DEPARTMENT OF PSYCHOLOGY

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Models of Memory

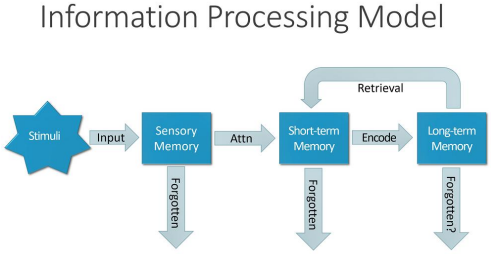
Memory is one of the most important cognitive processes in human psychology. It refers to the ability of an individual to encode, store, retain, and retrieve information and experiences over time. Memory helps individuals learn new things, remember past experiences, recognize people and objects, and use previously acquired knowledge in everyday life.

Psychologists have developed several models of memory to explain how information is received, processed, stored, and retrieved by the human mind. These models help us understand the structure and functioning of human memory. The following are the three most famous models to explain the process of memory that we are going to discuss:

A. Information Processing Model: The Information Processing Model is a theoretical framework in cognitive psychology that explains how human beings receive, process, store, and retrieve information. It was not proposed by a single psychologist; rather, it developed during the Cognitive Revolution[1] of the 1950s and 1960s (Gurbin, 2015). In cognitive psychology, information processing is an approach to the goal of understanding human thinking that treats cognition as essentially computational in nature, with the mind being the software and the brain being the hardware.[1] It arose in the 1940s and 1950s, after World War II ("Information Processing (Psychology)," 2025).

This approach compares the functioning of the human mind to a computer, in which information is received as input, processed, stored, and retrieved when required (Miller, 1956; Broadbent, 1958) The Information Processing Model is an approach in cognitive psychology that explains how human beings receive, process, store, and retrieve information. It compares the functioning of the human mind to the functioning of a computer, where information is received as input, processed, stored, and retrieved whenever required.

According to this approach, human memory is not simply a process of storing information. Rather, it involves several interconnected cognitive activities, including attention, perception, encoding, storage, and retrieval. The model helps us understand how individuals learn new information, retain knowledge, and use previously acquired information in everyday life.



Major Stages of Information Processing: The information processing approach generally explains memory through three major stages

Encoding : Encoding is the first major stage of memory processing. It refers to the process through which information received from the environment is converted into a form that can be processed and stored by the brain. In simple words, encoding means converting information into a form that our memory system can use. Example: When a student

[1] The Cognitive Revolution of the 1950s and 1960s refers to a major shift in the field of psychology from the study of observable behaviour towards the scientific study of internal mental processes, such as memory, attention, perception, language, thinking, and problem-solving. Before this period, Behaviourism was the dominant approach in psychology, focusing mainly on observable behaviour and the relationship between

listens to a teacher explaining a psychological concept and understands its meaning, the information is encoded into memory.

Types of encoding include:

Visual Encoding: Processing information in the form of images or pictures.

Acoustic Encoding: Processing information based on sounds.

Semantic Encoding: Processing information based on its meaning.

Storage: Storage refers to the process of maintaining encoded information in memory over a period of time so that it can be used later. It involves retaining information in different memory systems. Storage is generally discussed under three categories:

Sensory Memory: Temporarily holds information received through the sense organs.

Short-Term Memory: Temporarily holds a limited amount of information for a short duration.

Long-Term Memory: Stores information, experiences, knowledge, and skills for a relatively long period.

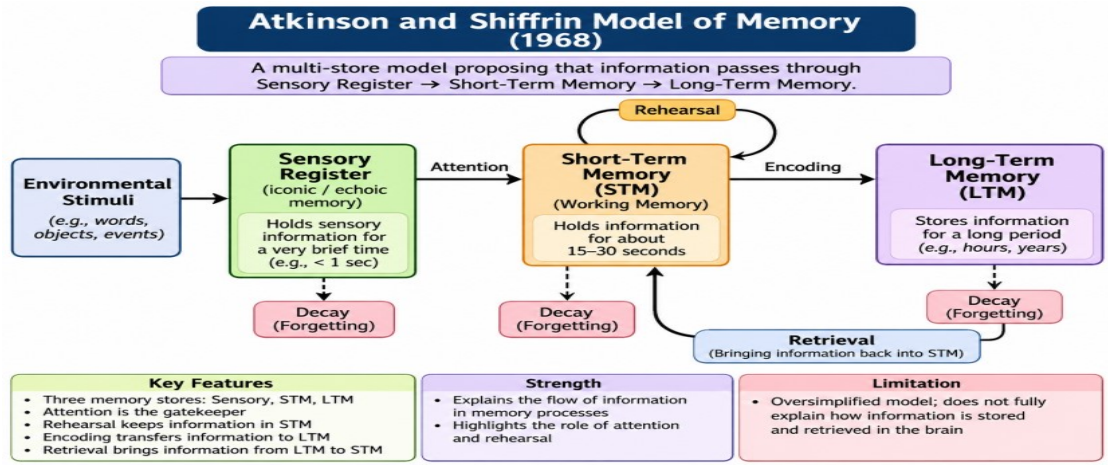
Example: A student studies the definition of memory and retains it in long-term memory for future examinations.

Retrieval: Retrieval refers to the process of accessing and bringing previously stored information into conscious awareness whenever required. It allows individuals to recall and use previously learned information.

Example: During an examination, a student recalls the definition of memory that was studied earlier.

Atkinson and Shiffrin's Multi-Store Model

The Information Processing Approach and Atkinson and Shiffrin's Multi-Store Model are closely related, but they are not identical. The Information Processing Approach is a broad theoretical perspective in cognitive psychology that explains how human beings receive, process, store, and retrieve information. In the year 1968 Atkinson and Shiffrin proposed a model for memory, known as "Stage model of memory" or "Modal model". This model is deeply influenced by the working of the computer. Atkinson and Shiffrin (1968) compare working of human memory to the working of computers. They proposed that similar to computers, we also possess different forms of memory systems, It considers different [2]cognitive processes, such as attention, perception, encoding, storage, and retrieval. On the other hand, the Multi-Store Model, proposed by Richard Atkinson and Richard Shiffrin in 1968, is a specific model of memory developed within this broader information-processing tradition. It explains the organisation and functioning of human memory through three major storage systems: sensory memory, short-term memory, and long-term memory. Thus, the Information Processing Approach provides a general explanation of how the human mind processes information, whereas the Atkinson and Shiffrin Model specifically explains how information is stored and transferred between different memory systems. described as follows (Singh, 2020, 2020)



Sensory Memory/ Register : In this, representation of sensory information is stored from a very brief period of time. e.g Iconic and Echoic memory.

STM (Short Term Memory): This system also holds information for a short duration of time. Studies have suggested that it can hold information for up to 30 seconds. Tasks such as dialling a phone number manually or writing in a dictation

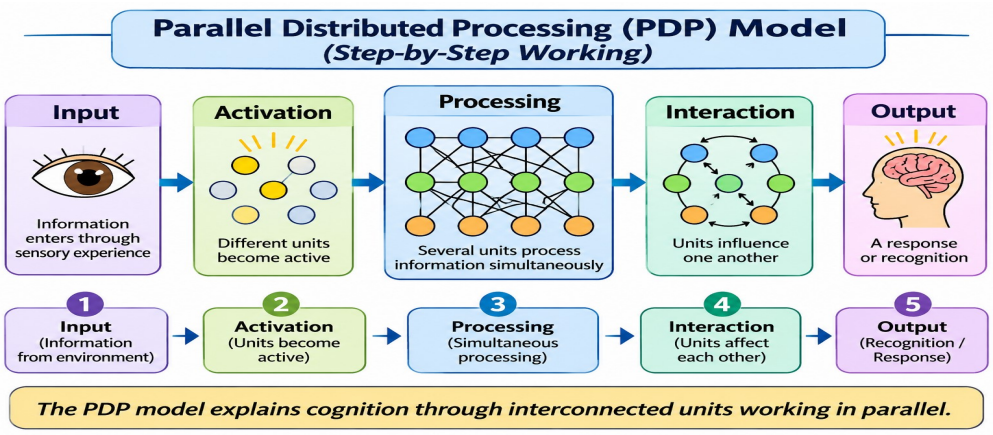
LTM (Long Term Memory): It has been considered as a storehouse of all kinds of memories. LTM allows us to retain vast amount of information for very long periods of time. E.g remember things from last evening to since childhood due to this system of memory.

Atkinson and Shiffrin's Multi-Store Model (1968) provides an important explanation of how human memory is organised and how information is processed, stored, and retrieved. According to this model, memory consists of three major storage systems: sensory memory, short-term memory, and long-term memory. Information initially enters sensory memory, and through attention, selected information is transferred to short-term memory. With rehearsal and further processing, information may be transferred to long-term memory for relatively

permanent storage. Thus, the model highlights the importance of attention, rehearsal, and the interaction between different memory stores in the process of remembering. Although it provides a simplified explanation of memory, it remains a significant foundation for understanding human memory and the information-processing approach in cognitive psychology.

The Parallel Distributed Processing (PDP) Model

The Parallel Distributed Processing (PDP) Model, also known as the Connectionist Model, is an important approach in cognitive psychology that explains how human beings process, represent, store, and retrieve information. The PDP approach became influential during the 1980s as an alternative to traditional information-processing explanations of cognition. Many people have been associated with this model of human cognition But David Rumelhart and James McClelland have done the most to formalize the theory (Solso 2005). According to this model, the mind processes different pieces of information simultaneously through



Inter connected units rather than processing everything one by one. It is also known as the Connectionist Model. The Parallel Distributed Processing Model explains how information is processed through several interconnected units working together at the same time.

In simple words, the mind processes different aspects of information simultaneously, and these units work together to produce a response.

The model works through the following steps:

1. Input: Information enters the mind through sensory experiences.
2. Activation: Different units become active.
3. Processing: Several units process information simultaneously.
4. Interaction: Units influence one another.
5. Output: The system produces a response or recognition.

The Parallel Distributed Processing Model explains how the human mind processes information through interconnected units working simultaneously. It emphasizes parallel processing, distributed representation, and learning through changes in connections.This model helps us understand important cognitive processes such as memory, learning, perception, and recognition.

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