

MODULE SIX

MEMORY

Memory is the act of preserving what has been acquired for later use. It is the retention of information beyond the present. The term memory also refers to the mental storage of information whether for a brief period or for many years.

Memory Storage.

The mental operations by which our sensory experiences are converted into knowledge are called information processing. In the information processing model, information can be processed through input, storage and retrieve. At each process, a variety of control mechanism operates. (such as attention storage and retrieval)

Stages of memory storage.

The raw sensory information that is selected is then encoded in a form of sound visual image, meaning that can be used in the next stages of memory. The influential stage theory of memory assumes that humans have three stages of memories that meet the need to store information for different length of time.

1. Sensory register

Remember though that information lasts only for an instant in sensory registers, much like sitting by the window on a speeding train as images rapidly move through your field of vision. These fleeting images are called **iconic** if they are **visual** and **echoic** if they are auditory information comes to us initially through our sensory register is very brief, designed to hold an exact image of each sensory experience until it can fully be processed e.g. visual information fades very quickly probably 1/10 of a second and for auditory information a vivid image of what we hear is retained for about the same length. The raw-image data remains in the sensory system even though information has been processed. The sensory register contains unprocessed information which can be transferred to the next stage i.e. short term memory.

2. Short term memory.

You have just read three paragraphs about king George of England have started to answer questions about the material; your ability to retain this material involves short term memory, a very important part of our memory system. Information comes into short memory through either sensory and perceptual processes or through long term memory, the short term memory has been describe as a work bench because so much activity involved in processing information goes on here. If the image is to be remembered it must be transferred to short term memory which is a

stage of temporary storage. Information is lost from STM In less than half a minute unless it is renewed. Information can be renewed in STM by a mental repetition or rehearsal. The aim is to keep material available until it can be used or stored in an integrated fashion. Chunking that is the organizing items into meaningful or manageable units , telephone numbers social security numbers, license plates are common examples of how chunking can help to remember lists of numbers in every day life. An interesting aspect of memory is that we remember information experienced first and last better than what we experience in the middle. The superior recall at the beginning of a list of items is called primacy effect, while excellent memory of the end of the list is called the recency effect. Together the combination is called the serial position effect.

3. Long term memory.

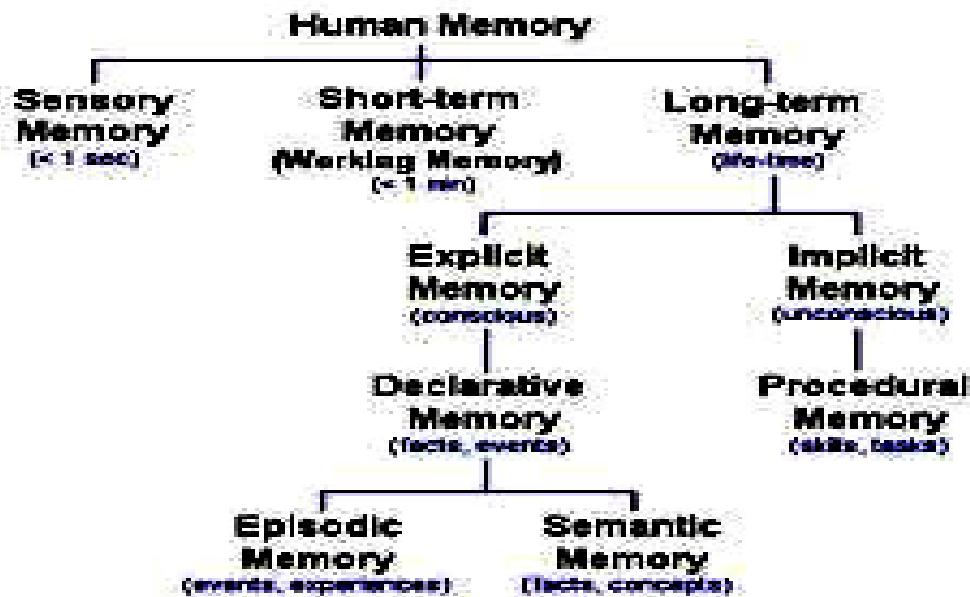
In this third phase, information is retained for intervals ranging from 30 seconds to the full life of time of the organism. Storage of information at this level is relatively permanent. Besides the time factor long term memory differs from short term memory in two ways.

First it is presumed to have unlimited capacity unlike STM. To transfer information to long term memory a more elaborate system is needed. The process is called encoding. It involves the preparation of information in a useful way so that it can be remembered.

Information can be processed and integrated in existing memories. The greater the degree of elaboration given to the item or incoming information the more likely it is that it will be remembered. Like in STM, information can reach long term memory if it is rehearsed. John Anderson (1983, 1985) believes that there is a distinction between declarative knowledge, information that can be verbally communicated and procedural knowledge which consists of skills about which it is difficult if not possible to communicate verbally. Declarative knowledge has been called knowing that, procedural knowledge has been called knowing how. Examples of procedural knowledge are driving a car and reading.

Declarative knowledge has been studied more extensively than procedural knowledge. A common distinction is declarative knowledge is made in between episodic memory and semantic memory.

Diagram showing the stage model of memory



Disorders of memory (amnesia)

Major disorders of memory deserve our attention and these include anterograde, amnesia retrograde amnesia, psycho-genic amnesia and dementia among others

a) Anterograde amnesia

Anterograde amnesia is a disorder of memory characterized by inability to consciously retrieve new information in long term memory. This occurs as a result of injury to brain either after surgery or after an accident. New information is lost as soon as one loses consciousness. The key biological structure that is damaged in anterograde amnesia is

the hippocampus which is believed to govern the transfer of memories from STM to LTM.

Anterograde amnesia can be caused by brain tumors; severe nutritional deficiencies. In addition, hard blows to the head can also cause anterograde amnesia. However persons with anterograde amnesia perform badly on long term declarative memory tasks but perform well as normal individuals on procedural memory tasks.

b) Retrograde amnesia

This is a memory disorder characterized by an inability to retrieve old long term memories generally for a specific period of time extending back from the beginning of the disorder.

Retrograde amnesia can be caused by seizures, brain damage of various sorts, or highly stressful events. However it generally occurs along with anterograde amnesia, because both anterograde and retrograde amnesia are experienced by individuals with Korsak off's syndrome caused by excessive abuse of alcohol, because of their extreme degree of memory in confabulation i.e. when they cannot remember something that is needed to complete a statement they make.

c) Psycho-genic amnesia

Some people suddenly lose their memory only to recover it month or even years later.

Such persons are victims of psycho-genic amnesia. This is a sudden disruption of memory that seems to take place in response to unbearable stress. Such a stress seems to split one's memory (dissociate) from conscious awareness.

FORGETTING (how we lose memory)

Forgetting is the inability to recall, recognize or relearn at improved rate. This condition may be due to a storage failure in which the memory trace was never satisfactorily created or consolidated. It may be due to retrieval failure in which memory trace is adequate but cue evoking it is lacking.

There are four main theories that explain forgetting:

1. Interference theory
2. Decay theory
3. Repression theory
4. Consolidation theory

Interference theory

Here information is lost from memory because it is disturbed or displaced by other information either by retro or proactive interference.

a. Retroactive Interference:

This is when later memories interfere with recall of something learned earlier. When testing this form of interference in an experiment, both the experimental and control groups learned task A in the first session. The control group rests in the second session while the experimental group learns task B.

Finally both groups are called upon to recall task A. According to retroactive interference the experimental group that learnt task B will show a poorer performance on task A.

This can be shown below.

	1st session	2nd session	Recall	Performance
Experimental group	Task A	Task B	Task A	Performance poorer
Control group	Task A	Rests	Task A	Performance better

b) Proactive Interference.

When earlier memories interfere with the recall of material learnt later it is called proactive interference. To test this experimental group learn task A and the control group rests. They both learn task B in the second session. The experimental group performs poorer on the memory test of task B due to proactive interference.

	1st session	2nd session	Recall	Performance
Experimental group	Task A	Task B	Task B	Poor
Control group	Rests	Task B	Task B	Better

This theory assumes that learning leaves a trace on the brain and that memory trace if not actively used fades with time.

Decay theorists

Stress that they have a limited capacity for processing information and that rehearsal prevents decay by keeping the material available until it can be used, and when rehearsal stops then decay succeeds.

Repression theory (motivated forgetting)

Sigmud Freud suggested that we forgot some information because it is threatening to us in some way. Freud believed that the conscious mind often dealt with unpleasant or dangerous information by an act of repression and this is normally referred to as motivated forgetting. Memories for highly stressful events such as auto accidents are pushed in the unconscious mind.

Consolidation theory.

Another view of forgetting that postulates storage failure focus on the sudden destruction of a new trace in its formative stage. In consolidation theory it is suggested that memory trace needs time to be firmly fixed certain conditions occurring soon after an experience can eradicate the before it becomes permanent.

Any event which destructs normal brain functioning can also destruct memory, certain drugs alcohol and excessive anesthesia inhibit brain functioning and can also result into loss of recent memories by interfering with consolidation of the memory trace.

ACTIVITY

1(a) What is memory?

(b) Assess the stages of memory.