**CGS601**
**End sem** Q2

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As stated in the lectures, long term memory is that aspect of memory which can store a large amount of data for long times ranging from some movements before or to decades and it can store any type of memory namely declarative(some events) and procedural memory(skills). It has huge capacity as one can recall events from some childhood (decades before) to events that just happened while STM is said to just have the moment that happened just now.

LTM somewhat explains the findings of Serial-position curve in which the words presented earlier and in the end have better accuracy of recalling than the words presented in between due to the reason that the words presented in starting are stored in LTM due to rehearsal(primacy effect) and the last words are in STM(recency effect), improving accuracy along the boundaries. This idea was supported in further study when after the last words, participants were asked to count immediately, preventing rehearsal for STM words, thus decreasing effect of recency effect.

**Coding in LTM:**

Auditory, visual and semantic, all three can take place in LTM, but it is concluded that semantic coding is the dominant one as we tend to remember the meaning and associated features better. This is supported by basic examples such as if we read a word and try to recall it, we may come up with a word that is a synonym of the above word or is similar in some features. (Tree-bush, home-house etc.). More studies show that LTM prefers semantic memory over auditory and visual (recalling bush instead of tree is a prime example). The example of recognition memory in the lectures also supports the above argument which involved reading a passage and recognising exact sentence structure from similar meaning sentences.

To study how memory is stored, people with brain injuries were of great importance(will discuss HM's case in last). Dissociation between STM and LTM was concluded by study of people having brain injuries. The one famous example is when the hippocampus is removed and a person in not able to make new LTM's but can recall the past events successfully concluding that hippocampus is crucial in forming new memories but is not quite useful while retrieving. Some modern studies and experiments also showed that recalling from STM and LTM activate different parts of the brain. As in the example earlier where words were presented one by one, if we give hint after the list, if hint was related to earlier word, it activated different part(LTM) and if hint was for latest words, it activates different part of brain(STM).

**Types of LTM:**

Two divisions broadly : Implicit and Explicit,

- Implicit (not conscious) :
    - Classical Conditioning
    - Procedural
    - Priming
- Explicit (conscious):
    - Episodic : Some events
    - Semantic : Facts

**Distinction between episodic and semantic:**

Tulving describes episodic LTM as *mental time travel* of remembering the past events while semantic memory is not associated with any time travel or an experience and is a fact or knowledge of the world(alphabets, newton's second law :)). We do not *mental time travel* in case of semantic memory.

- Their was a patient who suffered injury to the hippocampus and surrounding structures. The interesting observation in this case, that the patient lost episodic memory but the things he remembered were from semantic memory. This was one of the earliest evidence for distinction between episodic and semantic memory.
- A case of a woman which was almost completely opposite of the above mentioned case also came to light in which her episodic memory was intact but she was not able to recall facts (like what is the meaning of a cup, or how it looks like). But she was still able to recall events from life, strengthening the argument for distinction between episodic and semantic memory.

Brain imaging evidence is also found for these two memories. An experiment involving participants to keep a diary and on recalling of diary under the observation of an MRI also shows the distinction of two type of memories, tough there were some common areas, but a lot of differences were also observed.

Though there is ample evidence concluding episodic and semantic memory to be distinct but their is also ample evidence that they are linked in some many ways as we may tend to forgot a particular event or experience but may remember some facts associated with it and later may recall the event if we are made aware of some related facts. One example being I may be able to recall of a not so famous(still being famous) person if I have met him personally from others.

We have given examples of a man and women suffering from different aspects of amnesic profile. One has lost semantic memory but episodic memory is intact, opposite in the other.

Peter Graf in 1985 demonstrated implicit memory taking three groups , first being 8 amnesia patients with Korsakoff syndrome, 2 from other form, second group of patients without amnesia but were under treatment of alcoholism, 3rd group of patients with no history of alcoholism and amnesia. Different type of experiments were performed and in implicit memory  experiments all groups performed almost equivalently well while group 1 performed poorly in recall memory tests. Confirms poor explicit memory with amnesia.
Another experiment in 1968 was performed using 5 patients with Korsakoff's syndrome. Implicit memory had effect as they were performing task regularly, but they had no memory that they had performed these tasks earlier. H.M. who was an amnsic patient can acquire new skill with enough practice but had no memory how we acquired the skill. Amnesic patients can retain skills but are difficult to learn episodes or the event in which they acquired the skill.