Chapter Preview

Learning helps us adapt to our environment. Pavlov explored classical conditioning, in which we learn to anticipate events, such as being fed or experiencing pain. In his famous studies, Pavlov presented a neutral stimulus just before an unconditioned stimulus, which normally triggered an unconditioned response. After several repetitions, the neutral stimulus alone began triggering a conditioned response resembling the unconditioned response.

While in classical conditioning we learn to associate two stimuli, in operant conditioning we learn to associate a response and its consequence. Skinner showed that rats and pigeons could be shaped through reinforcement to display successively closer approximations of a desired behavior. Researchers have also studied the effects of positive and negative reinforcers, primary and conditioned reinforcers, and immediate and delayed reinforcers. Although Skinner’s emphasis on external control also stimulated much debate regarding human freedom and the ethics of managing people, his operant principles are being applied in schools, sports, the workplace, and homes.

The behaviorists’ optimism that learning principles would generalize from one response to another and from one species to another has been tempered. We now know that conditioning principles are biologically and cognitively constrained. Critics point to research on latent learning to support their claim that Skinner underestimated the importance of cognitive constraints.

Another type of learning that is important among higher animals is what Albert Bandura calls observational learning. Children tend to imitate what a model does and says, whether the behavior is prosocial or antisocial. Research suggests that violence on television leads to aggressive behavior by children and teenagers who watch the programs.

Chapter Guide

Introductory Exercise: Fact or Falsehood?

How Do We Learn?

7-1. Define learning, and identify some basic forms of learning.

**Learning** is the process of acquiring through experience new and relatively enduring information or behaviors. Nature’s most important gift to us may be our adaptability—our capacity to learn new behaviors that enable us to cope with ever-changing experiences.

- Exercise: Defining Learning (p. 395)
- Lecture: Cultural Beliefs About Learning: Mind or Virtue? (p. 396)
- Exercise/Critical Thinking Break: Identifying Conditioned Behaviors (p. 395)

We learn by association; our mind naturally connects events that occur in sequence. The events linked in **associative learning** may be two **stimuli** (as in **classical conditioning**) or a response and its consequences (as in **operant conditioning**). Conditioning is not the only form of learning. Through **cognitive learning**, we acquire mental information that guides our behavior. In **observational learning**, we learn from viewing others’ experiences.

Classical Conditioning

- Exercise: Ringing the Bell (p. 398)
- Lecture: Watson’s Colorful History (p. 397)
- PsychSim 5: Classical Conditioning (p. 398)
- Worth Video Anthology: Classical Conditioning: Pavlov and His Legacy; Pavlov’s Discovery of Classical Conditioning

7-2. Describe the basic components of classical conditioning, and discuss behaviorism’s view of learning.

Pavlov explored the phenomenon we call **classical conditioning**, in which organisms learn to associate stimuli and thus anticipate events. This laid the foundation for John B. Watson’s **behaviorism**, which held that psychology should be an objective science that studied only observable behavior.

Pavlov would repeatedly present a **neutral stimulus** (NS, such as a tone) just before an **unconditioned stimulus** (US), such as food, which triggered the **unconditioned response** (UR) of salivation. After several repetitions, the tone alone (now the **conditioned stimulus** [CS]) began triggering a **conditioned response** (CR), salivation. Unconditioned means “unlearned”; conditioned means “learned.” Thus, a UR is an event that occurs naturally in response to some stimulus. A US is something that naturally and automatically triggers the unlearned response. A CS is an originally neutral stimulus that, through learning, comes to be associated with some unlearned response. A CR is the learned response to the originally neutral but now conditioned stimulus.

- Exercises: Classical Conditioning Using Potato Chips and Lemonade Powder (p. 398); Classical Conditioning: Preparing for an Important Event (p. 399); Classical Conditioning With a Watergun (p. 400)
- Project: Conditioning the Eyeblink (p. 400)
- Feature Film: Jaws (p. 398)

7-3. Summarize the processes of acquisition, extinction, spontaneous recovery, generalization, and discrimination.

Responses are **acquired**—that is, initially learned—best when the CS is presented half a second before the US. This finding demonstrates how classical conditioning is biologically adaptive because it helps organisms prepare for good or bad events.

**Extinction** refers to the diminishing of a conditioned response when the conditioned stimulus occurs repeatedly without the unconditioned stimulus. **Spontaneous recovery** is the reappearance, after a pause, of an extinguished conditioned response. **Generalization** is the tendency to respond to stimuli that are similar to the conditioned stimulus. **Discrimination** is the learned ability to distinguish between a CS and other irrelevant stimuli.
Generalization can be adaptive because it extends a learned response to other stimuli in a given category, for example, fearing not only moving cars but also moving trucks and motorcycles. Discrimination has adaptive value because it limits our learned responses to appropriate stimuli, for example, fleeing from a guard dog but not from a guide dog.

Lectures: Classical Conditioning, Implicit Self-Esteem, and Automatic Racial Prejudice (p. 401); The Association Principle at Work (p. 402); Phobias (p. 403)
Exercises/Critical Thinking Breaks: “Unpacking” Examples of Extinction and Spontaneous Recovery (p. 401); Little Albert’s Legacy
Worth Video Anthology: Watson’s Little Albert; Classical Conditioning and the Immune System; Combating Lupus; Overcoming Fear

7-4. Explain why Pavlov’s work remains so important, and describe some applications of his work to human health and well-being.

Pavlov taught us that principles of learning apply across species and that classical conditioning is one way that virtually all organisms learn to adapt to their environment. Pavlov also demonstrated that significant psychological phenomena can be studied objectively. Finally, Pavlov taught us that conditioning principles have important applications, such as how to treat fear.

Classical conditioning principles provide important insights into drug abuse and how it may be overcome. Classical conditioning works on the body’s disease-fighting immune system. For example, when a particular taste accompanies a drug that influences immune responses, the taste by itself may come to produce those immune responses. Although Watson’s “Little Albert” study has not been easily replicated, it demonstrated how classical conditioning may underlie specific fears. Today, psychologists wonder if extinction procedures or even new conditioning can be used to change our unwanted responses to emotion-arousing stimuli.

Operant Conditioning

Exercise/Project: A Build-It-Yourself Skinner Box (p. 403)
Lecture: Skinner’s Last Days (p. 405)
PsychSim 5: Operant Conditioning (p. 403)
Worth Video Anthology: Operant Conditioning: Learned Behaviors

7-5. Define operant conditioning, and describe how operant behavior is reinforced and shaped.

Edward Thorndike’s law of effect states that rewarded behavior is likely to recur. Using this as his starting point, Skinner developed a behavioral technology that revealed principles of behavior control. He explored the principles and conditions of learning through operant conditioning, in which behavior operates on the environment to produce rewarding or punishing stimuli. Skinner used an operant chamber (Skinner box) in his pioneering studies of reinforcement with rats and pigeons.

In his experiments, Skinner used shaping, a procedure in which reinforcers, such as food, guide an animal’s natural behavior toward a desired behavior. By rewarding responses that are ever closer to the final desired behavior (successive approximations) and ignoring all other responses, researchers can gradually shape complex behaviors. Because nonverbal animals and babies can respond only to what they perceive, their reactions demonstrate which events they can discriminate.
7-6. Discuss the differences between positive and negative reinforcement, and identify the different types of reinforcers.

Reinforcers can be positive (presenting a pleasant stimulus after a response) or negative (reducing or removing an unpleasant stimulus). Primary reinforcers, such as food when we are hungry, are innately satisfying. Conditioned (secondary) reinforcers, such as cash, are satisfying because we have learned to associate them with more basic rewards. Immediate reinforcers, such as the enjoyment of watching late-night TV, offer immediate payback. Delayed reinforcers, such as a weekly paycheck, require the ability to delay gratification.

7-7. Explain how the different reinforcement schedules affect behavior.

When the desired response is reinforced every time it occurs, continuous reinforcement is involved. Learning is rapid but so is extinction if rewards cease. Partial (intermittent) reinforcement produces slower acquisition of the target behavior than does continuous reinforcement, but the learning is more resistant to extinction. Reinforcement schedules may vary according to the number of responses rewarded or the time gap between responses.

Fixed-ratio schedules reinforce behavior after a set number of responses; variable-ratio schedules provide reinforcers after an unpredictable number of responses. Fixed-interval schedules reinforce the first response after a fixed time interval, and variable-interval schedules reinforce the first response after varying time intervals. Reinforcement linked to number of responses produces a higher response rate than reinforcement linked to time. Variable (unpredictable) schedules produce more consistent responding than fixed (predictable) schedules.

7-8. Discuss how punishment and negative reinforcement differ, and explain how punishment affects behavior.

Punishment attempts to decrease the frequency of a behavior. Punishment administers an undesirable consequence, for example, spanking (positive punishment) or withdrawing something desirable, such as taking away a favorite toy (negative punishment). Negative reinforcement removes an aversive event (an annoying beeping sound) to increase the frequency of a behavior (fastening a seatbelt).

Punishment is not simply the logical opposite of reinforcement, for it can have several drawbacks, including suppressing rather than changing unwanted behaviors, teaching discrimination and fear, and increasing aggressiveness.
behavior. Critics argue that he dehumanized people by neglecting their personal freedom and by seeking to control their actions. Skinner countered: People’s behavior is already controlled by external reinforcers, so why not administer those consequences for human betterment?

Operant principles have been applied in a variety of settings. For example, in schools, Web-based learning, online testing systems, and interactive student software embody the operant ideal of individualized shaping and immediate reinforcement. In sports, performance is enhanced by first reinforcing small successes and then gradually increasing the challenge. In the workplace, positive reinforcement for jobs well done has boosted employee productivity. At home, parents can reward their children’s desirable behaviors and not reward those that are undesirable. To reach our personal goals, we can monitor and reinforce our own desired behaviors and cut back on incentives as the behaviors become habitual.

Exercise: Conditioning Honeybees, Wasps, and Fish (p. 414)
TV Episode: The Office: Jim Conditions Dwight (p. 415)

7-10. Explain how operant conditioning differs from classical conditioning.

Both classical and operant conditioning are forms of associative learning. They both involve acquisition, extinction, spontaneous recovery, generalization, and discrimination. Both classical and operant conditioning are influenced by biological and cognitive predispositions. The two forms of learning differ in an important way. In classical conditioning, the organism learns associations between two stimuli, and its behavior is respondent, that is, automatic. In operant conditioning, the organism learns associations between its behavior and resulting events; the organism operates on the environment.

Biology, Cognition, and Learning

Lecture: Biological Predispositions (p. 415)
Exercise: Human Taste Aversions (p. 416)
Exercise/Lecture Break: Explaining Taste Aversions (p. 416)

7-11. Explain how biological constraints affect classical and operant conditioning.

The early behaviorists’ view that any natural response could be conditioned to any neutral stimulus has given way to the understanding that each species is biologically prepared to learn associations that enhance its survival. Thus, humans are likely to develop an aversion to the taste of a contaminated food but not to the sight of an associated restaurant, its plates, or the music they heard there. Similarly, rats develop aversions to tastes but not to sights or sounds. Organisms are predisposed to learn associations that help them adapt and survive (as in Darwin’s principle of natural selection).

As with classical conditioning, an animal’s natural predispositions constrain its capacity for operant conditioning. Biological constraints predispose organisms to learn associations that are naturally adaptive. Training that attempts to override these tendencies will probably not endure, because the animals will revert to their biologically predisposed patterns in a process called instinctive drift.

Exercise: The Work Preference Inventory (p. 419)
Lectures: Cognitive Processes in Learning (p. 417); The Overjustification Effect (p. 417); Mindful Learning (p. 419)
Worth Video Anthology: Cognitive Maps
PsychSim 5: Maze Learning (p. 417)

7-12. Explain how cognitive processes affect classical and operant conditioning.

Research indicates that, for many animals, cognitive appraisals are important for learning. That is, thoughts and perceptions are important to the conditioning process. For example, animals appear capable of learning when to expect an unconditioned stimulus. The more predictable the association between the CS and the US, the stronger the CR.
Rats exploring a maze seem to develop a mental representation (a cognitive map) of the maze even in the absence of reward. Their latent learning becomes evident only when there is some incentive to demonstrate it.

Research indicates that people may come to see rewards, rather than intrinsic interest, as the motivation for performing a task. Again, this finding demonstrates the importance of cognitive processing in learning. By undermining intrinsic motivation—the desire to perform a behavior effectively and for its own sake—rewards can carry hidden costs. Extrinsic motivation is the desire to perform a behavior to receive external rewards or avoid threatened punishment. A person’s interest often survives when a reward is used neither to bribe nor to coerce but to signal a job well done.

Learning by Observation

7-13. Describe the process of observational learning, and explain how some scientists believe it is enabled by mirror neurons.

Among higher animals, especially humans, learning does not occur through direct experience alone. Observational learning also plays a part. The process of observing and imitating a specific behavior is often called modeling. Mirror neurons, located in the brain’s frontal lobes, are thought by some scientists to demonstrate a neural basis for observational learning. Our brain’s activity underlies our intensely social nature.

Bandura believes that we imitate because of reinforcements and punishments—those received by the model as well as by the imitator. By watching others, we learn to anticipate a behavior’s consequences in situations like those we are observing. We tend to imitate models that we perceive as similar to us, successful, or admirable.

7-14. Discuss the impact of prosocial modeling and of antisocial modeling.

Prosocial models have prosocial effects. People who show nonviolent, helpful behavior prompt similar behavior in others. Models are most effective when their actions and words are consistent. Exposed to a hypocrite, children tend to imitate the hypocrisy by doing what the model does and saying what the model says.

Research indicates that much violence shown on television goes unpunished, is portrayed as justified, and involves an attractive perpetrator. These conditions provide a recipe for a violence-viewing effect. However, correlational studies that link viewing violence with violent behavior do not indicate the direction of influence. Those who behave violently may enjoy watching violence on TV, or some third factor may cause observers both to behave violently and to prefer watching violent programs. To establish cause and effect, researchers have designed experiments in which some participants view violence and others do not. Later, given an opportunity to express violence, the people who viewed violence tend to be more aggressive and less sympathetic. In addition to imitating what they see, observers may become desensitized to brutality, whether on TV or in real life.
Fact or Falsehood?

T  F  1. Lowly animals, like sea slugs, behave by instinct and are incapable of learning.
T  F  2. Humans are the only animals that can learn behaviors merely by observing others perform them.
T  F  3. The study of inner thoughts, feelings, and motives has always occupied a central place in psychology.
T  F  4. A person can be more readily conditioned to dislike a particular food than to dislike the place where the food was eaten.
T  F  5. With training, pigeons can be taught to discriminate between Bach’s music and Stravinsky’s.
T  F  6. Negative reinforcement is another term for punishment.
T  F  7. Psychologists agree that punishment, regardless of its form, has little effect on behavior.
T  F  8. Animals learn only when rewards are given.
T  F  9. Animals can learn to make virtually any response if consistently rewarded for it.
T  F  10. Research indicates that televised violence leads to aggressive behavior by children and teenagers who watch the programs.