

Chapter Three

LEARNING AND THEORIES OF LEARNING

Definitions of learning

- *Learning is a relatively permanent change in behavior occurring as a result of experience or practice.*
- The above definition of learning has three important elements.
 1. Learning is a change in behavior **for better or worse**.
 2. It is a change that takes place **through practice or experience**. The changes due to growth, maturation, or injury are not to be considered as learning.
 3. Before a change can be regarded as learning, it must be **relatively permanent**. Therefore, changes due to maturation, fatigue, adaptation or sensitivity of the organism are not considered as learning.

Characteristics of learning

- If learning is a change in behavior as a result of experience, and then instruction must include a careful and systematic creation of those experiences that promote learning.
- This process can be quite complex because, among other things, an individual's background strongly influences the way that person learns.
- Yoakman and Simpson have described the following major important characteristics of learning:
 1. Learning is continuous modification of behavior throughout life
 2. Learning is pervasive, it reaches into all aspects of human life.

3. Learning involves the whole person, socially, emotionally & intellectually.
4. Learning is often a change in the organization of experiences.
5. Learning is responsive to incentives
6. Learning is an active process
7. Learning is purposeful
8. Learning depends on maturation, motivation and practice.
9. Learning is multifaceted

Principles of learning

- There are important principles that help explaining how learning occurs effectively. Some of these most important principles of learning are as follows:
- Individuals learn best when they are physically, mentally, and emotionally ready to learn.
- Students learn best and retain information longer when they have meaningful practice and exercise
- Learning is strengthened when accompanied by a pleasant or satisfying feeling, and that learning is weakened when associated with an unpleasant feeling.

- Things learned first create a strong impression in the mind that is difficult to erase.
- Things most recently learned are best remembered.
- The principle of intensity implies that a student will learn more from the real thing than from a substitute.
- Individuals must have some abilities and skills that may help them to learn.
- Things freely learned are best learned - the greater the freedom enjoyed by individuals, the higher the intellectual and moral advancement.

Factors Influencing Learning

- **Some of the factors that affect learning are the following.**

1. **Motivation:** The learner's motivation matters the effectiveness of learning. The stronger and clearer the motives for learning, the greater are the effort to learn.
2. **Maturation:** Neuro-muscular coordination is important for learning a given task. Example, The child has to be mature before she/he is able to learn.
3. **Health condition of the learner:** The learner should be in a good health status to learn. Example- Sensory defects, malnutrition, toxic conditions of the body, loss of sleep and fatigue hinder effective learning.
4. **Psychological wellbeing of the learner:** individual's psychological states like worries, fears, feelings of loneliness and inferiority hinders learning. Whereas self-respect, self-reliance, and self-confidence are necessary for effective learning.

5. **Good working conditions** – absence or presence of fresh air, light, comfortable surroundings, moderate temperature, absence of distractions like noise and learning aids determine learning effectiveness.
6. **Background experiences:** having background experiences affect effectiveness of learning.
7. **Length of the working period:** Learning periods should neither be too short nor too long. Long learning time sets fatigue and reduces effectiveness in learning.
8. **Massed and distributed learning:** Learning that spreads across time with reasonable time gaps brings better results compared with crammed learning that occurs at once or within short span of time.

Theories of Learning and their Applications

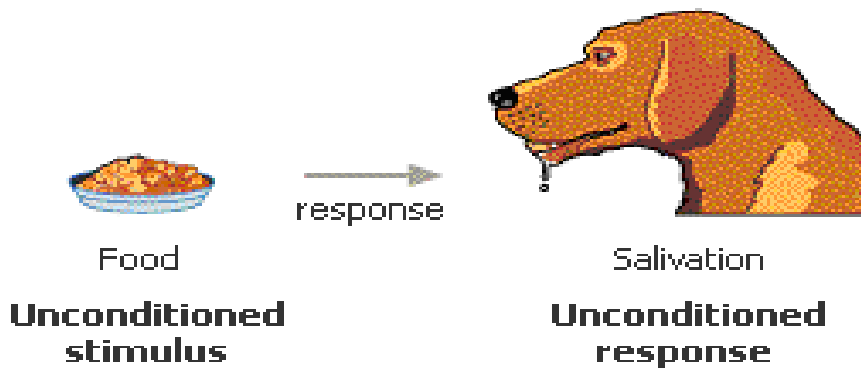
- **Behavioral Theory of Learning**

- Behavioral theory of learning believes that learning occurs as a result of stimulus-response associations.

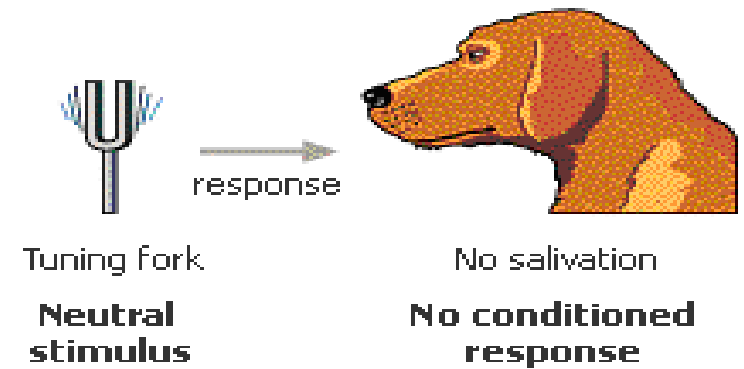
I. Classical Conditioning Theory of Learning

- The concept of classical conditioning was founded by a Russian physiologist, Ivan Pavlov.
- He studied the process of **salivary secretion in dog**.
- **Pavlov identified three steps** in the process of salivary conditioning which can be summarized as follows.

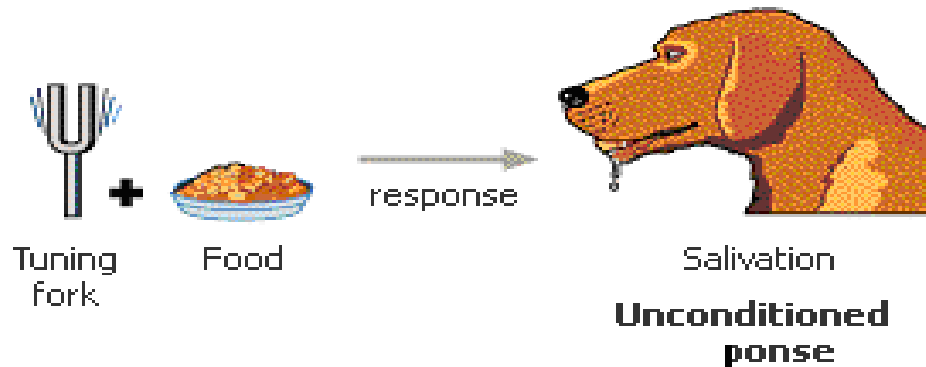
1. Before conditioning



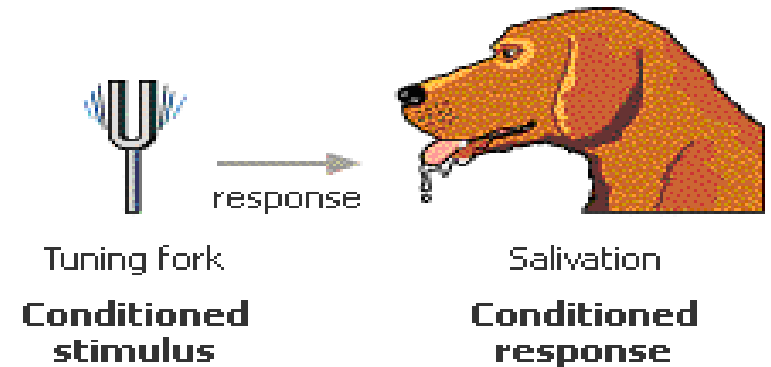
2. Before conditioning



3. During conditioning



4. After conditioning



Basics of Classical Condition

- To demonstrate classical conditioning, we must first identify stimuli and responses. In addition, you must be well familiarized with the following basic terms of classical condition:
- **Neutral stimulus:** A stimulus that, before conditioning, does not naturally bring about the response of interest.
- **Unconditioned stimulus (UCS):** A stimulus that naturally brings about a particular response without having been learned.
- **Unconditioned response (UCR):** A response that is natural and needs no training (e.g., salivation at the smell of food).
- **Conditioned stimulus (CS):** A once neutral stimulus that has been paired with an unconditioned stimulus to bring about a response formerly caused only by the unconditioned stimulus.
- **Conditioned response (CR):** A response that, after conditioning, follows a previously neutral stimulus (e.g., salivation at the ringing of a bell)

Principles of Classical Condition

- The basic principles of classical conditioning include the role of stimulus generalization, stimulus discriminations, extinction and spontaneous recovery.
- **Stimulus generalization** is a process in which, after a stimulus has been conditioned to produce a particular response, stimuli that are similar to the original stimulus begin to produce the same responses.
- For example, a dog conditioned to salivate to a dinner bell (CS) might also salivate to a door bell, a telephone bell.
- **Stimulus discrimination** is the process of distinguishing two similar stimuli; the ability to differentiate between stimuli.
- *Example, the dog salivates only in response to the dinner bell instead of the doorbell or the telephone bell.*

- In Pavlov's procedure, if a CS is repeatedly presented without presenting the UCS (meat), the CR will diminish and eventually stop occurring. This process is called **extinction**.
- A dog that has learned to salivate to a dinner bell (CS) will eventually stop doing so unless presentations of the dinner bell are periodically followed by presentations of the UCS (meat). But extinction only inhibits the CR, it does not eliminate it.
- ***Spontaneous recovery*** is the reemergence of an extinguished conditioned response after a period of rest and with no further conditioning.
- *For example, suppose you produce extinction of the CR of salivation by no longer presenting the dog with meat after ringing the dinner bell.*

Operant/Instrumental conditioning

The concept of operant conditioning was developed by an American psychologist, B. F. Skinner. He was interested in developing the science of behavior.

Definition: *The term operant conditioning refers to the fact that the learner must operate, or perform a certain behavior, before receiving a reward or punishment.*

Thus, by definition, operant conditioning is a type of learning in which behavior is strengthened if followed by reinforcement, or diminished if followed by punishment.

Operations in Operant Conditioning

- **Shaping:-** refers to the judicious use of selective reinforcement to bring certain desirable changes in the behavior of the organism.
- For a response to be reinforced, it must first occur. But, suppose you to train a child to use a knife and a fork properly. Such behaviors, and most others in everyday life, have almost no probability of appearing spontaneously.
- The operant solution for this is shaping. Shaping is an operant conditioning procedure in which successive approximations of a desired response are reinforced.
- In shaping you start by reinforcing a tendency in the right direction. Then you gradually require responses that are more and more similar to the final desired response.

- ***Extinction:-*** consists of simply withholding the reinforcement when the appropriate response occurs.
- ***Reinforcement:-*** is a stimulus that follows a behavior and increases the likelihood that the behavior will be repeated.
- A reinforcer is any event that increases the probability that the behavior that precedes it will be repeated.
- There are two basic types of reinforcers or reinforcing stimuli: *primary and secondary reinforcers*.

- Primary reinforcers: Food, water, light, stroking of the skin, and a comfortable air temperature are naturally reinforcing because they satisfy biological needs.
- Primary reinforcers, in general, have the ability to strengthen a behavior without prior learning.
- Secondary Reinforcers: are **conditioned or learned that include money, status and praise**. They reinforce behavior because of their prior association with primary reinforcing stimuli.
- Both primary and secondary reinforcers can be positive or negative.

a. Positive reinforcement:- is a stimulus which when applied following an operant response strengthens the probability of that response.

b. Negative reinforcement:- is any stimulus which when removed following an operant response, strengthens the probability of that response.

- *The basic principle of negative reinforcement is that eliminating something aversive can itself be a reinforcer or a reward.*
- *For example, if someone nags you all the time to study, but stops nagging when you comply, your studying is likely to increase- because you will then avoid the nagging.*

Schedules of reinforcement

A schedule of reinforcement refers to when and how a response is reinforced.

Reinforcement can be given on a ***continuous basis*** or it can be administered periodically/intermittently.

- ***Continuous Schedule***:- refers to an arrangement of providing reinforcement after every correct response.
- ***Partial or Intermittent Schedule***:- refers to an arrangement of providing sometimes reinforcement and withholding the reinforcement during other times. ***Partial reinforcement is divided in to two categories:-***
 - ***Ratio Schedule(based on number of responses)***
 - ***Interval Schedule(based on passage of time)***

1. **Fixed-ratio schedules:** A fixed ratio schedule of reinforcement occurs after a fixed number of responses. They produce high rate of responding. Employers often use fixed ratio schedules to increase productivity.
2. **Variable-Ratio Schedule:** A variable ratio schedule of reinforcement occurs after some average number of responses, but the number varies from reinforcement to reinforcement.
 - . The responses are more *resistant to extinction than when a fixed ratio schedule is used*.
3. **Fixed Interval Schedule:** A fixed interval schedule of reinforcement occurs only if a fixed amount of time has passed since the previous reinforcer.
4. **Variable Interval Schedule:** A variable interval schedule of reinforcement occurs only if a variable amount of time has passed since the previous reinforcer.

- **Punishment-** is a stimulus that weakens the response or makes it less likely to recur. Punishers can be any aversive (unpleasant) stimuli that weaken responses or make them unlikely to recur.
- Like reinforcers, punishers can also be primary or secondary. Pain and extreme heat or cold are inherently punishing and are therefore known as primary punishers. Criticism, demerits, catcalls, scolding, fines, and bad grades are common secondary punishers.
- The positive-negative distinction can also be applied to punishment. Something unpleasant may occur following some behavior (positive punishment), or something pleasant may be removed (negative punishment).

TABLE 5.3 FOUR WAYS TO MODIFY BEHAVIOR

	Reinforcement	Punishment
POSITIVE (Adding)	Something valued or desirable; <i>Positive Reinforcement</i> Example: getting a gold star for good behavior in school	Something unpleasant; <i>Punishment by Application</i> Example: getting a spanking for disobeying
NEGATIVE (Removing/ Avoiding)	Something unpleasant; <i>Negative Reinforcement</i> Example: avoiding a ticket by stopping at a red light	Something valued or desirable; <i>Punishment by Removal</i> Example: losing a privilege such as going out with friends

The Pros and Cons of Punishment

- Immediacy, consistency and intensity matter are important for effectiveness of punishment.
- **Immediacy** - When punishment follows immediately after the behavior to be punished.
- **Consistency**- when punishment is inconsistent the behavior being punished is intermittently reinforced and therefore becomes resistant to extinction.
- **Intensity**- In general terms severe punishments are more effective than mild ones. However, there are studies that indicate that even less intense punishments are effective provided that they are applied immediately and consistently.

- ***However, when punishment fails:***
- People often administer punishment inappropriately or mindlessly.
- *The recipient of punishment often responds with anxiety, fear or rage.*
- The effectiveness of punishment is often temporary, depending heavily on the presence of the punishing person or circumstances
- Most behavior is hard to punish immediately.
- Punishment conveys little information. An action intended to punish may instead be reinforcing because it brings attention.

Application of the theory of operant conditioning:

- 1. *Conditioning study behavior:*** *Teaching is the arrangement of contingencies of reinforcement, which expedite learning.*
 - Example: For Self-learning of a student teacher should reinforce student behavior through variety of incentives such as prize, medal, smile, praise, affectionate patting on the back or by giving higher marks.
- 2. *Conditioning and classroom behavior:*** *During a learning process, children can acquire unpleasant experiences. This unpleasantness becomes conditioned to the teacher, subject and the classroom and learners begin to dislike the subject and the teacher.*

- **Managing Problem Behavior:** Operant conditioning is a behavior therapy technique that shape students behavior. To do this, teachers should admit positive contingencies like praise, encouragement etc. for learning. One should not admit negative contingencies. Example punishment (student will run away from the dull and dreary classes – escape stimulation).
- **Dealing with anxieties through conditioning:** Through conditioning, fear, anxieties, prejudices, attitudes, and perceptual meaning develops.
- Examples of anxieties that are acquired through conditioning are signals on the road, siren blown during wartime, child receiving painful injection from a doctor. Anxiety is a generalized fear response.
- To break the habits of fear, a teacher can use desensitization techniques.

- **Conditioning group behavior:** *Conditioning can make an entire group learn and complete change in behavior with reinforcement. It breaks undesired and unsocial behavior too.*
- *Example: Putting questions or telling lie to teachers will make teachers annoyed. In such circumstances students learn to keep mum in the class. Asking questions, active participation in class discussion will make the teacher feel happy – interaction will increase and teaching learning process becomes more effective.*
- **Conditioning and Cognitive Processes:** *Reinforcement is given in different form, for the progress of knowledge and in the feedback form. When response is correct, positive reinforcement is given.*
- *Example: A student who stands first in the class in the month of January is rewarded in the month of December. To overcome this Program instruction is used. In this subject matter is broken down into steps. Organizing in logical sequence helps in learning.*

Social Learning Theory (observational learning) theory

- According to psychologist Albert Bandura, a major part of human learning consists of observational learning, which is learning by watching the behavior of another person, or *model*.
- *Because of its reliance on observation of others—a social phenomenon—the perspective taken by Bandura is often referred to as a social cognitive approach to learning (Bandura, 1999, 2004).*
- social cognitive theorists believe that in human beings, observational learning cannot be fully understood without taking into account the thought processes of the learner.
- Many years ago, Albert Bandura and his colleagues showed just how important observational learning is, especially for children who are learning the rules of social behavior.

- Bandura mentions *four conditions that are necessary before an individual can successfully model the behavior of someone else:*
- **Attention:** *the person must first pay attention to the model.*
- **Retention:** *the observer must be able to remember the behavior that has been observed. One way of increasing this is using the technique of rehearsal.*
- **Motor reproduction:** *the third condition is the ability to replicate the behavior that the model has just demonstrated.*
- **Motivation:** *the final necessary ingredient for modeling to occur is motivation; learners must want to demonstrate what they have learned.*
- *Remember that since these four conditions vary among individuals, different people will reproduce the same behavior differently.*

Educational Implications of Social Learning Theory

- Social learning theory has numerous implications for classroom use.
 1. Students often *learn a great deal simply by observing other people.*
 2. *Describing the consequences of behavior can effectively increase the appropriate behaviors and decrease inappropriate ones.*
 3. Modeling provides an *alternative to shaping for teaching new behaviors. Instead of using shaping, which is operant conditioning; modeling can provide a faster, more efficient means for teaching new behavior.*

4. Teachers and parents must *model appropriate behaviors and take care that they do not model inappropriate behaviors.*
5. Teachers should *expose students to a variety of other models. This technique is especially important to break down traditional stereotypes.*
6. Students must *believe that they are capable of accomplishing school tasks. Thus it is very important to develop a sense of self-efficacy for students.*
7. Teachers should help students set *realistic expectations for their academic accomplishments.*

Cognitive Learning Theory

- ❖ Cognitive learning theorists believe that thought processes have an important effect on learning. Humans often use mental or cognitive abilities when they interact with their environment.
- ❖ People can manipulate, alter, or change things mentally to examine possible outcomes before they actually do anything.
- ❖ Developed approaches that focus on the unseen mental processes that occur during learning, rather than concentrating solely on external stimuli, responses, and reinforcements.

Latent Learning

- Evidence for the importance of cognitive processes comes from a series of animal experiments that revealed a type of cognitive learning called latent learning.
- „Latent‘ means hidden and thus latent learning is learning that occurs but is not evident in behavior until later, when conditions for its appearance are favorable.
- It is said to occur without reinforcement of particular responses and seems to involve changes in the way information is processed.
- In a classic experiment, Tolman and Honzic (1930) placed three groups of rats in mazes and observed their behavior each day for more than two weeks.

- The rats in Group 1 always found food at the end of the maze. Group 2 never found food. Group 3 found no food for ten days but then received food on the eleventh.
- The Group 1 rats quickly learned to head straight the end of the maze without going blind alleys, whereas Group 2 rats did not learn to go to the end. But, Group 3 rats were different.
- For ten days they appeared to follow no particular route. Then, on the eleventh day they quickly learned to run to the end of the maze. By the next day, they were doing, as well as group one, which had been rewarded from the beginning.
- Group three rats had demonstrated latent learning, learning that is not immediately expressed. A great deal of human learning also remains latent until circumstances allow or require it to be expressed.

To cognitive theorists, it seemed clear 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 offered**.

Instead, those rats seemed to develop a **cognitive map** of the maze—a mental representation of spatial locations and directions.

People, too, develop cognitive maps of their surroundings. For example, latent learning may permit you to know the location of a kitchenware store at a local mall you've frequently visited, even though you've never entered the store and don't even like to cook.

Insight Learning

- It is a cognitive process whereby we reorganize our perception of a problem. Its learning to solve a problem by understanding various parts of the problem. It doesn't depend on conditioning of particular behaviors for its occurrence.
- Sometimes, for example, people even wake up from sleep with a solution to a problem that they had not been able to solve during the day.
- In a typical insight situation where a problem is posed, a period follows during which no apparent progress is made, and then the solution comes suddenly.
- What has been learned in insight learning can also be applied easily to other similar situations.

- Human beings who solve a problem insightfully usually experience a good feeling called an 'aha' experience.
- Wolfgang Kohler studied insight learning in chimpanzees
 - Kohler placed chimpanzees in certain situations and watched them solve the problems
 - Ex. Hanging a banana out of the chimpanzee's reach
 - Solution: Monkeys stacked boxes on top of one another to get to the banana
 - Kohler believed that the monkeys could not have come to the solution without a cognitive understanding of how to solve the problem.