

WHAT IS MEMORY?

Learning occupies a very significant place in one's life. It is the basis not only of the development and progress of human society but also of its survival. Learning, however, would be futile if its products cannot be utilized by us in the future. Whatever is learned needs to be somehow stored in the mind so that it can be utilized whenever required in the future. In psychological terms, this faculty of the mind to store the past experiences or learning and to reproduce them for use when required at a later time is known as 'memory'. Ryburn (1956) endorses this meaning of memory in the following words:

The power that we have to 'store' our experiences, and to bring them into the field of our consciousness some time after the experiences have occurred, is termed *memory*.

An assessment of the strength of the power or quality of this ability can be made on the basis of performance in terms of the quality of the revival or reproduction of what has been learnt and stored up. In this sense, a good memory must reflect "an ideal revival" as Stout (1938) puts:

So far as ideal revival is merely reproductive.... This productive aspect of ideal revival requires the object of past experiences to be re-instated as far as possible in the order and manner of their original occurrence.

However, the term 'memory', or the process of memorization, cannot be viewed merely in terms of reproduction or revival of past experiences or learning. It is quite a complex process which involves factors like learning, retention, recall, and recognition.

Mechanism of the Process of Memorization

Our mind possesses a special ability, by virtue of which every experience or learning leaves behind memory images or traces which are conserved in the form of 'engrams'. Thus what is learned leaves its after-effect which is conserved in the form of engrams composed of memory traces. This preservation of the memory traces by our central nervous system or brain is known as retention of the learned

or experienced act. The duration of retention depends upon the strength and quality of the memory traces. When we try to recollect or repeat our past experiences or learning, we make use of the memory traces and if we are successful in the revival of our memory traces, our memory is said to be good. But if, somehow or the other, the memory traces have died out, we cannot reproduce or make use of our past experiences and learning. In this case it is said that we have been unable to retain what has been learned or that we have forgotten.

Learning is then the primary condition for memorization. If there is no learning there would be no remembering. At the second stage we have to ensure that these learning experiences are retained properly in the form of mental impressions or images so that they can be retrieved when the need arises. The third and fourth stages in the process of memorization can be termed as recognition and recall. Recognition is a much easier and simpler a psychological process than recall. The difference between these two terms can be illustrated by the following example:

Suppose, Ramnath had been your classmate for two years and you spent a fairly long time together. The old experiences would have been retained as memory traces. Now if, at the mention of his name, you are able to recollect all the experiences you shared with him, and describe him, it is said that you have a good memory, because the memory traces were stored or retained in a proper form. If, on the other hand, you can recall the mutual experiences only vaguely or not at all, the memory traces have either become weak or have disappeared.

In such cases 'recognition' is, however, possible because this requires only the awareness of having known an object or situation. Here the presence of the already experienced object or person aids the task of recollection. In the above example, a photograph or the actual presence of Ramnath may facilitate the task of recollecting the past experiences.

The process of memorization, thus, begins with learning or experiencing something and ends with its revival and reproduction. Therefore, memory is said to involve four stages, viz., learning or experiencing something, its retention, recognition, and recall.

NATURE OF MEMORY

Memory plays an important role in our life. Our Memory is the storehouse which comprises of millions of our past experiences. Memory consists of the knowledge, skills, experiences, emotions, feelings and attitudes that we have acquired since the stage of infancy.

A substitute word for memory is remembering. Both the terms convey the same meaning. Memory is used in the sense of a 'Noun' and 'Remembering' is used in the sense of a 'Verb'.

The basic condition for memory is Learning. The effects of learning are retained in the form of 'Memory Traces' or 'Engrams'. Whatever we learn is preserved in the central nervous system of the brain in the form of 'Engrams' or 'Memory traces'. Memory traces are like the impressions or marks of the learning experiences in the brain. When we try to recall past experiences of our life, we make use of the memory traces. Cortex is considered to be the seat of memory in the brain.

DEFINITIONS OF MEMORY

Following are the important definitions of memory:

Wood Worth

"Memory Consists in remembering what has previously been learned."

Ross

"Memory is a complex process involving the establishment of dispositions, their retention, and the recalling of the experiences."

Spearman

"Memory consists of cognitive events which by occurring establish dispositions which facilitate their recurrence."

Klausmier

"Memory consists of a number of distinct learning activities such as retention, recall and recognition."

Stout

"Memory is the ideal revival, so far as ideal revival is merely reproductive in which the objects of past experiences are reinstated as far as possible in the order and manner of their original occurrence."

Ryburn

"Memory is the power that we have to store our experiences, and to bring them into the field of consciousness sometime after the experiences have occurred."

On the basis of above definitions, we can state that memory involves four factors. These are:

1. Learning.
2. Retention.

3. Recall.

4. Recognition.

Learning is the first factor or first activity which is responsible for the acquisition of new experiences and modifications of behaviour.

Retention is the persistence or preservation of the past experiences for a sufficient period of time. Retention follows learning. Whatever we learn is stored or preserved in the brain.

Recall consists in the revival or reproduction of the past experiences. Recall depends upon retention. If there is no retention, there will be no recall.

The fourth aspect or factor of memory is *Recognition*. Recognition is the awareness of the previous experiences that have been retained or stored in the brain. It consists in knowing and recognizing that object or material with which we became previously acquainted.

All the above mentioned four factors or aspects of Memory are interrelated. Learning is closely related to retention. Retention is closely related to recall and recall is closely related to recognition.

TYPES OF MEMORY

Psychologists have tried to classify memory into certain types according to its nature and the purpose it serves.

Sensory, Short-term and Long-term Memory

One of the broad classifications consisting of sensory or immediate memory, short-term memory and long-term memory is based on the storage and transfer model of remembering which was discussed earlier in the previous pages of this chapter. Let us now discuss these types of memory in detail.

Sensory or immediate memory. Sensory or immediate memory is the memory that helps an individual to recall something immediately after it is perceived. In this type of memory, the retention time is extremely brief—generally from a fraction of a second to several seconds. Old sensory impressions disappear as they are 'erased' by new information.

Immediate memory is needed when we want to remember a thing for a short time and can then forget it. For instance, when we enter an auditorium, we see the seat number given on our ticket. Having occupied the seat, we forget the seat number. We took up a telephone number from the directory and remember it. But after making the telephone call, we usually forget it. In all cases of this nature, immediate memory is needed which helps us to learn a thing immediately with speed and accuracy, remember it for a short duration and forget it rapidly after use.

Short-term memory. This type of memory is also temporary, though not nearly as short-lived as immediate memory. In order to further distinguish it from short-term memory, the following factors should also be taken into account:

1. Where the retention time is less than one second in immediate memory, the information temporarily stored in short-term memory may last as long as thirty seconds even if the material is not being rehearsed.
2. Whereas the sensory images in immediate memory decay regardless of the learner's actions, rehearsal by the learner can keep material in short-term memory indefinitely.
3. The span of immediate memory exceeds the short-term memory span. Whereas five to nine items ("the magical number, seven plus or minus two") can be held in short-term memory at any one time, about 11-13 items are available for recall in the immediate memory for at least half a second. However, some people are able to retain much more information in their short-term memories by a process called *chunking*, which groups information by coding it, e.g. the number 143254376 can be remembered by listing under three heads: 143, 254, 376 and the number 149162536496481 can be arranged as: 1 4 9 16 25 36 49 64 81 (in groups of the squares of 1 through 9) for better remembering.

Long-term memory. Unlike short-term memory, long-term memory has a seemingly limitless capacity to store information with little or no decay and requires little, if any, rehearsal. In addition to these characteristics, long-term memory codes information according to meaning, pattern and other characteristics. It is this memory that helps us to remember a number of things on a relatively permanent basis. Remembering identifying data like one's name, father's name, date of birth, date of marriage, etc., is the simplest example of long-term memory. With the help of our long-term memory we can easily store, retain and remember most of the things in our life at a second's notice and thus easily conduct our daily life.

Episodic and semantic memory. Episodic memory is connected with episodes and events. It may consist of personal events and experiences associated with one's life. What even has happened during one's life is stored in the shape of episodic memory traces organised according to the time, space and other characteristics of the events. At the time of recall, these memory traces are reproduced in the manner and sequence in which they have been organised and stored in one's mental apparatus. For example, if a person has been on an excursion and, on his return, narrates all that he did or experienced, how he felt and enjoyed himself, he is able to do so by the exercise of his episodic memory. Also, when after hearing his account of the events or episodes you make inferences, that is the outcome of your episodic memory. Thus, episodic memory is the memory which depends on retrieving the particular events or episodes experienced by a person through his direct or indirect experiences. It should be considered as quite personal and individual in all its shades and nuances because what one experiences and how these episodes and experiences are organised in one's memory is totally an individual affair and thereby one individual's episodic memory of even common events is bound to differ from that of other person.

Semantic memory helps in storing as well as retrieving a collection of relationships between events or association of ideas. Examples of such collection may be found in one's ability to recall names of the capitals of different states of the Indian Republic, the meaning of the symbol CO_2 , the formula for the computation of simple or compound interest, the rules for converting direct narrations into indirect narrations and vice versa, and so on. Semantic memory is thus based on general knowledge coupled with meaningful interpretation, generalized rules, principles and formulae. Semantic memory impressions are more or less permanent. Their recall does not necessarily depend on the retrieval of some specific episodes from the past and semantic memory is therefore, not as personal as episodic memory, e.g. the meaning of the symbol CO_2 and names of the capitals of the states, etc., are common to each individual's semantic memory.

Photographic memory. According to Haber (1979), the term 'photographic memory' stands for a kind of memory possessed by an individual who can remember a scene in photographic detail. The technical term used for such memory is *eidetic imagery*. Such people can 'see' a picture after it has been taken away, with their descriptions of objects from the picture stating the right colour and the proper locations.

Paranormal memory. This distinctive and unusual type of memory, popularly known as 'reincarnation' has emerged as a result of researches and findings in the field of para-psychology. It consists of the unusual memory traces concerning one's previous life or lives that can be partly or completely retrieved by the individual. In the language of psychoanalysis, such memory reflects an individual's regression not only in terms of time but also in terms of space and matter (from one place and one body to another). It is mostly connected with the phenomenon of rebirth, i.e. the belief that at the time of death one gives up one's body but not the soul which survives to acquire a new body much like one puts on new clothes after discarding old ones.