CHAPTER 7

Learning

In this chapter, you will learn about:

- how learning is defined
- theories of conditioning
- theories of cognitive and social learning

In the early 1900s, Russian physiologist Ivan Pavlov was studying the role of the salivary glands in digestion. While measuring the amount of saliva produced in the mouths of dogs when various foods and other substances were placed in their mouths, he noticed something interesting. The dogs began salivating even before the food was placed in their mouths. In fact, they began salivating when the researchers approached them. Although Pavlov's main interest at that time was digestion, he was so fascinated with this observation that he wanted to understand why it occurred. The modern study of "learning" had begun.

Pavlov observed that animals learned to respond to a signal when it was associated with something to which the animal normally responded, such as food. The responses that an animal or person normally has to something in the environment became a key part of the study of learning.

Today, there are many different theories about how humans learn. While each theory focuses on a different aspect of learning, scientists are coming to realize that learning is a complex process involving many different factors.

The Study of Learning

Shipbuilders often build and test a model ship before constructing the "real thing." For a model to be of much use, it must be built of the same materials as the actual ship. An animal salivating at a signal associated with food helps us to understand how people learn because it provides a model of learned behavior.

Scientists observe learning in animals as a model for human learning. But to make this model valid, researchers must identify the same behavior in the animal as the human behavior they wish to understand. For example, animals can act as good models for many behaviors, such as simple learning, but they aren't good models to study why humans cry at a sad movie or laugh at a comedian's joke.

What Is Learning?

Learning is a word used to describe a category of behavior. The sorts of behaviors that fit into that category may be as different as learning to solve quadratic equations and learning to respond to a facial expression. Animals learn to respond to their names or to simple commands. Clearly, no one explanation will be found—no single process will be identified—to account for all types of learning.

Just as there are many types of learning, so there are many theories attempting to explain it. There are even disagreements about what the word *learning* means. With that said, how should we define it?

Learning is a relatively permanent change in behavior that results from practice or experience. Let's break down that definition to see why each word is important.

* ***Behavior*** can demonstrate learning. You might have learned a great deal about how to drive a car before you were old enough to drive—just by watching. Only after you took the wheel were the things you'd learned reflected in your behavior. Before that, it was potential behavior.
* ***Change*** is physiological in that new connections between neurons are formed or different chemicals are produced.
* ***Relatively permanent*** behavior means that there might be some variance in how you behave, but overall the change in behavior is permanent. States such as fatigue or a strong motivation might make you change your behavior on a particular occasion. If you revert to your normal behavior later, it isn't learning.
* ***Practice and experience*** are terms that are used to rule out changes that occur because of maturation or aging. A child removes something from a high shelf when he or she has grown tall enough to reach the shelf, not because he or she has learned to reach it. An older person's handwriting may change if arthritis produces pain in the hand—not because the person has learned a different writing method.

Two more terms are fundamental to an understanding of learning. A **stimulus** is some action that produces activity in an organism. A stimulus can be anything perceived by the senses, such as a smell, taste, or touch. It can also be a more complex action, such as a baby's cry or the smile on someone's face. A **response** is the reaction of an organism to a stimulus.

Aristotle's Laws of Association

Although Ivan Pavlov is credited with the beginnings of modern studies of learning, the idea underlying his work was suggested in the fourth century B.C. by the Greek philosopher Aristotle. Aristotle developed what he called laws of association. **Associations** are mental connections between two stimuli. Aristotle's laws state:

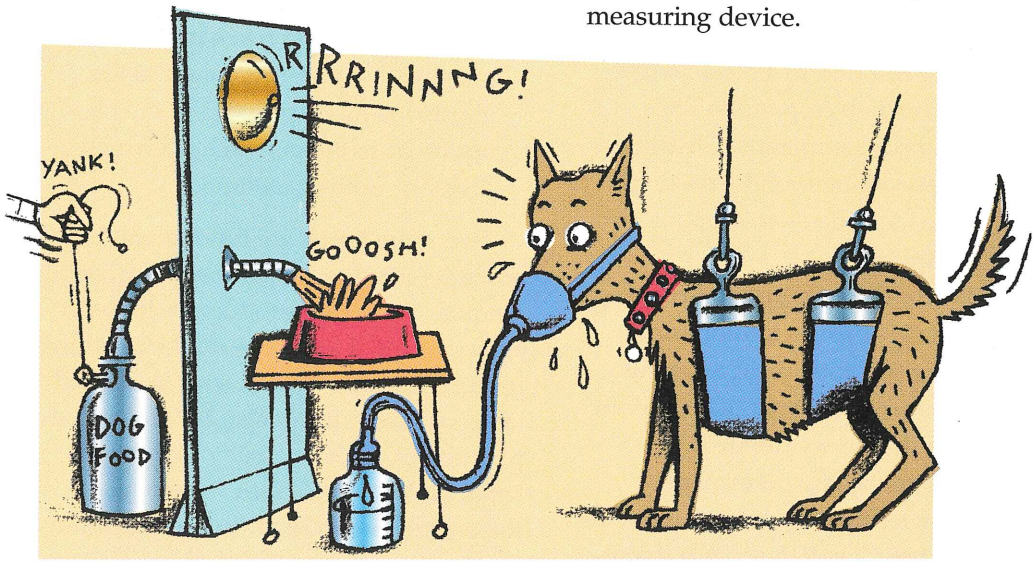
* Experience or recall of one object will produce a recall of objects that are similar or of opposite nature.
* Experience or recall of one object will produce a recall of things that were originally experienced at the same time.
* The more often two things are experienced together, the more likely it is that experiencing one will stimulate production or recall of the second.

Ivan Pavlov and His Dogs

Ivan Pavlov's research on digestion was already in the process of earning him a Nobel Prize when he became fascinated with the question of how dogs learned to associate various stimuli with an expectation of food. Pavlov is credited with the development of **classical conditioning**, which is learning through the association of a stimulus and response.

Pavlov recognized from the beginning that controlling the variables would be extremely difficult because dogs are so easily distracted by sounds and movement. He built a fortlike laboratory surrounded by a straw-filled trench to muffle sound. Once satisfied that he had limited any possible stimuli other than those being tested, he began his experiment.

Pavlov arranged his experiment in an attempt to limit the variables to the ones he wanted to observe. The dogs were strapped into a loose-fitting harness to reduce movement. A tube carried the dog's saliva to a measuring device.



Natural Response

Because salivating is the first step in the digestive process, it seems natural that the smell or taste of food would cause the dog's salivary glands to produce saliva. This natural response is called the **unconditioned response (UCR)**. No condition or training is necessary to produce it, and it is involuntary. The food that produces the unconditioned response is called the **unconditioned stimulus (UCS)**.

When Pavlov's students noticed that the dogs salivated in response to things other than food, such as the approach of the researcher, Pavlov tried to produce this response. He presented the dogs with an arbitrary stimulus that had nothing to do with food, such as a bell or buzzer. The dogs responded with an expectant "What is it?" look or perking up of the ears. Then, Pavlov paired the stimulus with the presentation of food within a few seconds. He did this repeatedly, eventually presenting just the bell without the food. The dogs salivated anyway.

Conditioned Stimulus and Response

When the sound and the food were paired, the dogs had learned to associate the sound with food. The involuntary response to food—salivating—was then transferred to the sound. Because the response was conditional on the experience of hearing the sound and being presented with food, it was called a **conditioned response (CR)**. The sound that caused the response was the **conditioned stimulus (CS)**.

When you react to someone's extended hand by reaching out your own to shake hands, you are demonstrating classical conditioning. Clearly, the animal model demonstrates a type of learning that is shared by humans.

John Watson and "Little Albert"

John Watson, founder of behaviorism, believed that researchers ought to look for practical applications of conditioning. In a 1920 study, Watson tried to determine if he could condition an infant to experience the emotion of fear.

Watson presented the infant, known as "Little Albert," with a white rat. Unafraid, Albert wanted to play with the rat. Thereafter, every time he presented the rat, Watson immediately followed with a loud noise. On the eighth trial and those following, as soon as the rat appeared, Albert began to cry and try to crawl away. Later tests showed that Albert had generalized his fear to other white, fuzzy objects including a white rabbit and a white fur coat.

Watson had demonstrated that fear could be conditioned. But was his study ethical?

Pavlov's Observations

Convinced that in classical conditioning an organism learned to associate two stimuli and that this was what constituted learning, Pavlov continued to experiment to test the limits of conditioning. He and his followers explored **four** areas:

1. **Time Between CS and UCS.** When you feel a shock (the UCS), you involuntarily pull your finger back (the UCR). If a researcher is trying to condition you to pull your finger back in response to a sound (the CS), should the sound come before, during, or after the shock to produce a CR to the sound itself? Tests show that the sound should precede the shock by no more than .5 second to produce the strongest conditioned response. After a number of trials, the sound alone produces the finger withdrawal. Apparently, the CS acts as a warning of the upcoming UCS. Does this make sense? If you were driving along and approached a dangerous intersection, would you want a warning sign to be placed way before the intersection, just before it, in the middle of it, or after it?
2. **Repetition.** Not surprisingly, the more often the CS and UCS are paired, the stronger the conditioned response. However, the greatest learning comes within the first set of repetitions, with each successive set showing less effect.
3. **Extinction.** If, after conditioning, the CS is presented repeatedly without the UCS, the CR eventually fades. This is called extinction. Extinction makes adaptive

sense. If an animal learns to associate a particular spot in the jungle with a predator it had once seen there and the predator never returned, it wouldn't be particularly useful for the animal to avoid that spot forever. Evolutionary theory suggests that extinction is a trait that was passed on in the genes of the most successful animals.

4. **Generalization and Discrimination.** In the real world, if you get an allergic reaction to tomatoes, you may avoid spaghetti sauce or pizza as well. As long as the CS is similar enough to the one learned, the CR will continue to occur. This is called stimulus generalization. Generalization is not always useful. A person who is afraid of tigers should be able to tell the difference between tigers and kittens. This is stimulus discrimination.

Applications of Classical Conditioning

Psychologists who work with individual clients sometimes use the principles of classical conditioning to help their clients. For example, if a child wets the bed at night, it is because the filling of the bladder doesn't wake him or her as it should. The child's bed might be wired so that the first hint of moisture causes a loud sound that wakes her. The filling of the bladder (CS) that initially didn't result in a response becomes associated with the sound (UCS) and the response of waking up (UCR).

Here are **three** ways in which classical conditioning can be used.

1. **Counterconditioning.** It's difficult to feel pleasure and fear at the same time. If a child fears small animals, a psychologist may present the child with a small animal at the same time that the child receives a favorite food. The child learns to pair the food with the appearance of the animal, replacing the fear with expectation of pleasure. This method of changing a negative response to a positive one is called counterconditioning.
2. **Flooding.** A client who fears being out among people (agoraphobia) tends to spend more and more time alone. Thus, he or she is never around people long enough to experience extinction of the fear response through discovery that most people are harmless. In flooding, the person is forced into contact with the feared stimulus to demonstrate the relative harmlessness of the stimulus. When the agoraphobic realizes that no harm occurs in the presence of people, the phobia may extinguish. One drawback to flooding is that, in some people, the fear is so great that further exposure to the stimulus makes it even worse.
3. **Desensitization.** If a client has a phobia of spiders, the therapist might use a sequence of events to gradually reduce the client's response to spiders. They might begin by looking at photos of spiders, then observing them at a distance, and finally up close. This method is called desensitization.

Operant Conditioning

In **operant conditioning**, a behavior is learned in connection with reward or punishment. Whenever you do something because you expect to receive some type of reward for the behavior (or avoid doing something to avoid punishment), you are demonstrating operant conditioning.

Thorndike and Trial-and-Error Learning

In early studies, E. L. Thorndike placed an animal, such as a cat, in a "puzzle box." The box contained a number of devices such as poles or chains. One of these devices, when clawed by the cat, would open the door to the box.

After clawing at the bars and other parts of the cage in an effort to get out, the cat began clawing at other things within the cage. When it clawed the key device, the door opened, and the cat left the box and got a food reward. After a number of trials, the cats stopped trying all of the unsuccessful behaviors and immediately clawed the door-opening device.

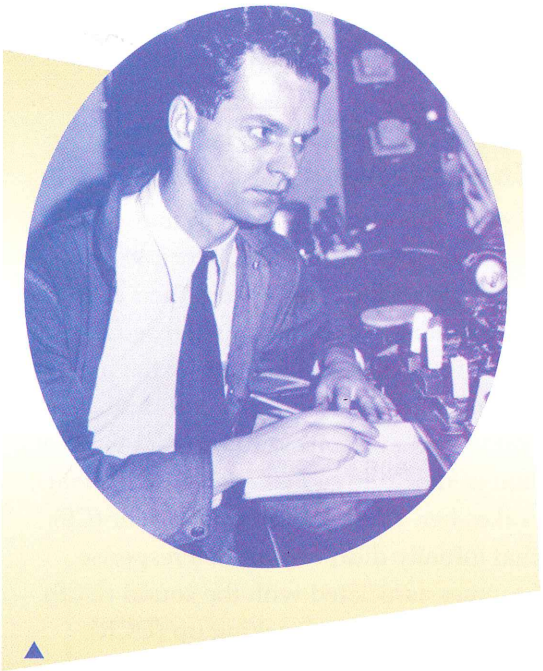
This trial-and-error learning, or what Thorndike called "selecting and connecting," is one example of operant conditioning.

Skinner's Research

B. F. Skinner, perhaps the most famous of the behaviorist psychologists, built on Thorndike's ideas and suggested that there were two types of behavior. The first, *respondent behavior,* like the UCR in classical conditioning, responds to some known stimulus and is involuntary.

The second type of behavior Skinner called *operant behavior.* Unlike respondent behavior, operant behavior represents a voluntary action on the part of the organism. Choosing to read a particular page in a book or to move one's hands is operant behavior.

Rather than study the stimulus that produced a response (behavior), Skinner preferred to study what happened next—whether the behavior would be repeated, and why. Skinner used reinforcement in his studies of behavior. **Reinforcement** is any event that encourages or discourages repetition of a behavior. It is the key to operant conditioning.



1933 photograph of B. F. Skinner at work in the lab.

Operant Conditioning and Behavior	
Operant Conditioning to Encourage Behavior	**Operant Conditioning to Discourage Behavior**
Positive reinforcement—Following a behavior with something considered pleasant to encourage repetition of the behavior.	**Punishment I**—Discouraging a behavior by following it with unpleasant consequences, such as paying a fine for breaking the law.
Negative reinforcement—Following a behavior by stopping or taking away something unpleasant. It's important to note that this is not punishment because it results in a positive experience for the subject.	**Punishment II**—Discouraging a behavior by withholding something that is pleasurable, such as being "grounded" for staying out too late.

Principles of Operant Conditioning

* Any response that is followed by a reinforcing stimulus tends to be repeated.
* A stimulus is considered reinforcing when it increases the rate of an operant response.

What sort of action will be perceived as a reward and therefore a reinforcement? An employee who is "rewarded" for his or her efforts by receiving extra vacation time may perceive the reward as punishment if he or she is a workaholic who prefers to work rather than take time off. One way to identify reinforcements is to observe people and determine what stimuli increase the rate at which they perform a behavior.

Primary and Secondary Reinforcements

* ***Primary Reinforcement.*** In a typical Skinner experiment, when an animal (rat or pigeon) presses a lever, it receives food. A reinforcing stimulus that is tied to some aspect of survival—such as food, water, or a sense of security—is called a primary reinforcement. Primary reinforcements provide the strongest motivation to learn.
* ***Secondary Reinforcement.*** Money isn't essential to survival, but it is often associated with something that is, such as the ability to purchase food or shelter. Praise from an adult is linked to the need for love or acceptance and a sense of security. Money and praise are examples of secondary reinforcements.

Changes in Operant Conditioning

As in classical conditioning, the conditioned response in operant conditioning can undergo several different kinds of changes:

* ***Generalization.*** Jerry is really interested in math. He finds that he gets good grades on his math tests whether he studies or not. Jerry generalizes, believing that he can get good grades on any test without studying.

* ***Discrimination.*** When he fails his science and English tests, Jerry learns to discriminate. He learns to tell the difference between classes in which the behavior of not studying brings a reward and those in which it doesn't. His interest in math apparently made it unnecessary for him to study, but only in math.
* ***Extinction.*** If Jerry begins to get poor grades in math as well as other subjects, he may have to study for all tests because he now experiences punishment for the behavior of not studying. The conditioned response has undergone extinction.

Shaping

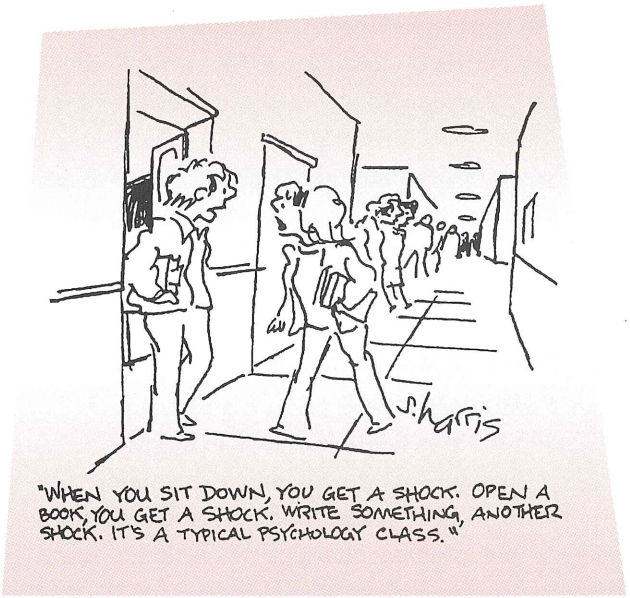
A common children's game involves hiding an object and having the child try to find it. One reinforcing method that parents often use is to tell the child, "You're getting warmer," as the child approaches the hiding place of the object. The phrase acts as reinforcement to keep the child looking.

When teaching an animal or a human a task more complex than simply pressing a lever for food, this same method is used. The learner is at first rewarded for any behavior that approximates the desired behavior. When teaching a small child to swing a bat at a baseball, any movement of the bat is initially rewarded with praise. As the learning proceeds, the child is rewarded only for swinging the bat more and more "correctly" until finally connecting with the ball—the desired behavior. This process is called *shaping*—a method of refining a behavior by reinforcing behaviors that approximate it more and more closely. Shaping is particularly useful when a behavior is not something that an organism already does.

Chaining

Skinner believed that even in a complex series of behaviors, each is learned through conditioning. He was able to teach rats to perform a series of tasks, such as pressing a lever to release a ball, picking up the ball, and dropping it into a tube to release food. Each step was taught separately and then they were linked together in a process called *chaining.*

Dogs trained as companion animals for people with various disabilities are taught using a combination of shaping and chaining. Praise from their trainer or owner is often the only reinforcement needed.



Schedules of Reinforcement

How often must a person receive reinforcement for a behavior to continue? Every time the behavior occurs? In nature, that's unlikely. Animals don't always find food when they search a certain location, but they must continue to look. Workers aren't rewarded or praised for every job they do, even if they've all done well. Different schedules of reinforcement used in operant conditioning have different effects on behavior.

Schedules of Reinforcement

Type of Reinforcement	Example	Effect
Fixed-interval (FI) schedule	Each day at 7 P.M., you turn on the radio to hear your favorite program. Your behavior is reinforced by hearing that program only if you turn on the radio at that time.	In this form of reinforcement, the person learns to engage in the behavior only when the appropriate interval has passed.
Variable-interval (VI) schedule	If a teacher walks around the room, randomly giving praise for various behaviors, the reinforcement to any one student's behavior occurs at different intervals.	In general, this results in the steadiest rate of responding—in this case, good behavior. One never knows when the pleasurable response—the praise—will come, so one is on good behavior most of the time.
Fixed-ratio (FR) schedule	A worker must produce 30 parts per hour to meet a quota that determines his or her pay.	The person engages in the behavior fairly consistently, with a brief rest after each reward.
Variable-ratio (VR) schedule	A person playing a slot-machine is rewarded only occasionally and after different numbers of "handle pulls."	To ensure the highest rate of reinforcement (wins), the player pulls the handle as fast as possible. Even if the machine never again pays off, the person keeps trying longer than on a machine on which he or she had never won in the first place.

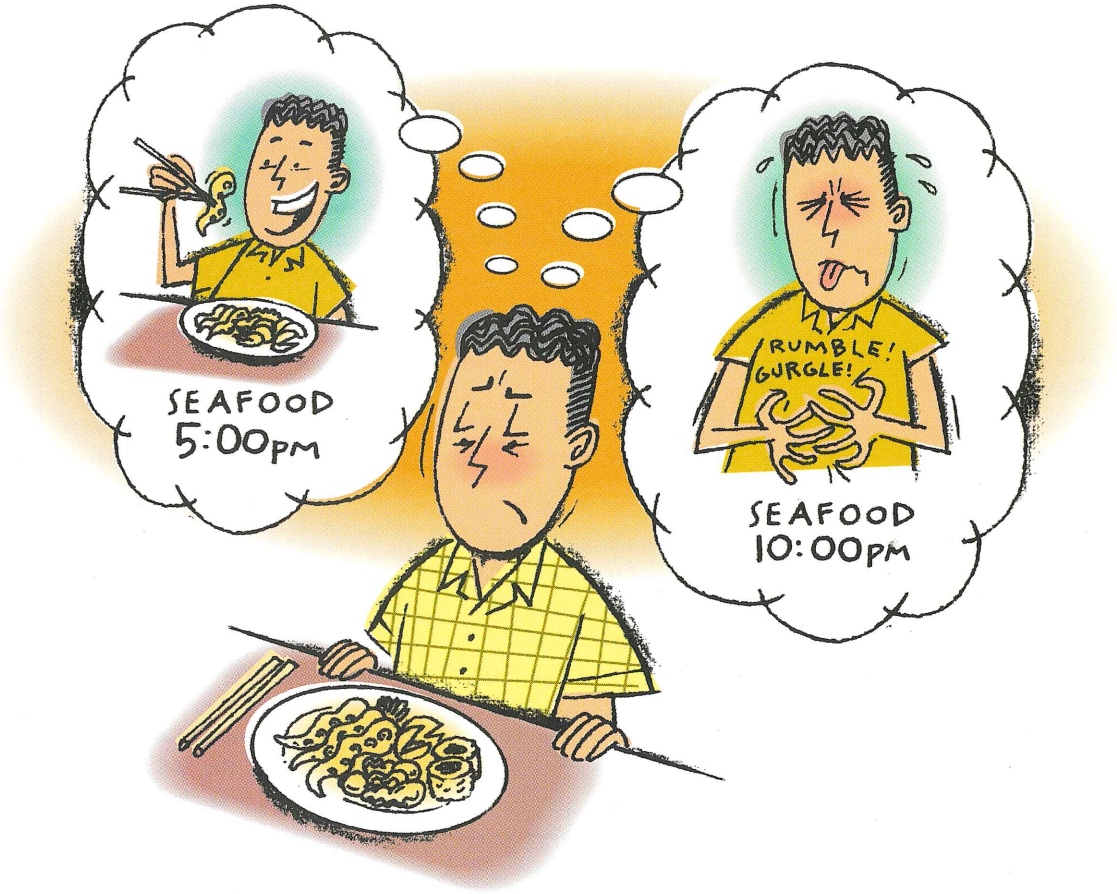
The Biology of Conditioning

Some biological factors are important when looking at conditioning. Here are **two** examples.

1. **Taste Aversions.** Animals and humans often develop a dislike for a particular food when eating that food resulted in nausea or illness. On the surface, it looks like conditioning. However, conditioning generally requires repeated trials, while taste aversions occur after only one. This is called *biological preparedness.*

   Learning to avoid a food that has made you ill is an adaptive behavior. If an animal required several trials to learn to associate the food and illness, it might not survive and reproduce.

2. **Instinctual Drift.** A raccoon instinctively washes its food before eating it. In one study, raccoons were taught to drop a coin in a slot to receive food. As the connection between the coin and food became stronger, the raccoons began washing the coins! Recognizing that such behaviors occur can help researchers avoid errors in their data and conclusions.



Should Operant Conditioning Be Used to Control Behavior?

Wilhelm Wundt, the founder of experimental psychology, once berated his own students for their attempts to use what they were learning about the mind. He maintained that research should be used solely to understand the mind, not to manipulate it. You decide.

THE ISSUES

In 1956 behaviorist B. F. Skinner and humanistic psychologist Carl Rogers debated the issues of using what they had discovered about operant conditioning and learning to control human behavior. Skinner argued that people are already responding to the stimuli in their environment, so why not use what we know to affect them in some positive way. He wanted to apply conditioning principles to move people toward more appropriate behaviors. He saw this as enabling them to have better lives and more personal happiness. Principles of operant conditioning are used today in therapy to help people overcome phobias and anxieties and to assist in changing other undesirable behaviors.

On the other side, Rogers argued that such use of conditioning requires someone who must decide what "appropriate behaviors" are. Who, Rogers asked, can be trusted to make those decisions for someone else, since even researchers' behaviors are their personal responses to their own environments? Rogers maintained that we shouldn't be trying to shape people's futures and control their behaviors, but rather be trying to make them aware that they could assume their own control of those things.

Should operant conditioning be used to control behavior?

THE PROCESS

1. **Restate the issues.** In your own words, state the nature of the disagreement.
2. **Provide evidence.** From your own experience and from the information above, list the evidence *for* the use of operant conditioning to control human behavior.
3. **Give opposing arguments.** From your own experience and from the information above, list the evidence *against* the use of operant conditioning to control human behavior.
4. **Look for more information.** What else would you like to know before you decide? Make a list of your questions. On the Internet, in the psychology section of the library, or in the index of psychology books, research ways in which *operant conditioning* is used. Look up *behavioral psychology.*
5. **Evaluate the information.** Make a chart with two columns:

Using Conditioning to Control Behavior	
For	Against

Record the arguments in each column and rank each column of arguments in importance from 1 to 5, with 1 as the most important.

6. **Draw conclusions.** Write one paragraph supporting your answer to the question "Should operant conditioning be used to control behavior?" Be sure to provide reasons.

More Than Conditioning

Several researchers have pointed out some behaviors that the theory of conditioning didn't seem to explain. In these cases, what goes on between the stimulus and response or between the behavior and the reinforcement?

Latent Learning

Edward Tolman suggested that as individuals interact with the environment, they form associations when two different stimuli are present. People might notice that whenever they respond in a certain way to a particular stimulus, a new stimulus appears. This leads to certain expectations about what behaviors will lead to changes in the environment. Tolman argued that organisms form **cognitive maps** of these associations, storing them for later use. Mice that explore a maze freely, but without reinforcement, later ran the maze more quickly for a food reward than mice who had never seen it before. Tolman called this *latent learning* because what they had learned was not obvious until it was needed.

Insight Learning

Wolfgang Kohler placed chimpanzees in a cage with bananas suspended from the ceiling. Also in the cage were several boxes. After trying all possible methods of jumping or climbing, the chimps seemed to study the boxes. Eventually, they would stack them beneath the bananas, climb up, and get the bananas. Clearly, this was more than Thorndike's trial-and-error and couldn't easily be explained by stimulus-response or reinforcement. Kohler referred to this type of learning as *insight learning*.

Cognitive Theories of Learning

With Tolman's and Kohler's experiments, psychology reached beyond behaviorist explanations into the realm of mental processes—cognitive psychology. **Cognition** includes such processes as thinking, memory formation, learning, and problem solving. One source lists nearly fifty different learning theories, most of them cognitive in approach. We'll address **two** of the major approaches.

1 The Work of Jean Piaget

The work of French psychologist Jean Piaget is often considered to be the beginning of the great interest in cognitive psychology. Piaget's theory suggests that mental abilities develop as a function of biological development and experience. One major point in Piaget's theory involves the concept of the **schema**, a pattern that is recognized in experience or complex reality that helps to explain or deal with it. Similar to cognitive maps, schemas contain information about objects, actions, events, relationships, or just about anything pertaining to a particular content. You might have a schema for your morning routine, for dealing with parents, or for driving a car.

Piaget believed that children are born with a few schemas already in place—reflexes that allow them to suck, reach, look, and grasp. As a child begins to explore the world using these schemas, they develop more complex cognitive structures. The child becomes more dependent on thinking than on reflexive behavior. Piaget proposed that, at any stage of development, the child is dependent on the schemas he or she has available.

Piaget recognized a person's need to have his schemas match what goes on in the world. As we interact with the world, some experiences fit, and others don't. *Assimilation* is understanding something new in terms of existing schemas. We simply recognize or know about the new experience without questions.

When something isn't explained by our existing schemas, we are forced to modify or add to the cognitive structure so that it is capable of assimilating the new experience. This is called *accommodation*—roughly the same as learning.

2 Information Processing Approach

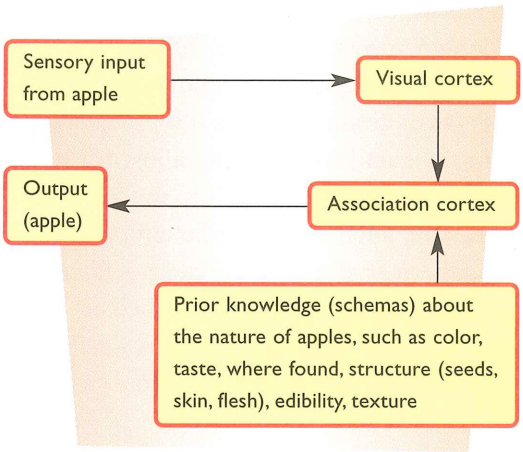
Current technology is often used to understand processes in other fields. At one time, the brain/mind was described in terms of a telephone switchboard with a central "operator" making appropriate connections. It should come as no surprise that one new theory explains learning in computer terms.

Input and Output

In the field of human information processing (HIP), psychologists use terms familiar to computer users to explain human learning. They use *input* in place of *stimulus* and *output* in place of *response* or *behavior*. A primary interest of cognitive psychologists is what goes on between input and output. HIP psychologists describe Piaget's schemas in computer terms such as *storage, encoding, processing, capacity, programs,* and *subroutines.*

HIP psychologists may outline what they believe goes on in the brain/mind on flow charts similar to those written for computer programs. Here's an example showing how visual input, after associating with information from existing schemas, results in the output of identifying an apple. The diagram focuses on biological factors in processing, as each step involves a structure within the nervous system. Other flowcharts might focus on other types of processes.

Biological Factors in Processing



Factors Affecting Learning

In the HIP approach, a number of different factors have been identified as affecting learning.

Meaningfulness. Words or ideas that have personal meaning are learned more readily than those that are meaningless.

Transfer. At one time, psychologists believed that studying a difficult subject, such as Latin, would develop the mind's "mental muscles" and enable people to learn other subjects more easily. Although no support was found for this idea, information learned in one situation will transfer to another situation to the extent that the situations are similar. Latin may help you to understand word meanings in English, but it will not help you to understand algebra. To promote the greatest transfer, some cognitive theorists recommend what they call *situated learning*. This means learning a subject, such as math or science, as it is found in the world rather than as a theoretical body of knowledge.

Chemical Influences. Among the many chemicals that can affect learning, two of the most important are stimulants and depressants. Stimulants, such as the caffeine in colas or coffee, increase the production of brain chemicals and may allow for more rapid learning. However, too much of a stimulant, such as an amphetamine, will actually overstimulate the brain and cause loss of learning. Depressants, such as alcohol, reduce the firing of nerve cells and the potential for learning. In some cases, having a level of a chemical in their bodies can help people to recall something they learned under the influence of the same level of that chemical.

The TOTE Model of HIP

Cognitive psychologist George A. Miller proposed a theory that he believed should replace stimulus-response as the fundamental unit of behavior. It is called the TOTE model—Test, Operate, Test, Exit.

A TOTE unit consists of a goal and the behaviors necessary to achieve that goal. Let's say that your goal is to drive a nail into a piece of wood with a hammer. You first *test* to see if the nailhead is flush with the surface. If it isn't, you *operate* by hitting the nail with the hammer. This Test-Operate-Test sequence continues until the nailhead is even with the surface. At that point, you *exit*—stop hammering.

Do you know anyone who takes forever to decide what to order at a restaurant? Miller would say that the person's *exit* strategy is flawed. That is, he or she doesn't have a clear goal in mind that signals the end of the process. Does the diner want a light meal, a good-tasting meal, a food to really enjoy, or one that is filling? The person keeps running through all of these possibilities until, eventually, time becomes the exit goal.

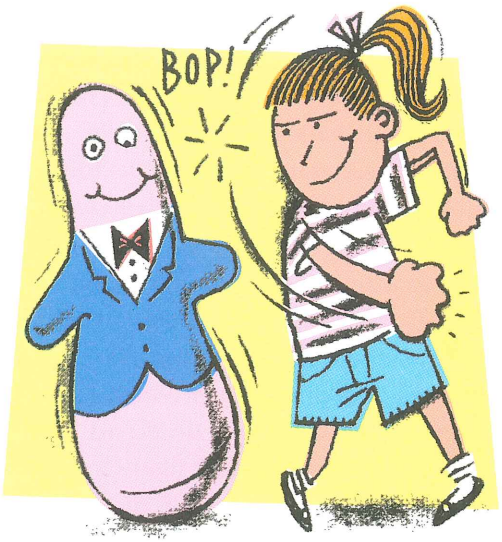
Social or Observational Learning

Albert Bandura believes that organisms learn both by *direct experience* (doing something and experiencing the consequences) and *vicarious experience* (observing the outcome of the behavior of others). According to Bandura, observational learning, or what we learn by watching others, is of equal importance to what we learn through personal experience.

In the 1960s, Bandura demonstrated that children could learn aggression by observing aggressive behavior. Bandura had groups of children observe adults interacting with "Bobo," a smiling, life-sized plastic figure with a weighted bottom. The children observed an adult punching and hitting Bobo, which kept bobbing up with a smile on its face.

Then, one group saw the adult praised and rewarded for the aggressive behavior, a second group saw the adult punished for the behavior, and a third group saw the adult receive no consequences for the behavior. When each group was allowed to play with Bobo, the group that had observed the adult rewarded for the behavior tended to imitate more of the adult's behaviors than the other two groups.

Later, each group was again permitted to play with Bobo, and everyone was rewarded for imitating the aggressive behavior of the adult. Even children who had seen the adult punished now acted aggressively.



Processes in Observational Learning

Bandura proposed a number of different factors that affect observational learning:

Attention. When a child observes someone's behavior, to what parts of that behavior is the child paying attention? This will depend not only on age and development but also on individual interests.

Retention. How does the child store what he or she has observed? What associations has the child made? Has the child imagined what it would be like to duplicate the behavior (rehearsal)?

Motor Reproduction Processes. Is the child physically capable of reproducing the behavior? Can the child observe and adjust his or her behavior if it doesn't match the observed behavior?

Motivation. What reinforcement is available, either from outside or from inside the self, or by observing the original behavior being reinforced?

Violence in the Media

Observational learning suggests that media violence can foster violent behavior in those who observe it. Clearly, the factors mentioned previously must be considered, as well as any previous social learning that a child has acquired through interactions with family and friends. A person raised in a family where aggressive behavior is nonexistent or is punished or where loving and gentle behavior is practiced and rewarded may be much less likely to duplicate behaviors observed in the media. The issue is complex. Do you think that media violence should be eliminated until all of the factors are understood?

Current Approaches to Learning

The development of new research techniques in neurobiology, evolutionary biology, and cognitive processes has yielded much of interest to learning theorists. There is a growing awareness that mental processes, including learning, are sometimes better studied as systems influenced by biological, cognitive, emotional, social, and environmental factors than as isolated events.

Individuals differ in their use of cognitive processes. Some people more easily perceive the big picture, while others notice details. Some need a hands-on approach, while others prefer to think or reason about an idea.

In addition to cognitive preferences, people seem to learn more easily through different sensory modes, often called *learning styles*. One person may need to see a word spelled out, a second may need to hear the word spelled, and a third may prefer to write the word—to get the feel of it. Here are **three** examples of the many factors that influence learning.

1 Emotional Influences

For some time, it's been recognized that a state of moderate emotional arousal is advantageous to learning. That emotion might be curiosity, humor, or sometimes even fear or anxiety. The key word is "moderate." If the emotion is overwhelming, little learning takes place.

Today, the role of emotion is proving to be even more important. Recent studies suggest that a lack of ability to experience emotion may affect reasoning and rational behavior. We'll learn more about this in Chapter 11.

2 Evolutionary Influences

At one time, scientists believed that the presence of a harmful organism (an antigen) would cause the body to produce a chemical (an antibody) that would destroy the antigen. Now, scientists know that a tremendous variety of antibodies are present at birth—just waiting to be "turned on" by their matching antigen.

Similarly, some researchers suggest that our brains/minds contain, at birth, all the cognitive processes we will need throughout our lives. These processes are "turned on" by situations that we encounter in the environment. This theory, called *selectionism*, lends support to the idea that children learn best by interacting with the appropriate environment rather than by being "given" knowledge.

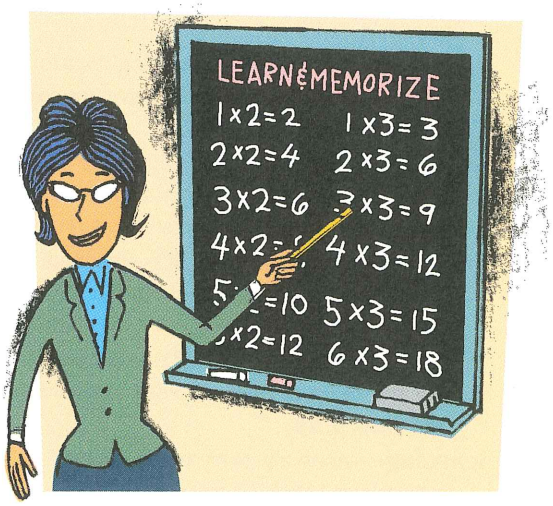
3 Cultural Validity

Researchers are becoming aware of the importance of the culture in which a behavior occurs. Unless a process being studied is tested with people from a wide sampling of cultures in the situations in which it normally occurs, scientists may not be justified in saying that it is a fundamental human cognitive process. Differences across cultures in areas such as spatial perception, auditory acuity, or attention focus may significantly influence behavior.

Culture and social environment play important roles in learning. Here are some factors that may affect what is learned and how we learn it.

* ***Cultural Values.*** Learning is dependent on values. In a given culture how highly is learning valued beyond what is necessary for historical roles to be adequately filled?
* ***Perceptual Processes.*** Learning begins with perception. If survival depends on spotting a leopard among the jungle foliage or noticing different sounds when one steps on branches, those abilities might be more highly developed in a forest than in a culture where such events do not occur. Whether there is an actual difference in sensory ability or in the signals to which one pays attention, these factors are likely to affect perception in learning.
* ***Intelligence.*** Learning varies with intelligence. One definition of intelligence includes possession of "practical sense" and the facility of adapting oneself to circumstances. Might various cultures associate different behaviors with the possession of these qualities?

Unless psychological researchers are aware of these and other cultural factors, their research may lack environmental validity.



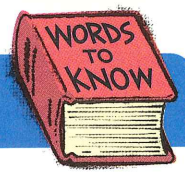
Chapter 7 Wrap-up

LEARNING

Psychologists are interested in understanding how human beings learn. They have identified four major ways in which learning takes place: (1) classical conditioning, which focuses on learning by making associations between stimuli and responses; (2) operant conditioning, which focuses on encouraging or discouraging behaviors through reinforcement; (3) cognitive learning, which focuses on the various mental processes that underlie behavior and learning; and (4) social or observational learning, which focuses on learning by observing and imitating others.

Current approaches help psychologists study different factors that may be involved in the learning process.

Psychology



association—mental connection between two stimuli. *p. 98*

classical conditioning—learning by associating various stimuli with a response. *p. 98*

cognition—processes of thinking, memory formation, learning, and problem solving, among others. *p. 108*

cognitive maps—Tollman's term for the mental processing of spatial relationships a person or animal experiences. *p. 108*

conditioned response (CR)—learned response to a conditioned stimulus that is not natural. *p. 99*

conditioned stimulus (CS)—stimulus that has been associated with a natural response. *p. 99*

learning—relatively permanent change in behavior resulting from practice or experience. *p. 97*

operant conditioning—encouraging or discouraging a behavior through reinforcement or punishment. *p. 102*

reinforcement—any event that encourages or discourages repetition of a behavior. *p. 102*

response—reaction of an organism to a stimulus. *p. 97*

schema—pattern that is recognized in experience or complex reality that helps to explain or deal with it. *p. 108*

stimulus—some action that produces activity in an organism. *p. 97*

unconditioned response (UCR)—organism's natural response to a stimulus. *p. 99*

unconditioned stimulus (UCS)—stimulus to which an organism has a natural response. *p. 99*