Unit 2: Behavioristic Theories (20)
Introduction to Classical Conditioning (Pavlovian conditioning)

Pavlov (1902) started from the idea that **there are some things that a dog does not need to learn**. For example, dogs don't learn to salivate whenever they see food. This reflex (response) is 'hard-wired' into the dog. In behaviorist terms, it is an **unconditioned response** (i.e., a stimulus-response connection that required no learning). In behaviorist terms, we write:

Unconditioned Stimulus (Food) > **Unconditioned Response** (Salivate)

However, when Pavlov discovered that the dogs learned to **associate** any object or event with food (such as the **lab assistant/bell**) produced the same response. Then, he realized that he had made an important scientific discovery. Thereafter, Pavlov devoted the rest of his career to studying this type of learning.

Pavlov knew that somehow, the dogs in his lab had **learned to associate food with his lab assistant**. This must have been learned, because at one point the dogs did not do it, and there came a point where they started, so their behavior had changed. A change in the behavior of this type must be the result of learning.

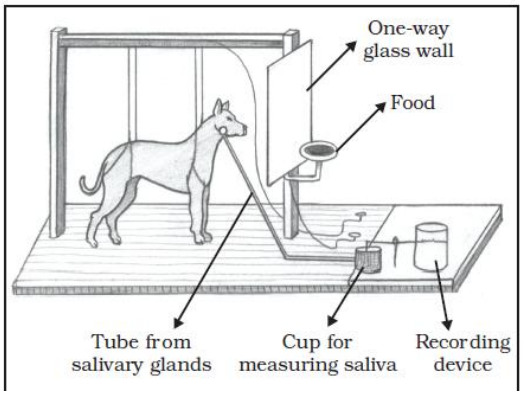
In behaviorist terms, the lab assistant was originally a neutral stimulus. It is called neutral because it produces no response. What had happened was that the neutral stimulus (the lab assistant) had become associated with an unconditioned stimulus (food).

In his experiment, Pavlov used a bell as his neutral stimulus. Whenever he gave food to his dogs, he also rang a bell. After a number of repeats of this procedure, he tried the bell on its own. As you might expect, the bell on its own now caused an increase in salivation.

So the dog had learned an association between the bell and the food and a new behavior had been learned. Because this response was learned (or conditioned), it is called a conditioned response. The neutral stimulus has become a conditioned stimulus.

Pavlov's Experiment with Dog

The earliest experiment of classical conditioning was conducted by **Ivan P.Pavlov** in 1901. He was interested in the physiology of digestion for which he conducted his experiment on dog. He did a minor surgery and inserted a tube into dog's jaw so that whenever dog secret saliva, he could come to know about it.



In the experiment, immediately after ringing of bell, food was served to dog and allowed to eat it. This continued for some days. After that, test was conducted in which all the things were same but after ringing of bell no meat powder (food) was served to dog. But surprisingly, dog still salivated. It salivated to the sound of bell, expecting the presentation of meat powder. **Now dog is conditioned to sound of bell connecting it to serving of meat powder**. Now, salivating to sound of bell became the **conditioned response** of the dog.

Pavlov found that for associations to be made, the two stimuli had to be presented **close together in time**. He called this the **law of temporal contiguity**. If the time between the conditioned stimulus (bell) and unconditioned stimulus (food) is too great, then **learning will not occur**.

Pavlov and his studies of classical conditioning have become famous since his early work between 1890-1930. Classical conditioning is "classical" in that it is the **first systematic study of basic laws of learning / conditioning**

Classical conditioning *theory states that* ***a subject can be conditioned (trained) to respond to a neutral stimulus if the neutral stimulus is paired up with any natural stimulus that creates the required response.*** *By presenting both stimulus simultaneously, the subject will unconsciously associate its current response to the neutral stimulus too.*

This technique is widely used to train animals. By creating a positive stimulus and then matching it to the neutral stimulus that needs to be taught, the trainer can modify the animal's behavior and get the response he is looking for after repeating the process for a given period of time. This method is also called Pavlovian conditioning.

Three Stages of Conditioning

There are three stages of classical conditioning. At each stage the stimuli and responses are given special scientific terms:

Stage 1: Before Conditioning:

In this stage, the **unconditioned stimulus (UCS)** produces an **unconditioned response (UCR)** in an organism -k|f0fLdf_. In basic terms, this means that **a stimulus in the environment** has produced a behavior / response which is **unlearned (i.e., unconditioned)** and therefore is a natural response which has not been taught. In this respect, no new behavior has been learned. For example, a stomach virus (UCS) would produce a response of nausea (UCR). In another example, a perfume (UCS) could create a response of happiness or desire (UCR).

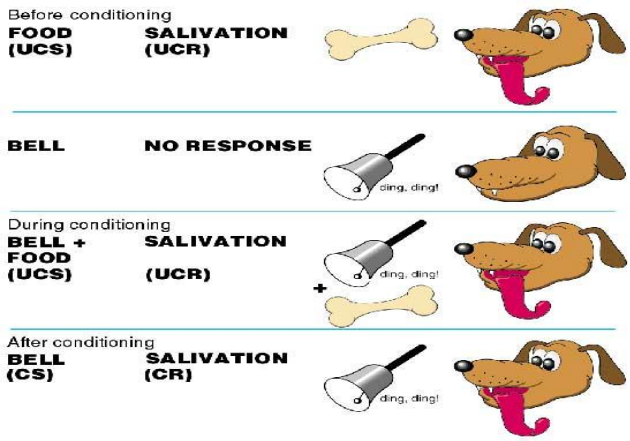
This stage also involves another stimulus which has no effect on a person and is called the **neutral stimulus (NS)**. The NS could be a person, object, place, etc. The neutral stimulus in classical conditioning does not produce a response until it is paired with the unconditioned stimulus.

Stage 2: During Conditioning:

During this stage a stimulus which produces no response (i.e., neutral) is associated with the unconditioned stimulus at which point it now becomes known as the **conditioned stimulus (CS)**.For example, a stomach virus (UCS) might be **associated** with eating a certain food such as chocolate (CS). Also, perfume (UCS) might be **associated** with a specific person (CS).
Often during this stage, the UCS must be associated with the CS on a number of occasions, or trials, for learning to take place. However, one trail learning can happen on certain occasions when it is not necessary for an association to be strengthened over time (such as being sick after food poisoning or drinking too much alcohol).

Stage 3: After Conditioning:

Now the conditioned stimulus (CS) has been associated with the unconditioned stimulus (UCS) to create a new conditioned response (CR). For example, a person (CS) who has been associated with nice perfume (UCS) is now found attractive (CR). Also, chocolate (CS) which was eaten before a person was sick with a virus (UCS) now produces a response of nausea (CR).



Key Principles/Characteristics 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 (or six) 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. **Stimulus Generalization:** In the conditioning process, stimulus generalization is the tendency for the conditioned stimulus to evoke similar responses after the response has been conditioned. For example, if a child has been conditioned to fear with a white rabbit, it will also fear with white objects such as a white toy rat. In the classic Little Albert experiment, researchers John B. Watson and Rayner conditioned a little boy to fear a white rat.

   The researchers observed that the boy experienced stimulus generalization by showing fear in response to similar stimuli including a dog, a rabbit, a fur coat, a white Santa Claus beard, and even Watson's own hair. Instead of distinguishing between the fear object and similar stimuli, the little boy became fearful of objects that were similar in appearance to the white rat.

3. **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.

4. **Extinction** : In classical conditioning, when a conditioned stimulus is presented alone without an unconditioned stimulus, the conditioned response will eventually cease (stop). For example, in Pavlov's classic experiment, a dog was conditioned to salivate to the sound of a bell. When the bell was repeatedly presented without the presentation of food, the salivation response eventually became extinct.

5. **Inhibition**

Inhibition is the opposite of facilitation and refers to a mental state in which there is interference in the conditioned response (CR). It is the cause of extinction. It is claimed that the inhibition is not a temporary process. There are a number of inhibitions (causes of extinction/interferences for CR).

a) Conditioned inhibition: It is the process the inhibition of the CR is permanent. The long term inhibition prevents for the spontaneous recovery.

b) External inhibition: It is the process of interference caused by external stimulus. In Pavlov's experiment a noisy truck passed by outside Pavlov's lab. His interpretation was that such an unusual stimulus distract the dog from the CS and hence cause a decreased flow of conditioned saliva.

d) **Latent inhibition**: The basic idea of latent inhibition is that it is often easier to learn something new than to unlearn something familiar. If something is already known, it interferes to learn differently because the earlier learning interferes later learning. A familiar stimulus takes longer to acquire meaning (as a signal or conditioned stimulus) than a new stimulus. It is also understood as L1 effect.

e) **Disinhibition**: A novel situation or stimulus can make an extinguished CS effective again. This is known as disinhibition.

6. **Spontaneous Recovery**: It refers to the re-emergence of a previously extinguished conditioned response after a delay. Sometimes, the CR suddenly reappears even after then link between CS and UCS has been broken down, or to put in another words, the organism has stopped eliciting CR in response to CS. In Pavlov's experiment, when the dog had completely stopped eliciting CR (Saliva) in response to CS (bell sound), the dog still responded with saliva at the sound of the bell. This sudden reappearance of saliva (CR) was referred as 'spontaneous recovery' by Pavlov.

This principle can be used to explain why "cured" alcohol and drug addicts again "relapse to addiction". When the cured addicts confront with the substance, the irresistible urge to use the substance again may resurface because of the strong connection to the drug previously. This can be termed as **Spontaneous Recovery**.

7. Latency

The time difference between the conditioned stimulus and the unconditioned stimulus is referred to as latency. First of all, note that the conditioned stimulus must come first. For example, if Pavlov always sounded the tone after the dog got meat powder, the tone, in the absence of the meat powder, would signal was that the dog somehow missed getting it's meet powder so, in fact, it might as well not salivate. Given that the conditioned stimulus does precede the unconditioned stimulus, the general rule of thumb is that the shorter the latency the more likely it is that the conditioning will occur

Implications (of Classical conditioning theory) in teaching and learning

This theory can help teachers and learners for teaching learning development in the following ways:

1. The theory implies one must be able to practice and master a task effectively before going on another one (एउटा सिकेर मात्र अर्को सिक्न सकिन्छ)। This means that a student needs to be able to respond to a particular stimulus (information) before he/she can be associated with a new one.
2. Teachers **should know how to motivate their students to learn**. They should be resourceful with various strategies that can enhance effective participation of the students in the teaching learning activities.
3. Most of the emotional responses can be learned through classical conditioning (classical condition को माध्यम बाट संवेगात्मक सिकाइ सिक्न सकिन्छ) A negative or positive response comes through the stimulus being paired with. For example, providing the necessary school material for primary school pupils will develop good feelings about school and learning in them, while, punishment will discourage them from attending the school.
4. The Learners develop hatred towards Maths due to teacher's behavior (शिक्षकको व्यवहारले गर्दा कुनै विषय प्रति नै घृणा जाग्न सकक्छ) But, a good method and loving behavior of the teacher can bring desirable impacts upon the Learners. The Learners may like the boring subject because of teacher's role.
5. In teaching audio-visual aids (श्रव्य दृष्य सामग्रीरसहयोगी सामग्री को भूमिका) role is very vital .When a teacher want to teach a cat. He or she shows the picture of the cat along with the spellings.

When teacher shows picture at the same time he or she spell out the spellings, after a while when only picture is shown and the Learners spell the word cat.

6. Emphasis on behaviour: Students should be active respondents to learning, and in the learning process. They should be given an opportunity to actually behave or demonstrate learning. Secondly students should be assessed by observing behaviour, we can never assume that students are learning unless we can observe that behaviour is changing.
7. Drill and practice: the repetition of stimulus response habits can strengthen those habits. For example, some believe that the best way to improve reading is to have students read more and more. "Practice is important.
8. To break a bad habit, a learner must replace one S-R connection with another one .In order to break habits, that teacher needs to lead an individual to make a new response to this same old stimulus.
9. Link learning with positive emotions. Arrange repeated pairing of positive feelings with certain kinds of learning, especially subjects that are anxiety provoking.
10. Teach students to generalize and discriminate appropriately.