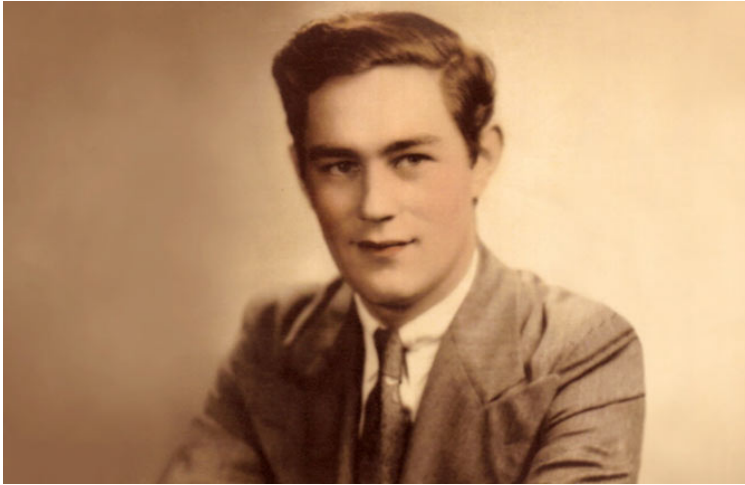


Open Your Class with This Tomorrow
Patient H.M.: A Story of Memory, Madness, and Family Secrets

Cognitive Psychology KEY
Scoville and Milner, 1957



Henry Gustav Molaison, (Patient H.M.) whose name was not revealed until after his death.

Background:

One of the most studied psychological case study in history, neurosurgeon William Scoville and neuropsychologist Brenda Milner worked with one individual, Henry Gustav Molaison (during his life was referred to simply as “H.M.” in the research literature). Patient H.M. suffered a brain injury when he was hit by a bicycle at age eight. This injury resulted in severe epileptic seizures, which could not be controlled by medications and grew progressively worse. H.M. attended high school and worked various jobs but eventually had to be looked after constantly because of his epileptic attacks. At the age of 27, H.M. underwent surgery that destroyed most of his hippocampus in an effort to reduce the epileptic seizures. The surgery was considered a success, however, following the surgery in a series of tests completed by Brenda Milner it was discovered that H.M. suffered from severe memory loss. He became unable to form any new memories lasting for more than about 30 seconds in what was diagnosed as a severe case of anterograde amnesia. Nothing new could be stored in his long-term memory, but his childhood memories were intact. The only old memories that were lost were those for events immediately before the operation. H.M. remembered his childhood classmates, his parents and the homes in which he lived as a child. His working memory (short-term memory) also remained intact as evidenced by numerous tests. Interestingly, H.M. was able to learn new procedural memories. Milner tested H.M. on his ability to trace the outline of a star in a mirror, this is a difficult task for all individuals, but with practice, people generally improve. H.M. showed this same type of improvement from trial to trial which lasted over time. The aspect of H.M.’s experience that was different from others was that even though he showed improvement in the task, he had no recollection of ever having completed the task earlier. In addition, he had no knowledge of who Brenda Milner was even though she had worked with him for many years.

Patient H.M. was a research participant for 53 years, first as a patient at Hartford

Hospital where Scoville performed the surgery. He then had many visits with Brenda Milner at the Montreal Neurological Institute and at his home. For nearly 40 years, until his death in 2008 he was studied by Susan Corkin at MIT. In 1997 Patient H.M. was given an MRI and the results showed that his brain damage was pervasive and included the hippocampus, the amygdala, and other nearby areas. MRI technology has been around for quite some time prior to 1997, but those who worked with H.M. were concerned that the metal clamps that Scoville had inserted into H.M.'s brain to indicate the depth of the lesion would explode in an MRI machine (he was fine). After his death, H.M.'s brain was sent to the Brain Observatory at which point it was placed in silicone and cut into 2,401 slices where it was live streamed as it was cut. This will allow for a more comprehensive investigation into H.M.'s brain and its structures, it will also provide more knowledge for brain research that can be used with future generations.

Years of research on this one patient contributed significant evidence to support the theory that the hippocampus is responsible for creating long-term memory. This study shows that brain damage in specific areas responsible for memory is related to amnesia and highlights the importance of the hippocampus in memory.

Questions

1. What type of research method did Scoville and Milner use in this situation?

Case Study

2. Give two examples of the strengths of this type of research method.

- **Case studies result in a large amount of data about a rare condition.**
- **Case studies allow researchers to examine the results of brain damage that would be unethical to create in subjects.**
- **Case studies generate raw material for further research.**
- **Case studies allow researchers to test new treatments or applications of research.**
- **Case studies allow for researchers to develop a greater understanding about the lives and condition of the patients.**

3. Give two examples limitations of this type of research method.

- **Case studies cannot determine cause and effect conclusions.**
- **Case studies have problems with experimenter bias due to the fact that the researchers have a close relationship with the subject and may be looking for improvements that are not actually present leading to unintentional errors in reporting of results.**
- **Case studies have a small sample size making it impossible for researchers to apply results to a larger population.**

4. Give an example of a potential ethical problem in this study and how researchers would address this concern in an application to the IRB.

- **Confidentiality due to the level of personal detail that is published is done by not using the participant's name and referring to him as Patient H.M.**

Books for Psychology Class

<https://booksforpsychologyclass.weebly.com>

- **Patient H.M. grant obtain informed consent due to his inability to form lasting memories. Researchers must obtain approval and give regular updates to someone who has been chosen to care for H.M. (a parent or another family member, for example) in what is called consent by proxy.**

5. What problems exist for replication of this study?

Because of the damage caused to Patient H.M. as a result of the surgery he had it would be unethical to intentionally conduct a replication with another individual. If an individual were to experience damage to his or her hippocampus similar to that of Patient H.M. due to an accident or injury, then another case study could possibly be conducted.