LEARNING
DEFINITION

• Learning is the process of acquiring knowledge (INFORMATION) and new responses. It is a change in behavior as a result of experience.
WHAT DO WE LEARN?
1. **Object**: we learn objects with all their characteristics, the contents of the environment are learned through object learning.

2. **Place**: we usually learn objects in place.
1. **Skill**: there appear to be many skills that we learn—e.g. dancing, reading, public speaking, group discussion.

2. **Concept and attitudes**: when student studies his lessons he gets new concepts about the topic concerned.

3. **combined** the law of combination is always in action.
METHODS OF LEARNING
I- TRIAL AND ERROR LEARNING
• Trial and error is the main method by which animals learn both objects and place. We shall provide two experiments where place learning predominates in the former and object learning predominates in the later.
A. The rat in the maze ‘place learning’:

A hungry rat is placed in a maze which consists of narrow passages between walls with some blind alleys and crooked paths through a route leading to food box. He begins to explore wondering through the various passages and at least reaches to avoid all the blind alleys and to learns to avoid all the blind alleys and to run swiftly (rapidly) from the starting point to the food box. This experiment is done by Dashiell 1910.
B. The cat in puzzle box ‘object learning’:

A cat is placed in a puzzle-box (a sort of cage inside which hangs a loop (ring) of string (cord) which if pulled raises a door and lets the cat out to eat a morsel of salmon in a near-by-dish, by trial and error the rat learns the shape of the loop, be pulls it to go out of the cage. This experiment is done by Throndike 1898.
• **In man trial and error** is only predominant in children, the child learns things by experience i.e. combined manipulation (handling) and observation, not only mechanical things but even social requirements are learned by the child through trial and error combined with observation.

• **Negative Adaptation:**

• It means elimination of certain unnecessary responses.

• Adaptation of the eye to vision in the dark or reduced illumination
• **In the laboratory:** in the previous experiment, when the cat was first placed in the box there is fear responses and explanatory behavior which gradually dropped. As they were reinforced by finding any thing dangerous in the box, what remained is the necessary rewarding responses.

• **In every day life:** developing the habit of inattention to continually distracting stimuli e.g. the tram noise outside the house.
II- CONDITIONING
• It is the acquisition of a stimulus response relationship. It can be classified into two main types according to whether the reinforcement is given before or after the desired responses.
Classical or Pavlovian Conditioning

Two related events:

- **Stimulus 1**: Lightning
- **Stimulus 2**: Thunder

Result after repetition:

- **Stimulus**: We see lightning
- **Response**: We wince (grimace) anticipating thunder

• We learn to associate two stimuli
Pavlov during his studies on the physiology of the digestive system of dogs. He found that a neutral stimulus such as a bell could be paired with food leading to secretion of saliva when the former was presented alone the conditioning occurs, he called this new reflex ‘The conditioned Reflex’.
The neutral stimulus became known as ‘The conditioned stimulus (CS)’ food as ‘the Unconditioned Stimulus (US)’.

Salivation in response to food ‘The Unconditioned Response (UR)’ and salivation in response to the bell ‘The conditioned Response (CR)’

US --------------- UR
FOOD -------------- SALIVATION
CS --------------- CR
BELL -------------- SALIVATION
2. The conditioning is thought to be the basic process by which certain early fears and emotional reactions are learned such as fear may be conditioned to the sight of a flame if the child has been burnt before.

3. The basic principles of classical conditioning have been demonstrated to hold from the smallest one cell organism to the man
• **Extinction (Deconditioning)**: (repeated presentation of the conditioned stimulus without pairing it with the unconditioned one, led to gradual weakening and disappearance of the conditioned response e.g. As we grow up extinction of certain emotional reactions as for example irrational fears occurs that is way how phobias of childhood disappears in adulthood.)
• **Generalization**: similar stimuli will elicit a response which is weaker than elicited by original CS e.g. if the child has been frightened by a wildly barking dog, the fear response may be generalized to other dogs.
• **Discrimination**: The organism will respond to the CS but will not respond to stimuli which are different from it i.e. can differentiate between stimuli.

• **Reinforcement**: food or any event which elicits an instructive response strengthens the neutral stimulus and therefore called reinforcer, the reinforcement -here- (US) occurs regardless of the response. In operant conditioning later on the reward or punishment is contingent on the occurrence of a response.
Experimental Neurosis (conditioned Neurosis)

• When dogs are exposed to stimuli which differ slightly from one another but which illicit contradictory responses.
• They become restless, aggressive and incapable of responding further.
Learned Helplessness

• It is a term used to describe a method developed in dogs by Sligman, in which the avoidance of shock become impaired due to their prior exposure to unavoidable shock
B) Operant Conditioning

- We learn to associate a response and its consequence
Classical or Pavlovian Conditioning

• Ivan Pavlov
  – 1849-1936
  – Russian physician/ neurophysiologist
  – Nobel Prize in 1904
  – studied digestive secretions
Classical or Pavlovian Conditioning

- Pavlov’s device for recording salivation
Classical or Pavlovian Conditioning

• Classical Conditioning
  – organism comes to associate two stimuli
    • lightning and thunder
    • tone and food
  – begins with a reflex
  – a neutral stimulus is paired with a stimulus that evokes the reflex
  – neutral stimulus eventually comes to evoke the reflex
Classical or Pavlovian Conditioning

- **Unconditioned Stimulus (UCS)**
  - effective stimulus that unconditionally automatically and naturally triggers a response

- **Unconditioned Response (UCR)**
  - unlearned, naturally occurring automatic response to the unconditioned stimulus
    - salivation when food is in the mouth
Classical or Pavlovian Conditioning

• **Conditioned Stimulus (CS)**
  – previously neutral stimulus that, after association with an unconditioned stimulus, comes to trigger a conditioned response

• **Conditioned Response (CR)**
  – learned response to a previously neutral conditioned stimulus
Conditioning

• Acquisition
  – the initial stage of learning, during which a response is established and gradually strengthened
  – in classical conditioning, the phase in which a stimulus comes to evoke a conditioned response
  – in operant conditioning, the strengthening of a reinforced response
Conditioning

• Extinction
  – diminishing of a CR
  – in classical conditioning, when a UCS does not follow a CS
  – in operant conditioning, when a response is no longer reinforced
Classical or Pavlovian Conditioning

• **Spontaneous recovery**
  – reappearance, after a rest period, of an extinguished CR

• **Generalization**
  – tendency for a stimuli similar to CS to evoke similar responses
Classical or Pavlovian Conditioning

• Discrimination
  – in classical conditioning, the ability to distinguish between a CS and other stimuli that do not signal and UCS
  – in operant conditioning, responding differently to stimuli that signal a behavior will be reinforced or will not be reinforced
Classical or Pavlovian Conditioning

UCS (passionate kiss) → UCR (sexual arousal)

UCS (passionate Kiss) → UCR (sexual arousal)

CS (onion breath) → UCS (passionate kiss) → UCR (sexual arousal)

CS (onion breath) → CR (sexual arousal)
Nausea Conditioning in Cancer Patients

UCS (drug)

UCR (nausea)

CS (waiting room)

UCS (drug)

UCR (nausea)

CS (waiting room)

CR (nausea)
Operant Conditioning

- Operant Conditioning
  - type of learning in which behavior is strengthened if followed by reinforcement or diminished if followed by punishment

- Law of Effect
  - Thorndike’s principle that behaviors followed by favorable consequences become more likely and behaviors followed by unfavorable consequences become less likely
Operant Conditioning

• **Operant Behavior**
  – complex or voluntary behaviors
    • push button, perform complex task
  – operates (acts) on environment
  – produces consequences

• **Respondent Behavior**
  – occurs as an automatic response to stimulus
  – behavior learned through classical conditioning
Operant Conditioning

• B.F. Skinner (1904-1990)
  – elaborated Thorndike’s Law of Effect
  – developed behavioral technology
Operant Conditioning

- Skinner Box
  - soundproof chamber with a bar or key that an animal presses or pecks to release a food or water reward
  - contains a device to record responses
Operant Conditioning

• **Reinforcer**
  – any event that strengthens the behavior it follows

• **Shaping**
  – conditioning procedure in which reinforcers guide behavior toward closer approximations of a desired goal

• **Successive Approximations**
  – reward behaviors that increasingly resemble desired behavior
Principles of Reinforcement

• Primary Reinforcer
  – innately reinforcing stimulus
  – satisfies a biological need – food, pleasure

• Secondary Reinforcer
  – conditioned reinforcer
  – learned through association with primary reinforce- money, token economy
Schedules of Reinforcement

• **Continuous Reinforcement**
  – reinforcing the desired response each time it occurs
  – learning occurs rapidly
  – extinction occurs rapidly

• **Partial Reinforcement**
  – reinforcing a response only part of the time
  – results in slower acquisition
  – greater resistance to extinction
1. General consideration: The operant is behaviour resulting in reinforcement, the organism emits a response (pigeon bar press) which results in an environmental event (delivery of food pellet) which is a rewarding consequence. In this sense, the environment ‘controls’ behaviour. Operant Conditioning is the more general case of learning - affects all behaviour including autonomic nervous system.
2. **Biofeedback**: It is a direct outgrowth of this theory and has been applied to a variety of medical problems in Biofeedback. Individual is given reinforcement for emitting some types of physiological response e.g. Heart rate, EEG alpha … etc.
III-LEARNING BY IMITATION
• Imitation is observed in higher animals like monkeys and apes. A good amount of child learning is by imitation.

• An adult combines imitation with other methods of learning.

• The more mature a person the less he imitates to learn, and more he develops insight learning.
IV-INSIGHT LEARNING
• By insight, we mean planning the solution on mental level, before hand i.e. a trial and error learning on a mental level without actual trying.
FACTORS AFFECTING LEARNING
A) Factors in the Individual

1. Permanent structure; such as:
   - The intelligence level and the presence of special aptitudes, e.g. musical aptitude.
   - Previous learning, e.g. perfect learning of mathematics helps in learning physics & statistics.
   - Acquired habits of good observation and accurate attention.
   - The presence of healthy sensory and motor abilities.
2. Temporary state; such as:
   – The emotional state.
   – Motivation.
   – The state of general health at the time of learning
B) Factors in the Environment

1. The object to be learned; must be introduced perfectly organized and simple for understanding.

2. Trainer’s role; he person who teaches others or trains them in a skill.
3. The surrounding circumstances; must be suitable, e.g., the illumination must be sufficient and no distraction must be present.

4. Method of practice; must be efficient, e.g. Using the touch method is more efficient than the finger method in acquiring the skill of typewriting.
The good trainer should follow certain rules

1. Provide standards: The trainer ought to provide clear standards of performance.

2. Improve motivation: this could be achieved by:
   A. Clarify goals and objectives of training.
   B. Make trainee see his progress.
   C. Arrange competition between individuals and groups.
3. Arrange for practice of the skill.
4. Make use of training aids e.g. charts, films.
5. Evaluate and keep records of performance.
6. Give the training in an applicable way.