

CHAPTER FOUR

MEMORY & FORGETTING



Meaning of Memory

■ **Memory:** is the ability to retain information

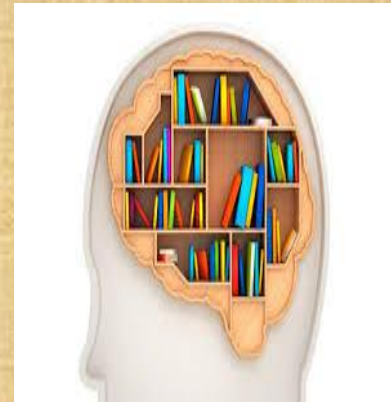
over time

- It's the capacity to encode, store and retrieve information

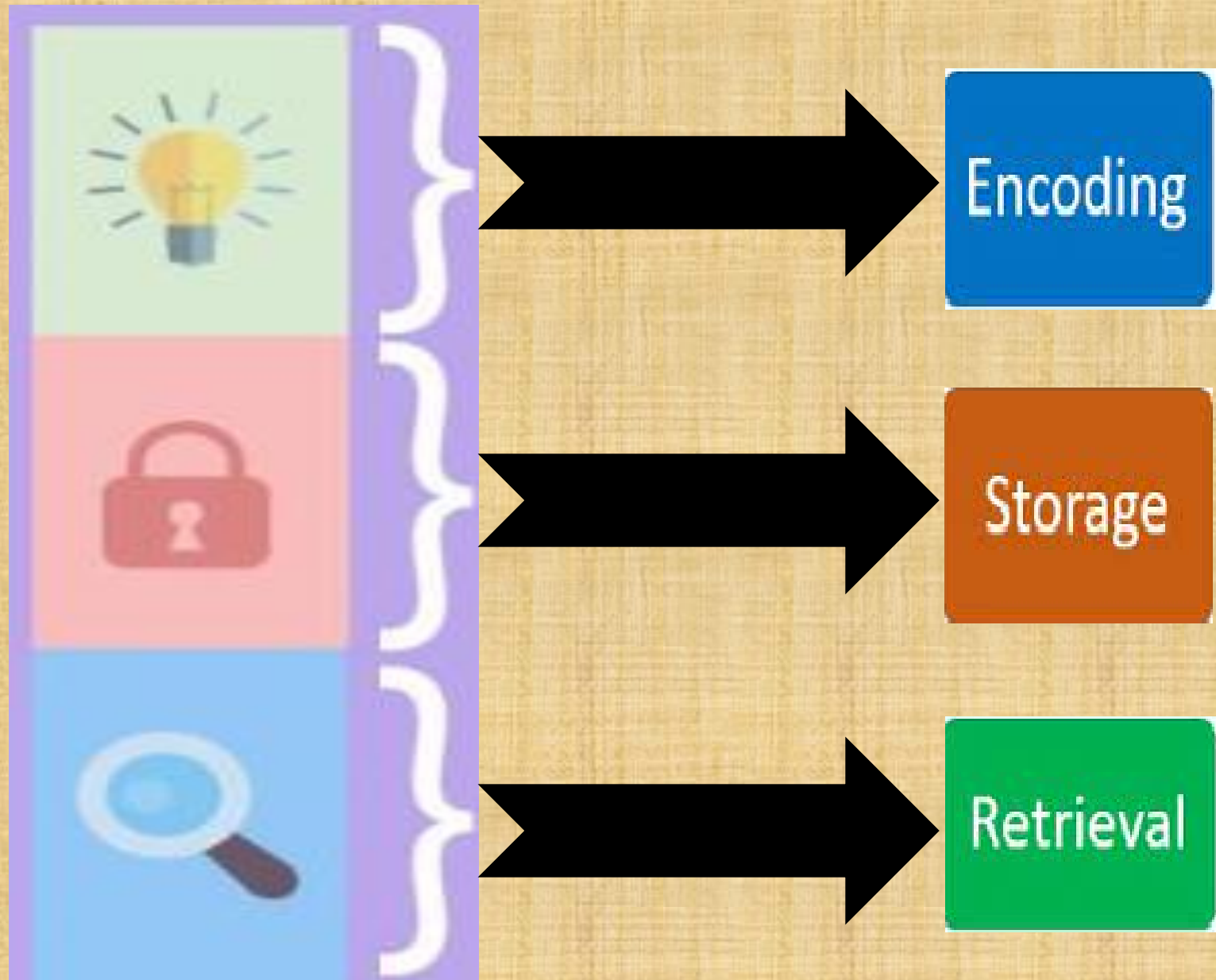
- It is the ability to remember past events or previously learned information or skill

- It is a complex mental system.

- That involves multiple stages of information processing

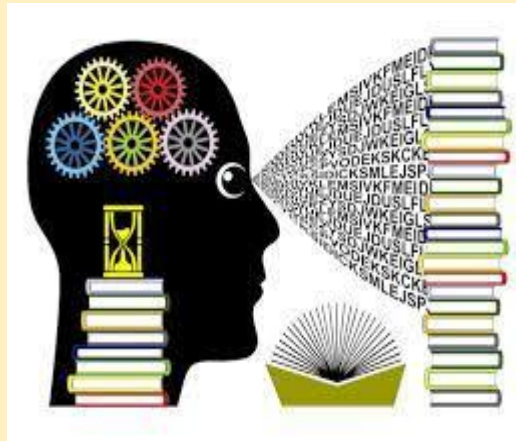


Memory Processes



Memory Processes

- **Encoding**: transforming information into a form that can be entered and retained in the memory system.
 - Integrating information in to the memory system.
 - It could be through association or other means
- E.g Associating George $\Rightarrow$ George Washington



Cont ...

- **Storage**: retaining information in memory so that it can be used at a later time.
 - Some physiological change in the brain must take place ➡ **Consolidation**
 - Preserving information for latter use



- **Retrieval**: recovering information stored in memory so that we are consciously aware of it.

Eg. Calling George by his name when you meet



Types of Memory

➤ Sensory Memory/ Register

- SM is the **first step** in the memory process.
- It has very **rich** and **detailed** information
 - But information stays for only a very short time
- **Function**—**holds** information long enough to be processed for basic physical characteristics
- **Capacity**—very large
 - It can hold many items at once
- **Duration**—**very** brief retention of images



Cont...

■ **SM** divided into **two** types:

Iconic memory
briefly holds
visual information
during eye blink.

- **Iconic memory**—holds visual information for about a quarter of a second or more

- As soon as you shift your

- attention, the information disappears



■ **Echoic memory**— is an auditory information,

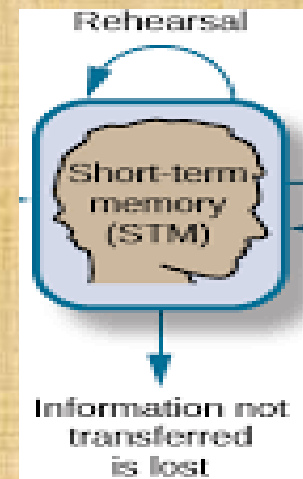
- Holds auditory information from 1-2 seconds



Echoic memory briefly holds sounds.

Short Term or Working Memory

- **STM:** Sometimes referred to as *working memory*.
 - holds a limited amount of information
 - On average seven items – for a limited period of time i.e. up to 30 seconds
- **Function—conscious** processing of information
 - where information is actively worked on.
- **Capacity—limited** storage (holds 7 ± 2 items)
- **Duration—brief** storage (about 30 seconds)



Characteristics of STM

- ***It is active***: informatⁿ stays as long as the person is consciously examining and manipulating it.
- ***Rapidly accessed***: informatⁿ easily disappears unless it is accessed in LTM
- ***Preserves the temporal sequence*** : Informatⁿ is memorized as it is orderly arranged
- ***Limited in capacity***: People can hold on average 7 ± 2 pieces of informatⁿ at a time.

Controlling Informatⁿ in STM

- **Rehearsal**: repeating informatⁿ again and again –

maintenance rehearsal

- Elaborative rehearsal is important in transferring informatⁿ to LTM (involves

creating meaning, associating & interpreting concepts.

Maintenance rehearsal is not a very effective encoding process.

- **Chunking**: a process of breaking down large Informatⁿ in to its smaller parts

Which is easier to remember?

□ 4 8 3 7 9 2 5 1 6

□ 483 792 516

No
Chunking

15125551212

Chunking

1 (512) 555 1212

Long term memory

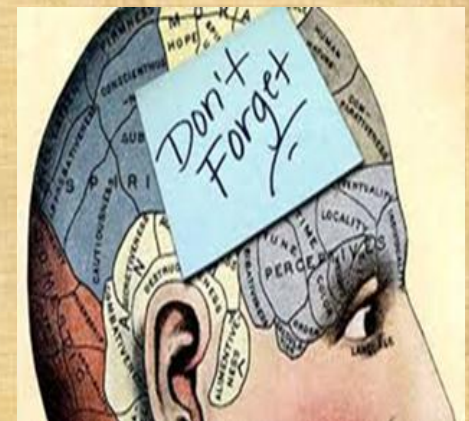


- A relatively permanent type of memory
 - Holds huge amount of information for a long time
- Has unlimited capacity to store information
- Has a potential to retrieve or remember infⁿ in the future

➤ Types of long term memory

⇒ **Explicit/declarative memory**: refers to knowledge that can be **consciously brought to mind** and “**declared.**”

- It is **conscious** memory of facts and events
- It can be **semantic** or **episodic**



Cont...

- **Semantic Memory**: refers to general world knowledge or facts, such as:
 - Three systems of memory: H_2O , NaCl , H_2SO_4
- **Episodic Memory**: consists of memories of **particular** episodes or events from personal experience.
- ⇒ **Implicit memory**: is based on experience with **out consciously** recollected
 - *It cannot be verbalized* or *consciously recollected*
 - It can be **procedural memories** that requires applying skills of:
 - Playing tennis,
 - Riding a bicycle & typing

SENSORY MEMORY



SHORT TERM WORKING MEMORY



LONG TERM MEMORY

Explicit

(conscious/declarative)

Implicit

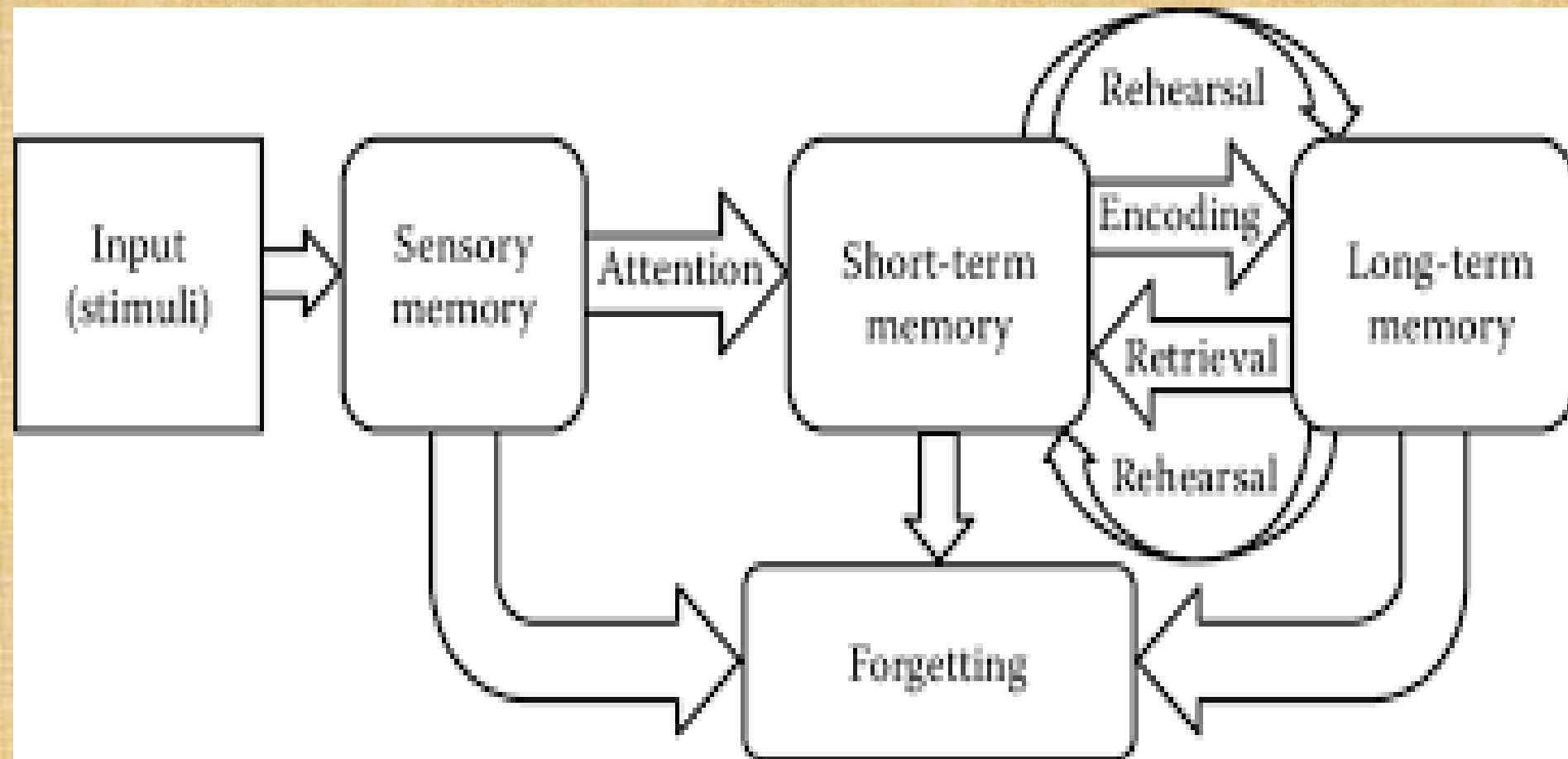
(unconscious/non-declarative)

Episodic
(events)

Semantic
(facts)

Procedural
(skills)

Cont...

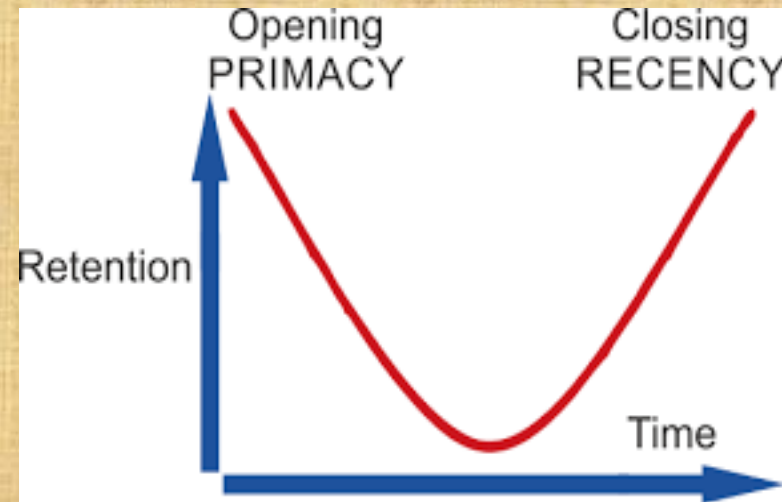


The serial position effect

- Ebbinghaus studied memory by using senseless syllables. Such as:

(VEM, BOZ, FUW etc.)

- ✓ He found that items in **the middle are difficult to remember** than those at **the beginning** and **end** – called **serial position effect**



- Better memory of items at the beginning of a list is called **the primacy effect**. And
- Better memory for items at the end of a list is called the **recency effect**.

Factors Affecting Memory

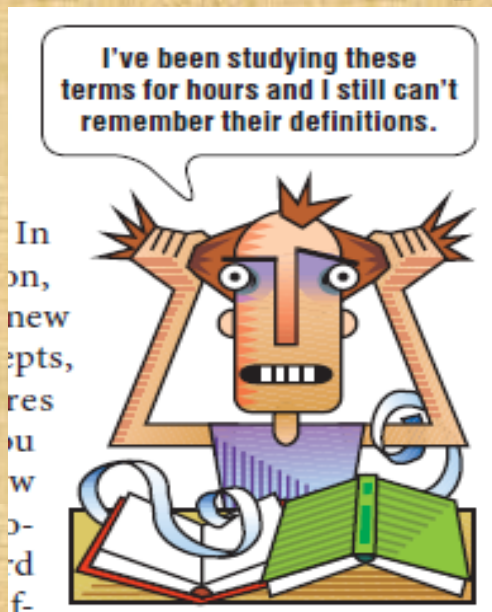
- **Ability to retain:** depends upon good memory traces left in the brain by past experiences
- **Good health:** A person with good health can retain the learnt material better than a person with poor health
- **Age of the learner:** Youngsters can remember better than the aged.
- **Maturity:** Very young children cannot retain and remember complex material
- **Will to remember:** Willingness to remember
- **Intelligence:** More intelligent person will have better memo

Cont ...

- **Interest:** If a person has more interest, he will learn and retain better
- **Over learning:** Experiments have proved it will lead to better memory - repetition
- **Speed of learning:** Quicker learning leads to better retention – considering the pace of learners
- **Meaningfulness of the material:** Meaningful materials are better retained than for nonsense material
- **Sleep or rest:** Sleep or rest helps for clear memory and makes good connections in the brain

Meaning & Concepts of Forgetting

- Since our brain will ***be over exposed*** to various inf^{ns} daily, the tendency to ***remember decreases***
- Due to this we may forget the names of individuals, places ...



Forgetting refers to the ***apparent loss*** of inf^{ns} already encoded and stored in the long-term memory

Theories of Forgetting

- **Decay theory**: memory traces fade with time if they are not accessed now and then.
 - i.e. due to *simple passage of time*
- **Interference**: forgetting occurs due to particular memory *interferes* with the *retrieval* of other memories. *Two types*:
 - = *Proactive interference*: old memories interfere with new memories.



Cont ...

= ***Retroactive interference***: material learned later disrupts retrieval of information learned earlier.



➤ **Displacement theory/ New memory for old**

- States that new information ***entering memory can wipe out old information***
- Its mostly associated with STM – its capacity is $7 \pm \text{inf}^{\text{ns}}$
- It ***cannot*** be associated with the LTM because of its ***virtually unlimited capacity***

Cont...

- **Motivation theory:** Freud claimed that we can forget experiences through **repression** –
 - => Motivated forgetting i.e. through **repression**
 - => People block those memories from **consciousness** that are too **threatening** or **painful** for them
 - => Forgetting emotionally threatening experiences from consciousness such as:
 - witnessing a murder, Embarrassment, guilt and shock
- **Cue - dependency theory:** states that forgetting occurs due to **lack of adequate retrieval cues**.

Improving Memory

■ **Pay Attention:**

- Be conscious and pay attention
- Then the encoded the information in the first place

■ **Encode information in more than one way:**

- The more elaborate the encoding, the more memorable

■ **Add meaning:**

- The more meaningful the material, the more likely it is to store in long-term memory

Cont ...

- **Take your time:**

- Minimize interference by using study breaks for rest or recreation.
- Sleep is the ultimate way to reduce interference - **Rest**

- **Over learn:**

- Rehearsal and repetition

- **Monitor your learning:**

- Reviewing periodically, you will have a better idea of how you are doing