

Corkin (2002)

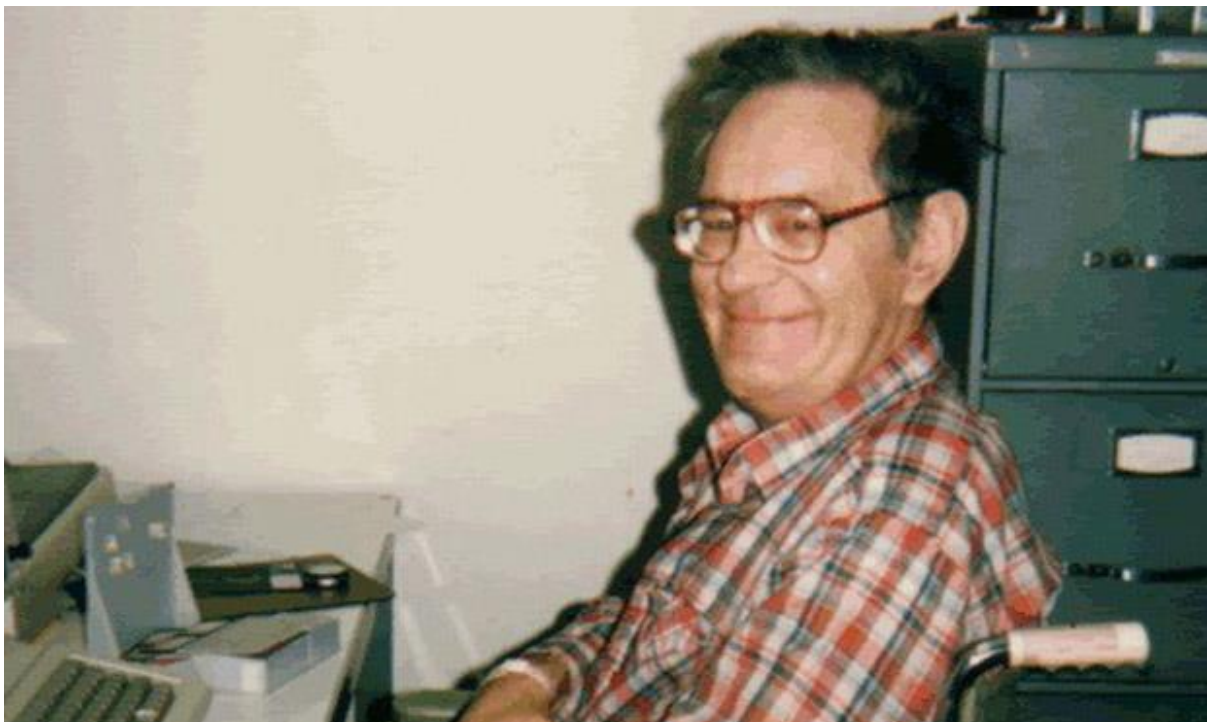
An Investigation With The Patient H.M.

This study is used to answer questions on:

Brain scanning (MRI)
Localisation of function
Multi-store Memory Model
Working Memory Model
Neuroplasticity
Research Methods: Case Study
Research Methods: Ethics

Abstract

This case study examined Henry Molaison (H.M.). After a childhood accident, H.M. suffered from epileptic seizures and by the age of 27, could not live a normal life. He agreed to have part of his brain removed in an attempt to stop the epileptic fits. After the surgery, the fits almost completely stopped, but H.M. was left with anterograde amnesia – the inability to form new memories. He also suffered from retrograde amnesia – the inability to recall events before his surgery (although some of memories were to return over time). H.M. was studied for over 50 years by a variety of different psychologists who used H.M.'s condition to investigate and create new explanations of memory.



Aim

- To investigate the effects of damage to the medial temporal lobe (MTL)

Case Study Details

American Henry Molaison (H.M.) was knocked down by a bicycle aged 7 years old. From the age of 10, he began to have minor epileptic fits and from the age of 16, he regularly had major epileptic fits. By the age of 27, he was unable to maintain a job or live a normal life as he was having 10 or more fits a day.

In 1953, Dr. William Scoville performed an operation on Henry's brain removing the medial temporal lobe. This operation was considered risky and still experimental, but H.M.'s life was so difficult that he and his family agreed to the procedure. This resulted in H.M.'s epileptic fits stopping but left him with some serious memory issues.

H.M. forgot events almost as soon as they occurred but did not show any decreases in intelligence. He underestimated his own age and was constantly apologising for forgetting the names of people he had just met. H.M. had anterograde amnesia – he was unable to form new memories from the brain surgery onwards. He also suffered from retrograde amnesia – the inability to recall events before the surgery. However, this lessened over time and H.M. was able to recall many of his memories beyond 11 years before the surgery e.g. in his childhood.

Despite his inability to form new memories, H.M. was able to have conversations and recall a string of 6 or 7 numbers. He was also able to remember information for up to 15 minutes if he continued to rehearse it. However, he would forget the information (and the method of rehearsing it) as soon as his attention was focused somewhere else. Information that was difficult to rehearse (e.g. faces or patterns) was very difficult for H.M. to recall and he forgot them in less than 1 minute.

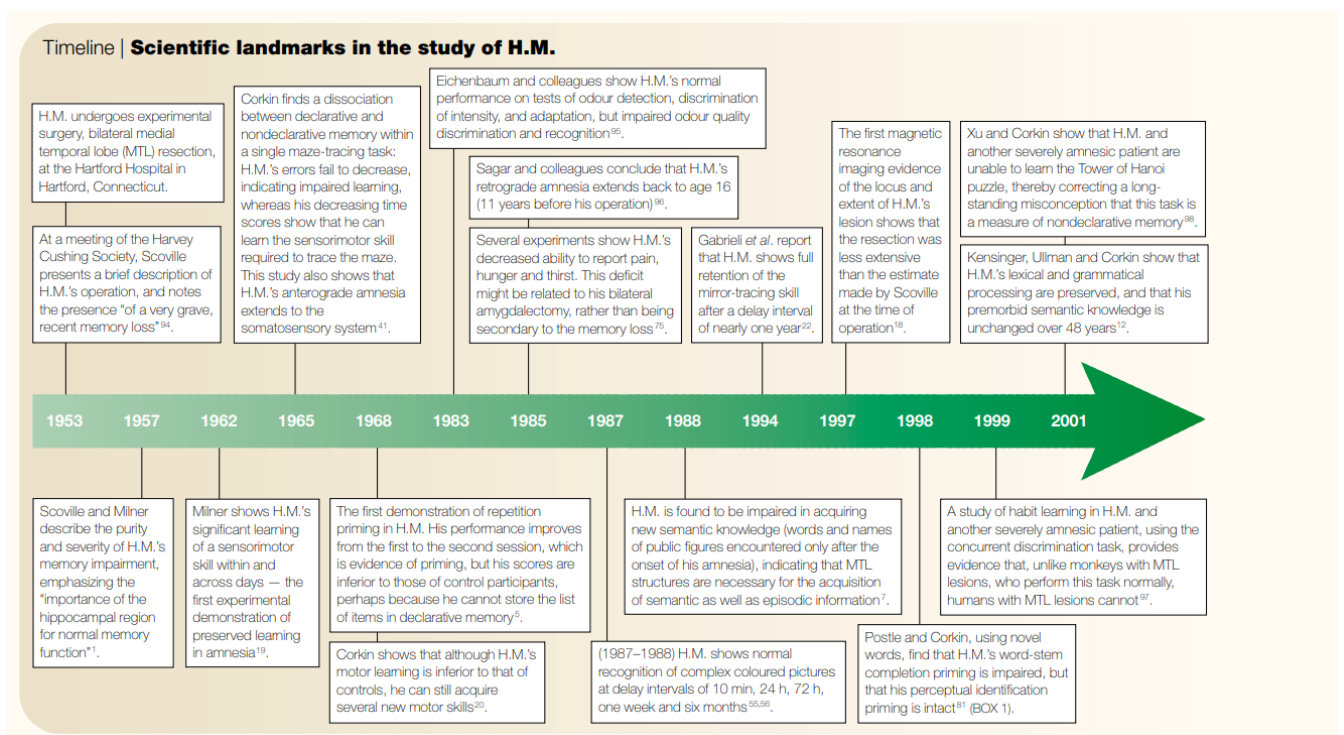
This can be seen as evidence for the multi-store model of memory. H.M. seemed to have access to the short-term store and information could be held there. However, he seemed unable to transfer the information to the long-term store. It also suggests that the working memory model is a valid model as H.M. demonstrated different types of memory impairment that could be explained by the different working memory model systems.

However, H.M. was able to learn new skills even though he could not recall how he had learned them. A classic test conducted on H.M. involved him drawing an object whilst looking in a mirror. This skill is very difficult when first attempted but with practice, an individual can become proficient. It was found that H.M. was able to draw objects in this way after practicing and learning the skill, but he could not recall the task or his practising. This led researchers to deduce two types of memory: declarative and procedural. Declarative memory is the storing and recalling of events from the past, such as recalling a birthday party. H.M. was unable to form new declarative memories. Procedural memories are learned skills such as riding a bike or driving a car. H.M. was able to learn new skills which suggest multiple memory systems in different areas of the brain.

Different psychologists studied H.M. for over 50 years until his death in December 2008. Their work demonstrates localisation of function in that certain areas of the brain seem to be responsible for certain functions or types of memory. Later work with H.M. suggested that

neuroplasticity may also play a role in memory functions. H.M. still had access to some of his older memories before the brain surgery. He also demonstrated the ability to form some new knowledge, such as being able to identify the faces of famous people even though they had not been famous before his surgery. Researchers suggested a change in H.M.'s brain and that memory could be supported by other parts of the brain once the connections are strong enough.

An MRI was conducted on H.M. in 1998 to identify exactly where the damage to his brain had occurred. After his death in December 2008, his brain was removed and sliced so that further research could continue.



Evaluation

Generalisability

- H.M. was a unique case. Although there were other patients who had similar procedures and experienced similar memory issues, H.M. was unique in that he was extensively tested.
- H.M.'s brain did not appear to be significantly different to other human brains, therefore we can generalise the findings to a certain extent.

Reliability

- An MRI scan later in life demonstrated exactly what damage had been caused in H.M.'s brain.
- During testing, extensive notes and controls were taken so that procedures could be repeated.

Application to life

- Understanding how memory works is vital in helping those who suffer brain damage cope with the changes in their life.
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Validity

- The researchers had direct access to H.M. and were able to test him in a variety of ways for over 50 years.

Ethics

- The original surgery raises ethical issues as it was unclear what effect it would have on H.M. However, H.M.'s life was so difficult (and he gave informed consent) that there appeared to be little alternative.

