

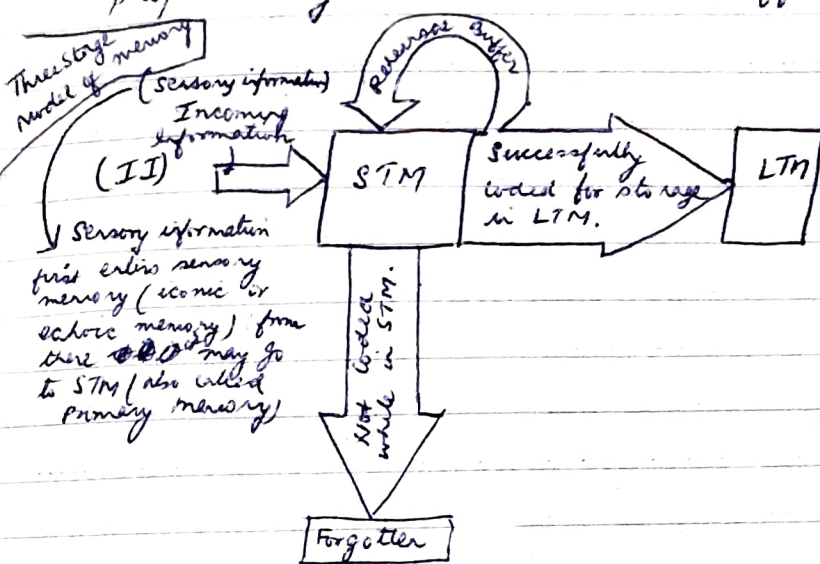
Memory Processes P.4, Sem II, Unit.

Short term and Long term Memory Cognitive Psych

as an explanation for forgetting (two-process of memory). Here one type of storage mechanism is involved in remembering events just recently experienced and that a different type is involved in the recall of information that has received repeated attention. These mechanisms have been labelled STM and LTM.

- Except for occasional mental blocking on a memory

A diagrammatic model to differentiate between STM and LTM proposed by Atkinson and Shiffrin, 1971.

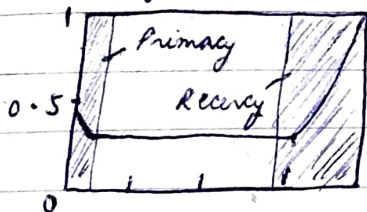


STM involves trace-dependent forgetting, while LTM involves cue-dependent forgetting. II is fed into STM and if not attended to begins to fade away. It is possible, however, to maintain selected

information in STM by means of rehearsal. By rehearsing the information, the trace in STM is prevented from decaying - at least for a short period of time. Each decaying trace is reset by rehearsal, at which point it begins to decay again. But the necessity for rehearsal imposes a limit upon the number of items that can be maintained simultaneously in STM; the set of traces being maintained in STM at any one time is referred to as the rehearsal buffer. The information coming into STM begins to decay rapidly unless the person regards it as particularly important, in which case it is entered into the rehearsal buffer. Thus information is temporarily stored in STM via rehearsal until incoming information replaces it. While information resides in STM it may be coded and transferred to long-term storage. Information that is allowed to decay in STM before such a transfer takes place is permanently lost. LTM is assumed to be virtually unlimited. Even though the information is permanently stored, memory may fail because the cues needed to retrieve the information from LTM are incomplete.

- LTM storage is analogous to a large filing cabinet.
- The 2 process theory provides several reasons why forgetting may occur. Immediate recall may fail because subsequent inputs to STM have caused the information to decay. LTR recall may fail because the information was never transferred to LTM or because not enough cues are available at the time of attempted recall to locate the information in LTM.
 - ~~we have~~ Although, LTM is permanent, we have difficulty retrieving the correct item upon recall when many items of similar codes are stored in it.
 - Theories of the not just mentioned is called information - processing models.
 - ~~Human~~ Physiological evidence for 2 process theory. The results of retrograde - Amnesia studies support the notion that a consolidation period is necessary following learning if the material is to be retained in LTM.
 - Evidence for the theory comes from the analysis of a memory task known as free recall. In a typical experiment, a list of unrelated words is presented to the subject one at a time. Later the subject attempts to recall as many words as possible in any order. The result of principal interest is the probability of recalling each item in a list as a function of its place in the list as 'serial presentation position'. Plotting the ~~function~~ function yields a U-shaped curve. The increased probability of recall for the first few words in the list is called the Primacy effect; the ~~last large increase increase~~ increase for the last seven to ten words is called the

Recency effect. According to this theory, the R effect is due to retrieval from STM, and the earlier portions of the serial position curve reflect retrieval from LTM only.



- The items ~~still~~ in STM, still being rehearsed when the last item is presented are immediately recalled by the subject, giving rise to the Recency Effect.
- Since items, presented first in a list enter an empty or partly empty rehearsal buffer, they remain longer than later items and consequently receive additional rehearsal. This extra rehearsal causes more transfer of information to LTM for the first items, giving rise to the primacy effect.
- Significant improvements in memory come about primarily through more effective methods of encoding and retrieving information. The use of mental imagery, organizational schemes, self-recitation during study and overlearning aid both the encoding and retrieval processes.

Characteristics of STM

- Memory span for short periods of time is limited to seven discrete items (Miller, 1958). Subsequent research indicates that it is frequently even lower than this (Broadbent, 1975).
- It declines very rapidly. Forgetting begins within a few seconds and is usually complete before 20 seconds have elapsed.

- Limits of STM can be partially overcome by processes of grouping information. Example - Craik and Simon (1973) report on the ability of them to look at the board for 3-4 seconds and then reproduce the entire board faultlessly.
- How is it that small no. of items (seven, plus or minus two) remain accessible - two possible reasons. The first is that we have immediate access to all STM materials, simultaneously (parallel processing); the other is that we access each STM item in sequence (termed serial or sequential processing).
- Retrieval from STM involves sequential rather than parallel processing. The more items there are in STM, the longer it takes for processing. In fact, it takes approximately 250 milliseconds to process a single item in STM. But since STM is limited to 7 items (more or less), total processing time remains very short.

CHARACTERISTICS OF LTM

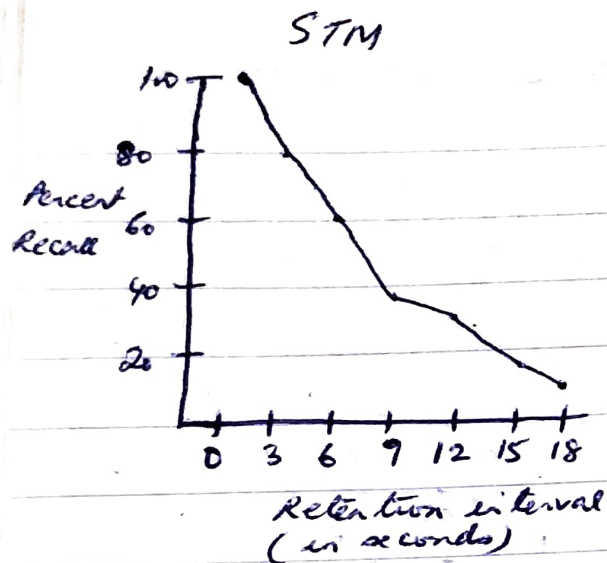
- Meaningful material is more easily learned and remembered for longer periods of time. (Atkinson & Robinson, 1969)
- Another characteristic is the Zeigarnik effect. It is the apparent tendency that we have to recall interrupted activities. This phenomenon is best explained by reference to the Gestalt notion that we tend toward closure (completion) both in perception and in thought.
- Capacity for LTM of pictures may be almost unlimited.
- There is evidence that a consolidation period is required for material to be stored in LTM.

material that is learned remains unstable and easily disrupted during the first 30 mins. Given given given sufficient time it is ~~consolidated~~ consolidated and cannot be removed. Evidence for this comes from cases of Retrograde Amnesia.

- There are two kinds of memory (LTM) as proposed by Tulving (1972) - (1) Semantic ^{or generic} - Abstract memories of facts like historical dates, grammar, principles, theories (2) Episodic Memory - Highly personal experiences & memories of experiences, tied to a particular time and place.
- (McIsaac & Santee, 1981) suggest that the advantages of considering the generic and episodic memory separately may not be very great.

Distinction between STM & LTM.

- (1) Time differences.
- (2) STM involves an active, ongoing rehearsal process that is very easily disrupted. In contrast, LTM, although it initially requires active involvement, eventually becomes a more passive process, subject to the distortion of time, but not easily disrupted by any of a variety of specific interruptions.
- (3) STM is of very limited capacity. It is like attention span. Capacity of LTM is relatively unlimited.
- (4) Another distinction between STM & LTM has to do with the ease with which material may be retrieved from each. Recall in the case of STM is automatic and easy. Whereas in LTM it is slow and difficult, sometimes involving search and the occasional elimination of incorrect responses.



(Data from Peterson & Peterson, 1959)

Experiment on the recall of trigram
 of 3 consonants after interval of
 3, 6, 9, 12, 15, 18 sec. Trigram
 presented auditorily. (Subject
 asked to ~~count~~ count backward,
 which prevented the subject from
 rehearsing)