1. Details of Module and its structure

Module Detail	
Subject Name	Psychology
Course Name	Psychology 02 (Class XI, Part- 2)
Module Name/Title	Learning – Part 1
Module Id	kepy_10601
Pre-requisites	Understanding of the nature of experiences, behaviours, and mental processes in everyday life. Need to write the prerequisite required for the concept of earning by a new learner.
Objectives	The learner would be able to • describe the nature of learning, • explain classical and operant conditioning, • explain the determinants of classical conditioning
Keywords	Behaviour, Experience, Learning, Fatigue, Performance, associative learning Unconditioned response, Unconditioned stimulus, Conditioned stimulus, Conditioned response, Conditioning, forward conditioning, backward conditioning, trace conditioning, simultaneous conditioning, appetitive conditioning, aversive conditioning, Negative reinforcement, Operant or instrumental conditioning, S-S learning,

2. Development Team

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Introduction

You know that at the time of birth every human baby is equipped with the capacity to make a limited number of responses. These responses occur reflexively whenever appropriate stimuli are present in the environment. As the child grows and matures, s/he becomes capable of making diverse types of responses. These include identifying the images of some persons as one's mother, father or grandfather, using a spoon when eating food, and learning how to identify alphabets, to write, and to combine them into words. S/he also observes others doing things in specific environmental conditions, and imitates them. Learning names of objects such as book, orange, mango, cow, boy, and girl, and retaining them is another important task. As one grows older, one observes many events or objects, and learns their distinct features. Objects are categorised as 'furniture', 'fruits', and so on. One also learns to drive a scooter or a car, to communicate with others effectively, and to interact with others. It is all due to learning that a person becomes hard working or indolent, socially knowledgeable, skilled, and professionally competent. Each individual manages her or his life and solves all kinds of problems because of the capacity to learn and adapt.

This module focuses on the various aspects of learning. Firstly, learning is defined and characterised as a psychological process. Secondly, an account is presented that explains how one learns. This entails learning through conditioning.

Thus, you will learn about

- Nature of Learning,
- Paradigms of Learning,
- Classical Conditioning
- Operant/Instrumental Conditioning and
- Determinants of Classical Conditioning

Nature of Learning

Learning is a key process in human behaviour. It refers to a spectrum of changes that take place as a result of one's experience. Learning may be defined as "any relatively permanent change in behaviour or behavioural potential produced by experience". One must remember that some behavioural changes occur due to the use of drugs, or fatigue. Such changes are temporary. They are not considered learning. Changes due to practice and experience, which are relatively permanent, are illustrative of learning.

Features of Learning

The process of learning has certain distinctive characteristics, like, learning always involves some kinds of experience. We experience an event occurring in a certain sequence on a number of occasions. If an event happens then it may be followed by certain other events. For example, one learns that if the bell rings in the hostel after sunset, then dinner is ready to be served. Repeated experience of satisfaction after doing something in a specified manner leads to the formation of habit. Sometimes a single experience can lead to learning. A child strikes a matchstick on the side of a matchbox, and gets her/his fingers burnt. Such an experience makes the child learn to be careful in handling the matchbox in future.

Behavioural changes that occur due to learning are relatively permanent. They must be distinguished from the behavioural changes that are neither permanent nor learned. For example, changes in behaviour often occur due to the effects of fatigue, habituation, and drugs. Suppose you are reading your textbook of psychology for some time or you are trying to learn how to drive a motor car, a time comes when you will feel tired. You stop reading or driving. This is a behavioural change due to fatigue, and is temporary. It is not considered learning.

Let us take another case of change in one's behaviour. Suppose in the vicinity of your residence a marriage is being performed. It generates a lot of noise, which continues till late night. In the beginning, the noise distracts you from whatever you are doing. You feel disturbed. While the noise continues, you make some orienting reflexes. These reflexes become weaker and weaker, and eventually become undetectable. This is also one kind of behavioural change. This change is due to continuous exposure to stimuli. It is called habituation. It is not due to learning. You must have noticed that people who are on sedatives or drugs or alcohol, their behaviour changes as it affects physiological functions. Such changes are temporary in nature and disappear, as the effect wears out.

Learning involves a sequence of psychological events. This will become clear if we were to describe a typical learning experiment. Suppose psychologists are interested in understanding how a list of words is learned. They will go through the following sequence:

i. do a pre-test to know how much the person knows before learning,
ii. present the list of words to be remembered for a fixed time,
iii. during this time the list of words is processed towards acquiring new knowledge,
iv. after processing is complete, new knowledge is acquired (this is LEARNING), and

v. after some time, elapses, the processed information is recalled by the person. By comparing the number of words which a person now knows as compared to what s/he knew in the pre-test, one infers that learning did take place.

Thus, learning is an inferred process and is different from performance. Performance is a person's observed behaviour or response or action. Let us understand what is meant by the term inference. Suppose you are asked by your teacher to memorise a poem. You read that poem a number of times. Then you say that you have learned the poem. You are asked to recite the poem and you are able to recite it. The recitation of the poem by you is your performance. On the basis of your performance, the teacher infers that you have learned the poem.

Paradigms of Learning

Learning takes place in many ways. There are some methods that are used in acquisition of simple responses while other methods are used in the acquisition of complex responses. In this section you will learn about all these methods. The simplest kind of learning is called conditioning. Two types of conditioning have been identified. The first one is called classical conditioning, and the second instrumental/operant conditioning.

In addition, we have observational learning, cognitive learning, verbal learning, concept learning, and skill learning, which will be studied in the next few modules.

Classical Conditioning

This type of learning was first investigated by Ivan P. Pavlov. He was primarily interested in the physiology of digestion. During his studies he noticed that dogs, on whom he was doing his experiments, started secreting saliva as soon as they saw the empty plate in which food was served. As you must be aware, saliva secretion is a reflexive response to food or something in the mouth. Pavlov designed an experiment to understand this process in detail. He again used dogs.

In the first phase, a dog was placed in a box and harnessed. The dog was left in the box for some time. This was repeated a number of times on different days. In the meantime, a simple surgery was conducted, and one end of a tube was inserted in the dog's jaw and the other end of the tube was put in a measuring glass.

In the second phase of the experiment, the dog was kept hungry and placed in harness with one end of the tube ending in the jaw and the other end in the glass jar.

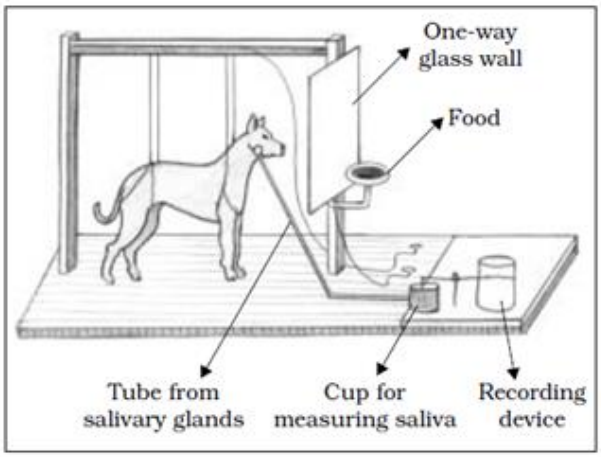

Fig.1: A Dog in Pavlovian Harness for Conditioning

sounded and immediately thereafter food (meat powder) was served to the dog. The dog was allowed to eat it. For the next few days, every time the meat powder was presented, it was preceded by the sound of a bell. After a number of such trials, a test trial was introduced in which everything was the same as the previous trials except that no food followed the sounding of the bell. The dog still salivated to the sound of the bell, expecting presentation of the meat powder as the bell had come to be connected with it. This association between the bell and food resulted in acquisition of a new response by the dog, i.e. salivation to the sound of the bell. This has been termed conditioning. You may have noticed that all dogs salivate when they are presented with food. Food is thus an Unconditioned Stimulus (US) and salivation which follows it, an Unconditioned Response (UR). After conditioning, salivation started to occur in the presence of the sound of the bell. So learners, the bell becomes a Conditioned Stimulus (CS) and saliva secretion a Conditioned Response (CR). This kind of conditioning is called classical conditioning. It is obvious that the learning situation in classical conditioning is one of S–S learning in which one stimulus (e.g., sound of bell) becomes a signal of another stimulus (e.g., food). Here one stimulus signifies the possible occurrence of another stimulus.

It is interesting to note that examples of classical conditioning abound in everyday life. Imagine you have just finished your lunch and feel satisfied. Then you see some sweet dish served on the adjoining table. This signals its taste in your mouth, and triggers the secretion of saliva. You feel like eating it. This is a conditioned response (CR). Let us take another example. In the early stages of childhood, one is naturally afraid of any loud noise. Suppose a small child catches an inflated balloon which bursts in her/his hands making a loud noise. The child becomes afraid. Now the next time s/he is made to hold a balloon, it becomes a signal or cue for noise and elicits fear response. This happens because of contiguous

presentation of balloon as a conditioned stimulus (CS) and loud noise as an unconditioned stimulus (US).

Stages of Conditioning	*Nature of Stimulus*	*Nature of Response*
Before	Food (US) Sound of the Bell	Salivation (UR) Alertness (No Specific Response)
During	Sound of the Bell (CS) + Food (US)	Salivation (UR)
After	Sound of the Bell (CS)	Salivation (CR)

Table 1. Relationships of stages of conditioning and operations

Determinants of Classical Conditioning: How quickly and strongly acquisition of a response occurs in classical conditioning depends on several factors. Some of the major factors influencing learning a CR are as follows.

Firstly, Time Relations between Stimuli: The classical conditioning procedures, discussed below, are basically of four types based on the time relations between the onset of conditioned stimulus (CS) and unconditioned stimulus (US). The first three are called forward conditioning procedures, and the fourth one is called backward conditioning procedure. The basic experimental arrangements of these procedures can be seen in the table as follows

	Type of Conditioning	**Relation between CS (bell) and US (food) with respect to time gaps**
1.	Simultaneous conditioning	The CS (bell) and US (food) are presented together.
2	Delayed conditioning	The onset of CS (bell precedes the onset of US (food) and the CS ends before the end of the US.
3	Trace conditioning	The onset and end of the CS (bell) precedes the onset of US (food),with some time gap between the two.
4	Backward conditioning	The US (food) precedes the onset of CS (bell).

Table 2: Showing the classical conditioning procedures, based on the time relations between the onset of conditioned

stimulus (CS) and unconditioned stimulus (US). It is now well established that delayed conditioning procedure is the most effective way of acquiring a CR. Simultaneous and trace conditioning procedures do lead to acquisition of a CR, but they require greater number of acquisition trials in comparison to the delayed conditioning procedure. It may be noted that the acquisition of response under backward conditioning procedure is very rare.

Secondly, Type of Unconditioned Stimuli: used in studies of classical conditioning are basically of two types, i.e. appetitive and aversive.

Appetitive unconditioned stimuli automatically elicits approach responses, such as eating, drinking, caressing, etc. These responses give satisfaction and pleasure.

On the other hand, aversive US, such as noise, bitter taste, electric shock, painful injections, etc. are painful, harmful, and elicit avoidance and escape responses. It has been found that appetitive classical conditioning is slower and requires greater number of acquisition trials, but aversive classical conditioning is established in one, two or three trials depending on the intensity of the aversive US.

Thirdly, Intensity of Conditioned Stimuli: influences the course of both appetitive and aversive classical conditioning. More intense conditioned stimuli are more effective in accelerating the acquisition of conditioned responses. It means that the more intense the conditioned stimulus, the fewer are the number of acquisition trials needed for conditioning.

For example, the higher the intensity of the bell, the higher is the likelihood of acquiring the conditioned response of salivation. Lower level of intensity may not act as a signal to acquire the response.

Operant Instrumental Conditioning

Another type of conditioning was first investigated by B.F. Skinner. Skinner studied the occurrence of voluntary responses when an organism operates on the environment. He called them operant. Operant are those behaviours or responses, which are emitted by animals and human beings voluntarily and are under their control. The term operant is used because the organism operates on the environment. Conditioning of operant behaviour is called operant conditioning.

Skinner conducted his studies on rats and pigeons in specially made boxes, called the Skinner Box. A hungry rat (one at a time) is placed in the chamber, which was so built that the rat could move inside but could not come out. In the chamber there was a lever, which was connected to a food container kept on the top of the chamber (see Figure 2 on screen). When the lever is pressed, a food pellet drops on the plate placed close to the lever. While moving around and pawing the walls (exploratory behaviour), the hungry rat accidentally presses the lever and a food pellet drops on the plate. The hungry rat eats it. In the next trial, after a while the exploratory behaviour again starts. As the number of trials increases, the rat takes lesser and lesser time to press the lever for food. Conditioning is complete when the rat presses the lever immediately after it is placed in the chamber. It is obvious that lever pressing is an operant response and getting food is its consequence.

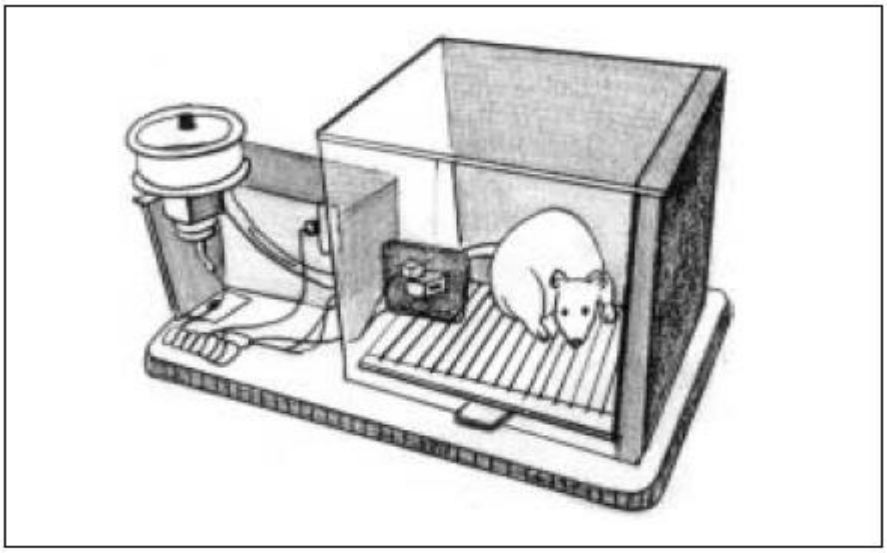

Fig.2: Skinner Box images

In this situation the response is instrumental in getting the food. That is why, this type of learning is also called instrumental conditioning. Examples of instrumental conditioning abound in our everyday life. Children who want to have some sweets in the absence of their mother learn to locate the jar in which mother hides the sweets for safekeeping and eat it. Children learn to be polite and say 'please' to get favours from their parents and others. One learns to operate mechanical gadgets such as radio, camera, T.V., etc. based on the principle of instrumental conditioning. As a matter of fact, human beings learn shortcuts to attain desired goals or ends through instrumental conditioning.

Summary

Learning is any relatively permanent change in behaviour or behavioural potential produced by experience or practice. The main types of learning studied in this module are: classical and operant conditioning,

Pavlov first investigated classical conditioning in the course of studies on digestion in dogs. In this kind of learning an organism comes to associate stimuli. A neutral stimulus (CS) that signals an unconditioned stimulus (US) begins to produce a response (CR) that anticipates and prepares the organism for US.

Skinner investigated operant or instrumental conditioning (OC). An operant is any response voluntarily emitted by an organism. OC is a type of learning in which response is strengthened if followed by reinforcement. A reinforce can be any event that increases the frequency of preceding response.