CHAPTER FOUR

MEMORY AND FORGETTING

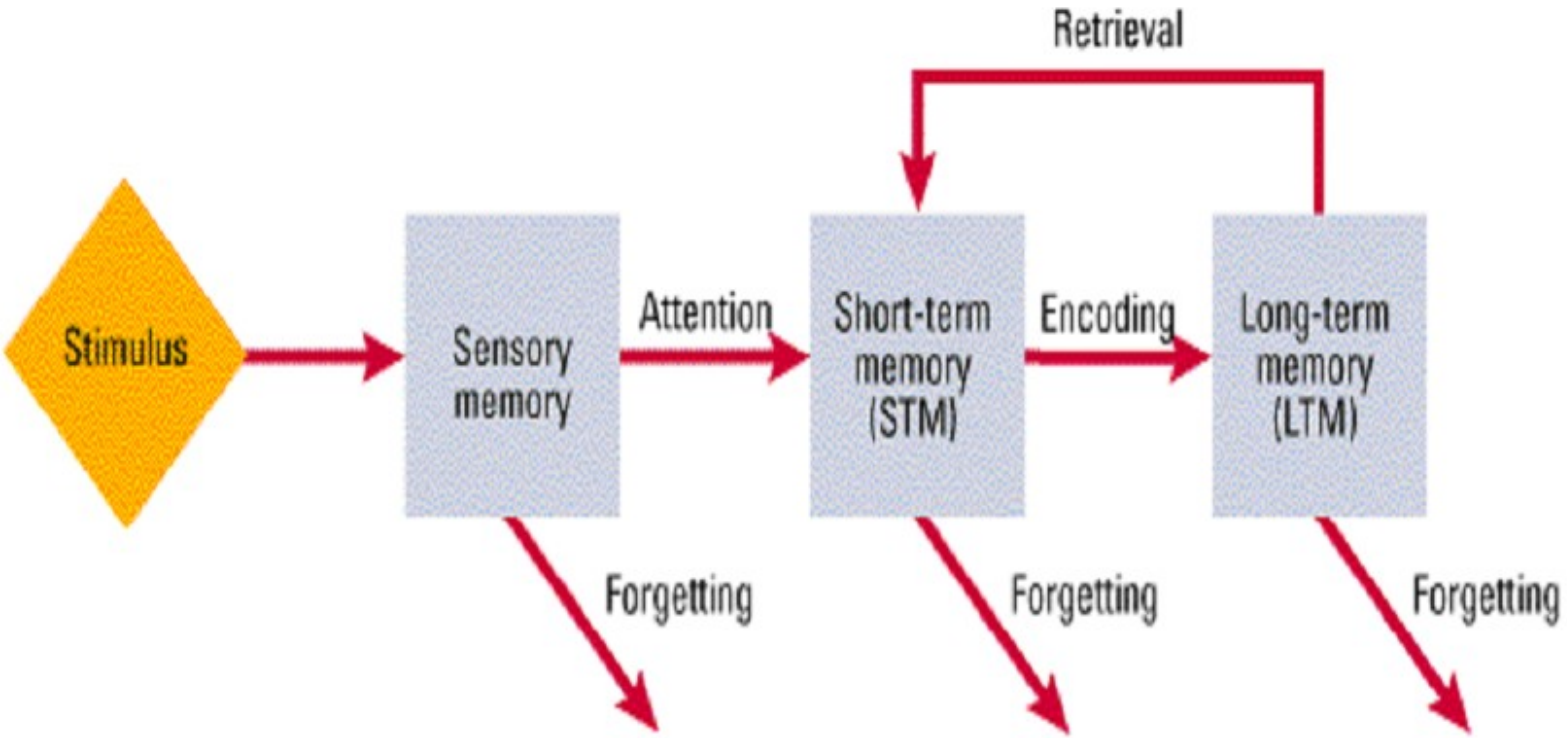
4.1 Memory

- **Questions**
  - What is memory?
  - Are there different kinds of memory?
  - What are the biological bases of memory?

4.1.1 Meaning and Processes of Memory

- Memory is the retention of information/what is learned earlier over time.
- It is the way in which we record the past for later use in the present.
- Memory is a blanket label for a large number of processes that form the bridges between our past and our present.

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Processes of Memory

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- Memory processes are the mental activities we perform to put information into memory, to keep it there, and to make use of it later.
- **a) Encoding**: Taken from computer science, the term encoding refers to the form (i.e. the code) in which an item of information is to be placed in memory.
- In encoding we transform a sensory input into a form or a memory code that can be further processed

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- **b) Storage**: To be remembered the encoded experience must leave some record in the nervous system (the memory trace); it must be squirreled away and held in some more or less enduring form for later use.
- Storage is the persistence of information in memory.
- **c) Retrieval**: is the point at which one tries to remember to dredge up a particular memory trace from among all the others we have stored.
- In retrieval, material in memory storage is located, brought into awareness and used.

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- Failure to remember can result from problems during any of the three phases of the memory process
- Memory is the process by which information is encoded (phase1), stored (phase 2) and later retrieved (phase 3).

5.1.2 Stages/Structure of Memory

- Memory structure is the nature of memory storage itself- how **information is represented** in memory and **how long it lasts** and **how it is organized**.
- Many cognitive psychologists relate the mind to an information processor, along the lines of a digital computer that takes items of information in; processes them in steps or stages, and then produces an output.

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- Example;
  - Consider how the computer works (see page 59 & 60 in the module)
- According to Richard Atkinson and Richard Shiffrin (1968), memory has three structures:

I. **Sensory Memory/Sensory Register**: It is the entry way to memory. It is the first information storage area.

- Sensory memory acts as a holding bin, retaining information until we can select items for attention from the stream of stimuli bombarding our senses.

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- It can hold virtually all the information reaching our senses for **a brief time**.
- For instance, **visual images** (Iconic memory) remain in the visual system for a maximum of **one second**.
- **Auditory images** (Echoic memory) remain in the auditory system for a slightly longer time, by most estimates up to **two second or so.**
- Most information briefly held in the sensory memory simply **decays** from the register.

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II. **Short-term Memory**: is part of our memory that holds the contents of our attention.

- consist of the by-products or end results of perceptual analysis.
- STM is important in a variety of tasks such as **thinking, reading, speaking, and problem solving.**
- There are various terms used to refer to this stage of memory, including **working memory, immediate memory, active memory,** and **primary memory.**

Cont.…

Questions

- Why do we call STM as a working memory?

Cont....

- Short term memory is distinguished by four characteristics:
  - ✓ It is active
  - ✓ Rapid accessibility
  - ✓ Preserves the temporal sequence of information
  - ✓ Limited capacity

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- According to most models of memory, we overcome this problem, by grouping small groups of information into larger units or **chunks.**
- Chunking is the grouping or “packing” of information into higher order units that can be remembered as single units.
- It expands working memory by making large amounts of information more manageable.
- The real capacity of STM is not a few bits of information but a few chunks.
- A chunk may be a word, a phrase, a sentence, or even a visual image, and it depends on previous experience.

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III. Long Term Memory

- It is a memory system used for the relatively **permanent storage** of meaningful information.
- The capacity of LTM seems to have **no practical limits**.
- LTM stores information for **indefinite periods**
- It may last for days, months, years, or even a lifetime.

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- The LTM is assumed to be composed of different sub systems:
  - **Declarative/ explicit memory** the **conscious recollection** of information such as specific facts or events that can be **verbally** communicated.
  - ✓ subdivided into semantic and episodic memories.

i. **Semantic memory-** factual knowledge like the meaning of words, concepts and our ability to do math. Keeping information on the basis of meaning of the item.

ii.Episodic memory-memories for events and situations from personal experience. They are internal representations of personally experienced events.

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- **Non-declarative/ implicit memory**-refers to a variety of phenomena of memory in which behaviour is affected by **prior experience** without that experience being consciously recollected.
  - ✓ One of the most important kinds of implicit memory is procedural memory.
- **Serial Position-** Effect occurs when you are introduced to a lot of people at a party and find you can recall the names of the first few people you met and the last, but almost no one in between.

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- Factors that Influence Memory Process in Humans are as follows:

  a. **Ability to retain**: This depends upon good memory traces left in the brain by past experiences.

  b. **Good health**: A person with good health can retain the learnt material better than a person with poor health.

  c. **Age of the learner**: Youngsters can remember better than the aged.

  d. **Maturity**: Very young children cannot retain and remember complex material.

  e. **Will to remember**: Willingness to remember helps for better retention.

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f. **Intelligence**: More intelligent person will have better memory than a dull person,

g. **Interest**: If a person has more interest, he will learn and retain better.

h. **Over learning**: Experiments have proved that over learning will lead to better memory.

i. **Speed of learning**: Quicker learning leads to better retention,

j. **Meaningfulness of the material**: Meaningful materials remain in our memory for longer period than for nonsense material,

k. **Sleep or rest**: Sleep or rest immediately after learning strengthens connections in the brain and helps for clear memory.

5.2 Forgetting

Questions

- ✓ What is forgetting? How forgetting occur or what causes forgetting?
- ✓ Why do human beings forget information?
- ✓ In what way and how do we forgot that information?
- ✓ Is forgetting bad or good for us?

4.2.1 Meaning and Concepts of Forgetting

- Hermann Ebbinghaus (1885/1913).
- If we attempt to encode, store and recall all the information we face daily, we are in trouble. Hence, we are selective in storing and forgetting information.
- Psychologists generally use the term forgetting to refer to the apparent loss of information already encoded and stored in the long-term memory.

Theories of Forgetting

- **4.2.2.1.The Decay Theory**

- The decay theory holds that memory traces or engram fade with time if they are not accessed now and then.
- This explanation assumes that when new material is learned a memory trace or engram- an actual physical change in the brain- occurs.
- In decay, the trace simply fades away with nothing left behind, because of the passage of

4.2.2.2. Interference

- Interference theory holds that forgetting occurs because similar items of information interfere with one another in either storage or retrieval.
- There are two kinds of interference that influence forgetting: **proactive and retroactive**.
- Proactive Interference- information learned earlier interferes with recall of newer material.
- Retroactive Interference-new information interferes with the ability to remember old information

4.2.2.3. New Memory for Old/ Displacement Theory

- This theory holds that new information entering memory can wipe out old information, just as recording on an audio or videotape will obliterate/wipe out the original material.
- This theory is mostly associated with the STM

4.2.2.4. Motivated Forgetting

- Sigmund Freud maintained that people forget because they block from consciousness those memories that are two threatening or painful to live with, and he called this **self-protective process Repression.**
- Today many psychologists prefer to use a more general term, motivated forgetting.

4.2.2.5. Cue Dependent Forgetting

- Often when we need to remember, we rely on **retrieval cues**.
- When we lack retrieval cues, we may feel as if we have lost the call number for an entry in the mind‘s library.
- In long-term memory, this type of memory failure may be the most common type of all.
- Cues that were present when you learned a new fact or had an experience are apt to be especially useful later as retrieval aids.

4.3. Improving Memory

- To improve our memories other than drug must rely on the following mental strategies
- **General guidelines.**
  - **Pay Attention**
  - **Encode information in more than one way**
  - **Add meaning**
  - **Take your time**
  - **Over learn**
  - **Monitor your learning**