

What Is Classical Conditioning?

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More in Theories

Classical conditioning is a type of learning that had a major influence on the school of thought in psychology known as behaviorism. Discovered by Russian physiologist [Ivan Pavlov](#), classical conditioning is a learning process that occurs through associations between an environmental stimulus and a naturally occurring stimulus.

Classical Conditioning Basics

Although classical conditioning was not discovered by a psychologist at all, it had a tremendous influence over the school of thought in psychology known as [behaviorism](#).

Behaviorism is based on the assumption that:

- All learning occurs through interactions with the environment
- The environment shapes behavior

It's important to note that classical conditioning involves placing a neutral signal before a naturally occurring reflex. In Pavlov's classic experiment with dogs, the neutral signal was the sound of a tone and the naturally occurring reflex was salivating in response to food. By associating the neutral stimulus with the environmental stimulus (presenting of food), the sound of the tone alone could produce the salivation response.

In order to understand how more about how classical conditioning works, it is important to be familiar with the basic principles of the process.

How Does Classical Conditioning Work?

Classical conditioning basically involves forming an association between two stimuli resulting in a learned response. There are three basic phases of this process:

Phase 1: Before Conditioning

The first part of the classical conditioning process requires a naturally occurring stimulus that will automatically elicit a response. Salivating in response to the smell of food is a good example of a naturally occurring stimulus.

During this phase of the processes, the unconditioned stimulus (UCS) results in an unconditioned response (UCR).

For example, presenting food (the UCS) naturally and automatically triggers a salivation response (the UCR).

At this point, there is also a neutral stimulus that produces no effect - yet. It isn't until this neutral stimulus is paired with the UCS that it will come to evoke a response.

Let's take a closer look at the two critical components of this phase of classical conditioning.

The unconditioned stimulus is one that unconditionally, naturally, and automatically triggers a response. For example, when you smell one of your favorite foods, you may immediately feel very hungry. In this example, the smell of the food is the unconditioned stimulus.

The unconditioned response is the unlearned response that occurs naturally in response to the unconditioned stimulus. In our example, the feeling of hunger in response to the smell of food is the unconditioned response.

Phase 2: During Conditioning

During the second phase of the classical conditioning process, the previously neutral stimulus is repeatedly paired with the unconditioned stimulus. As a result of this pairing, an association between the previously neutral stimulus and the UCS is formed. At this point, the once neutral stimulus becomes known as the conditioned stimulus (CS).

The subject has now been conditioned to respond to this stimulus.

The conditioned stimulus is previously neutral stimulus that, after becoming associated with the unconditioned stimulus, eventually comes to trigger a conditioned response. In our earlier example, suppose that when you smelled your favorite food, you also heard the sound of a whistle. While the whistle is unrelated to the smell of the food, if the sound of the whistle was paired multiple times with the smell, the sound would eventually trigger the conditioned response. In this case, the sound of the whistle is the conditioned stimulus.

Phase 3: After Conditioning

Once the association has been made between the UCS and the CS, presenting the conditioned stimulus alone will come to evoke a response even without the unconditioned stimulus. The resulting response is known as the conditioned response (CR).

The conditioned response is the learned response to the previously neutral stimulus. In our example, the conditioned response would be feeling hungry when you heard the sound of the whistle.

Key Principles of Classical Conditioning

Behaviorists have described a number of different phenomena associated with classical conditioning. Some of these elements involve the initial establishment of the response while others describe the disappearance of a response. These elements are important in understanding the classical conditioning process.

Let's take a closer look at five key principles of classical conditioning:

1. Acquisition

Acquisition is the initial stage of learning when a response is first established and gradually strengthened. During the acquisition phase of classical conditioning, a neutral stimulus is repeatedly paired with an unconditioned stimulus. As you may recall, an unconditioned stimulus is something that naturally and automatically triggers a response without any learning. After an association is made, the subject will begin to emit a behavior in response to the previously neutral stimulus, which is now known as a conditioned stimulus. It is at this point that we can say that the response has been acquired.

For example, imagine that you are conditioning a dog to salivate in response to the sound of a bell. You repeatedly pair the presentation of food with the sound of the bell. You can say the response has been acquired as soon as the dog begins to salivate in response to the bell tone.

Once the response has been established, you can gradually reinforce the salivation response to make sure the behavior is well learned.

2. Extinction

Extinction is when the occurrences of a conditioned response decreases or disappears. In classical conditioning, this happens when a conditioned stimulus is no longer paired with an unconditioned stimulus.

For example, if the smell of food (the unconditioned stimulus) had been paired with the sound of a whistle (the conditioned stimulus), it would eventually come to evoke the conditioned response of hunger. However, if the unconditioned stimulus (the smell of food) were no longer paired with the conditioned stimulus (the whistle), eventually the conditioned response (hunger) would disappear.

3. Spontaneous Recovery

Sometimes a learned response can suddenly reemerge even after a period of extinction. Spontaneous Recovery is the reappearance of the conditioned response after a rest period or period of lessened response. For example, imagine that after training a dog to salivate to the sound of a bell, you stop reinforcing the behavior and the response eventually becomes extinct. After a rest period during which the conditioned stimulus is not presented, you suddenly ring the bell and the animal spontaneously recovers the previously learned response.

If the conditioned stimulus and unconditioned stimulus are no longer associated, extinction will occur very rapidly after a spontaneous recovery.

4. Stimulus Generalization

Stimulus Generalization is the tendency for the conditioned stimulus to evoke similar responses after the response has been conditioned.

For example, if a dog has been conditioned to salivate at the sound of a bell, the animal may also exhibit the same response to stimuli that are similar to the conditioned stimulus. In John B. Watson's famous Little Albert Experiment, for example, a small child was conditioned to fear a white rat. The child demonstrated stimulus generalization by also exhibiting fear in response to other fuzzy white objects including stuffed toys and Watson own hair.

5. Stimulus Discrimination

Discrimination is the ability to differentiate between a conditioned stimulus and other stimuli that have not been paired with an unconditioned stimulus.

For example, if a bell tone were the conditioned stimulus, discrimination would involve being able to tell the difference between the bell tone and other similar sounds. Because the subject is able to distinguish between these stimuli, he or she will only respond when the conditioned stimulus is presented.

Classical Conditioning Examples

It can be helpful to look at a few examples of how the classical conditioning process operates both in experimental and real-world settings.

Classical Conditioning of a Fear Response

One of the most famous examples of classical conditioning was John B. Watson's experiment in which a fear response was conditioned in a boy known as Little Albert. The child initially showed no fear of a white rat, but after the rat was paired repeatedly with loud, scary sounds, the child would cry when the rat was present. The child's fear also generalized to other fuzzy white objects.

Let's examine the elements of this classic experiment. Prior to the conditioning, the white rat was a neutral stimulus. The unconditioned stimulus was the loud, clanging sounds and the unconditioned response was the fear response created by the noise. By repeatedly pairing the rat with the unconditioned stimulus, the white rat (now the conditioned stimulus) came to evoke the fear response (now the conditioned response).

This experiment illustrates how phobias can form through classical conditioning. In many cases, a single pairing of a neutral stimulus (a dog, for example) and a frightening experience (being bitten by the dog) can lead to a lasting phobia (being afraid of dogs).

Classical Conditioning of Taste Aversions

Another example of classical conditioning can be seen in the development of conditioned taste aversions. Researchers John Garcia and Bob Koelling first noticed this phenomenon when they observed how rats that had been exposed to a nausea-causing radiation developed an aversion to flavored water after the radiation and the water were presented together. In this example, the radiation represents the unconditioned stimulus and the nausea represents the unconditioned response. After the pairing of the two, the flavored water is the conditioned stimulus, while the nausea that formed when exposed to the water alone is the conditioned response.

Later research demonstrated that such classically conditioned aversions could be produced through a single pairing of the conditioned stimulus and the unconditioned stimulus. Researchers also found that such aversions can even develop if the conditioned stimulus (the taste of the food) is presented several hours before the unconditioned stimulus (the nausea-causing stimulus).

Why do such associations develop so quickly? Obviously, forming such associations can have survival benefits for the organism. If an animal eats something that makes it ill, it needs to avoid eating the same food in the future to avoid sickness or even death. This is a great example of what is known as biological preparedness. Some associations form more readily because they aid in survival.

In one famous field study, researchers injected sheep carcasses with a poison that would make coyotes sick but not kill them. The goal was help sheep ranchers reduce the number of sheep lost to coyote killings. Not only did the experiment work by lowering the number of sheep killed, it also caused some of the coyotes to develop such a strong aversion to sheep that they would actually run away at the scent or sight of a sheep.

A Word From Verywell

In reality, people do not respond exactly like Pavlov's dogs. There are, however, numerous real-world applications for classical conditioning. For example, many dog trainers use classical conditioning techniques to help people train their pets.

These techniques are also useful for helping people cope with phobias or anxiety problems. Therapists might, for example, repeatedly pair something that provokes anxiety with relaxation techniques in order to create an association.

Teachers are able to apply classical conditioning in the class by creating a positive classroom environment to help students overcome anxiety or fear. Pairing an anxiety-provoking situation, such as performing in front of a group, with pleasant surroundings helps the student learn new associations. Instead of feeling anxious and tense in these situations, the child will learn to stay relaxed and calm.

Sources:

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