

Empiricism (e.g. Hume, Harley, Hobbes) argued that all cognition was based on sensation and so could be understood mechanically – this gave rise to **associationism**, so associated or similar memories were grouped together.

Kant (1724) argued that the mind imposes innate categories on sensory experience; **top-down cognition**.

Herman Ebbinghaus (1850–1909) was the first to study memory experimentally. Using himself as a subject, he studied his own memory for nonsense syllables (to avoid influence of prior knowledge) and learnt that memory involves formation of new associations and could be **strengthened by repetition**. He also documented the **learning and retention curves** with greatest learning occurring early and the strongest memories being those repeated in a distributed fashion.

Bartlett (1886–1969) documented how memories could incorporate **fabrications** and errors. This opposed the behaviourist wisdom of the time.

Historical Approaches

Memories are **encoded** (stored), **stored/consolidated** (transferred to long-term storage) and **retrieved**.

Endel Tulving (1972)

Made the famous distinction between **episodic** and **semantic** declarative memory.

Episodic Memory: "...receives and stores information about temporally dated episodes or events, and temporal-spatial relations among these events. A perceptual event can be stored in the episodic system solely in terms of its perceptible properties or attributes and it is always stored in terms of its autobiographical reference to the already existing".

Episodic Memory does not just involve memory for the past though, it also modulates a persons ability to think about the future (autonoetic consciousness). Schacter et al. (2008) found that simulating possible future events depends on the same neural machinery; they call this **episodic simulation**.

Semantic Memory: "...mental thesaurus, organised knowledge a person possesses about words and other verbal symbols, their meaning and referents, about relations, rules, formulas and algorithms among them for manipulation."

Experimental Psychology can be facilitated by human and animal research, but these can differ. For example, **long-term** storage in animals can take up to 6 hours, whereas human long-term storage can take minutes.

Apparently obvious claims need experimental backing, as layperson 'obvious' perceptions of memory such as the stores metaphor have been shown not to be true.

Encoding: Attention, Information load, Information processing, Perceptual aspects, Timing, Context, Valence, Motivation etc.

Storage: Sleep, Interference, Retention interval, partial access etc.

Retrieval: Instructions, Attention, Cues, Timing, Context etc.

Methodology Caveats

Approaches

Memory is a person's ability to remember things. Memory in a psychological sense is the storage of an **internal representation** of an acquired piece of knowledge.

William James said "without memory we would be **servants of the moment**, with nothing but our innate reflexes to help us deal with the world". He was arguably the first to distinguish between primary and secondary memory, now known as short-term and long-term memory, respectively.

Introduction to Memory

Types of Memory

Suffered from severe traumatic brain injury at 30 years of age (1981). He could read and converse quite well but began to show slowed **mentation** (mental activity).

K.C. showed an inability to commit new information to any type of memory; **severe anterograde amnesia and temporally graded retrograde amnesia**. Unlike HM his **semantic memory** (e.g. tell the difference between stalactites and stalagmites) was intact, but he lacked episodic memory for his entire past.

He also has severe impairment of his **autonoetic consciousness (self-knowing)** which means that he is unable to envision himself in the future.

Patient K.C.

His brain shows severe injury to the medial temporal lobes and the hippocampus, bilaterally (both sides).

Patient Clive

Clive Wearing was a former music producer for the BBC and suffered **herpes-simplex encephalitis** which caused a severe memory impairment or **amnesia**. The herpes-simplex is a viral infection that affects the **medial temporal lobe's** and so are not only vulnerable to epilepsy but to viruses. This is treatable, but often the treatment is offered too late. He had very severe **anterograde and retrograde amnesia**.

However, Clive was a remarkable piano player and was still able to play and use sheet music (flawlessly). This theme linked to those from H.M, who could acquire procedural memory such as mirror writing.

Patient H.M.

Suffered from severe epilepsy and seizures that totally impaired his every day life. He suffered from traumatic 'drop attacks' where he would fall to the floor, even when he was crossing the street.

William Beecher **Scoville** was the neurosurgeon responsible for treating H.M's epilepsy. He decided to remove the **anterior hippocampus** to remove parts of H.M's **medial temporal lobe** and so lost approximately two thirds of his anterior **hippocampus, perirhinal cortex and amygdala**.

After the surgery, H.M unexpectedly was unable to form new memories; **severe anterograde memory**. He also had severe memory impairments for events that had occurred in the last 5 years; **temporally graded retrograde amnesia**. This suggests that memory was formed in a neural system, and was not just an emergent property of the mind.

H.M lived in M.I.T and was further studied by **Sue Corkin et al**. In 2002, she found evidence that H.M was able to acquire new **motor skills** such as drawing an object in a mirror. He was therefore able to learn tasks using **repetition priming** despite his inability to acquire new semantic and episodic memories.