlov determined that almost any kind of stimulus could become associated with the unconditioned stimulus (UCS) if it is paired with the UCS often enough. In his original study, for example, the sight of the food dish itself became a stimulus for salivation before the food was given to the dogs. Every time they got food (to which they automatically salivated), they saw the dish. At this point, the dish was called a **neutral stimulus (NS)** because it had no effect on salivation. After being paired with the food so many times, the dish came to produce the same salivation response, although a somewhat weaker one, as did the food itself. When a previously neutral stimulus, through repeated pairing with the unconditioned stimulus, begins to cause the same kind of involuntary response, learning has occurred. The neutral stimulus can now be called a **conditioned stimulus (CS)**. (*Unconditioned* means “unlearned,” and *conditioned* means “learned.”)

**Conditioned Response** The response that is given to the CS (conditioned stimulus) is not usually quite as strong as the original unconditioned response (UCR), but it is essentially the same response. However, because it comes as a response to the conditioned stimulus (CS), it is called the **conditioned response (CR)**.

**Putting it All Together: Pavlov’s Canine Classic, or Tick Tock, Tick Tock** Pavlov did a classic experiment in which he paired the ticking sound of a metronome (a simple device that produces a rhythmic ticking sound) with the presentation of food to see if the dogs would eventually salivate at the sound of the metronome (Pavlov, 1927). Since the metronome’s ticking did not normally produce salivation, it was a neutral stimulus (NS) before any conditioning took place. The repeated pairing of a NS and the UCS (unconditioned stimulus) is usually called **acquisition**, because the organism is in the process of acquiring learning. Figure 5.1 is a chart of how each element of the conditioning relationship worked in Pavlov’s experiment.

Notice that the responses, CR (conditioned response) and UCR (unconditioned response), are the same—salivation. They simply differ in what they are the response to. An **unconditioned** stimulus (UCS) is always followed by an **unconditioned** response (UCR), and a **conditioned** stimulus (CS) is always followed by a **conditioned** response (CR).

Is this rocket science? No, not really. Classical conditioning is actually one of the simplest forms of learning. It’s so simple that it happens to people all the time without them even being aware of it. Does your mouth water when you merely see an advertisement for your favorite food on television? Does your stomach get upset every time you hear the high-pitched whine of the dentist’s drill? These are both examples of classical conditioning.

After all the dog stories, the salivation to the TV ad probably needs no explanation, but what about the dentist’s drill? Over the course of many visits, the body comes to associate that sound (CS) with the anxiety or fear (UCR) the person has felt while receiving a painful dental treatment (UCS), and so the sound produces a feeling of anxiety (CR) whether that person is in the chair or just in the outer waiting area.
Although classical conditioning happens quite easily, there are a few basic principles that Pavlov and other researchers discovered (although we will see that there are a few exceptions to some of these principles):

1. The CS must come before the UCS. If Pavlov started the metronome just after he gave the dogs the food, they did not become conditioned (Rescorla, 1988).

2. The CS and UCS must come very close together in time—ideally, no more than 5 seconds apart. When Pavlov tried to stretch the time between the potential CS and the UCS to several minutes, no association or link between the two was made. Too much could happen in the longer interval of time to interfere with conditioning (Pavlov, 1926; Wasserman & Miller, 1997). Recent studies have found that the interstimulus interval (ISI, or the time between the CS and UCS) can vary depending on the nature of the conditioning task and even the organism being conditioned. In these studies, shorter ISIs (less than 500 milliseconds) have been found to be ideal for conditioning (Polewan et al., 2006).

3. The neutral stimulus must be paired with the UCS several times, often many times, before conditioning can take place (Pavlov, 1926).
4. The CS is usually some stimulus that is distinctive* or stands out from other competing stimuli. The ticking was a sound that was not normally present in the laboratory and, therefore, distinct (Pavlov, 1926; Rescorla, 1988).

**STIMULUS GENERALIZATION AND DISCRIMINATION** Pavlov did find that similar sounds would produce the same conditioned response from his dogs. He and other researchers found that the strength of the response to the similar sounds was not as strong as to the original one, but the more similar the other sound was to the original sound (be it a metronome or any other kind of sound), the more similar the strength of the response was as well (Siegel, 1969). (See Figure 5.2.) The tendency to respond to a stimulus that is only similar to the original conditioned stimulus is called **stimulus generalization**. For example, a person who reacts with anxiety to the sound of a dentist’s drill might react with some slight anxiety to a similar-sounding machine, such as an electric coffee grinder. Of course, Pavlov did not give the dogs any food after the similar ticking sound. It didn’t take long for the dogs to stop responding (generalizing) to the “fake” ticking sounds altogether. Because only the real CS was followed with food, they learned to tell the difference, or **discriminate**, between the “fake” ticking and the CS ticking, a process called **stimulus discrimination**.

Stimulus discrimination occurs when an organism learns to respond to different stimuli in different ways. For example, although the sound of the coffee grinder might produce a little anxiety in the dental-drill-hating person, after a few uses that sound will no longer produce anxiety because it isn’t associated with dental pain.

**EXTINCTION AND SPONTANEOUS RECOVERY** What would have happened if Pavlov had stopped giving the dogs food after the real CS? Pavlov did just that, and the dogs gradually stopped salivating to the sound of the ticking. When the metronome’s ticking (CS or conditioned stimulus) was repeatedly presented in the absence of the UCS (unconditioned stimulus or food, in this case), the salivation (CR or conditioned response) “died out” in a process called **extinction**.

Why does the removal of an unconditioned stimulus lead to extinction of the conditioned response? One theory is that the presentation of the CS alone leads to new learning. During extinction, the CS–UCS association that was learned is weakened, as the CS no longer predicts the UCS. In the case of Pavlov’s dogs, through extinction they learned to not salivate to the metronome’s ticking, as it no longer predicted that food was on its way.

Look back at Figure 5.1. Once conditioning is acquired, the conditioned stimulus (CS) and conditioned response (CR) will always come before the original unconditioned stimulus (UCS). The UCS, which comes after the CS and CR link, now serves as a strengthener, or reinforcer, of the CS–CR association. Remove that reinforcer, and the CR it strengthens will weaken and disappear—at least for a while.

The term **extinction** is a little unfortunate in that it seems to mean that the original conditioned response is totally gone, dead, never coming back, just like the dinosaurs. Remember that the definition of learning is any relatively **permanent** change in behavior. The fact is that once people learn something, it’s almost impossible to “unlearn” it. People can learn new things that replace it or lose their way to it in memory, but it’s still there. In the case of classical conditioning, this is easily demonstrated.

After extinguishing the conditioned salivation response in his dogs, Pavlov waited a few weeks, putting the conditioned stimulus (e.g., the metronome) away. There were no more training sessions, and the dogs were not exposed to the metronome’s ticking in that time at all. But when Pavlov took the metronome back out and set it ticking, the dogs all began to salivate, although it was a fairly weak response and didn’t last very long. This brief recovery of the conditioned response proves that the CR is “still in there” somewhere (remember, learning is relatively **permanent**). It is just suppressed or inhibited by the lack of an association with the unconditioned stimulus of food (which is no longer reinforcing or strengthening the CR). As time passes, this inhibition weakens, especially if the original

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*distinctive: separate, having a different quality from something else.
conditioned stimulus has not been present for a while. In spontaneous recovery the conditioned response can briefly reappear when the original CS returns, although the response is usually weak and short-lived. See Figure 5.3 for a graph showing both extinction and spontaneous recovery. People experience classical conditioning in many ways. People who are allergic to cats sometimes sneeze when they see a picture of a cat.

**HIGHER-ORDER CONDITIONING** Another concept in classical conditioning is higher-order conditioning (see Figure 5.4). This occurs when a strong conditioned stimulus is paired with a neutral stimulus. The strong CS can actually play the part of a UCS, and the previously neutral stimulus becomes a second conditioned stimulus.

**Figure 5.4 HIGHER-ORDER CONDITIONING**

In Stage 1, a strong salivation response is conditioned to occur to the sound of the metronome (CS1). In Stage 2, finger snapping (NS) is repeatedly paired with the ticking of the metronome (CS1) until the dog begins to salivate to the finger snapping alone (now CS2). This is called higher-order conditioning because one CS is used to create another, "higher" CS.
For example, let’s assume that Pavlov has conditioned his dogs to salivate at the sound of the metronome. What would happen if just before Pavlov turned on the metronome, he snapped his fingers? The sequence would now be “snap-ticking-salivation,” or “NS-CS-CR” (“neutral stimulus/conditioned stimulus/conditioned response”). If this happens enough times, the finger snap will eventually also produce a salivation response. The finger snap becomes associated with the ticking through the same process that the ticking became associated with the food originally and is now another conditioned stimulus. Of course, the food (UCS) would have to be presented every now and then to maintain the original conditioned response to the metronome’s ticking. Without the UCS, the higher-order conditioning would be difficult to maintain and would gradually fade away.

**WHY DOES CLASSICAL CONDITIONING WORK?** There are two ways to explain how one stimulus comes to “stand in” for another. One is the original explanation given by Pavlov, whereas the other is based on a cognitive explanation. Pavlov believed that the conditioned stimulus, through its association close in time with the unconditioned stimulus, came to activate the same place in the animal’s brain that was originally activated by the unconditioned stimulus. He called this process stimulus substitution. But if a mere association in time is all that is needed, why would conditioning fail to happen when the CS is presented immediately after the UCS?

Robert Rescorla (1988) found that the CS has to provide some kind of information about the coming of the UCS in order to achieve conditioning. In other words, the CS must predict that the UCS is coming. In one study, Rescorla exposed one group of rats to a tone, and just after the tone’s onset and while the tone was still audible, an electric shock was administered for some of the tone presentations. Soon the rats became agitated* and reacted in fear by shivering and squealing at the onset of the tone, a kind of conditioned emotional response. With a second group of rats, Rescorla again sounded a tone but administered the electric shock only after the tone stopped, not while the tone was being heard. That group of rats responded with fear to the stopping of the tone (Rescorla, 1968; Rescorla & Wagner, 1972).

The tone for the second group of rats provided a different kind of information than the tone in the first instance. For the first group, the tone meant the shock was coming, whereas for the second group, the tone meant there was no shock while the tone was on. It was the particular expectancy created by pairing the tone or its absence with the shock that determined the particular response of the rats. Because this explanation involves the mental activity of consciously expecting something to occur, it is an example of an explanation for classical conditioning called the cognitive perspective.

**CLASSICAL CONDITIONING APPLIED TO HUMAN BEHAVIOR**

5.3 Define conditioned emotional responses, and explain conditioned taste aversions.

Later scientists took Pavlov’s concepts and expanded them to explain not only animal behavior but also human behavior. One of the earliest of these studies showed that even an emotional response could be conditioned.

**CONDITIONED EMOTIONAL RESPONSES: RATS!** In the first chapter of this text, John B. Watson’s classic experiment with “Little Albert” and the white rat was discussed. This study was a demonstration of the classical conditioning of a phobia—an irrational fear response (Watson & Rayner, 1920).

Watson paired the presentation of the white rat to the baby with a loud, scary noise. Although the baby was not initially afraid of the rat, he was naturally afraid of the loud noise and started to cry. Soon, every time the baby saw the rat, he started to cry. In conditioning terms, the loud noise was the UCS, the fear of the noise the UCR, the white rat became the CS, and the fear of the rat (the phobia) was the CR. (It should be pointed out that Watson didn’t really “torture” the baby—Albert’s fright was temporary. Of course,

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*agitated: excited, upset.
no ethics committee today would approve an experiment in which an infant experiences such psychological distress.)

Little Albert remains a topic of interest for many researchers and students of psychology alike. Researchers have suggested his true identity was Douglas Merritte, the son of a wet nurse at the hospital where the study took place (Beck & Irons, 2011; Beck et al., 2009). And, if in fact Little Albert was really Douglas Merritte, additional research has revealed that Douglas was neurologically impaired at the time he was tested by Watson and Rayner (due to hydrocephalus, brain infections, and serious allergic reactions) and sadly, later died at six years of age (Fridlund et al., 2012). And while Watson and Rayner’s original study still prompts curiosity and controversy, so do the recent investigations, as not everyone believes that Little Albert’s identity has been found (Harris, 2011; Powell, 2010; Reese, 2010).

The learning of phobias is a very good example of a certain type of classical conditioning, the *conditioned emotional response (CER)*. Conditioned emotional responses are some of the easiest forms of classical conditioning to accomplish, and our lives are full of them. It’s easy to think of fears people might have that are conditioned or learned: a child’s fear of the dentist’s chair, a puppy’s fear of a rolled-up newspaper, or the fear of dogs that is often shown by a person who has been attacked by a dog in the past. But other emotions can be conditioned, too.

The next time you watch television, watch the commercials closely. Advertisers often use certain objects or certain types of people in their ads to generate a specific emotional response in viewers, hoping that the emotional response will become associated with their product. Sexy models, cute little babies, and adorable puppies are some of the examples of stimuli the advertising world uses to tug at our heartstrings, so to speak.

It is even possible to become classically conditioned by simply watching someone else respond to a stimulus in a process called *vicarious conditioning* (Bandura & Rosenthal, 1966; Hygge & Öhman, 1976; Jones & Menzies, 1995). Many years ago, children received vaccination shots in school. The nurse lined the children up, and one by one they had to go forward to get a needle in the arm. When some children received their shots, they cried quite a bit. By the time the nurse got near the end of the line of children, they were all crying—many of them before she ever touched needle to skin. They had learned their fear response from watching the reactions of the other children. The good news is that the same learning principles that can contribute to phobias and anxiety disorders can also be used to treat them, as we’ll see in the video *Using Classical Conditioning to Treat Disorders*. 

Watch the Video, *Using Classical Conditioning to Treat Disorders.*
CONDITIONED TASTE AVersions AND BIOLOGICAL PREPAREDNESS  Are there any foods that you just can’t eat anymore because of a bad experience with them? Believe it or not, your reaction to that food is a kind of classical conditioning.

Many experiments have shown that laboratory rats will develop a conditioned taste aversion for any liquid or food they swallow up to 6 hours before becoming nauseated. Researchers (Garcia et al., 1989; Garcia & Koelling, 1966) found that rats that were given a sweetened liquid and then injected with a drug or exposed to radiation* that caused nausea would not touch the liquid again. In a similar manner, alcoholics who are given a drug to make them violently nauseated when they drink alcohol may learn to avoid drinking any alcoholic beverage. The chemotherapy drugs that cancer patients receive also can create severe nausea, which causes those people to develop a taste aversion for any food they have eaten before going in for the chemotherapy treatment (Berteretche et al., 2004).

But I thought that it took several pairings of these stimuli to bring about conditioning. How can classical conditioning happen so fast?

It’s interesting to note that birds, which find their food by sight, will avoid any object or insect that simply looks like the one that made them sick. There is a certain species of moth with coloring that mimics the monarch butterfly. That particular butterfly is poisonous to birds, but the moth isn’t. The moth’s mimicry causes birds to avoid eating it, even though it is quite edible. Whereas mammals are biologically prepared to associate taste with illness, birds are biologically prepared to associate visual characteristics with illness (Shapiro et al., 1980).

As for phobias, fear is a natural emotional response that has ties to survival—we need to remember what the fear-inducing stimuli are so we can safely avoid them in future. Nausea and fear are both examples of involuntary reactions that help organisms survive to reproduce and pass on their genetic material, so the innate tendency to make quick and strong associations between stimuli and these reactions has evolutionary importance.

Biological preparedness for fear of objects that are dangerous makes sense for survival, but when objects are not typically dangerous, it turns out to be very difficult to condition a fear of those objects. In one study, monkeys easily learned to be afraid of a toy snake or crocodile by watching videos of other monkeys reacting fearfully to these stimuli (a good example of vicarious conditioning). But the monkeys never learned to fear flowers or a toy rabbit by the same means (Cook & Mineka, 1989). Snakes and crocodiles are predators; flowers and rabbits are not.

WRITING PROMPT

Do you think that humans are as controlled by their biology as other animals?

*The response entered here will be saved to your notes and may be collected by your instructor if he/she requires it.*

Submit

*radiation: beams of energy.*
**Concept Map L.O. 5.2, 5.3**

- **discovered by Ivan Pavlov**
  - worked with salivating dogs
- **several key elements must be present and experienced**
- **unconditioned stimulus (UCS):** original, naturally occurring stimulus that ordinarily leads to an involuntary response
- **unconditioned response (UCR):** involuntary response to the unconditioned stimulus
- **conditioned stimulus (CS):** previously neutral stimulus that begins to cause the same kind of involuntary response when paired repeatedly with the UCS
- **conditioned response (CR):** response that is given to the CS

**Classical Conditioning**

- **(learning to make an involuntary response to a stimulus other than the original, natural stimulus that normally produces it)**
- **basic principles for classical conditioning to occur**
  - CS must come before the UCS
  - CS and UCS must come very close together in time (< 5 sec)
  - CS must be paired with the UCS many times
  - CS must be distinct from other competing stimuli
- **stimulus generalization:** response to a stimulus that is similar to the original CS
- **stimulus discrimination:** response to different stimuli in different ways
- **extinction:** presentation of the CS in the absence of the UCS leads to reduction in the CR
- **spontaneous recovery:** reappearance of a previously extinguished CR
- **higher-order conditioning:** occurs when strong CS is paired with new neutral stimulus; new previously neutral stimulus becomes a second CS

- **conditioned emotional responses:** emotional responses that have become classically conditioned to occur in response to learned stimuli; based on work of John B. Watson, helps explain development of phobias
- **conditioned taste aversion** is one situation where classical conditioning can occur quickly without repeated pairings
- **vicarious conditioning** can occur by simply watching someone else respond to a stimulus

**Why does it work?**

- **Pavlov**—stimulus substitution occurs where the CS comes to activate the same part of the brain that was originally activated by the UCS
- **cognitive perspective**—organism consciously expects something to occur; CS provides information about the coming of the UCS (based on work of Rescorla)

**Practice Quiz**

**How much do you remember?**  
ANSWERS ON PAGE AK-1.

1. Michael noticed that whenever he moved his dog’s food dish, his dog would come into the kitchen and act hungry and excited. He reasoned that because he feeds the dog using that dish, the sound of the dish had become a(n)
   a. unconditioned stimulus.
   b. conditioned stimulus.
   c. unconditioned response.
   d. conditioned response.

2. Which of the following statements is essential to classical conditioning?
   a. The CS and UCS must come close together in time.
   b. The CS must come immediately after the CR.
   c. The neutral stimulus and UCR must be paired several times before conditioning takes place.
   d. The CS should be something highly unusual.

(continued)
chapter 5

What’s in It for Me? Operant Conditioning

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3. Ever since she was scared by a dog as a young child, Angelica has been afraid of all dogs. The fact that she is not only afraid of the original dog but all types of dogs is an example of
   a. extinction.  
   b. spontaneous recovery.  
   c. stimulus discrimination.  
   d. stimulus generalization.

4. Helen has overcome her fear of toy snakes. However, on one occasion her fear returned when she found a toy snake in the cushions of her couch. Such a reaction is called
   a. spontaneous recovery.  
   b. higher-order conditioning.  
   c. extinction.  
   d. stimulus generalization.

5. In Watson’s experiment with “Little Albert,” the conditioned stimulus was
   a. the white rat.  
   b. the loud noise.  
   c. the fear of the rat.  
   d. the fear of the noise.

6. Cindy had cheesy tacos at a local Mexican restaurant. Later she became terribly ill and suffered bouts of nausea and vomiting. What might we predict based on conditioned taste aversion research?
   a. Cindy will probably develop a strong liking for cheesy tacos.  
   b. Cindy will probably be able to eat cheesy tacos with no nausea at all.  
   c. Cindy will probably get nauseated the next time she tries to eat cheesy tacos.  
   d. Cindy will probably continue to eat cheesy tacos except when she feels nauseous.

7. Rescorla found that the CS must ________ the UCS for conditioning to take place.
   a. replace  
   b. come after  
   c. come at the same time as  
   d. predict

THE CONTRIBUTIONS OF THORNDIKE AND SKINNER

5.4 Describe the theory of operant conditioning and how it differs from classical conditioning, and explain the contributions of Thorndike and Skinner.

While classical conditioning involves the learning of involuntary, automatic responses, operant conditioning is about how organisms learn voluntary responses. Operant conditioning is based on the research of Edward L. Thorndike and B. F. Skinner.

FRUSTRATING CATS: THORNDIKE’S PUZZLE BOX AND THE LAW OF EFFECT  Edward L. Thorndike (1874–1949) was one of the first researchers to explore and attempt to outline the laws of learning voluntary responses, although the field was not yet called operant conditioning. Thorndike placed a hungry cat inside a “puzzle box” from which the only escape was to press a lever located on the floor of the box. Thorndike placed a dish of food outside the box, so that the hungry cat would be highly motivated to get out. Thorndike observed that the cat would move around the box, pushing and rubbing up against the walls in an effort to escape. Eventually, the cat would accidentally push the lever, opening the door. Upon escaping, the cat was fed from a dish placed just outside the box. The lever is the stimulus, the pushing of the lever is the response, and the consequence is both escape (good) and food (even better).

The cat did not learn to push the lever and escape right away. After a number of trials (and many errors) in a box like this one, the cat took less and less time to push the
lever that would open the door (see Figure 5.5). It’s important not to assume that the cat had “figured out” the connection between the lever and freedom—Thorndike kept moving the lever to a different position, and the cat had to learn the whole process over again. The cat would simply continue to rub and push in the same general area that led to food and freedom the last time, each time getting out and fed a little more quickly.

Based on this research, Thorndike developed the **law of effect**: If an action is followed by a pleasurable consequence, it will tend to be repeated. If an action is followed by an unpleasant consequence, it will tend not to be repeated (Thorndike, 1911). This is the basic principle behind learning voluntary behavior. In the case of the cat in the box, pushing the lever was followed by a pleasurable consequence (getting out and getting fed), so pushing the lever became a repeated response.

So did Thorndike call this operant conditioning?

No, but Thorndike’s important and groundbreaking work began the study of what would eventually become **operant conditioning**.

**B. F. Skinner: The Behaviorist’s Behaviorist** B. F. Skinner (1904–1990) was the behaviorist who assumed leadership of the field after John Watson. He was even more determined than Watson that psychologists should study only measurable, observable behavior. In addition to his knowledge of Pavlovian classical conditioning, Skinner found in the work of Thorndike a way to explain all behavior as the product of learning. He even gave the learning of voluntary behavior a special name: operant conditioning (Skinner, 1938). Voluntary behavior is what people and animals do to operate in the world. When people perform a voluntary action, it is to get something they want or avoid something they don’t want, right? So voluntary behavior, for Skinner, is **operant** behavior, and the learning of such behavior is operant conditioning.

The heart of operant conditioning is the effect of consequences on behavior. Thinking back to the section on classical conditioning, learning an involuntary behavior really depends on what comes before the response—the unconditioned stimulus and what will become the conditioned stimulus. These two stimuli are the **antecedent** stimuli (antecedent means something that comes before another thing). But in operant conditioning, learning depends on what happens after the response—the consequence. In a way, operant conditioning could be summed up as this: “If I do this, what’s in it for me?”

**THE CONCEPT OF REINFORCEMENT**

**5.5 Differentiate between primary and secondary reinforcers and the processes of positive and negative reinforcement.**

“What’s in it for me?” represents the concept of **reinforcement**, one of Skinner’s major contributions to behaviorism. The word itself means “to strengthen,” and Skinner defined reinforcement as anything that, when following a response, causes that response to be more likely to happen again. Typically, this means that reinforcement is a consequence that is in some way pleasurable to the organism, which relates back to Thorndike’s law of effect. The “pleasurable consequence” is what’s in it for the organism. (Keep in mind that a “pleasurable consequence” might be something like getting food or money when you need it, but it might also mean avoiding a tiresome chore,
like doing the dishes or taking out the garbage. I’ll do almost anything to get out of doing the dishes, myself!\)

Going back to Thorndike’s puzzle box research, what was “in it” for the cat? We can see that the escape from the box and the food that the cat received after getting out are both reinforcement of the lever-pushing response. Every time the cat got out of the box, it got reinforced for doing so. In Skinner’s view, this reinforcement is the reason that the cat learned anything at all. In operant conditioning, reinforcement is the key to learning.

Skinner had his own version of a puzzle box called a “Skinner box” or “operant conditioning chamber” (see Figure 5.6). His early research often involved placing a rat into one of these chambers and training it to push down on a bar to get food.

**PRIMARY AND SECONDARY REINFORCERS** The events or items that can be used to reinforce behavior are not all alike. Let’s say that a friend of yours asks you to help her move some books from the trunk of her car to her apartment on the second floor. She offers you a choice of $25 or a candy bar. Unless you’ve suffered recent brain damage, you’ll most likely choose the money, right? With $25, you could buy more than one candy bar. (At today’s prices, you might even be able to afford three.)

Now pretend that your friend offers the same deal to a 3-year-old child who lives downstairs for carrying up some of the paperback books: $25 or a candy bar. Which reward will the child more likely choose? Most children at that age have no real idea of the value of money, so the child will probably choose the candy bar. The money and the candy bar represent two basic kinds of reinforcers, items or events that when following a response will strengthen it. The reinforcing properties of money must be learned, but candy gives immediate reward in the form of taste and satisfying hunger.

A reinforcer such as a candy bar that satisfies a basic need like hunger is called a primary reinforcer. Examples would be any kind of food (hunger drive), liquid (thirst drive), or touch (pleasure drive). Infants, toddlers, preschool-age children, and animals can be easily reinforced by using primary reinforcers. (It’s not a good idea, however, to start thinking of reinforcers as rewards—freedom from pain is also a basic need, so pain itself can be a primary reinforcer when it is removed. Removal of a painful stimulus fills a basic need just as eating food when hungry fills the hunger need.)

A secondary reinforcer such as money, however, gets its reinforcing properties from being associated with primary reinforcers in the past. A child who is given money to spend soon realizes that the ugly green paper can be traded for candy and treats—primary reinforcers—and so money becomes reinforcing in and of itself. If a person praises a puppy while petting him (touch, a primary reinforcer), the praise alone will eventually make the puppy squirm with delight.

**That sounds very familiar. Isn’t this related to classical conditioning?**

Secondary reinforcers do indeed get their reinforcing power from the process of classical conditioning. After all, the pleasure people feel when they eat, drink, or get a back rub is an automatic response, and any automatic response can be classically conditioned to occur to a new stimulus. In the case of money, the candy is a UCS for pleasure (the UCR), and the money is present just before the candy is obtained. The money becomes a CS for pleasure, and people certainly do feel pleasure when they have a lot of that green stuff, don’t they?

In the case of the puppy, the petting is the UCS, the pleasure at being touched and petted is the UCR. The praise, or more specifically the tone of voice, becomes the CS for pleasure. Although classical and operant conditioning often “work together,” as in the
creation of secondary reinforcers, they are two different processes. Table 5.1 presents a brief look at how the two types of conditioning differ from each other.

**POSITIVE AND NEGATIVE REINFORCEMENT** Re却是iders can also differ in the way they are used. Most people have no trouble at all understanding that following a response with some kind of pleasurable consequence (like a reward) will lead to an increase in the likelihood of that response being repeated. This is called positive reinforcement, the reinforcement of a response by the addition or experience of a pleasurable consequence, such as a reward or a pat on the back. But many people have trouble understanding that the opposite is also true: Following a response with the removal or escape from something unpleasant will also increase the likelihood of that response being repeated—a process called negative reinforcement. Remember the idea that pain can be a reinforcer if it is removed? If a person’s behavior gets pain to stop, the person is much more likely to do that same thing again—which is part of the reason people can get addicted to painkilling medication. (We’ll discuss the concepts of positive and negative reinforcement in more detail later on.)

**WRITING PROMPT**

What type of reinforcement worked best for you when you were in grade school? Positive or negative? Did this change in high school?

> The response entered here will be saved to your notes and may be collected by your instructor if he/she requires it.

We’ve discussed what reinforcement is and how it affects the behavior that follows the reinforcement. In the next section we’ll discuss the different ways in which reinforcement can be administered as well as the difference between reinforcement and punishment. We’ll also look at the role of the stimuli that come before the behavior that is to be reinforced and a few other operant conditioning concepts.

**SCHEDULES OF REINFORCEMENT: WHY THE ONE-ARMED BANDIT IS SO SEDUCTIVE**

5.6 Distinguish among the schedules of reinforcement.

The timing of reinforcement can make a tremendous difference in the speed at which learning occurs and the strength of the learned response. However, Skinner (1956) found that reinforcing every response was not necessarily the best schedule
of reinforcement for long-lasting learning as we’ll see in the video, *Schedules of Reinforcement*.

**THE PARTIAL REINFORCEMENT EFFECT** Alicia’s mother gives her a quarter every night she remembers to put her dirty clothes in the clothes hamper. Bianca’s mother gives her a dollar at the end of the week, but only if Bianca has put her clothes in the hamper every night. Alicia learns more quickly than does Bianca because responses that are reinforced each time they occur are more easily and quickly learned. After a time, the mothers stop giving the girls the money. Which child will stop putting her clothes in the hamper more quickly?

The answer might be surprising. It will more likely be Alicia, who has expected to get a reinforcer (the quarter) after every single response. As soon as the reinforcers stop, the behavior extinguishes. Bianca has expected to get a reinforcer only after seven correct responses. When the reinforcers stop, Bianca might continue to put the clothes in the hamper for several more days or even another whole week, hoping that the reinforcer will eventually come anyway. Bianca may have learned more slowly than Alicia, but once she learned the connection between putting her clothes in the hamper and getting that dollar, she was less likely to stop doing it—even when her mother failed to give the dollar as expected.

Bianca’s behavior illustrates the **partial reinforcement effect** (Skinner, 1956): A response that is reinforced after some, but not all, correct responses will be more resistant to extinction than a response that receives **continuous reinforcement** (a reinforcer for each and every correct response). Although it may be easier to teach a new behavior using continuous reinforcement, partially reinforced behavior is not only more difficult to suppress but also more like real life. Imagine being paid for every hamburger you make or every report you turn in. In the real world, people tend to receive partial reinforcement rather than continuous reinforcement for their work.

Partial reinforcement can be accomplished according to different patterns or schedules. For example, it might be a certain interval of time that’s important, such as an office safe that can only be opened at a certain time of day. It wouldn’t matter how many times one tried to open the safe if the effort didn’t come at the right time. On the other hand, it may be the number of responses that is important, as it would be if one had to sell
Learning a certain number of raffle tickets in order to get a prize. When the timing of the response is more important, it is called an interval schedule. When it is the number of responses that is important, the schedule is called a ratio schedule because a certain number of responses is required for each reinforcer (e.g., 50 raffle tickets for each prize). The other way in which schedules of reinforcement can differ is in whether the number of responses or interval of time is fixed (the same in each case) or variable (a different number or interval is required in each case). So it is possible to have a fixed interval schedule, a variable interval schedule, a fixed ratio schedule, and a variable ratio schedule (Skinner, 1961).

**Fixed Interval Schedule of Reinforcement** The kind of reinforcement schedule most people are more familiar with is called a fixed interval schedule of reinforcement, in which a reinforcer is received after a certain, fixed interval of time has passed. If Professor Conner were teaching a rat to press a lever to get food pellets, she might require it to push the lever for 2 minutes to get a pellet. It wouldn’t matter how many times the rat pushed the bar press, it would only get the pellet after 2 minutes had passed. If people receive a paycheck once every two weeks (provided that they show up to work in those two weeks), they are being reinforced on this kind of schedule.

As shown in Figure 5.7, a fixed interval schedule of reinforcement does not produce a fast rate of responding (notice that the line doesn’t go “up” as fast as in the blue fixed ratio line). Since it only matters that at least one response is made during the specific interval of time, speed is not that important. Eventually, the rat will start pushing the lever only as the interval of time nears its end, causing the scalloping effect you see in

![Figure 5.7 Schedules of Reinforcement](image)

The four colored lines show the typical pattern of responding for both fixed and variable interval and ratio schedules of reinforcement. In both the fixed interval and fixed ratio schedules, there is a pause after each reinforcement as the learner briefly “rests.” The “scalloped” shape of the fixed interval curve is a typical indicator of this pause, as is the stair-step shape of the fixed ratio curve. In the variable interval and ratio schedules, no such pause occurs, because the reinforcements are unpredictable. Notice that both fixed and variable interval schedules are slower (less steep) than the two ratio schedules because of the need to respond as quickly as possible in the ratio schedules.
the graph. The response rate goes up just before the reinforcer and then drops off immediately after, until it is almost time for the next food pellet. This is similar to the way in which factory workers speed up production just before payday and slow down just after payday (Critchfield et al., 2003).

Paychecks aren’t the only kind of fixed schedule that people experience. When do you study the hardest? Isn’t it right before a test? If you know when the test is to be given, that’s like having a fixed interval of time that is predictable, and you can save your greatest studying efforts until closer to the exam. (Some students save all of their studying for the night before the exam, which is not exactly the best strategy.) Another example of a fixed interval schedule would be the way that most people floss and brush their teeth most rigorously* the few days before their next dental exam. In this case, they are probably hoping for negative reinforcement. The cleaner they get their teeth before the appointment, the less time they might have to spend in that chair.

So if a scheduled test is a fixed interval, then would a pop quiz be a variable interval schedule?

**VARIABLE INTERVAL SCHEDULE OF REINFORCEMENT** Pop quizzes are unpredictable. Students don’t know exactly what day they might be given a pop quiz, so the best strategy is to study a little every night just in case there is a quiz the next day. Pop quizzes are good examples of a variable interval schedule of reinforcement. The interval of time after which the organism must respond in order to receive a reinforcer changes from one time to the next. In a more basic example, a rat might receive a food pellet when it pushes a lever, every 5 minutes on average. Sometimes the interval might be 2 minutes, sometimes 10, but the rat must push the lever at least once during that interval to get the pellet. Because the rat can’t predict how long the interval is going to be, it pushes the bar more or less continuously, producing the smooth graph in Figure 5.7. Once again, speed is not important, so the rate of responding is slow but steady.

Another example of a variable interval schedule might be the kind of fishing in which people put the pole in the water and wait—and wait, and wait, until a fish takes the bait—if they are lucky. They only have to put the pole in once, but they might refrain from taking it out for fear that just when they do, the biggest fish in the world would swim by. Dialing a busy phone number is also this kind of schedule, as people don’t know when the call will go through, so they keep dialing and dialing.

**FIXED RATIO SCHEDULE OF REINFORCEMENT** In ratio schedules, it is the number of responses that counts. In a fixed ratio schedule of reinforcement, the number of responses required to receive each reinforcer will always be the same number.

Notice two things about the fixed ratio graph in Figure 5.7. The rate of responding is very fast, especially when compared to the fixed interval schedule, and there are little “breaks” in the response pattern immediately after a reinforcer is given. The rapid response rate occurs because the rat wants to get to the next reinforcer just as fast as possible, and the number of lever pushes counts. The pauses or breaks come right after a reinforcer, because the rat knows “about how many” lever pushes will be needed to get to the next reinforcer because it’s always the same. Fixed schedules—both ratio and interval—are predictable, which allows rest breaks.

In human terms, anyone who does piecework, in which a certain number of items have to be completed before payment is given, is reinforced on a fixed ratio schedule. Some sandwich shops give out punch cards that get punched one time for each sandwich purchased. When the card has 10 punches, for example, the person might get a free sandwich.

*rigorously: strictly, consistently.*
VARIABLE RATIO SCHEDULE OF REINFORCEMENT

The purple line in Figure 5.7 is also very fast, but it’s much smoother, like the variable interval graph. Why are they similar?

A variable ratio schedule of reinforcement is one in which the number of responses changes from one trial to the next. In the rat example, the rat might be expected to push the bar an average of 20 times to get reinforcement. That means that sometimes the rat would push the lever only 10 times before a reinforcer comes, but at other times it might take 30 lever pushes or more.

Figure 5.7 shows a purple line that is just as rapid a response rate as the fixed ratio schedule because the number of responses still matters. But the graph is much smoother because the rat is taking no rest breaks. It can’t afford to do so because it doesn’t know how many times it may have to push that lever to get the next food pellet. It pushes as fast as it can and eats while pushing. It is the unpredictability of the variable schedule that makes the responses more or less continuous—just as in a variable interval schedule.

In human terms, people who shove money into the one-armed bandit, or slot machine, are being reinforced on a variable ratio schedule of reinforcement (they hope). They put their coins in (response), but they don’t know how many times they will have to do this before reinforcement (the jackpot) comes. People who do this tend to sit there until they either win or run out of money. They don’t dare stop because the “next one” might hit that jackpot. Buying lottery tickets is much the same thing, as is any kind of gambling. People don’t know how many tickets they will have to buy, and they’re afraid that if they don’t buy the next one, that will be the ticket that would have won, so they keep buying and buying.

Regardless of the schedule of reinforcement one uses, there are some things that can be done to make using reinforcement of a behavior as effective as possible. One thing also concerns timing: A reinforcer should be given as immediately as possible after the desired behavior. Delaying reinforcement tends not to work well, especially when dealing with animals and small children. (Older children and adults can think about future reinforcements, such as saving up one’s money to buy a highly desired item, so delayed reinforcement can work with them.) Care should also be taken to reinforce only the desired behavior—for example, many parents make the mistake of giving a child who has not done some chore the promised treat anyway, which completely undermines the child’s learning of that chore or task.

THE ROLE OF PUNISHMENT IN OPERANT CONDITIONING

5.7 Compare and contrast punishment with reinforcement, and list some of the problems associated with using punishment.

So I think I get reinforcement now, but what about punishment? How does punishment fit into the big picture?

Let’s go back to the discussion of positive and negative reinforcement. These strategies are important for increasing the likelihood that the targeted behavior will occur again. But what about behavior that we do not want to reoccur?

DEFINING PUNISHMENT  Punishment is actually the opposite of reinforcement. It is any event or stimulus that, when following a response, causes that response to be less likely to happen again. Punishment weakens responses, whereas reinforcement (no matter whether it is positive or negative) strengthens responses. Let’s look at these two concepts in more detail.
People experience two kinds of things as consequences in the world: things they like (food, money, candy, sex, praise, and so on) and things they don’t like (spankings, being yelled at, and experiencing any kind of pain, to name a few). In addition, people experience these two kinds of consequences in one of two ways: Either people experience them directly (such as getting money for working or getting yelled at for misbehaving) or they don’t experience them, such as losing an allowance for misbehaving or avoiding a scolding by lying about misbehavior. These four consequences are named and described in Table 5.2.

First, take a look at the left column of Table 5.2, the one labeled “Reinforcement.” Getting money for working is an example of positive reinforcement, the reinforcement of a response by the addition or experience of a pleasurable consequence, as mentioned earlier. That one everyone understands. But what about avoiding a penalty by turning one’s income tax return in on time? That is an example of negative reinforcement, the reinforcement of a response by the removal or escape from an unpleasant consequence. Because the behavior (submitting the return before the deadline) results in avoiding an unpleasant stimulus (a penalty), the likelihood that the person will behave that way again (turn it in on time in the future) is increased—just as positive reinforcement will increase a behavior’s likelihood. Examples are the best way to figure out the difference between these two types of reinforcement, so try to figure out which of the following examples would be positive reinforcement and which would be negative reinforcement:

1. Arnie’s father nags him to wash his car. Arnie hates being nagged, so he washes the car so his father will stop nagging.
2. Trey learns that talking in a funny voice gets him lots of attention from his classmates, so now he talks that way often.
3. Allen is a server at a restaurant and always tries to smile and be pleasant because that seems to lead to bigger tips.
4. An Li turns her report in to her teacher on the day it is due because papers get marked down a letter grade for every day they are late.

Here are the answers:

1. Arnie is being negatively reinforced for washing his car because the nagging (unpleasant stimulus) stops when he does so.
2. Trey is getting positive reinforcement in the form of his classmates’ attention.
3. Allen’s smiling and pleasantness are positively reinforced by the customers’ tips.
4. An Li is avoiding an unpleasant stimulus (the marked-down grade) by turning in her paper on time, which is an example of negative reinforcement.
TWO KINDS OF PUNISHMENT

I’m confused—I thought taking something away was a kind of punishment?

People get confused because “negative” sounds like it ought to be something bad, like a kind of punishment. But negative reinforcement strengthens a response, while punishment weakens a response. There are two ways in which punishment can happen, just as there are two ways in which reinforcement can happen.

Now take a look at the right column of Table 5.2, labeled “Punishment.”

Punishment by application occurs when something unpleasant (such as a spanking, scolding, or other unpleasant stimulus) is added to the situation or applied. This is the kind of punishment that most people think of when they hear the word punishment. This is also the kind of punishment that many child development specialists strongly recommend parents avoid using with their children because it can easily escalate into abuse (Dubowitz & Bennett, 2007; Straus, 2000; Trocmé et al., 2001). A spanking might be physically harmless if it is only two or three swats with a hand, but if done in anger or with a belt or other instrument, it becomes abuse, both physical and emotional.

Punishment by removal, on the other hand, is the kind of punishment most often confused with negative reinforcement. In this type of punishment, behavior is punished by the removal of something pleasurable or desired after the behavior occurs. “Grounding” a teenager is removing the freedom to do what the teenager wants to do and is an example of this kind of punishment. Other examples would be placing a child in time-out (removing the attention of the others in the room), firing someone for disobeying the law (removing money), and punishing aggressive behavior by taking away television privileges. This type of punishment is far more acceptable to child development specialists because it involves no physical aggression and avoids many of the problems caused by more aggressive punishments.

The confusion over the difference between negative reinforcement and punishment by removal makes it worth examining the difference just a bit more. Negative reinforcement occurs when a response is followed by the removal of an unpleasant stimulus. If something unpleasant has just gone away as a consequence of that response, wouldn’t that response tend to happen again and again? If the response increases, the consequence has to be a kind of reinforcement. The problem is that the name sounds like it should be some kind of punishment because of the word negative, and that’s exactly the problem that many people experience when they are trying to understand negative reinforcement. They get negative reinforcement mixed up with punishment by removal, in which a pleasant thing is removed (like having your driver’s license taken away because you caused a bad accident). Because something is removed (taken away) in both cases, people think that they will both have the effect of punishment, or weakening a response. The difference between them lies in what is taken away: In the case of negative reinforcement, it is an unpleasant thing; in the case of this particular form of punishment, it is a pleasant or desirable thing. For a head-to-head comparison of negative reinforcement and this particular type of punishment by removal, see Table 5.3.

<table>
<thead>
<tr>
<th>Table 5.3 Negative Reinforcement Versus Punishment by Removal</th>
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<tbody>
<tr>
<td><strong>Example of Negative Reinforcement</strong></td>
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<tr>
<td>Stopping at a red light to avoid getting in an accident.</td>
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<tr>
<td>Mailing an income tax return by April 15 to avoid paying a penalty.</td>
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<tr>
<td>Obeying a parent before the parent reaches the count of “three” to avoid getting a scolding.</td>
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</tbody>
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This young girl’s father is applying punishment by removal by forcing her to cut up her credit card.
PROBLEMS WITH PUNISHMENT  Although punishment can be effective in reducing or weakening a behavior, it has several drawbacks as explained in the video Problems with Using Punishment.

The job of punishment is much harder than that of reinforcement. In using reinforcement, all one has to do is strengthen a response that is already there. But punishment is used to weaken a response, and getting rid of a response that is already well established is not that easy. (Ask any parent or pet owner.) Many times punishment only serves to temporarily suppress or inhibit a behavior until enough time has passed. For example, punishing a child’s bad behavior doesn’t always eliminate the behavior completely. As time goes on, the punishment is forgotten, and the “bad” behavior may occur again in a kind of spontaneous recovery of the old (and probably pleasurable for the child) behavior.

Look back at Table 5.2 under the “Punishment” column. Punishment by application can be quite severe, and severe punishment does do one thing well: It stops the behavior immediately (Bucher & Lovaas, 1967; Carr & Lovaas, 1983). It may not stop it permanently, but it does stop it. In a situation in which a child might be doing something dangerous or self-injurious, this kind of punishment is sometimes more acceptable (Duker & Seys, 1996). For example, if a child starts to run into a busy street, the parent might scream at the child to stop and then administer several rather severe swats to the child’s rear. If this is not usual behavior on the part of the parent, the child will most likely never run into the street again.

Other than situations of immediately stopping dangerous behavior, severe punishment has too many drawbacks to be really useful. It should also be discouraged because of its potential for leading to abuse (Dubowitz & Bennett, 2007; Gershoff, 2000; Trocmé et al., 2001):

- Severe punishment may cause the child (or animal) to avoid the punisher instead of the behavior being punished, so the child (or animal) learns the wrong response.
- Severe punishment may encourage lying to avoid the punishment (a kind of negative reinforcement)—again, not the response that is desired.
• Severe punishment creates fear and anxiety, emotional responses that do not promote learning (Baumrind, 1997; Gershoff, 2000, 2002). If the point is to teach something, this kind of consequence isn’t going to help.

• Hitting provides a successful model for aggression (Gershoff, 2000; Milner, 1992).

That last point is worth a bit more discussion. In using an aggressive type of punishment, such as spanking, the adult is actually modeling (presenting a behavior to be imitated by the child). After all, the adult is using aggression to get what the adult wants from the child. Children sometimes become more likely to use aggression to get what they want when they receive this kind of punishment (Bryan & Freed, 1982; Larzelere, 1986), and the adult has lost an opportunity to model a more appropriate way to deal with parent–child disagreements. Since aggressive punishment does tend to stop the undesirable behavior, at least for a while, the parent who is punishing actually experiences a kind of negative reinforcement: “When I spank, the unpleasant behavior goes away.” This may increase the tendency to use aggressive punishment over other forms of discipline and could even lead to child abuse (Dubowitz & Bennett, 2007). Finally, some children are so desperate for attention from their parents that they will actually misbehave on purpose. The punishment is a form of attention, and these children will take whatever attention they can get, even negative attention.

Punishment by removal is less objectionable to many parents and educators and is the only kind of punishment that is permitted in many public schools. But this kind of punishment also has its drawbacks—it teaches the child what not to do but not what the child should do. Both punishment by removal and punishment by application are usually only temporary in their effect on behavior. After some time has passed, the behavior will most likely return as the memory of the punishment gets weaker, allowing spontaneous recovery.

If punishment doesn’t work very well, what can a parent do to keep a child from behaving badly?

The way to make punishment more effective involves remembering a few simple rules:

1. **Punishment should immediately follow the behavior it is meant to punish.** If the punishment comes long after the behavior, it will not be associated with that behavior. (This is also true of reinforcement.)

2. **Punishment should be consistent.** This actually means two things. First, if the parent says that a certain punishment will follow a certain behavior, then the parent must make sure to follow through and do what he or she promised to do. Second, punishment for a particular behavior should stay at the same intensity or increase slightly but never decrease. For example, if a child is scolded for jumping on the bed the first time, the second time this behavior happens the child should also be punished by scolding or by a stronger penalty, such as removal of a favorite toy. But if the first misbehavior is punished by spanking and the second by only a scolding, the child learns to “gamble” with the possible punishment.

3. **Punishment of the wrong behavior should be paired, whenever possible, with reinforcement of the right behavior.** Instead of yelling at a 2-year-old for eating with her fingers, the parent should pull her hand gently out of her plate while saying something such as, “No, we do not eat with our fingers. We eat with our fork,” and then placing the fork in the child’s hand and praising her for using it. “See, you are doing such a good job with your fork. I’m so proud of you.” Pairing punishment (the mild correction of pulling her hand away while saying “No, we do not eat with our fingers”) with reinforcement allows parents (and others) to use a much milder punishment and still be effective. It also teaches the desired behavior rather than just suppressing the undesired one.

The following section discusses some very recent research on the problems that can be generated by a particular form of punishment by application: spanking.
5.8 Describe the role of operant stimuli in controlling behavior as well as other concepts that can enhance or limit operant conditioning.

We’ve discussed the role of the antecedent stimulus in classical conditioning, as well as the concepts of extinction, generalization, and spontaneous recovery. These concepts are also important in operant conditioning, but in slightly different ways.

**DISCRIMINATIVE STIMULUS: SLOW DOWN, IT’S THE COPS** You see a police car in your rearview mirror and automatically slow down, even if you weren’t speeding. The traffic light turns red, so you stop. When you want to get into a store, you head for the door and push or pull on the handle. All of these things—slowing down, stopping, using the door handle—are learned. But how do you know what learned response to make, and when? The police car, the stoplight, and the door handle are all cues, stimuli that tell you what behavior will get you what you want.

A **discriminative stimulus** is any stimulus that provides an organism with a cue for making a certain response in order to obtain reinforcement. For example, a police car is a discriminative stimulus for slowing down, and a stop sign is a cue for stopping because...
both of these actions are usually followed by negative reinforcement—people don’t get a ticket or don’t get hit by another vehicle. A doorknob is a cue for where to grab the door in order to successfully open it. In fact, if a door has a knob, people always turn it, but if it has a handle, people usually pull it, right? The two kinds of opening devices each bring forth a different response from people, and their reward is opening the door.

**EXTINCTION, GENERALIZATION, AND SPONTANEOUS RECOVERY IN OPERANT CONDITIONING**  
*Extinction* in classical conditioning involves the removal of the UCS, the unconditioned stimulus that eventually acts as a reinforcer of the CS–CR bond. It should come as no surprise, then, that extinction in operant conditioning involves the removal of the reinforcement. Have you ever seen a child throw a temper tantrum in the checkout line because the little one wanted some candy or toy? Many exasperated* parents will cave in and give the child the treat, positively reinforcing the tantrum. The parent is also being negatively reinforced for giving in, because the obnoxious* behavior stops. The only way to get the tantrum behavior to stop is to remove the reinforcement, which means no candy, no treat, and if possible, no attention from the parent. (Not only is this hard enough to do while enduring the tantrum, but also the tantrum behavior may actually get worse before it extinguishes!)

Just as in classical conditioning, operantly conditioned responses also can be generalized to stimuli that are only similar to the original stimulus. For example, what parent has not experienced that wonderful moment when Baby, who is just learning to label objects and people, refers to every man she sees as “Dada”? The name “Dada” is a response to the presence of her own father and is reinforced by his delight and attention to her. But in the beginning, she will generalize her “Dada” response to any man. As other men fail to reinforce her for this response, she’ll learn to discriminate between them and her father and only call her father “Dada.” In this way, the man who is actually her father becomes a discriminative stimulus just like the stoplight or the doorknob mentioned earlier.

*Spontaneous recovery* (the recurrence of a conditioned response after extinction) will also happen with operant responses. Anyone who has ever trained animals to do several different tricks will say that when first learning a new trick, most animals will try to get reinforcers by performing their *old* tricks.

### APPLICATIONS OF OPERANT CONDITIONING: SHAPING AND BEHAVIOR MODIFICATION

**5.9** Describe how operant conditioning is used to change animal and human behavior, and identify some limitations to its use.

Operant conditioning is more than just the reinforcement of simple responses. It can be used to modify the behavior of both animals and humans.

![How do the circus trainers get their animals to do all those complicated tricks?](One way to deal with a child's temper tantrum is to ignore it. The lack of reinforcement for the tantrum behavior will eventually result in extinction.)

**SHAPING**  
When you see an animal in a circus or in a show at a zoo perform tricks, you are seeing the result of applying the rules of conditioning—both classical and operant—to animals. But the more complex tricks are a process in operant conditioning called *shaping*, in which small steps toward some ultimate goal are reinforced until the goal itself is reached.

For example, if Jody wanted to train his dog Rover to jump through a hoop, he would have to start with some behavior that the dog is already capable of doing on its own. Then he would gradually “mold” that starting behavior into the jump—something the dog is capable of doing but not likely to do on its own. Jody would have to start with the hoop on the ground in front of Rover’s face and then call the dog through the hoop, using the treat as bait. After Rover steps through the hoop (as the shortest way to the

*exasperated: irritated or annoyed.
*obnoxious: highly offensive or undesirable.
treat), Jody should give Rover the treat (positive reinforcement). Then he could raise the hoop just a little, reward him for walking through it again, raise the hoop, reward him, and so on until Rover is jumping through the hoop to get the treat. The goal is achieved by reinforcing each successive approximation (small steps one after the other that get closer and closer to the goal). This process is shaping (Skinner, 1974). Through pairing of a sound such as a whistle or clicker with the primary reinforcer of food, animal trainers can use the sound as a secondary reinforcer and avoid having an overfed learner.

While animals can learn many types of behavior through the use of operant conditioning, it seems that not every animal can be taught anything. For more on this topic, see the following section on biological constraints.

Classic Studies in Psychology

Biological Constraints on Operant Conditioning

Raccoons are fairly intelligent animals and are sometimes used in learning experiments. In a typical experiment, a behaviorist would use shaping and reinforcement to teach a raccoon a trick. The goal might be to get the raccoon to pick up several coins and drop them into a metal container, for which the raccoon would be rewarded with food. The behaviorist starts by reinforcing the raccoon for picking up a single coin. Then the metal container is introduced, and the raccoon is now required to drop the coin into the slot on the container in order to get reinforcement.

It is at this point that operant conditioning seems to fail. Instead of dropping the coin in the slot, the raccoon puts the coin in and out of the slot and rubs it against the inside of the container, then holds it firmly for a few seconds before finally letting it go. When the requirement is upped to two coins, the raccoon spends several minutes rubbing them against each other and dipping them into the container, without actually dropping them in. In spite of the fact that this dipping and rubbing behavior is not reinforced, it gets worse and worse until conditioning becomes impossible.

Keller and Marian Breland, in their attempt to train a raccoon, found that this problem was not limited to the raccoon (Breland & Breland, 1961). They ran into a similar difficulty with a pig that was being trained to pick up a total of five large wooden coins and put them into a “piggy bank.” Although at first successful, the pig became slower and slower at the task, dropping the coin, rooting (pushing) it around with its nose, picking it up, dropping it again, and rooting some more. This behavior became so persistent that the pig actually did not get enough to eat for the day.

The Brelands concluded that the raccoon and the pig were reverting* to behavior that was instinctual for them. Instinctual behavior is genetically determined and not under the influence of learning. Apparently, even though the animals were at first able to learn the tricks, as the coins became more and more associated with food, the animals began to drift back into the instinctual patterns of behavior that they used with real food. Raccoons rub their food between their paws and dip it in and out of water. Pigs root and throw their food around before eating it. The Brelands called this tendency to revert to genetically controlled patterns instinctive drift.

In their 1961 paper describing these and other examples of instinctive drift, the Brelands (both trained by Skinner himself) determined that, contrary to Skinner’s original ideas:

1. The animal does NOT come to the laboratory a tabula rasa, or “blank slate,” and cannot be taught just any behavior.

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*R reverting: to go back in action, thought, speech, and so on.
2. Differences between species of animals matter in determining what behavior can or cannot be conditioned.
3. Not all responses are equally able to be conditioned to any stimulus.

As became quickly obvious in their studies with these animals, each animal comes into the world (and the laboratory) with certain genetically determined instinctive patterns of behavior already in place. These instincts differ from species to species, with the result that there are some responses that simply cannot be trained into an animal regardless of conditioning.

Questions for Further Discussion
1. What other kinds of limitations do animals have in learning?
2. What kinds of behavior might people do that would be resistant to conditioning?
3. How can these research findings about animal behavior be generalized to human behavior?

BEHAVIOR MODIFICATION  Operant conditioning principles such as reinforcement and the process of shaping have been used for many years to change undesirable behavior and create desirable responses in animals and humans—particularly in schoolchildren. The term behavior modification refers to the application of operant conditioning (and sometimes classical conditioning) to bring about such changes. The video Behavior Modification Plan for Improving Health describes a sample behavior modification plan for someone who wants to watch less television and exercise more.

As another example, if a teacher wants to use behavior modification to help a child learn to be more attentive during the teacher’s lectures, the teacher may do the following:
1. Select a target behavior, such as making eye contact with the teacher.
2. Choose a reinforcer. This may be a gold star applied to the child’s chart on the wall, for example.
3. Put the plan in action. Every time the child makes eye contact, the teacher gives the child a gold star. Inappropriate behavior (such as looking out of the window) is not reinforced with gold stars.
4. At the end of the day, the teacher gives the child a special treat or reward for having a certain number of gold stars. This special reward is decided on ahead of time and discussed with the child.

Both gold stars and wooden sticks can be considered *tokens*, secondary reinforcers that can be traded in for other kinds of reinforcers. The use of tokens to modify behavior is called a *token economy*.

Another tool that behaviorists can use to modify behavior is the process of *time-out*. Time-out is a form of mild punishment by removal in which a misbehaving animal, child, or adult is placed in a special area away from the attention of others. Essentially, the organism is being “removed” from any possibility of positive reinforcement in the form of attention. When used with children, time-out should be limited to 1 minute for each year of age with a maximum time-out of 10 minutes (longer than that and the child can forget why the time-out occurred).

Applied behavior analysis (ABA) is the modern term for a form of behavior modification that uses both analysis of current behavior and behavioral techniques to mold a desired behavior or response.

In ABA, skills are broken down to their simplest steps and then taught to the child through a system of reinforcement. Prompts (such as moving a child’s face back to look at the teacher or the task) are given as needed when the child is learning a skill or refuses to cooperate. As the child begins to master a skill and receives reinforcement in the form of treats or praise, the prompts are gradually withdrawn until the child can do the skill independently. Applied behavior analysis is a growing field, with many colleges and universities offering excellent degrees at both the undergraduate and graduate levels. Typical uses for ABA are treating children with disorders, training animals, and developing effective teaching methods for children and adults of all levels of mental abilities (Baer et al., 1968).

An example of how ABA can be used is found in the use of shaping to mold desirable, socially acceptable behavior in individuals with *autism*. Autism is a disorder in which the person has great difficulty in communicating with others, often refusing to look at another person. This specific application of ABA can be said to have begun with the work of Dr. O. Ivar Lovaas (1964) and his associates, although the basic techniques are those first outlined by Skinner. Lovaas used small pieces of candy as reinforcers to teach social skills and language to children with autism.

Other techniques for modifying behavior have been developed so that even behavior that is normally considered involuntary such as blood pressure and muscle tension can be brought under conscious control. For nearly 60 years, scientists have known how to use feedback of a person’s biological information (such as heart rate) to create a state of relaxation (Margolin & Kubic, 1944). Biofeedback is the traditional term used to describe this kind of biological feedback of information, and through its use many problems can be relieved or controlled.

A relatively newer biofeedback technique called neurofeedback involves trying to change brain-wave activity. Although this technique uses the latest in technology, the basic principles behind it are much older. Traditionally, this technique was based on recording the electrical activity of the brain, or EEG. To record the EEG, a person would have to be connected to a stand-alone *electroencephalograph*, a machine that amplifies and records the brain’s electrical activity. Modern biofeedback and neurofeedback amplifiers are often connected to a computer that records and analyzes the physiological activity of the brain. Neurofeedback can be integrated with video-game-like programs that individuals can use to learn how to produce brain waves or specific types of brain activity associated with specific cognitive or behavioral states (e.g., increased attention, staying focused, relaxed awareness). Individuals learn to make these changes through the principles of operant conditioning (Sherlin et al., 2011). Neurofeedback using...
the EEG continues to be investigated in specific disorders such as attention-deficit/hyperactivity disorder (ADHD) and in new areas such as the control of chronic pain (Arns et al., 2009; Jensen et al., 2013). Other recent neurofeedback studies have incorporated MRI or fMRI to examine the effects of EEG-based neurofeedback on the brain (Ghaziri et al., 2013; Ros et al., 2013). And in some studies, fMRI is being used as a neurofeedback method in and of itself (Ruiz et al., 2013; Scharnowski et al., 2012; Sulzer et al., 2013).
Practice Quiz  How much do you remember?  ANSWERS ON PAGE AK-1.
Pick the best answer.

1. Which of the following is an example of Thorndike’s law of effect?
   a. John, a teenager, gets compliments from Carla for wearing a nice shirt. Subsequently, John wears the shirt whenever he thinks he will be seeing Carla.
   b. James always cleans his room or he knows he will be punished.
   c. Josh tries to complete his homework even though he hates having to do it.
   d. Jeremy often sits around inside hoping that someone will call him to go do something.

2. With operant conditioning, _________ are important in forming an association, whereas with classical conditioning, _________ are important in forming an association.
   a. consequences; antecedent stimuli
   b. reflexes; rewards
   c. conditioned stimuli; reflexive stimuli
   d. positive reinforcement; negative reinforcement

3. Joe owned a small repair shop. Each day, he would check the mail to see if any of his customers mailed in a payment for the work he had done for them. Some days, he would receive a check or two. At other times, he would have to wait days before getting another payment. What schedule of reinforcement is evident here?
   a. fixed interval
   b. fixed ratio
   c. variable interval
   d. variable ratio

4. Little Jimmie’s mother was upset to find that Jimmie had not picked up his building blocks after repeated requests to do so. The next morning, Jimmie found all his blocks had been picked up and put into a bag on the top of the refrigerator. Jimmie’s mother told him that he couldn’t play with his blocks for the next two days. Which type of discipline did she use?
   a. negative reinforcement
   b. punishment by application
   c. punishment by removal
   d. positive reinforcement

5. The study by Keller and Marian Breland found that instinctive drift in animal behavior is
   a. caused by confusion between punishment types.
   b. caused by overuse of positive reinforcement.
   c. the result of conscious decisions on the part of animals not to take part in further testing.
   d. genetically determined and not under the influence of learning.

6. Which of the following is the best example of applied behavior analysis?
   a. Tiffany works with children by asking them what they want to accomplish and then helping them attain that goal through different forms of classical conditioning.
   b. Bethany has children watch her repeatedly so as to understand how a task is to be done. Once they have finished the observation, they are then asked to imitate the behavior.
   c. Agatha observes a child to see what purpose a disruptive classroom behavior serves, and identifies a new replacement behavior. She then implements a training program for the new behavior, reinforcing often at the simplest levels and gradually removing reinforcers as the child demonstrates the behavior independently.
   d. Camille wants children to learn a new behavior and uses punishment as the basis for the behavior change.

7. Neurofeedback is a form of _________ and works to change a person’s _________ through a series of reinforcements.
   a. classical conditioning; thoughts
   b. operant conditioning; anxieties
   c. observation learning; behaviors
   d. biofeedback; brain activity

Cognitive Learning Theory

In the early days of behaviorism, the original focus of Watson, Skinner, and many of their followers was on observable, measurable behavior. Anything that might be occurring inside a person or animal’s head during learning was considered to be of no interest to the behaviorist because it could not be seen or directly measured. Other psychologists, however, were still interested in the mind’s influence over behavior. Gestalt psychologists, for instance, were studying the way that the human mind tried to force a pattern on stimuli in the world around the person. But to Learning Objectives 1.3. This continued interest in the mind was followed, in the 1950s and 1960s, by the comparison of the human mind to the workings of those fascinating “thinking machines,” computers. Soon after, interest in cognition, the mental events that take place inside a person’s mind while behaving, began to dominate experimental psychology. Many behavioral psychologists could no longer ignore the thoughts, feelings, and expectations that clearly existed in the mind and that seemed to influence observable behavior and...
eventually began to develop a cognitive learning theory to supplement the more traditional theories of learning (Kendler, 1985). Three important figures often cited as key theorists in the early days of the development of cognitive learning theory were the Gestalt psychologists Edward Tolman and Wolfgang Köhler and modern psychologist Martin Seligman.

**TOLMAN’S MAZE-RUNNING RATS: LATENT LEARNING**

5.10 Define and explain the concept of latent learning.

One of Gestalt psychologist Edward Tolman’s best-known experiments in learning involved teaching three groups of rats the same maze, one at a time (Tolman & Honzik, 1930). In the first group, each rat was placed in the maze and reinforced with food for making its way out the other side. The rat was then placed back in the maze, reinforced, and so on until the rat could successfully solve the maze with no errors—the typical maze-learning experiment (see Figure 5.8).

The second group of rats was treated exactly like the first, except that they never received any reinforcement upon exiting the maze. They were simply put back in again and again, until the tenth day of the experiment. On that day, the rats in the second group began to receive reinforcement for getting out of the maze. The third group of rats, serving as a control group, was also not reinforced and was not given reinforcement for the entire duration of the experiment.

A strict Skinnerian behaviorist would predict that only the first group of rats would learn the maze successfully because learning depends on reinforcing consequences. At first, this seemed to be the case. The first group of rats did indeed solve the maze after a certain number of trials, whereas the second and third groups seemed to wander aimlessly around the maze until accidentally finding their way out.

On the 10th day, however, something happened that would be difficult to explain using only Skinner’s basic principles. The second group of rats, upon receiving the
reinforcement for the first time, should have then taken as long as the first group to solve the maze. Instead, they began to solve the maze almost immediately (see Figure 5.9).

Tolman concluded that the rats in the second group, while wandering around in the first nine days of the experiment, had indeed learned where all the blind alleys, wrong turns, and correct paths were and stored this knowledge away as a kind of “mental map,” or cognitive map, of the physical layout of the maze. The rats in the second group had learned and stored that learning away mentally but had not demonstrated this learning because there was no reason to do so. The cognitive map had remained hidden, or latent, until the rats had a reason to demonstrate their knowledge by getting to the food. Tolman called this latent learning. The idea that learning could happen without reinforcement, and then later affect behavior, was not something traditional operant conditioning could explain. To see a real-life example of latent learning, participate in the experiment Learning.
KÖHLER’S SMART CHIMP: INSIGHT LEARNING

5.11 Explain the concept of insight learning.

Another exploration of the cognitive elements of learning came about almost by accident. Wolfgang Köhler (1887–1967) was a Gestalt psychologist who became marooned* on an island in the Canaries (a series of islands off the coast of North Africa) when World War I broke out. Stuck at the primate research lab that had first drawn him to the island, he turned to studies of animal learning.

In one of his more famous studies (Köhler, 1925), he set up a problem for one of the chimpanzees. Sultan the chimp was faced with the problem of how to get to a banana that was placed just out of his reach outside his cage. Sultan solved this problem relatively easily, first trying to reach through the bars with his arm, then using a stick that was lying in the cage to rake the banana into the cage. As chimpanzees are natural tool users, this behavior is not surprising and is still nothing more than simple trial-and-error learning.

But then the problem was made more difficult. The banana was placed just out of reach of Sultan’s extended arm with the stick in his hand. At this point there were two sticks lying around in the cage, which could be fitted together to make a single pole that would be long enough to reach the banana. Sultan first tried one stick, then the other (simple trial and error). After about an hour of trying, Sultan seemed to have a sudden flash of inspiration. He pushed one stick out of the cage as far as it would go toward the banana and then pushed the other stick behind the first one. Of course, when he tried to draw the sticks back, only the one in his hand came. He jumped up and down and was very excited, and when Köhler gave him the second stick, he sat on the floor of the cage and looked at them carefully. He then fitted one stick into the other and retrieved his banana. Köhler called Sultan’s rapid “perception of relationships” insight and determined that insight could not be gained through trial-and-error learning alone (Köhler, 1925). Although Thorndike and other early learning theorists believed that animals could not demonstrate insight, Köhler’s work seems to demonstrate that insight requires a sudden “coming together” of all the elements of a problem in a kind of “aha!” moment that is not predicted by traditional animal learning studies. 

Another of Köhler’s chimpanzees, Grande, has just solved the problem of how to get to the banana by stacking boxes. Does this meet the criteria for insight, or was it simple trial-and-error learning?

SELIGMAN’S DEPRESSED DOGS: LEARNED HELPLESSNESS

5.12 Explain the concept of learned helplessness.

Martin Seligman is now famous for founding the field of positive psychology, a new way of looking at the entire concept of mental health and therapy that focuses on the adaptive, creative, and psychologically more fulfilling aspects of human experience rather than on mental disorders. But in the mid to late 1960s Seligman, a learning theorist, and his colleagues accidentally discovered an unexpected phenomenon while doing experiments on dogs using classical conditioning (Seligman, 1975). Their original intention was to study escape and avoidance learning. Seligman and colleagues presented a tone followed by a harmless but painful electric shock to one group of dogs (Overmier & Seligman, 1967; Seligman & Maier, 1967). (See Figure 5.10 on the next page.) The dogs in this group were harnessed so that they could not escape the shock. The researchers assumed that the dogs would learn to fear the sound of the tone and later try to escape from the tone before being shocked.

These dogs, along with another group of dogs that had not been conditioned to fear the tone, were placed into a special box consisting of a low fence that divided the box into two compartments. The dogs, which were now unharnessed, could easily see over the fence and jump over if they wished—which is precisely what the dogs that

*marooned: in this sense, being placed on an island from which escape is impossible.
had not been conditioned did as soon as the shock occurred. Imagine the researchers’ surprise when, instead of jumping over the fence when the tone sounded, the previously conditioned dogs just sat there. In fact, these dogs showed distress but didn’t try to jump over the fence even when the shock itself began.

Why would the conditioned dogs refuse to move when shocked? The dogs that had been harnessed while being conditioned had apparently learned in the original tone/shock situation that there was nothing they could do to escape the shock. So when placed in a situation in which escape was possible, the dogs still did nothing because they had learned to be “helpless.” They believed they could not escape, so they did not try.

More recently, Seligman’s colleague and co-researcher in those early studies, Steven F. Maier, has revisited the phenomenon of learned helplessness from a neuroscientific approach, and this work has provided some new insights. Maier and others have focused on an area of the brain stem that releases serotonin and can play a role in activating the amygdala (which plays an important role in fear and anxiety) but also participates in decreasing activity in brain areas responsible for the “fight-or-flight” response.

This combination of increased fear/anxiety with non-escape or freezing is the very behavior associated with learned helplessness. This part of the brain stem (the dorsal raphe nucleus) is a much older part of the brain and not able to determine what type of stressors are controllable. Their research suggests that a higher-level area, a part of the frontal lobe called the ventromedial prefrontal cortex (vmPFC), is able to help determine what is controllable. In turn, the vmPFC inhibits the brain stem area and calms the amygdala’s response, allowing an animal to effectively respond to a stressor and exhibit control (Amat et al., 2005; Maier et al., 2006; Maier & Watkins, 2005). In other words, it is possible that the dogs in the early studies, rather than learning to be helpless, were not learning how to relax and exhibit control (Maier et al., 2006).

I know some people who seem to act just like those dogs—they live in a horrible situation but won’t leave. Is this the same thing?

Seligman extended this theory of learned helplessness, the tendency to fail to act to escape from a situation because of a history of repeated failures in the past, to explain depression. Depressed people seem to lack normal emotions and become somewhat apathetic, often staying in unpleasant work environments or bad marriages or relationships rather than trying to escape or better their situation. Seligman proposed that this depressive behavior is a form of learned helplessness. Depressed people may have learned in the past that they seem to have no control over what happens to them (Alloy & Clements, 1998). A sense of powerlessness and hopelessness is common to depressed people, and certainly this would seem to apply to Seligman’s dogs as well. Maier’s recent work also has implications here, especially the focus on the components necessary for learning how to relax and exhibit control: input from the vmPFC, and training (repeated exposures to stressors). This combination provides a mechanism for not only understanding resilience,* resilience: the ability to recover quickly from change and/or stress.
but also for possibly helping people foster resilience and avoid anxiety or mood disorders such as posttraumatic stress disorder (PTSD) or depression (Maier et al., 2006) to Learning Objectives 12.6 and 12.9. Maier and colleagues are continuing to study the brain foundations of learned helplessness and examining how factors related to control and controllability not only impact immediate events, but future stressful events as well (Amat et al., 2010; Rozeske et al., 2011; Varela et al., 2012).

Think about how this might apply to other situations. There are many students who feel that they are bad at math because they have had problems with it in the past. Is it possible that this belief could make them not try as hard or study as much as they should? Isn’t this kind of thinking also an example of learned helplessness?

Cognitive learning is also an important part of a fairly well-known form of learning, often simplified as “monkey see, monkey do.” Let’s take a look at learning through watching the actions of others.

Concept Map L.O. 5.10, 5.11, 5.12

Practice Quiz  How much do you remember? ANSWERS ON PAGE AK-1.

Pick the best answer.

1. In Tolman’s maze study, the fact that the group of rats receiving reinforcement only after day 10 of the study solved the maze far more quickly than did the rats who had been reinforced from the first day can be interpreted to mean that these particular rats
   a. were much smarter than the other rats.
   b. had already learned the maze in the first 9 days.
   c. had the opportunity to cheat by watching the other rats.
   d. were very hungry and, therefore, learned much more quickly.

2. Lisa’s parents have decided to take a 3-week trip to Europe. Consequently, Lisa’s mother will not be able to make her famous pies for the upcoming bake sale. When her mother encourages Lisa to bake the pies herself, Lisa panics at first but then finds that she knows how to put the recipe together. Her ability to prepare the recipe is an example of
   a. latent learning.
   b. learned helplessness.
   c. insight learning.
   d. discovery learning.

3. Which theory is commonly represented by the “aha!” phenomenon?
   a. Tolman’s latent learning theory
   b. Köhler’s insight theory
   c. Seligman’s learned helplessness theory
   d. Bandura’s observational learning

4. Research by Steven Maier suggests that learned helplessness involves a higher-level region of the brain known as the __________, which helps subjects determine what is controllable.
   a. amygdala
   b. hippocampus
   c. dorsal raphe nucleus
   d. ventromedial prefrontal cortex (vmPFC)
Observational Learning

Observational learning is the learning of new behavior through watching the actions of a model (someone else who is doing that behavior). Sometimes that behavior is desirable, and sometimes it is not, as the next section describes.

BANDURA AND THE BOBO DOLL

5.13 Describe the process of observational learning.

Bandura’s classic study in observational learning involved having a preschool child in a room in which the experimenter and a model interacted with toys in the room in front of the child (Bandura et al., 1961). In one condition, the model interacted with the toys in a nonaggressive manner, completely ignoring the presence of a “Bobo” doll (a punch-bag doll in the shape of a clown). In another condition, the model became very aggressive with the doll, kicking it and yelling at it, throwing it in the air and hitting it with a hammer.

When each child was left alone in the room and had the opportunity to play with the toys, a camera filming through a one-way mirror caught the children who were exposed to the aggressive model beating up the Bobo doll in exact imitation of the model (see Figure 5.11). The children who saw the model ignore the doll did not act aggressively toward the toy. Obviously, the aggressive children had learned their aggressive actions from merely watching the model—with no reinforcement necessary. The fact that learning can take place without actual performance (a kind of latent learning) is called the learning/performance distinction.

Ah, but would that child have imitated the model if the model had been punished? Wouldn’t the consequences of the model’s behavior make a difference?

In later studies, Bandura showed a film of a model beating up the Bobo doll. In one condition, the children saw the model rewarded afterward. In another, the model was punished. When placed in the room with toys, the children in the first group beat up the doll, but the children in the second group did not. But when Bandura told the children in the second group that he would give them a reward if they could show him what the model in the film did, each child duplicated the model’s actions. Both groups had learned from watching the model, but only the children watching the successful (rewarded) model imitated the aggression with no prompting (Bandura, 1965). Apparently, consequences do matter in motivating a child (or an adult) to imitate a particular model. The tendency for some movies and television programs to make “heroes” out of violent, aggressive “bad guys” is particularly disturbing in light of these findings. In fact,
Bandura began this research to investigate possible links between children’s exposure to violence on television and aggressive behavior toward others.

In one nationwide study of youth in the United States, it was found that young people ages 8 to 18 spend on average almost 7.5 hours per day involved in media consumption (television, computers, video games, music, cell phones, print, and movies), 7 days a week. Furthermore, given the prevalence of media multitasking (using more than one media device at a time), they are packing in approximately 10 hours and 45 minutes of media during those 7.5 hours! (Rideout et al., 2010). While not all media consumption is of violent media, it is quite easy to imagine that some of that media is of a violent nature.

Correlational research stretching over nearly two decades suggests that a link exists between viewing violent television and an increased level of aggression in children (Bushman & Huesmann, 2001; Engelhardt et al., 2013; Huesmann & Eron, 1986; Sacks et al., 2011). While correlations do not prove that viewing violence on TV is the cause of increased violence, one cannot help but be curious as to the effects, especially given the continuing rise of media consumption in young people, coupled with the multiple ways young people interact with media. As such, there has been an ongoing debate as to the validity of the links between aggression and exposure to media violence (primarily focusing on television, movies, video games, and music). Although still a topic of debate (Ferguson, 2010, 2013), there appears to be a strong body of evidence that exposure to some forms of media violence does have immediate and long-term effects, increasing the likelihood of aggressive verbal and physical behavior and aggressive thoughts and emotions—and the effects appear to impact children, adolescents, and adults (Anderson et al., 2003; Anderson et al., 2010).

THE FOUR ELEMENTS OF OBSERVATIONAL LEARNING

5.14 List the four elements of observational learning.

Bandura (1986) concluded, from these studies and others, that observational learning required the presence of four elements.

**ATTENTION** To learn anything through observation, the learner must first pay attention to the model. For example, a person at a fancy dinner party who wants to know which utensil to use has to watch the person who seems to know what is correct. Certain characteristics of models can make attention more likely. For example, people pay more attention to those people they perceive as similar to them and to people whom they perceive as attractive.

**MEMORY** The learner must also be able to retain the memory of what was done, such as remembering the steps in preparing a dish that was first seen on a cooking show.

**IMITATION** The learner must be capable of reproducing, or imitating, the actions of the model. A 2-year-old might be able to watch someone tie shoelaces and might even remember most of the steps, but the 2-year-old’s chubby little fingers will not have the dexterity* necessary for actually tying the laces. A person with extremely weak ankles might be able to watch and remember how some ballet move was accomplished but will not be able to reproduce it. The mirror neurons discussed in Chapter Two may be willing, but the flesh is weak.

**DESIRE** Finally, the learner must have the motivation or desire to perform the action. That person at the fancy dinner, for example, might not care which fork or which knife is the “proper” one to use. Also, if a person expects a reward because one has been given in the past, or has been promised a future reward (like the children in the second group of

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*dexterity: skill and ease in using the hands.
Bandura’s study), or has witnessed a model getting a reward (like the children in the first group), that person will be much more likely to imitate the observed behavior. Successful models are powerful figures for imitation, but rarely would we be motivated to imitate someone who fails or is punished.

(An easy way to remember the four elements of modeling is to remember the letters AMID, which stand for the first letters of each of the four elements. This is a good example of using a strategy to improve memory. [Link to Learning Objectives PIA.7]).

### Concept Map L.O. 5.13, 5.14

**Observational Learning**  
(the learning of a new behavior through the observation of a model; typically associated with classic work of Bandura and “Bobo doll” study)

- children observing an adult model’s aggressive or nonaggressive behaviors tended to later act in the same manner they saw modeled; no reinforcement was necessary
- later research suggested that potential consequences can influence motivation to imitate a particular model
- pay attention to the model
- able to remember what was done
- capable of reproducing, or imitating, the actions of the model
- have the desire or motivation to perform the action

### Practice Quiz  How much do you remember?  ANSWERS ON PAGE AK-1.

**Pick the best answer.**

1. Bandura’s studies found that learning can take place without actual performance. What is this referred to as?  
   a. learning/performance distinction  
   b. insight-based learning  
   c. ARID  
   d. cognitive learning

2. A famous study conducted by Albert Bandura involved watching children interact with:
   a. jigsaw puzzles  
   b. a toy kitchen  
   c. a kiddie pool filled with water  
   d. a Bobo doll

3. In one nationwide study of kids in the United States, it was discovered that young people between the ages of 8 and 18 years spend approximately _____ hours a day interacting with media, including television, computers, cell phones, and other forms.  
   a. 3.5  
   b. 5.75  
   c. 7.5  
   d. 9.25

4. What is the correct sequence of the four elements of observational learning?  
   a. Attention, Imitation, Desire, Memory  
   b. Attention, Memory, Imitation, Desire  
   c. Desire, Attention, Memory, Imitation  
   d. Memory, Attention, Desire, Imitation

### Applying Psychology to Everyday Life

**Can You Really Toilet Train Your Cat?**

**5.15** Provide and describe an example of conditioning in the real world.

(This article has been excerpted with permission of the author and cat-trainer extraordinare Karawynn Long. Karawynn Long is a published writer and Web designer who lives in Seattle with her family. Sadly, since this article was written, her cat, Misha, has passed...
This cat is being trained to use the toilet employing the learning techniques discussed in this section.
in the middle, hind legs on the outside). If he starts out with three or, heaven forbid, all four feet in the bowl, just get the front two feet out first. Praise him all over the place every time he completes the activity in this position. [The praise is the positive reinforcement and should be done with each successful step.]

(Misha is very doglike in that he craves approval and praise. If your cat is indifferent to this sort of thing, you can also reward him with small food treats and wean him from them later when the toilet behavior has “set.” Just keep the treats as small and infrequent as possible—half a Pounce™ or similar treat per occasion should be plenty.) [If treats are too frequent, it will make it difficult to phase out the reinforcer after the behavior is well learned.]

When he is regularly using the toilet with his front feet out (and some cats naturally start from this position), begin lifting a hind foot out and placing it on the seat outside the front paws. Your cat will probably find this awkward at first and try to replace the foot in the litter. Be persistent. Move that foot four times in a row if you have to, until it stays there. Praise and/or treat.

Repeat with the other hind foot, until your cat learns to balance in that squat. Once he’s getting all four feet regularly on the seat, it’s all easy from here.

Which is fortunate, because the last bit is also the most unpleasant. I suggest that you postpone this stage until you have at least a weekend, and preferably several days, when you (or another responsible party) will be at home most of the time. I skipped through this part in about two days; I only hope that your cat allows you to move along that fast.

Begin reducing the litter in the bowl. Go as fast as he’ll feel comfortable with, because as the litter decreases, the odor increases. You’ll want to be home at this point so that you can praise him and dump out the contents of the bowl immediately after he’s finished, to minimize both the smell and the possibility that your cat, in a confused attempt to minimize the smell on his own, tries to cover it up with litter that no longer exists and ends up tracking unpleasantness into the rest of the house.

By the time you’re down to a token teaspoonful of litter in the bottom of the bowl, your next-door neighbors will probably be aware of the precise instant your cat has used the toilet. This is as bad as it gets. The next time you rinse out the metal bowl, put a little bit of water in the bottom. Increase the water level each time, just as you decreased the litter level. Remember—if at any point Felix looks nervous enough about the change to give the whole thing up and take his business to the corner behind the door, back up a step or two and try the thing again more slowly. [Shaping takes a lot of patience, depending on the behavior being shaped and the learning ability of the animal—or person.]

Once the water in the mixing bowl is a couple of inches deep and your cat is comfortable with the whole thing, you get to perform the last bit of magic. Take the mixing bowl away, leaving the bare toilet. (Lid Up, Seat Down.)

Voila! Your cat is now toilet trained.

Questions for Further Discussion

1. Why would this technique probably not work with a dog?
2. Are there any safety concerns with teaching a cat in this way?
3. Are there any other difficulties that might arise when doing this training?

Part of the training may include learning to press the flush handle.
Chapter Summary

Definition of Learning

5.1 Discuss the meaning of the term learning.
   • Learning is any relatively permanent change in behavior brought about by experience or practice and is different from maturation that is genetically controlled.

It Makes Your Mouth Water: Classical Conditioning

5.2 Describe and explain the origins of classical conditioning and its important elements.
   • In classical conditioning, one stimulus can, through pairing with another stimulus, come to produce a similar response.
   • The unconditioned stimulus (UCS) is a naturally occurring stimulus that produces the innate, or involuntary, unconditioned response (UCR).
   • When paired with the UCR, a neutral stimulus eventually begins to elicit an involuntary, and automatic behavior called the conditioned response (CR).
   • The neutral stimulus (NS) and UCS must be paired several times and the CS must precede the UCS by only a few seconds.
   • Other important aspects of classical conditioning include stimulus generalization, stimulus discrimination, extinction, spontaneous recovery, and higher-order conditioning.
   • Pavlov believed that the NS became a substitute for the UCS through association in time.
   • The cognitive perspective asserts that the CS has to provide some kind of information or expectancy about the coming of the UCS in order for conditioning to occur.

5.3 Define conditioned emotional responses, and explain conditioned taste aversions.
   • Watson demonstrated that a phobia could be learned through classical conditioning by exposing a baby to a white rat and a loud noise, producing conditioned fear of the rat in the baby.
   • Conditioned taste aversions occur when an organism becomes nauseated some time after eating a certain food, which then becomes aversive to the organism.
   • Some kinds of conditioned responses are more easily learned than others because of biological preparedness.

What’s in It for Me? Operant Conditioning

5.4 Describe the theory of operant conditioning and how it differs from classical conditioning, and explain the contributions of Thorndike and Skinner.
   • Thorndike developed the law of effect: A response followed by a pleasurable consequence will be repeated, but a response followed by an unpleasant consequence will not be repeated.
   • B. F. Skinner named the learning of voluntary responses operant conditioning because voluntary responses are what we use to operate in the world around us.

5.5 Differentiate between primary and secondary reinforcers and the processes of positive and negative reinforcement.
   • Reinforcement is the process of strengthening a response by following it with a pleasurable, rewarding consequence.
   • A primary reinforcer is a stimulus that satisfies a basic, natural drive, whereas a secondary reinforcer is a stimulus that becomes reinforcing only after being paired with a primary reinforcer.
   • In positive reinforcement, a response is followed by the presentation of a pleasurable stimulus, whereas in negative reinforcement, a response is followed by the removal or avoidance of an unpleasant stimulus.

5.6 Distinguish among the schedules of reinforcement.
   • Continuous reinforcement occurs when each and every correct response is followed by a reinforcer.
   • Partial reinforcement, in which only some correct responses are followed by reinforcement, is much more resistant to extinction. This is called the partial reinforcement effect.
   • In a fixed interval schedule of reinforcement, at least one correct response must be made within a set interval of time to obtain reinforcement.
   • In a variable interval schedule of reinforcement, a variable number of responses are required before reinforcement is given.
   • In a variable ratio schedule of reinforcement, a varying number of responses are required to obtain reinforcement.

5.7 Compare and contrast punishment with reinforcement, and list some of the problems associated with using punishment.
   • Punishment is any event or stimulus that, when following a response, makes that response less likely to happen again.
   • In punishment by application, a response is followed by the application or experiencing of an unpleasant stimulus, such as a spanking.
   • In punishment by removal, a response is followed by the removal of some pleasurable stimulus, such as taking away a child’s toy for misbehavior.
   • A person who uses aggressive punishment, such as spanking, can act as a model for aggressive behavior.
   • Punishment of both kinds normally has only a temporary effect on behavior.
   • Punishment can be made more effective by making it immediate and consistent and by pairing punishment of the undesirable behavior with reinforcement of the desirable one.
5.8 Describe the role of operant stimuli in controlling behavior as well as other concepts that can enhance or limit operant conditioning.
- Discriminative stimuli are cues that provide information about what response to make in order to obtain reinforcement.
- Shaping, extinction, generalization and discrimination, and spontaneous recovery are other concepts in operant conditioning.
- Instinctive behavior in animals is resistant to conditioning or modification, a phenomenon called instinctive drift.

5.9 Describe how operant conditioning is used to change animal and human behavior, and identify some limitations to its use.
- Operant conditioning can be used in many settings on both animals and people to change, or modify, behavior. This use is termed behavior modification and includes the use of reinforcement and shaping to alter behavior.
- Token economies are a type of behavior modification in which secondary reinforcers, or tokens, are used.
- Applied behavior analysis (ABA) is the modern version of behavior modification and makes use of functional analysis and behavioral techniques to change human behavior.
- Neurofeedback is a type of biofeedback in which the person is typically connected to an electroencephalograph, a machine that records the brain’s electrical activity.

Cognitive Learning Theory

5.10 Define and explain the concept of latent learning.
- Tolman found that rats that were allowed to wander in a maze but were not reinforced still showed evidence of having learned the maze once reinforcement became possible. He termed this hidden learning latent learning, a form of cognitive learning.

5.11 Explain the concept of insight learning.
- Köhler found evidence of insight, the sudden perception of the relationships among elements of a problem, in chimpanzees.

5.12 Explain the concept of learned helplessness.
- Seligman found that dogs that had been placed in an inescapable situation failed to try to escape when it became possible to do so, remaining in the painful situation as if helpless to leave. Seligman called this phenomenon learned helplessness and found parallels between learned helplessness and depression.

Observational Learning

5.13 Describe the process of observational learning.
- Observational learning is learning through watching others perform, or model, certain actions.
- Bandura’s famous Bobo doll experiment demonstrated that young children will imitate the aggressive actions of a model even when there is no reinforcement for doing so.

5.14 List the four elements of observational learning.
- Bandura determined that four elements needed to be present for observational learning to occur: attention, memory, imitation, and desire.

Applying Psychology to Everyday Life: Can You Really Toilet Train Your Cat?

5.15 Provide and describe an example of conditioning in the real world.
- Writer Karawynn Long used shaping, reinforcement, and classical conditioning to train her cat to use the toilet in her bathroom instead of a litter box.

Test Yourself ANSWERS ON PAGE AK-1.

Pick the best answer.

1. Sheila almost got hit by a car at a street corner because she was too busy texting on her phone. From that day on, Sheila looks before she reaches the street corner. Her change in behavior is a result of
   a. learning.
   b. memory.
   c. motivation.
   d. both sensation and perception.

2. At home, you rattle the chain on your dog’s leash every time you prepare to take him for a walk. After several episodes like this, you find that your dog comes running to the front door even when you pick up the leash to put it back in the closet. In this example, what is the conditioned stimulus?
   a. going for a walk
   b. the sound of the leash
   c. the front door
   d. the dog runs to the door

3. A child has been classically conditioned to fear a white rat. If the child does not show fear when shown a black rat, this is called
   a. stimulus generalization.
   b. stimulus discrimination.
   c. spontaneous recovery.
   d. extinction.

4. During the cold winter, you have stopped taking your dog for walks. What’s more, your dog has gotten used to the fact that when you accidentally rattle his leash, he isn’t going for a walk, and subsequently he doesn’t come running to the front door. What has occurred?
   a. stimulus generalization
   b. stimulus discrimination
   c. spontaneous recovery
   d. extinction

5. Rhonda had tartar sauce with her fish one night. The next morning she was nauseated and sick for much of the day. The next time she was offered the chance to go out for fish, she felt queasy and
declined. Her queasiness at the thought of fish with tartar sauce was probably due to
a. higher-order conditioning.
b. a conditioned taste aversion.
c. stimulus substitution.
d. stimulus generalization.

6. Caitlin works in the psychology department’s rat lab. In her studies, she found that many of her lab rats would develop a conditioned taste aversion to certain foods after as little as one trial. Caitlin’s psychology professor refers to this as a classic example of
a. biological preparedness.
b. psychological preparedness.
c. instinctive drift.
d. stimulus substitution.

7. Blake finds that if he washes his car prior to going out on the town, more of his friends want to ride along with him. What theory would best explain his willingness to always wash and clean his car before going out?
   a. Thorndike’s law of effect
   b. Skinner’s theory of operant conditioning
   c. Pavlov’s theory of classical conditioning
   d. Köhler’s insight learning theory

8. In classical conditioning, behavior typically is _______, whereas with operant conditioning, behavior is ________.
   a. rewarded; punished
   b. biological; internal
   c. voluntary; involuntary
   d. involuntary; voluntary

9. Where do secondary reinforcers get their power from?
   a. Pavlov’s classical conditioning
   b. Thorndike’s law of effect
   c. Bandura’s observational theory
   d. Köhler’s insight theory

10. Positive reinforcement results in an ( ) ________ in the target behavior and negative reinforcement results in an ( ) ________ in the target behavior.
    a. increase; decrease
    b. increase; increase
    c. decrease; decrease
    d. decrease; increase

11. Belinda has a terrible headache. If she takes some aspirin and her headache goes away, and as a result Belinda is more likely to take aspirin in the future when she has a headache, this would be an example of
    a. positive reinforcement.
    b. negative reinforcement.
    c. punishment.
    d. generalization.

12. Ben gets paid every 2 weeks. In one 2-week period, he worked a total of 20 hours. During another 2-week period, he worked a total of 50 hours. Regardless of the total number of hours he works each week, he is paid every 2 weeks. What schedule of reinforcement is being used?
    a. fixed ratio
    b. variable ratio
    c. fixed interval
    d. variable interval

13. Denise is grounded for coming home after curfew. Additionally, her parents have taken away her cell phone for a month. Losing her cell phone privileges is an example of
    a. negative reinforcement.
    b. punishment by application.
    c. punishment by removal.
    d. learned helplessness

14. What is the relationship between negative reinforcement and punishment?
   a. Both tend to strengthen a response.
   b. Both tend to weaken a response.
   c. Negative reinforcement strengthens a response while punishment weakens a response.
   d. Negative reinforcement weakens a response while punishment strengthens a response.

15. Which of the following is an example of the use of extinction with operant conditioning?
   a. A mother ignores her child’s temper tantrum so that the behavior ultimately goes away.
   b. A mother gives in to her child’s demands for candy by buying the child some chocolate so as to quiet him or her.
   c. A mother spanks a child when he or she starts throwing a tantrum.
   d. A mother gives a child chocolate prior to him or her asking for it so as to keep a tantrum from occurring in the first place.

16. Studies by Keller and Marian Breland found that many animals exhibit instinctive drift. What does this mean?
   a. The animals studied could not learn any skills even with the use of reinforcement.
   b. The animals studied would learn skills through reinforcement but eventually revert to their genetically controlled patterns of behavior.
   c. The animals studied would learn skills through reinforcement and they remained that way no matter how much reinforcement they were given.
   d. The animals studied could learn only skills similar to those found in the wild.

17. Jose was lying in bed when he suddenly realized how he might deal with a fast approaching deadline at work. When his coworkers asked how he came up with his idea, he said, “It just came to me out of nowhere.” Psychologists would refer to this as
    a. latent learning
    b. learned helplessness.
    c. insight learning.
    d. observational learning.

18. Jody failed repeatedly in college algebra. Finally, she gave up and was seriously considering dropping out of college. One day, her best friend offered to personally help her if she signed up for college algebra again, but she refused. What concept might explain her reluctance?
    a. latent learning
    b. learned helplessness
    c. insight learning
    d. observational learning

19. What does AMID stand for?
   a. Attention, Memory, Intention, Detention
   b. Attention, Memory, Imitation, Desire
   c. Ask, Memory, Imitate, Develop
   d. Association, Memory, Imitation, Desires

20. Daria has noticed how some of her friends have lost weight and gotten trim by exercising 1–2 hours each day. However, she has no plans to imitate their behavior. What component of Bandura’s model of observational learning will explain why Daria has not started a similar weight loss program?
    a. Daria’s unconscious does not believe she can achieve the goal.
    b. Daria is not motivated nor does she have the desire to begin the program.
    c. Daria’s self-esteem must first be addressed.
    d. Daria’s unwillingness may be a sign of mental disorder.