Describe the stage model of memory by Atkinson and Shiffrin in words

ATKINSON AND SHIFFRIN'S THE STAGE
MODEL
Traditionally, the most widely used model of information processing is the stage
theory model, based on the work of Atkinson and Shiffrin (1968). The key
elements of this model are that it views learning and memory as discontinuous
and multi-staged. It is hypothesised that as new information is taken in, it is in
some way manipulated before it is stored. The stage theory model, as shown in
Figure 1.4.2, recognises three types or stages of memory: sensory memory, shortterm or working
memory, and long-term memory.
Fig. 1.4.2: A stage model of memory (Adapted from Atkinson and Shiffrin 1969)
In the Atkinson-Shiffrin model, memory starts with a sensory input from the
environment. This input is held for a very brief time – several seconds at most –
in a sensory register associated with the sensory channels (vision, hearing, touch,
and so forth). This occurs in as little as ½ second for visual stimuli (Sperling, 1960),
and about 4 or 5 seconds for auditory stimuli (Darwin et al., 1972). The transfer
of new information quickly to the next stage of processing is of critical importance,
and sensory memory acts as a portal for all information that is to become part of
memory. There are many ways to ensure transfer and many methods for facilitating
that transfer. To this end, attention and automaticity are the two major influences
on sensory memory, and much work has been done to understand the impact of
each on information processing.
Information that is attended to and recognised in the sensory register may be
passed on to second stage of information processing, i.e. short-term memory
(STM) or working memory, where it is held for perhaps 20 or 30 seconds. This
stage is often viewed as active or conscious memory because it is the part of
memory that is being actively processed while new information is being taken
in. Some of the information reaching short-term memory is processed by being
rehearsed – that is, by having attention focused on it, perhaps by being repeated
over and over (maintenance rehearsal), or perhaps by being processed in some
other way that will link it up with other information already stored in memory
(elaborate rehearsal). Generally 5 + 2 number of units can be processed at any
given time in STM.
Information that is rehearsed may then be passed along to long-term memory
(LTM); information not so processed is lost. When items of information are placed
in long-term memory, they are organised into categories, where they may reside
for days, months, years, or for a lifetime. When you remember something, a
representation of the item is withdrawn, or retrieved, from long-term memory.
Organisations of long-term memory - Each of the memory unit or structures

represented in the mind is distinct and serves a different operational function. However, it is evident that some type of very specialised categorisation system exists within the human mind. One of the first to make this idea explicit was Bruner (as cited in Anderson, 1998). "Based upon the idea of categorisation, Bruner's theory states 'To perceive is to categorise, to conceptualise is to categorise, to learn is to form categories, to make decisions is to categorise'". Tulving (1972) was the first to distinguish between episodic and semantic memory. "Episodic memories are those which give a subject the sense of remembering the actual situation, or event" (Eliasmith, 2001). Episodic memory's store is centered on personal experience and specific events. It is entirely circumstantial and it is not generally used for the processing of new information except as a sort of backdrop. Semantic memory, in contrast, deals with general, abstract information and can be recalled independently of how it was learned. It is semantic memory that is the central focus of most current study because it houses the concepts, strategies and other structures that are typically used for encoding new information. Most researchers now combine these two in a broader category labeled declarative.

Other researchers have identified additional organisational types. For example, Abbott lists declarative and procedural while Huitt (2000), citing the work of Paivio (1971, 1986) adds imagery to this list. However, Pylyshyn (2002) states that imagery is not a distinct organisational structure, but follows the rules that apply to semantic and episodic memory. Abbott (2002) and Huitt (2000) define declarative memory as that which can be talked about or verbalised. It is, then the sum of stored information that can be readily retrieved and put into words in conscious thought and sharing. As previously stated, declarative memory can be subdivided into both semantic and episodic memories. Procedural memory can be thought of as "how to" knowledge (Huitt, 2000). It is the type of long-term memory sometimes associated with information that has reached a state of automaticity, but it not limited to this. This type of memory is defined in terms of learned skills and the ability to recall instruction-like memory. Paivio (1971, 1986) describes imagery as the memory structure for collecting and storing information related to pictures. It captures information much like a photograph and can be extremely useful for context and visual presentation of information.

Information Processing in Three Stage Model - Atkinson and Shiffrin make an important distinction between the concepts of memory and memory stores; they use the term memory to refer to the data being retained, while store refers to the structural component that contains the information. Simply indicating how long an item has been retained does not necessarily reveal where it is located in the structure of memory.

Information processing from one store to another is largely controlled by the subject. Information briefly held in the sensory register is scanned by the subject, and selected information is introduced into the STS. Transfer of information from the STS was regarded as capable of taking place so long as it was held there. Atkinson and Shiffrin postulated that information might enter the longterm store directly from the sensory register

The Atkinson-Shiffrin Memory Model, also known as the multi-store model or stage model of memory, is a foundational theory in cognitive psychology proposed by Richard Atkinson and Richard Shiffrin in 1968. This model conceptualizes human memory as a system consisting of three distinct sequential stages through which information flows.

The Three Memory Stages

Sensory Memory

Sensory memory is the first stage where environmental information is initially recorded through the five senses. This stage has the following characteristics:

- Extremely brief duration: Visual (iconic) information lasts about 0.5 seconds, while auditory (echoic) information persists for approximately 3-4 seconds[1] [2]

- Large capacity for holding sensory inputs[3]

- Information decays rapidly unless attention is directed to it[1]

- Acts as a portal or buffer for all information that might become part of memory[4]

- Not under conscious control - we automatically gather sensory information from our environment[2]

Attention and automaticity are the two major influences determining whether information transfers from sensory memory to the next stage[4].

Short-Term Memory (STM)

The second stage holds information that has been selected from sensory memory through attention. Key features include:

- Limited capacity of approximately 7±2 items or "chunks" of information[5] [2]

- Brief duration of about 15-30 seconds without rehearsal[2] [6]

- Also called working memory or primary/active memory by some researchers[7] [8]

- Functions as the conscious, active processing center where new information is manipulated[4]

- Information can be maintained through rehearsal techniques[1]

Two types of rehearsal can occur in STM:

- Maintenance rehearsal: Simple repetition of information to keep it active[4]

- Elaborative rehearsal: Processing information more deeply by connecting it to existing knowledge, which facilitates transfer to long-term memory[1] [9]

Long-Term Memory (LTM)

The final stage where information that has been rehearsed in STM is stored more permanently:

- Nearly unlimited capacity and duration[7] [2]
- Can store information for days, months, years, or a lifetime[4]
- Information is organized into categories for efficient storage and retrieval[4]
- Primarily uses semantic encoding (based on meaning)[5]
- Contains both explicit (declarative) and implicit memories[1]

Long-term memory can be further subdivided into different types:

- Episodic memory: Personal experiences and specific events[4]
- Semantic memory: General knowledge and concepts[4]
- Procedural memory: Skills and "how-to" knowledge[4]

Information Processing in the Model

The model describes three key processes involved in memory:

1. **Encoding**: Transforming sensory input into a form that can be stored in memory[5]
2. **Storage**: Retaining information in the appropriate memory store[5]
3. **Retrieval**: Accessing stored information when needed[5]

Information flow through the model follows a specific path:

- Information enters through sensory input to the sensory register
- If attended to, information transfers to short-term memory
- Through rehearsal and processing in STM, information may transfer to LTM
- Information in LTM can be "copied" back to STM when needed for active processing[7]

According to Atkinson and Shiffrin, the longer an item is held in short-term memory through rehearsal, the stronger its memory trace will be in long-term memory[7]. However, they also noted that more elaborate encoding processes beyond simple rehearsal can enhance transfer to LTM by relating new information to existing knowledge[7].

Significance and Limitations

The Atkinson-Shiffrin model provided a clear framework for understanding memory processes that stimulated extensive research in cognitive psychology. While some aspects have been refined by later theories (such as Baddeley and Hitch's working memory model), its core concepts about the sequential processing of information through distinct memory stores remain influential in our understanding of human memory[5].

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