

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 2
Module Id	key_10602
Pre-requisites	The learner should have an understanding of the nature of learning, classical and operant conditioning and determinants of classical conditioning.
Objectives	The learner would be able to • describe the determinants of operant conditioning • explain the types of reinforcement, • understand the various schedules of reinforcement • explain observational learning and cognitive learning
Keywords	Reinforces, positive reinforcement, negative reinforcement, punishment, continuous reinforcement, partial reinforcement, delayed reinforcement, extinction, resistance to extinction, generalisation, discrimination, spontaneous recovery, primary reinforcer, secondary reinforcer, observational learning, imitation, social learning, modelling, cognitive learning, insight learning, latent learning, cognitive map

2. Development Team

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In the preceding module, you have studied the nature of learning, classical and operant conditioning and determinants of classical conditioning.

This module focuses on

- the various determinants of Operant Conditioning
- the types of reinforcement,
- the various schedules of reinforcement
- observational learning and cognitive learning

Determinants of Operant Conditioning

In the previous module we learnt that operant or instrumental conditioning is a form of learning in which behaviour is learned, maintained or changed through its consequences. Such consequences are called reinforcers. A reinforcer is defined as any stimulus or event, which increases the probability of the occurrence of a (desired) response. A reinforcer has numerous features, which affect the course and strength of a response. They include its types – positive or negative; number or frequency; quality – superior or inferior, and schedule – continuous or intermittent (partial). All these features influence the course of operant conditioning. We will now examine some of these factors in detail.

A. Types of Reinforcement

Reinforcement may be **positive** or **negative**.

Positive reinforcers involves stimuli that have pleasant consequences. They strengthen and maintain the responses that have caused them to occur. Positive reinforcers satisfy needs, which include food, water, medals, praise, money, status, information, etc.

Negative reinforcers involve unpleasant and painful stimuli. Responses that lead organisms to get rid of painful stimuli or avoid and escape from them provide negative reinforcement. Thus, negative reinforcement leads to learning of avoidance and escape responses. For instance, one learns to put on woollen clothes, burn firewood or use electric heaters to avoid the unpleasant cold weather. One learns to move away from dangerous stimuli because they provide negative reinforcement. E.g. we avoid entering a lane where there is a ferocious dog because it may bite.

It may be noted that negative reinforcement is not punishment. Use of punishment reduces or suppresses the response while a negative reinforcer increases the probability of avoidance or

escape response. For instance, drivers and co-drivers wear their seat belts to avoid getting injured in case of an accident or to avoid being fined by the traffic police.

It should be understood that no punishment suppresses a response permanently. Mild and delayed punishment has no effect. The stronger the punishment, the more lasting is the suppression effect but it is not permanent.

Sometimes punishment has no effect irrespective of its intensity. On the contrary, the punished person may develop dislike and hatred for the punishing agent or the person who administers the punishment.

B. Number of Reinforcement and other Features

It refers to the number of trials on which an organism has been reinforced or rewarded. Amount of reinforcement means how much of reinforcing stimulus (food or water or intensity of pain causing agent) one receives on each trial. Quality of reinforcement refers to the kind of reinforcer. Chickpeas or pieces of bread are of inferior quality as compared with raisins or pieces of cake as reinforcer. The course of operant conditioning is usually accelerated to an extent as the number, amount, and quality of reinforcement increases.

C. Schedules of Reinforcement

A reinforcement schedule is the arrangement of the delivery of reinforcement during conditioning trials. Each schedule of reinforcement influences the course of conditioning in its own way. The organism being subjected to operant conditioning may be given reinforcement in every acquisition trial or in some trials it is given and in others it is omitted. Thus, the reinforcement may be continuous or intermittent.

When a desired response is reinforced every time it occurs, we call it continuous reinforcement. In contrast, in intermittent schedules responses are sometimes reinforced, sometimes not. It is known as partial reinforcement and has been found to produce greater resistance to extinction – than is found with continuous reinforcement. For example, in a continuous reinforcement schedule, a rat receives a food pellet each time it presses a lever, On the other hand in intermittent schedule the rat will receive food pellet only for some lever pressing responses.

Delayed Reinforcement

The effectiveness of reinforcement is dramatically altered by delay in the occurrence of reinforcement. It is found that delay in the delivery of reinforcement leads to poorer level of performance. It can be easily shown by asking children which reward they will prefer for doing some chore. Smaller rewards immediately after doing the chore will be preferred rather than a big one after a long gap.

Key Learning Processes in Conditioning

When learning takes place, be it classical or operant conditioning, it involves the occurrence of certain processes. These include reinforcement, extinction or non-occurrence of learned response, generalisation of learning to other stimuli under some specifiable conditions, discrimination between reinforcing and non-reinforcing stimuli, and spontaneous recovery.

Now let's understand each one of these processes.

a. Reinforcement

Reinforcement is the operation of administering a reinforcer by the experimenter. Reinforcers are stimuli that increase the rate or probability of the responses that precede. A positive reinforcer increases the rate of response that precedes its presentation. Negative reinforcers increase the rate of the response that precedes their removal or termination. The reinforcers may be primary or secondary. A primary reinforcer is biologically important since it determines the organism's survival (e.g., food for a hungry organism).

A secondary reinforcer is one which has acquired characteristics of the reinforcer because of the organism's experience with the environment. We frequently use money, praise, and grades as reinforcers. They are called secondary reinforcers. Systematic use of reinforcers can lead to the desired response. This way we can shape a desired behavior.

b. Extinction

Extinction means disappearance of a learned response due to removal of reinforcement from the situation in which the response used to occur. If the occurrence of CS-CR is not followed by the unconditioned stimulus (CS) in classical conditioning, or lever pressing is no more followed by food pellets in the Skinner box, the learned behaviour will gradually be weakened and ultimately disappear.

Such a learning shows resistance to extinction. It means that even though the learned response is now not reinforced, it would continue to occur for some time. However, with increasing number of trials without reinforcement, the response strength gradually diminishes and ultimately it stops occurring.

How long a learned response shows resistance to extinction depends on a number of factors. It has been found that with increasing number of reinforced trials resistance to extinction increases and learned response reaches its highest level. At this level performance gets stabilised. After that the number of trials do not make a difference in the response strength. Resistance to extinction increases with increasing number of reinforcements during acquisition trials, beyond that any increase in number of reinforcement reduces the resistance to extinction. Studies have also indicated that as the amount of reinforcement (number of food pellets) increases during the acquisition trials, resistance to extinction decreases.

If the reinforcement is delayed during acquisition trials, the resistance to extinction increases. Reinforcement in every acquisition trial makes the learned response to be less resistant to extinction. In contrast, intermittent or partial reinforcement during acquisition trials makes a learned response more resistant to extinction.

c. Generalisation and Discrimination

The processes of generalisation and discrimination occur in all kinds of learning. Suppose an organism is conditioned to elicit a conditioned response (CR) (saliva secretion or any other reflexive response) on presentation of a CS (light or sound of bell). After conditioning is established, and another stimulus similar to the CS (e.g., ringing of telephone) is presented, the organism makes the conditioned response to it. This phenomenon of responding similarly to similar stimuli is known as generalisation. Again, suppose a child has learned the location of a jar of a certain size and shape in which sweets are kept. Even when the child's mother is not around, the child finds the jar and obtains the sweets. This is a learned operant. Now the sweets are kept in another jar of a different size and shape and at a different location in the kitchen. In the absence of the mother the child locates the jar and obtains the sweets. This is also an example of generalisation. When a learned response occurs or is elicited by a new stimulus, it is called generalisation.

Another process, which is complimentary to generalisation, is called discrimination. Generalisation is due to similarity while discrimination is a response due to difference. For

example, suppose a child is conditioned to be afraid of a person with a long moustache and wearing black clothes. In subsequent situation, when s/he meets another person dressed in black clothes with a beard, the child shows signs of fear. The child's fear is generalised. S/he meets another stranger who is wearing grey clothes and is clean-shaven. The child shows no fear. This is an example of discrimination. Occurrence of generalisation means failure of discrimination. Discriminative response depends on the discrimination capacity or discrimination learning of the organism.

d. Spontaneous Recovery

Spontaneous recovery occurs after a learned response is extinguished. Suppose an organism has learned to make a response for getting reinforcement, then the response is extinguished by stopping the reinforcement. A question now may be asked, whether the response is completely extinguished, and will not occur if the CS is presented after a time gap. It has been demonstrated that after lapse of considerable time, the learned or CR recovers and occurs to the CS. The amount of spontaneous recovery depends on the duration of the time lapsed after the extinction session. The longer the duration of time lapsed, the greater is the recovery of learned response. Such a recovery occurs spontaneously. Fig.1 shows the phenomenon of spontaneous recovery.

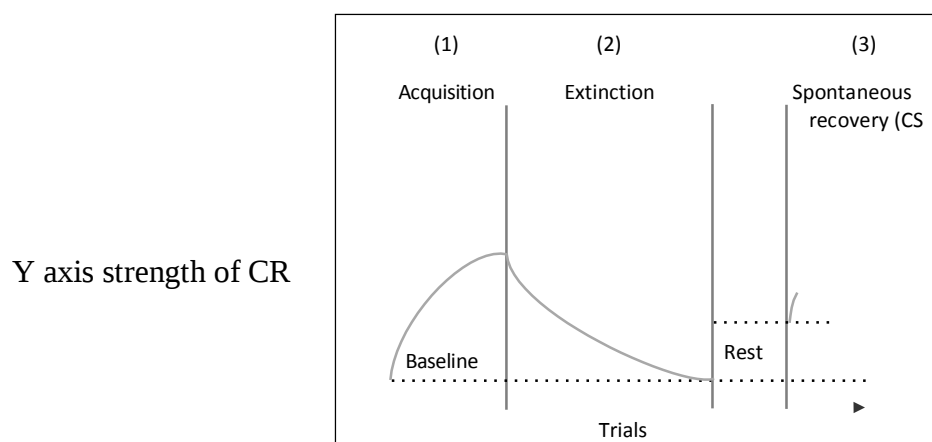


Fig.1: Phenomenon of Spontaneous Recovery

Observational Learning

The next form of learning takes place by observing others. Earlier this form of learning was called imitation. Bandura and his colleagues in a series of experimental studies investigated observational learning in detail. In this kind of learning, human beings learn social behaviours, therefore, it is sometimes called social learning. In many situations individuals do not know how to behave. They observe others and emulate their behaviour. This form of learning is called modelling.

Examples of observational learning abound in our social life. Fashion designers employ tall, pretty, and gracious young girls and tall, smart, and well-built young boys for popularising clothes of different designs and fabrics. People observe them on televised fashion shows and advertisements in magazines and newspapers. They imitate these models. Observing superiors and likeable persons and then emulating their behaviour in a novel social situation is a common experience.

In order to understand the nature of observational learning we may refer to the studies conducted by Bandura. In one of his well-known experimental study, Bandura showed a film of five minutes' duration to children.

The film shows that in a large room there are numerous toys including a large sized 'Bobo' doll. Now a grown-up boy enters the room and looks around. The boy starts showing aggressive behaviour towards the toys in general and the bobo doll in particular. He hits the doll, throws it on the floor, kicking it and sitting on it. This film has three versions. In one version a group of children see the boy (model) being rewarded and praised by an adult for being aggressive to the doll. In the second version another group of children see the boy being punished for his aggressive behaviour. In the third version the third group of children are not shown the boy being either rewarded or punished.



Fig 2: Boy hitting a Bobo doll as in the experiment.

Source: https://www.tutorialspoint.com/social_learning/bobo_doll_experiment.htm

After viewing a specific version of the film all the three groups of children were placed in an experimental room in which similar toys were placed around. The children were allowed to play with the toys. These groups were secretly observed and their behaviours noted. It was found that those children who saw aggressive behaviour being rewarded were most aggressive; children who had seen the aggressive model being punished were least aggressive. Thus, in

observational learning observers acquire knowledge by observing the model's behaviour, but performance is influenced by model's behaviour being rewarded or punished.

You must have noticed that children observe adults' behaviours, at home and during social ceremonies and functions. They enact adults in their plays and games. For instance, young children play games of marriage ceremonies, birthday parties, thief and policeman, housekeeping, etc. Actually they enact in their games what they observe in society, on television, and read in books.

Children learn most of the social behaviours by observing and emulating adults. The way to put on clothes, dress one's hair, and conduct oneself in society are learned through observing others. It has also been shown that children learn and develop various personality characteristics through observational learning. Aggressiveness, pro-social behaviour, courtesy, politeness, diligence, and indolence are acquired by this method of learning.

Activity that you can do-

You can have first-hand experience of observational learning by doing the following exercise. Collect four or five school going children and demonstrate how to make a boat out of a sheet of paper. Do it two or three times and ask the children to observe carefully. After having shown how to fold the paper in different ways for a number of times, give them sheets of paper and ask them to make a toy boat.

Most children will be able to do it somewhat successfully.

Cognitive Learning

Some psychologists view learning in terms of cognitive processes that underlie it. They have developed approaches that focus on such processes that occur during learning rather than concentrating solely on S-R and S-S connections, as we have seen in the case of classical and operant conditioning. Thus, in cognitive learning, there is a change in what the learner knows rather than what s/he does. This form of learning shows up in insight learning and latent learning.

a. Insight Learning

Kohler demonstrated a model of learning which could not be readily explained by conditioning. He performed a series of experiments with chimpanzees that involved solving complex

problems. Kohler placed chimpanzees in an enclosed play area where food was kept out of their reach. Tools such as poles and boxes were placed in the enclosure. The chimpanzees rapidly learned how to use a box to stand on or a pole to move the food in their direction. In this experiment, learning did not occur as a result of trial and error and reinforcement, but came about in sudden flashes of insight.



Fig:3 Insight Learning by Wolfgang Kohler

Source: <https://www.bing.com/images/search>

The chimpanzees would roam about the enclosure for some time and then suddenly would stand on a box, grab a pole and strike a banana, which was out of normal reach above the enclosure. The chimpanzee exhibited what Kohler called insight learning – the process by which the solution to a problem suddenly becomes clear.

In a normal experiment on insight learning, a problem is presented, followed by a period of time when no apparent progress is made and finally a solution suddenly emerges. In insight learning, sudden solution is the rule. Once the solution has appeared, it can be repeated immediately the next time the problem is confronted. Thus, it is clear that what is learned is not a specific set of conditioned associations between stimuli and responses but a cognitive relationship between a means and an end. As a result, insight learning can be generalised to other similar problem situations.

b. Latent Learning

Another type of cognitive learning is known as latent learning. In latent learning, a new behaviour is learned but not demonstrated until reinforcement is provided for displaying it. Tolman made an early contribution to the concept of latent learning. To have an idea of latent learning, we may briefly understand his experiment.

Tolman put two groups of rats in a maze and gave them an opportunity to explore. In one group, rats found food at the end of the maze and soon learned to make their way rapidly through the maze. On the other hand, rats in the second group were not rewarded and showed no apparent signs of learning. But later, when these rats were reinforced, they ran through the maze as efficiently as the rewarded group.

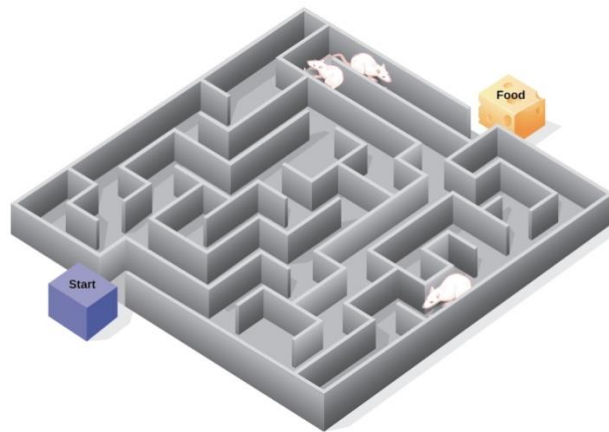


Fig:4. Tolman's Cognitive map

Source: <https://courses.lumenlearning.com>

Tolman contended that the unrewarded rats had learned the layout of the maze early in their explorations. They just never displayed their latent learning until the reinforcement was provided. Instead, the rats developed a cognitive map of the maze, i.e. a mental representation of the spatial locations and directions, which they needed to reach their goal.

An example of latent learning in human being can be best understood through this example. Children may learn by watching the actions of others but only demonstrate it at a later date, when the learned material is needed. For example, Rohit's school bus drops him to school every day. One day he has to cycle to school and even though Rohit had never got a chance to demonstrate his learning of the route, he is able to reach school as he had learnt the way. This demonstrates latent learning. Rohit had learned the route to school, but had no need to demonstrate this knowledge earlier.

Learned Helplessness

It is an interesting phenomenon, which is a result of an interaction between the two forms of conditioning. Learned helplessness underlies psychological cases of depression. Seligman and Maier demonstrated this phenomenon in a study on dogs. First, they subjected dogs to sound (CS) and electric shock (US) using classical conditioning procedure. The animal had no scope

to escape or avoid the shock. This pairing was repeated a number of times. Then the dogs were subjected to shock in an operant conditioning procedure. The dogs could escape the shock by pressing their heads against the wall. After having experienced inescapable shock in the Pavlovian contingency, the dog failed to escape or avoid shock in the operant conditioning procedure. The dog just suffered the shock through and did not attempt to escape. This behaviour of the dog was called learned helplessness.

This phenomenon has been shown to be operative in humans also. It has been found that continuous failure in a set of tasks shows the occurrence of learned helplessness. In an experimental study, the subjects are initially given failure experience irrespective of their performance. In the second phase the subjects are given a task. Learned helplessness is often measured in terms of the subject's ability and persistence before they give up the task. Continuous failure leads to little persistence and poor performance. This shows helplessness. There are numerous studies that demonstrate that persistent depression is often caused by learned helplessness.

Summary

- A reinforcer is defined as any stimulus or event, which increases the probability of the occurrence of a desired response.
- Reinforcement, extinction, spontaneous recovery, generalization and discrimination are key learning processes.
- Children learn most of the social behaviours by observing and emulating Adults- Observational learning.
- In cognitive learning, there is a change in what the learner knows rather than what s/he does.
- It has been found that continuous failure in a set of tasks shows the occurrence of learned helplessness.