

# Memory and Forgetting

## Definitions of Memory

- “Memory is the mental capacity to store, recall or recognize the events that were previously experienced.”
- Memory is an active information-processing system that receives, stores organise and recovers information.
- Memory is the faculty of the brain by which information is encoded, stored, and retrieved when needed.

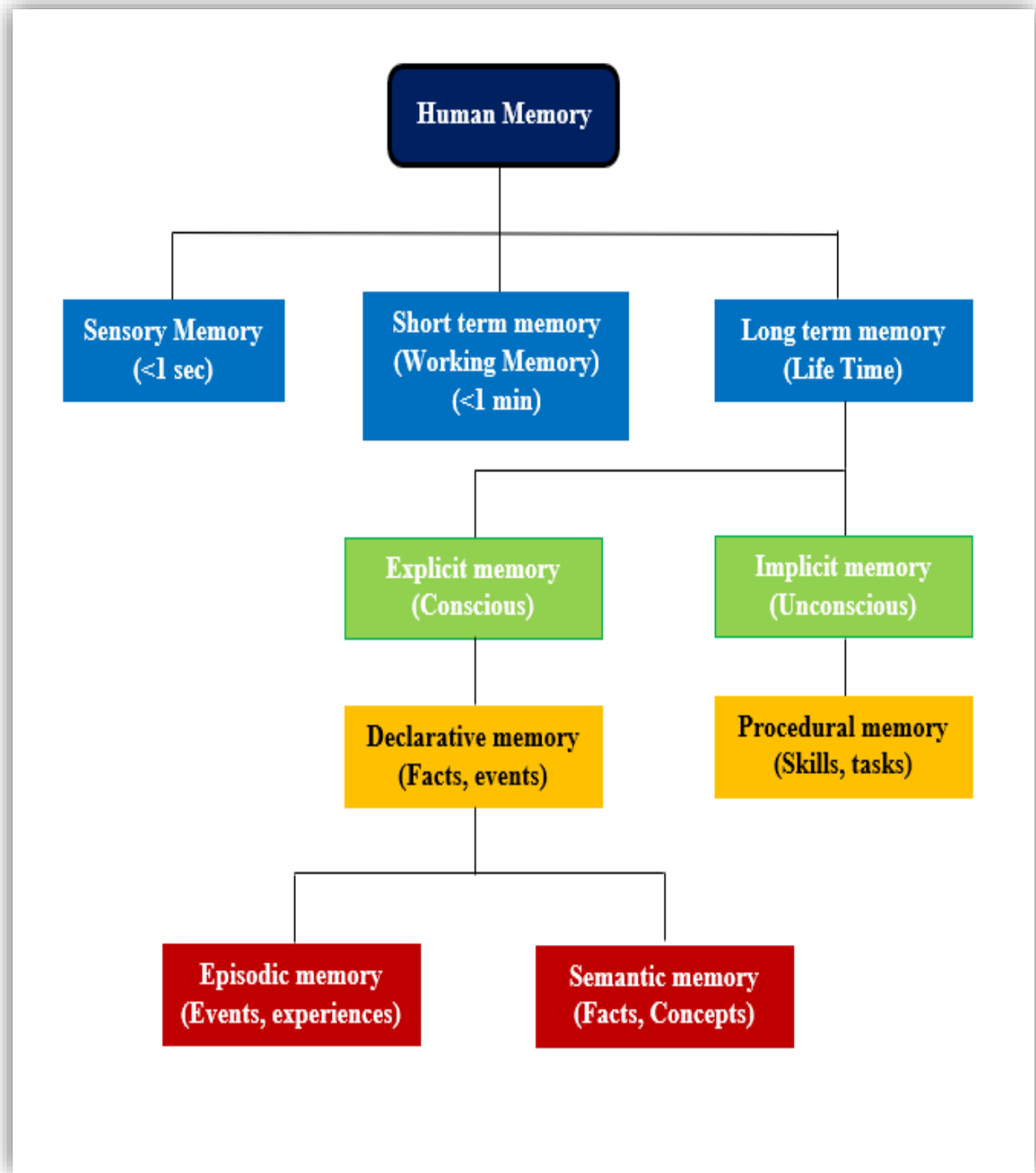
## Types of Memory



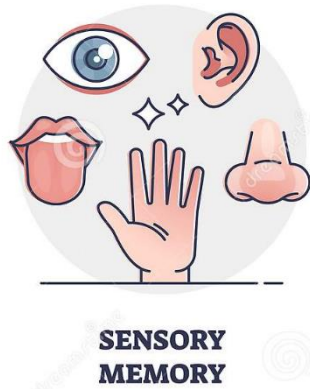
- Sensory Memory
- Short - Term Memory
- Long – Term Memory

## Human Memory Vs Computer

Human memory	Computer memory
Storage capability but not permanent deletion	Storage capability and have permanent deletion.
Types	Types
Sensory memory	RAM
Short term memory	ROM
Long term memory	

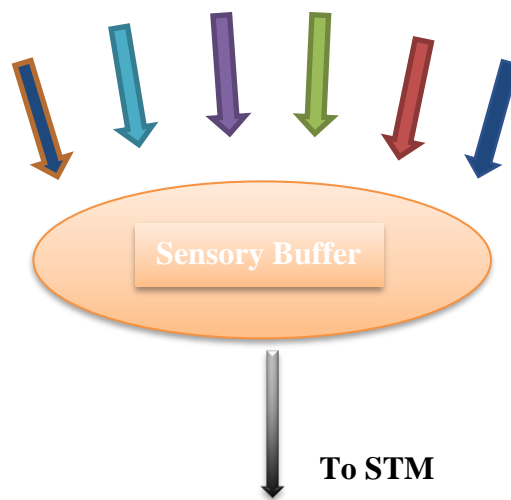


## Sensory memory



This is where stimulus enters the brain and is sorted information is retained for only a fraction of a second. There are three separate stores

- Iconic stage – for visual impact
- Echoic store – for audacity input
- Haptic store-for tactile input



## Short term memory



### **SHORT-TERM MEMORY**

- The stuff we encode from the sensory goes to STM
- Events are encoded visually, acoustically or semantically.
- Holds about 7+/- items for about 20 seconds.
- We recall digits better than letters.

#### **Definition:**

- Short term memory takes over when the information in our sensory memory is transferred to our consciousness or our awareness.
- This is the information that is current active such as reading this page, talking to a friend or writing a paper.

#### **Characteristics**

- Short term memory can definitely last longer than sensory memory (up to 30 seconds or so)
- Also known as working memory
- Intermediate memory

#### **Displacement**

Mena that new information will push out part of the old information.

## Long term memory



### Definition:

- The long-term memory refers to unlimited capacity memory store that hold information over lengthy periods of time.
- By saying “lengthy period of time” we mean that it is possible for memories in LTM to remain there for an entire life time.

### Declarative Memory:

Declarative memory consists of facts and events that can be consciously recalled or declared; also known as explicit memory.

Types:

- Episodic memory
- Semantic memory

### Explicit memory

Definition:

- It is the conscious, intentional recollection of factual information, previous experiences and concepts.
- Requires conscious thought unlike implicit memory.

How are Explicit Memories Made?

- Step1: Encoding

- Step2: Storage
- Step3: Retrieval

### **Episodic Memory**

Episodic memory consists of the storage and recollection of observation information attached to specific life events

### **Semantic Theory**

Semantic theory refers to general world knowledge (facts ideas, meanings and concepts) that can be articulated and it is independent of personal experience.

### **Non – Declarative Memory**

- Implicit memory is also called “non declarative” memory. It is a type of long-term memory that stands in contrast to explicit memory in that it doesn’t require conscious thought

### **Definition**

- Implicit memory uses past experiences to remember things without thinking about them. It doesn’t require any conscious thought.
- Also known as unconscious memory or automatic memory

### **Types**

- Procedural memory
- Priming

### **Procedural Memory**

Procedural memory is a type of implicit memory and long memory which aids the performance of particular type of without conscious awareness of these previous experiences such as walking, talking and riding a bike.

### **Priming Memory**

Priming is the implicit memory effect in which exposure to a stimulus influences response to a later stimulus. It is a technique in psychology used to train a person’s memory both in positive and negative ways.

## Associating Words and Pictures

- In priming there is no need for researchers to ask subjects to memorize certain sequences of words because they take advantage of word association when they “prime” subjects.

## Stages of Memory

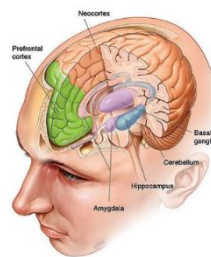
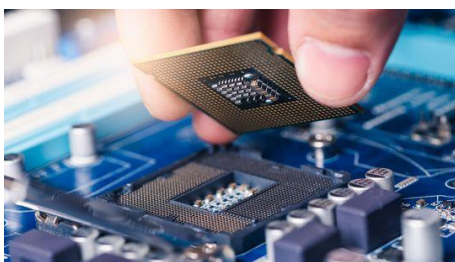


### 1. Encoding



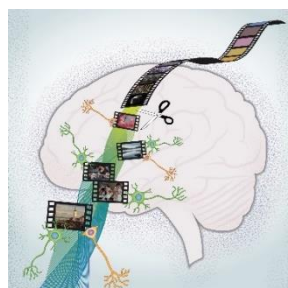
**The processing of information into the memory system.**

### 2. Storage



**The retention of encoded material Over time.**

### 3. Retrieval



**The process of getting the Information out of memory stage.**

## Encoding

- Encoding is translating sensory information into a form in which it can be stored.
- Visual coding enables information to be stored as pictures.
- Acoustic coding enables information to be stored as sounds.
- Semantic coding enables information to be stored as meanings.

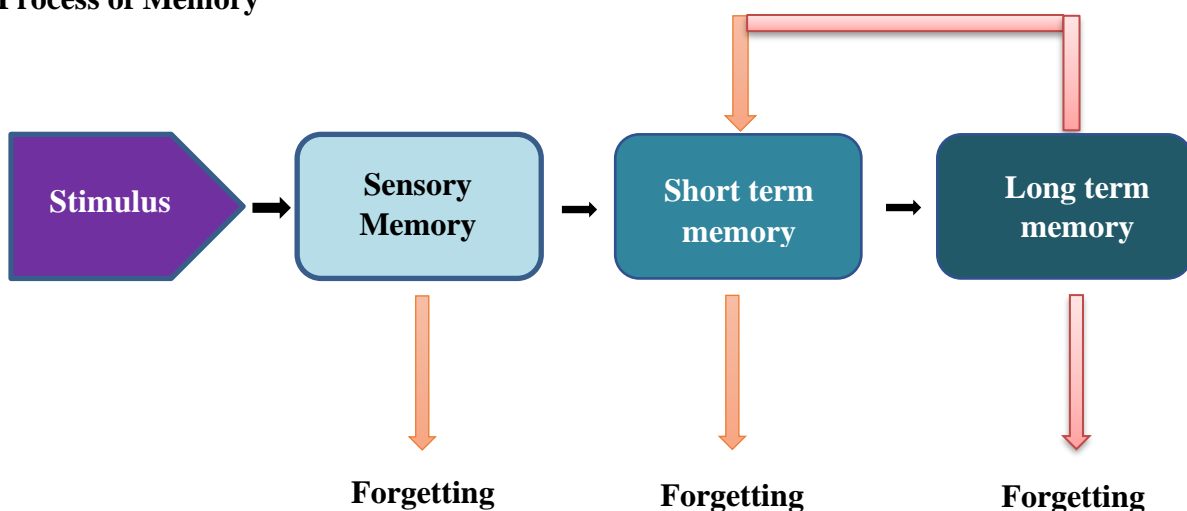
## Storage

- Storage is the maintenance of encoded information over time.
- Storage is achieved through two types of rehearsal:
  - Maintenance rehearsal uses repetition to aid storage.
  - Elaborative rehearsal aids storage by fitting new information into an organizational system (giving meaning)
  - Elaborative rehearsal is generally more secure than maintenance rehearsal.

## Retrieval

- Retrieval is locating stored information and returning it to conscious thought.
- **Context - dependent:** retrieved more readily when the person is in a similar situation or environment as when the information was learned.
- **State - dependent:** retrieved more readily when the person is in a similar emotional state as when the information was learned.
- Mood Congruence Effect
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## Process of Memory





## **Memory Span**

- Memory span may be defined functionally as “the ability of an individual to reproduce immediately, after one presentation, a series of discrete stimuli in their original order”
- The number of items that a person can correctly recall in order.

## **Ways To Improve Memory**

- Recitation: repeating information verbally until it is encoded into long term memory)
- Rehearsal: (silently repeating information until it is encoded into long term memory)
- Selection: highlighting important information instead of reading an entire page)
- Organization (Chunking): (separating information into smaller chunks of information to remember)
- Spaced Practice: (Studying a small amount of information for a short time, then taking a break before studying more)
- Mnemonic: any kind of memory system or aid.

## **Forgetting**

Definition:

- According to Munn (1967) “forgetting is the loss, temporary or permanent of the ability to recall or recognize something learnt earlier”.
- According to Drever (1952) “forgetting means failure at any time to recall an experience when attempting to do or to perform an action previously learnt.

Characteristics:

- It is opposite of remembering
- This is inability to recall the previously learnt material.

## **Causes of Forgetting**

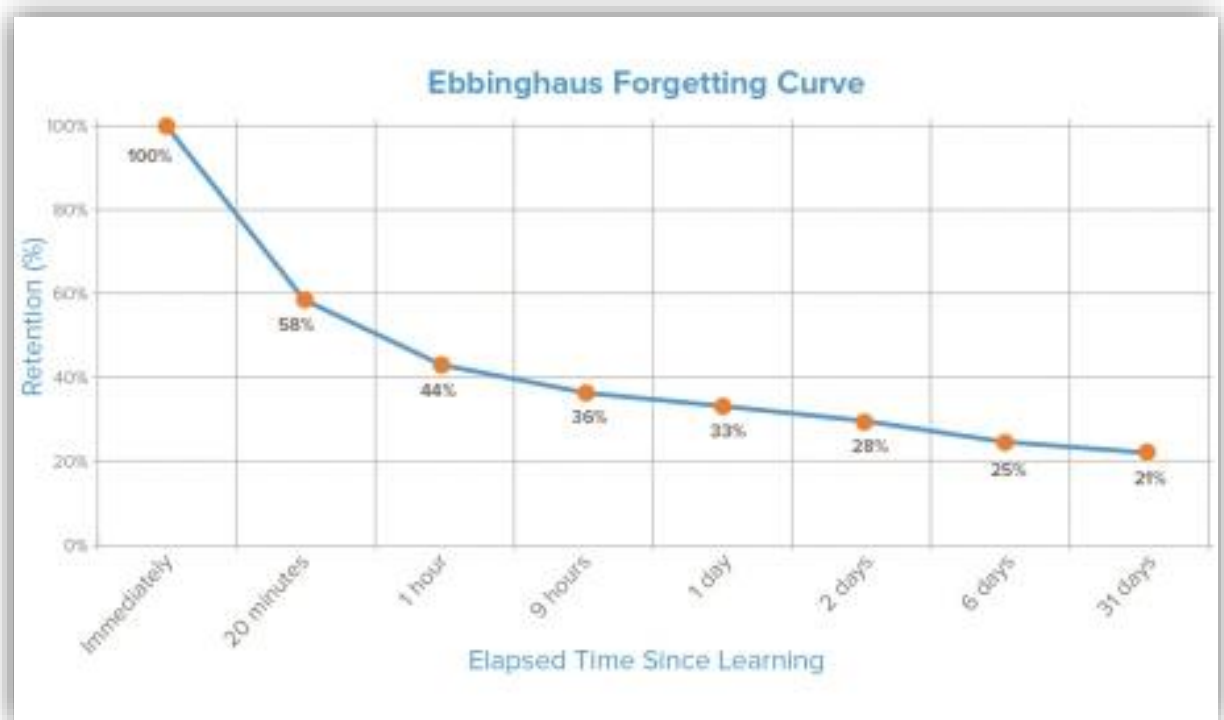
There are two kinds of forgetting

- 1) Normal forgetting
- 2) abnormal forgetting

- Entropy through disease: older experience the weaker its memory

- Interference: forgetting by interference is a case of retention amnesia, here stability and existence of memory traces are disturbed. Ex. Crowded learning, unspaced learning.
- If the learning is not meaningful forgetting the course as it does not give scope for the development of relationship.
- Inadequate Impressions at the time of learning leads to forgetting.
- Lack Of Interest in the learning material leads to forgetting.
- Mental or physical ill health sets in physical and mental fatigue and affects learning.
- Motivated forgetting: unpleasant events are to be forgotten soon to participate in the present

### Ebbinghaus forgetting curve



Humans start losing the memory of learned knowledge over time in a matter of days or weeks unless he learned knowledge is consciously reviewed time and again. The forgetting curve hypothesizes the decline of memory retention in time. This curve shows how information is lost over time when there is no attempt to retain it. A related concept is the strength of memory that refers to the durability that memory traces in the brain.

## **Decay Theory**

- According to decay theory, forgetting occurs because a memory (or the memory traces) fades through disuse as time passes, unless it is reactivated by being used occasionally.
- If the memory trace simply decayed over time, it would be reasonable to assume that the presentation of retrieval cues would have no effect on the retrieval information or events that have been held in LTM for a considerable period of time but it does.

## **Retrieval Failure Theory**

- At times we cannot recall the name of a friend whom we know well. But when conditions are different the information comes back spontaneously (tip of the tongue).

## **Emotional Disturbances:**

- Due to fear of anxiety, self-consciousness, stage fright, ect paralyse recall.

### **1. The Trace Decay Theory**

According to this theory, forgetting occurs because of the fading of the memory traces or engrams as a result of lack of using the stored item for a longer period.

### **2. The Theory of Inhibition or Interference**

According to this theory, forgetting occurs because of the interference or inhibition of the memory traces of other stored or learned items.

There are two kinds of interference:

- a) Proactive inhibition: if the earlier learning interferes with later learning and inhibits recall of new material, it is known as proactive inhibition.
- b) Retroactive inhibition: inhibition of the earlier learning and recall by later learning is known as retroactive inhibition.

## **Interference Theory:**

- Forgetting is a result of some memories interfering with others
  - Proactive interferences: old memories interfere with ability to remember new memories

- Retroactive memories: new memories interfere with ability to remember old memories
- Interference is stronger when material is similar

### **3. The Repression Theory**

It is a defensive mechanism that painful items are thrown into unconscious mind and the person does not wish to remember them

Displacement:

- There are only a limited number of slots in STM-if new information is taken in then some old information must be “knocked out” (displaced)

This is a STM theory of forgetting

### **Consolidation Theory**

- In order for information to be transferred from short term memory long term memory a period of time for consolidation is required to ensure it is permanently stored.
- Consolidation refers to the physical changes made to the neurons in the brain when something new is being learned and immediately following learning.
- These changes form the memory of what has been learned.
- If there is a disruption during the consolidation phase the information may not be embedded in long term memory.
- Consolidation is a gradual process that takes up to 30 minutes.

### **Motivated Forgetting:**

- Motivated forgetting arises from strong motive or desire to forget usually because the experience is too disturbing or upsetting to remember.

Example,

- We do tend to recall more pleasant than unpleasant things.
- Trauma victims don't have full memories of traumatic events.

“Sometimes you have to forget what you feel and remember what you deserve!”

