Memory and learning

Experience, Memories

Memory and Learning with interlinked to each other but many scientists contemplate it by various phenomena. Learning occurred through experiences. Learning involves the memory also because by memorizing person learn. Memory is retained in the brain through learning . It is basically information which brain a store. These are interrelated with each other. Memory depends on learning and learning depends on memory.

Memory and types

There are various kinds of memory.

1. Sensory Memory
2. Short term memory
3. Long term memory

- Sensory Memory

As the name indicates sensory memory so this type of memory is provided by senses and it is very short . It retains in the brain only for few seconds.

- Short term memory

It is a kind of memory which is based on our successful life events. For example, remember a phone number, remember the taste offood, remember people's face, etc. Short term memory can be remembered in brain for a short time. It is the next step in long term memory.
It is also termed as memory of now.

- Long term Memory

It is a kind of memory which is based on significant life events and physical skills which we have learned. The capacity of long term memory is unlimited

and can be stored for months, years and even lifetime. For example the name of the person, his home address, his favorite food, his love, etc.

Long term memory is divided further in two categories

1. Explicit /declarative
2. Implicit/non-declarative

Explicit or Declarative

This is type of memory which is remembered and can be described in words like birth date, best friend name, events, words having meanings, etc….. This is called Declarative memory.

Non Declarative or Implicit Memory

This is the type of memory which you can't define by words but by other means. Memoriesof motor skills which don't require words. For example Driving a car etc

Learning

People learn from theenvironment. People continuously learn through the environment by interacting with it and influenced by the environment. Learning is basically adapting a change from environment or change in behavior which occurred due to the response from the environment.

The type of change which came across learning is termed as memories.

There are four types of learning

1. Perceptual Learning
2. Stimulus-Response Learning
3. Motor learning
4. Relational learning

Perceptual Learning

Information is received by the senses and response is given to the stimulus is called perceptual learning. It occurs through sensory interaction through environment as well as through practice. It is basically the senses which receives the information and meaning is given to that information is called perceptual learning.

Stimulus-Response Learning

The stimulus is given to any subject through the environment and then response occurred by the subject it is called stimulus-response learning. Amygdala is involved in stimulus-response learning.

Two types of Stimulus-response Learning

1. Classical conditioning
2. Operant conditioning

Classical conditioning

It is a type of learning in which there is an association between a neutral stimulus with a paired stimulus. It is also termed as Pavlovian or respondent conditioning.

Operant Conditioning

It is a type of learning given by Skinner which is based on the consequences of behavior.

Motor Learning

It is a kind of learning which comes through practice which occurred by changes in the central nervous system which produce the motor abilities. Examples running, climbing, swimming, etc.

Relational Learning

Relational Learning occurs through coordination. It is a process from unconscious to conscious.
For example when dog bark we hear the sound and we recognize how the dog looks like.
Perceptual learning leads to classical conditioning, it leads to operant condition and finally, it leads to relational learning.

Physiology of Memory and learning

Brain areas which are involved in memory are hippocampus, Amygdala, prefrontal cortex, limbic system and Cerebellum.

Hippocampus

The role played by hippocampus is it converts short memory into long term memory. It can move explicit memory to cerebral hemispheres of the brain because it can't store the memories. It can also play a role inmotivationspatial learning. Location: medial temporal lobe beneath the cortex, having c shape and two identical hemispheres and is adjoining to the amygdala.

It is also a part of a limbic system. It is very important for forming new memories. The relationship between amygdala and hippocampus play a very

important role in association of emotions with memories. The size of the hippocampus can be reduced because ofstressresponses for example cortisol. Damaged in hippocampus causes a disease called Amnesia which means loss of memory.

Amygdala: It plays a crucial role in, fear, aggression and most important in the emergence of emotional memory. It is involved in fear conditioning.

Cerebellum

The function of the cerebellum is in motor coordination and in new learning motor skills.
It is also involved in planned and voluntary muscle activities.
Vestibulocerebellum involves balance and control of eye movement.

Spinocerebellum: it enhances muscle tone and skilled voluntary movement. It also plays a crucial role in synchronization and timing.
Cerebrocerebellum: It plays an important role in the initiation of voluntary activity by providing input to the cortical motor areas involved in procedural memories.

Limbic System

Cingulated gyrus: coordinates sensory input with emotions. It also involved in aggressive behavior. It also plays an important role in emotional responses related to pain.

Long term potential

It increases the excitation of a neuron at synaptic input caused by repeated high-frequency input.

Electrical stimulation in hippocampus leads to long term synaptic changes.

Cerebral cortex

Involved in sensory perception, Voluntary control, and movement, personalitytraits, thinking, memory, decision making, creativity, and self-consciousness.