

### Chapter in Review

1. Learning is difficult to define, but most psychologists would agree that: In learning the organism acquires some new knowledge or behavior as a result of experience; learning can only be inferred, not observed; and the changes in behavior or knowledge that occur in learning are relatively enduring.
2. *Learned* is not the opposite of *innate*. The capacity to learn is innate and unlearned, even if the result of some particular learning is 100% cultural or experiential. Organisms are born “biologically prepared” to learn certain things but not other things, even if they never learn what they have been prepared to learn, and even though they learn a great many things for which they were not biologically prepared.
3. Habituation and sensitization are the simplest forms of learning. Habituation occurs when a stimulus at first causes a strong response, but due to repeated exposure over time response is lessened. Sensitization occurs when the organism responds with increasing attention over time to a stimulus that is presented repeatedly.
4. Associative learning is more complex than habituation and sensitization. Associative learning occurs when an organism comes to associate two or more stimuli or events that occur close together in space and time. Classical conditioning is the most basic form of associative learning. The capacity to be classically conditioned evolved to prepare organisms for what is to come. In classical conditioning a neutral stimulus (e.g., a tone or bell) comes to elicit an unconditioned response (UCR; e.g., salivation in a dog) after it has been repeatedly paired with an unconditioned stimulus (UCS; e.g., food). After conditioning, the neutral stimulus (e.g., bell, tone) is known as the conditioned stimulus (CS) and the unconditioned response (e.g., salivation) is termed the conditioned response (CR).
5. Acquisition is learning a new behavior through conditioning. For acquisition to occur reliably in classical conditioning, the neutral stimulus must be presented before rather than after the UCS, and the UCS must follow immediately after the neutral stimulus is presented. Second order conditioning involves the pairing of a conditioned stimulus (CS) with a new neutral stimulus until the UCR is elicited when the new neutral stimulus is presented. Second-order conditioning will occur even though the new neutral stimulus is never paired with the UCS.
6. Extinction occurs when a CS is repeatedly presented over time without the UCS. If this occurs, the CR becomes weaker and ultimately disappears. However, if, after several hours have passed the CS is once again presented (without the UCS) the UCR may once again occur—if in a weakened form. This is known as spontaneous recovery. Renewal is the resurgence of an extinguished behavior if the animal is placed in a different context from the one in which extinction originally occurred. Generalization has occurred when an organism displays a CR when exposed to a neutral stimulus that is similar, but not identical, to the original CS. Discrimination occurs when one neutral stimulus produces a CR, but another similar neutral stimulus does not. The so-called “Little Albert” experiments of John Watson and Rosalie Rayner have long been cited as classic demonstrations of classical conditioning, but these experiments were in fact somewhat shoddy and perhaps unethical.
7. Classical conditioning is limited in several ways. It cannot condition new behaviors. It can only elicit innate or reflexive behaviors using previously neutral stimuli. Classical conditioning also involves cognition, and various cognitive elements must

be in place for strong conditioning to occur. Classical conditioning is also limited by biological preparedness resulting from the evolutionary history of the organism, and by the environment in which conditioning occurs (natural vs. artificial ecology).

8. Thorndike's law of effect provided the basis for radical behaviorist B. F. Skinner's development of techniques of operant conditioning. According to Skinner, operant conditioning is a type of learning in which the consequences of a behavior affect the probability that the behavior will be repeated in the future. In other words, the organism teaches itself by coming to associate the consequences of a behavior with the performance of that behavior. Reinforcement of a behavior increases the likelihood that the behavior will continue or be repeated, while punishment decreases this likelihood. Positive reinforcement occurs when the frequency or probability of a behavior is increased as a result of the addition or presentation of something following the performance of the behavior—generally something rewarding. Negative reinforcement occurs when a behavior is reinforced by the removal or avoidance of something aversive. Positive punishment occurs when the consequence of a behavior is the addition or presentation of something—generally something aversive. Negative punishment occurs when the consequence of a behavior is the removal of something rewarding. However, while reinforcers tend to be rewarding and punishers unpleasant or aversive, this is not always the case.
9. Operant conditioning frequently involves shaping through successive approximation (shaping). Shaping involves successive reinforcement of those behaviors that come increasingly closer to the behavior you ultimately wish to reinforce. The Premack principle states that high probability behaviors are good reinforcers for low-probability behaviors. Primary reinforcers are those that will be suitable for conditioning with virtually all members of a species because they are essential for survival or reproduction. A secondary reinforcer is one not intrinsically associated with survival or reproduction, but which has become associated with a primary reinforcer through conditioning. For example, money is a secondary reinforcer because human beings have come to associate it with primary reinforcers such as food and shelter.
10. Reinforcement schedules affect conditioning. Continuous reinforcement is reinforcement that occurs every time a behavior occurs. Continuous reinforcement results in rapid conditioning, but also rapid extinguishing of the learned behavior once reinforcement stops. Partial reinforcement refers to situations where reinforcement occurs periodically. This type of conditioning is stronger and more difficult to extinguish. There are several types of partial reinforcement schedules. Fixed interval (FI) schedules provide reinforcement for the first response after a specific interval of time has passed. Variable-interval (VI) schedules provide reinforcement at unpredictable time intervals. Fixed-ratio (FR) schedules provide reinforcement after a specific number of responses. Variable-ratio (VR) schedules provide reinforcement after an unpredictable number of responses. VR reinforcement is the most difficult to distinguish.
11. Punishment can be effective in operant conditioning if it is severe and consistent. However, it may pose ethical problems, and can result in retaliation or other negative side-effects rather than conditioning. Reinforcement is generally superior as a conditioner.

12. As with classical conditioning, cognition and the evolutionary history of the organism may set limits on operant conditioning. For example, Edward Tolman demonstrated that cognitive activity, including latent learning, could either interfere with or hasten operant behavior. Keller and Marian Breland showed that when attempts to condition a behavior ran counter to instinctual patterns of behavior of an animal (instinctive drift) conditioning might not occur.
13. Observational learning, as first described by John Dollard and Neal Miller, describes ways in which an organism might learn by observing the experiences of others. Modeling is a type of observational learning where a child might acquire behaviors he or she observes in an admired adult. The best-known studies of modeling are the “Bobo doll” studies by Albert Bandura and his colleagues. This research raised concerns about the effects on children of viewing violent television and films. Vicarious conditioning involves learning through observing the consequences of others’ behavior, rather than simply observing the behaviors. Mirror neurons may help explain how observational learning occurs in the brain.
14. Questions about the effects of media violence on behavior have not been settled despite some claims that they have. Depictions of violence in the media have grown much more numerous and graphic. When a topic elicits strong opinions and emotions among the general public, researchers and professional organizations may sometimes make statements that are not supported very well by scientific evidence. Media pessimists are convinced that the evidence is more than adequate to support their view that exposure to media violence substantially increases the risk of aggressive and violent behavior in the real world. Media skeptics argue that the research is not at all clear cut, contains contradictory findings, inadequate methods, focuses on trivial aggression, and raises more questions than it answers. Evidence does support the following claims: (1) There is a real link between media violence and aggressive thoughts, emotions, and behavior; but (2) this association is not straightforward, not every person exposed to media violence is affected similarly, and the link between media violence and real-world violence (as opposed to aggression) is very weak. However, this does not mean that no such link exists, only that it has yet to be demonstrated.

## Section Summaries

### *What is learning?*

1. Learning is difficult to define precisely, and cannot be directly observed. However, it involves relatively enduring psychological change in knowledge or behavior resulting from specific experiences. *Learned* is not the opposite of *innate*.
2. Habituation and sensitization are simple forms of learning that involve only a stimulus and a response. Habituation occurs when an organism responds with decreasing attention to a stimulus over time. Sensitization occurs when an organism responds with increasing attention to the stimulus over time.
3. Associative learning involves forming associations between two or more stimuli.

### *What is classical conditioning?*

1. Classical conditioning is the most basic form of associative learning. The principles of classical conditioning were initially discovered by accident by Ivan Pavlov. Classical conditioning does not teach new behaviors to an organism, but elicits typically innate or reflexive behaviors, generally (but not always) using previously neutral stimuli. Classical conditioning prepares an organism for what is to come.
2. Classical conditioning in the laboratory involves forming an association between a neutral stimulus (e.g., the tone of a bell) and an unconditioned stimulus (UCS). The UCS is one that ordinarily elicits a reflexive, unconditioned response (UCR). For example, food placed in a dog's mouth is a UCS that elicits the UCR of salivation. Once the association between the neutral stimulus and the UCR is formed through repeated pairings, that originally neutral stimulus will now elicit the UCR with no UCS necessary. The formerly neutral stimulus is then referred to as the conditioned stimulus (CS). The UCR is then referred to as the conditioned response (CR).
3. Two criteria must usually be met for acquisition of a conditioned response to occur in a laboratory: The conditioning stimulus must be presented prior to the UCS, and the UCS must follow rapidly (in most cases within seconds).
4. If a CS is repeatedly presented without the UCS, extinction occurs. However, the response is not "unlearned" or "wiped out." Spontaneous recovery can occur if the organism is allowed to rest after extinction and the CS is once again presented. Moreover, conditioned responses can be renewed after substantial time has passed if the organism is placed in a different context from the one in which extinction occurred.
5. Generalization occurs when an organism displays a conditioned response to a stimulus that is similar, but not identical, to the CS. Discrimination occurs when an animal only displays a conditioned behavior to the original CS and not to similar stimuli.
6. Classical conditioning may also occur naturally in the wild. In such cases, the stimuli being paired with the UCR are often not neutral at all—for example, the sound of a rattlesnake has a natural connection to fear response in a rodent because this sound often predicts that the snake is about to strike.

### *What are the limits of classical conditioning?*

1. Classical conditioning does not teach new behaviors to an organism, but elicits innate or otherwise reflexive behaviors with previously neutral stimuli.

2. Researchers in cognitive psychology and evolutionary/functional approaches to learning have demonstrated that (1) classical conditioning may involve cognition; (2) the evolutionary history of each organism affects the ease with which specific behaviors may be conditioned to specific stimuli; and (3) the ecological context in which conditioning occurs affects the way conditioning occurs.
3. Robert Rescorla demonstrated that conditioning rats to fear did not work unless the conditioning stimulus reliably predicted the shocks. This implied that the rats were using cognitive processes.
4. John Garcia overturned the general process behaviorist doctrine of equipotentiality, which proposed that virtually any neutral stimulus could be used to condition virtually any response. However, Garcia's research showed that the evolutionary history of each organism prepares it to be more or less easily conditioned by various stimuli.
5. The functionalist perspective proposes that classical conditioning occurs in natural environments as well as in the laboratory. Conditioning stimuli in the natural ecology of an animal are rarely neutral or arbitrary. Conditioning that occurs in nature may be more rapid, robust, and less dependent upon a very small time interval between presentation of the conditioning stimulus and the UCS. It is more resistant to interference in the conditioning process. Experiments among Japanese quail support the view that classical conditioning evolved to prepare an organism for imminent opportunities or threats.

*What is operant conditioning?*

1. Operant conditioning is a type of learning in which the consequences of a behavior—its reinforcement or punishment—affect the probability that the behavior will be repeated in the future. When a behavior is reinforced, the likelihood that it will continue or be repeated is increased. When a behavior is punished, the likelihood that the behavior will continue or be repeated is decreased.
2. Both reinforcement and punishment may be positive (adding something) or negative (removing something). Negative reinforcement thus does not mean punishment. It means reinforcement by removing something unpleasant.
3. Reinforcers may be primary (e.g., food) or secondary (e.g., money). Primary reinforcers are those that are essential for survival. Secondary reinforcers are those that the organism has come to associate with primary reinforcers.
4. Reinforcement schedules may be continuous or partial. Partial reinforcement is easier to maintain, more common in the natural world, and harder to extinguish. Partial reinforcement schedules may be fixed or variable; interval or ratio (FI, VI, FR, VR). Response is usually strongest and most enduring when variable ratio (VR) schedules are used.
5. FI schedules provide reinforcement for the first behavior after a specific interval of time has passed; VI schedules provide reinforcement at unpredictable time intervals; FR schedules provide reinforcement after a specific number of responses; VR schedules provide reinforcement after an unpredictable number of responses.
6. Most examples of operant conditioning involve shaping. Shaping involves reinforcement of those behaviors that come increasingly closer to the behavior you

actually wish to reinforce. Chaining is similar to shaping but is primarily used to condition sequences of complex behaviors.

7. Punishment is sometimes effective (particularly if it is severe, inescapable, consistently applied, and immediate), but it may present problems, such as the desire for revenge. Punishment is also considered inhumane by many.

*What are the limits of operant conditioning?*

1. Operant conditioning has broad applicability in everyday life, animal training, and treatment of psychological distress and antisocial behavior.
2. Edward Tolman's concepts of the cognitive map and latent learning were the first substantial challenge to the view that all behavior could be explained through contingencies of reinforcement and punishment.
3. The evolutionary history of an organism puts constraints on what it may learn and how easily it may learn specific tasks.

*What is observational learning?*

1. Observational learning theory describes the ways in which individuals learn by observing others. Important concepts of observational learning include modeling and vicarious conditioning.
2. There are four stages in the process of observational learning: attention, retention, reproduction, and motivation.
3. Recent research suggests that mirror neurons are the neural basis for observational learning, and may also be responsible for qualities such as empathy and the ability to comprehend the intentions of others.
4. Although strong opinions exist regarding the question of effects of violent media on aggression, the question has not been settled to everyone's satisfaction. There is a real link between viewing media violence and aggressive thoughts, emotions, and behavior, but this association is not straightforward, and not every person exposed to media violence is affected similarly. There is also an important difference between possible effects of violent media on aggression and effects on violence.