



Because learning changes everything.®

Chapter 5

Learning

MODULE 15—Classical Conditioning

What is learning?

How do we learn to form associations between stimuli and responses?

Learning

Learning: a relatively permanent change in behavior brought about by experience.

It's not always easy to identify whether a change in behavior is due to nature or nurture.

The Basics of Classical Conditioning ¹

Ivan Pavlov's classic experiments on basic learning processes showed that dogs who salivated in response to food would begin to salivate just at the approach of the experimenter who normally brought the food.

- The dogs were responding as a result of learning.

Classical conditioning: a type of learning in which a neutral stimulus comes to elicit a response after it is paired with a stimulus that naturally brings about that response.

The Basics of Classical Conditioning ²

Neutral stimulus: a stimulus that, before conditioning, does not naturally bring about the response of interest.

Unconditioned stimulus (UCS): naturally brings about a particular response without having been learned.

Unconditioned response (UCR): is natural and needs no training.

The Basics of Classical Conditioning ³

Conditioned stimulus (CS): a once-neutral stimulus that has been paired with an unconditioned stimulus.

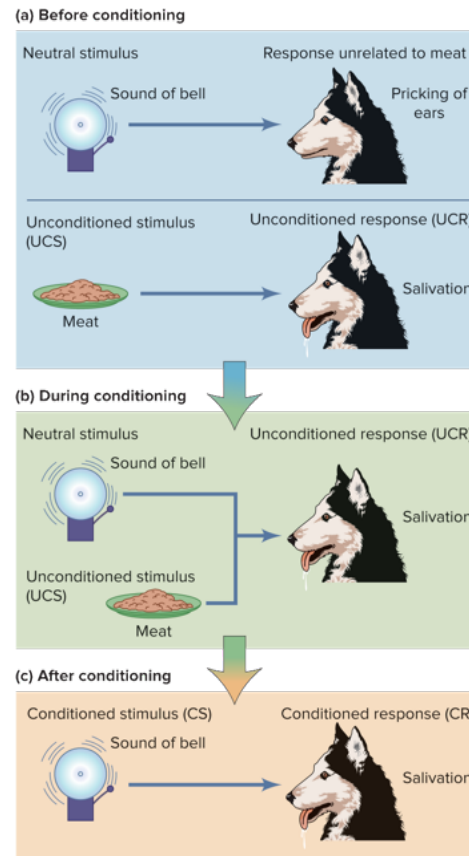
- Brings about a response formerly caused only by the unconditioned stimulus.

Conditioned response (CR): a response that, after conditioning, follows a previously neutral stimulus.

MODULE 15 FIGURE 1

The basic process of classical conditioning.

- (a) Before conditioning: The sound of a bell does not produce salivation, meaning that the bell is a neutral stimulus. In contrast, meat naturally brings about salivation, making the meat an unconditioned stimulus (UCS) and salivation an unconditioned response (UCR).
- (b) During conditioning: The bell rings just before the presentation of the meat.
- (c) After conditioning: Eventually, the sound of the bell alone produces salivation. We now can say that conditioning has been accomplished: The previously neutral stimulus of the bell is now considered a conditioned stimulus (CS) that brings about the conditioned response (CR) of salivation.



[Access the text alternative for slide images.](#)

Extinction

Extinction: a basic learning phenomenon that occurs when a previously conditioned response decreases in frequency and disappears.

Spontaneous recovery: the reemergence of an extinguished conditioned response after a period of rest and with no further conditioning.

Generalization and Discrimination

Stimulus generalization: a process in which after a stimulus has been conditioned to produce a particular response, stimuli that are similar to the original stimulus produce the same response.

- The greater the similarity between two stimuli, the greater the likelihood of stimulus generalization.

Stimulus discrimination: the process that occurs if two stimuli are sufficiently distinct from one another.

- One evokes a conditioned response but the other does not.
- Stimulus discrimination provides the ability to differentiate between stimuli.

MODULE 16—Operant Conditioning

What are the roles of reward and punishment in learning?

What are some practical methods for bringing about behavior change, both in ourselves and in others?

Operant Conditioning

Operant conditioning: learning in which a voluntary response is strengthened or weakened, depending on the response's favorable or unfavorable consequences.

Unlike classical conditioning, operant conditioning applies to voluntary responses that an organism performs deliberately.

- The organism *operates* on its environment to produce a desirable result.

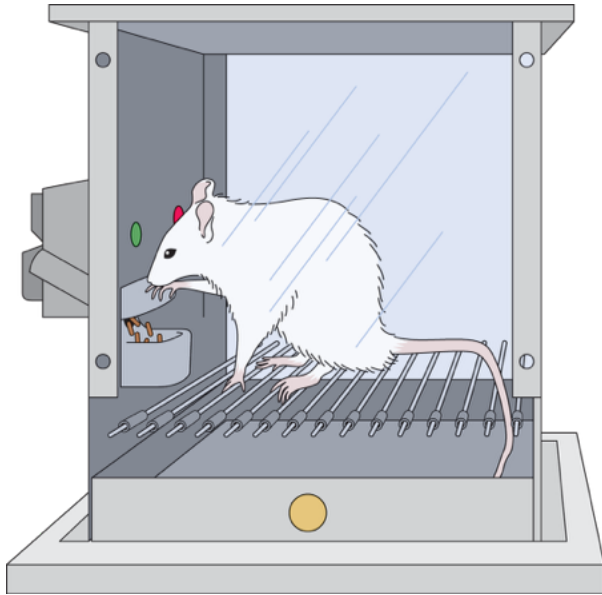
The Basics of Operant Conditioning ¹

Psychologist B. F. Skinner developed the Skinner box: a chamber with a highly controlled environment, used to study operant conditioning with laboratory animals.

For example, a hungry rat is taught to press a lever in the Skinner box.

- At first, it accidentally presses the lever as it explores its environment—and it receives a food pellet.
- It will not learn the connection the first time.
- Sooner or later, it presses the lever again, and in time, the frequency of the pressing response increases.

MODULE 16 FIGURE 2



B. F. Skinner with a Skinner box used to study operant conditioning. Laboratory rats learn to press the lever in order to obtain food, which is delivered in the tray.

Reinforcement: The Central Concept of Operant Conditioning

Reinforcement: the process by which a stimulus increases the probability that a preceding behavior will be repeated.

Reinforcer: any stimulus that increases the probability that a preceding behavior will occur again.

Positive Reinforcers, Negative Reinforcers, and Punishment ₁

Positive reinforcer: a stimulus added to the environment that brings about an increase in a preceding response.

Negative reinforcer: an unpleasant stimulus whose removal leads to an increase in the probability that a preceding response will be repeated.

Note that negative reinforcement is not the same as punishment.

Positive Reinforcers, Negative Reinforcers, and Punishment ₂

Punishment: a stimulus that decreases the probability that a previous behavior will occur again.

There are two types of punishment:

Positive punishment weakens a response through the application of an unpleasant stimulus.

- For example, spanking.

Negative punishment weakens a response through the removal of something pleasant.

- For example, no more video games.

MODULE 16 FIGURE 3

Intended Result	When Stimulus Is Added, the Result Is ...	When Stimulus Is Removed or Terminated, the Result Is ...
Increase in behavior (reinforcement)	Positive reinforcement: Example: Giving a raise for good performance. Result: <i>Increase</i> in response of good performance.	Negative reinforcement: Example: Applying ointment to relieve an itchy rash leads to a higher future likelihood of applying the ointment. Result: <i>Increase</i> in response of using ointment.
Decrease in behavior (punishment)	Positive punishment: Example: Yelling at a teenager who steals a bracelet. Result: <i>Decrease</i> in frequency of response of stealing.	Negative punishment: Example: Restricting teenager's access to car due to breaking curfew. Result: <i>Decrease</i> in response of breaking curfew.

Types of reinforcement and punishment.

Schedules of Reinforcement: Timing Life's Rewards ₁

Schedule of reinforcement: the pattern of frequency and timing of reinforcement following desired behavior.

Continuous reinforcement schedule: reinforcing of a behavior every time it occurs.

Partial (or intermittent) reinforcement schedule: reinforcing of a behavior some but not all of the time.

Schedules of Reinforcement: Timing Life's Rewards ₂

Fixed-ratio schedule: reinforcement is given only after a specific number of responses are made.

Variable-ratio schedule: reinforcement occurs after an average number of responses, but the reinforcement schedule is unpredictable.

The crucial factor in both is the *number* of responses.

Schedules of Reinforcement: Timing Life's Rewards ₃

Fixed-interval schedule: reinforcement is provided for a response only after a fixed time period has elapsed.

Variable-interval schedule: the time between reinforcements varies around some average rather than being fixed.

The crucial factor in both is the *amount of time* that has elapsed since the reward.

Shaping: Reinforcing What Doesn't Come Naturally

Shaping: the process of teaching a complex behavior by rewarding closer and closer approximations of the desired behavior.

- Start by reinforcing any behavior similar to the behavior you want the person to learn.
- Later, you reinforce only responses that are closer to the behavior you ultimately want to teach.
- Finally, you reinforce only the desired response.

Each step moves only slightly beyond the previously learned behavior.

Shaping allows even lower animals to learn complex responses that would never occur naturally.

MODULE 17—Cognitive Approaches to Learning

What are the roles of cognition and thought in learning?

Cognitive Learning Theory

Cognitive learning theory: an approach to the study of learning that focuses on the thought processes that underlie learning.

In its basic formulation, it suggests that it is not enough to say that people respond because there is an assumed link between a stimulus and a response.

Instead, the idea is that people develop an *expectation* that they will receive a reinforcer after making a response.

Observational Learning: Learning Through Imitation

According to psychologist Albert Bandura, a major part of human learning is **observational learning**: learning by observing the behavior of another person, or model.

- Classic Bobo doll experiment.
- Particularly important where the operant conditioning technique—a trial-and-error approach—is inappropriate.
- Viewed as a social phenomenon, it is often referred to as a *social cognitive approach* to learning.

Observational learning may have a genetic basis.

- *Mirror neurons* fire when one observes another person carrying out a behavior.

Violence in Television and Video Games: Does the Media's Messages Matter? ¹

Most psychologists agree that consuming high levels of media violence makes people more susceptible to acting aggressively.

Some contrary research findings do exist, however.

- For example, some researchers argue violent video games may produce certain positive results, such as a rise in social networking.

The American Pediatric Association has urged parents to minimize their children's exposure to violent media of any sort.

Violence in Television and Video Games: Does the Media's Messages Matter? ²

Several aspects of media violence may contribute to real-life aggressive behavior.

- Lowering inhibitions against behaving aggressively.
- Predisposing us to view even nonaggressive acts by others as aggressive.
- Desensitization.

Real-life exposure to *actual* violence also leads to increases in aggression.

Cultural Influences on Learning

Some psychologists suggest that people develop particular *learning styles*, characteristic ways of approaching material, based on their cultural background and unique abilities.