

HM, the Man with No Memory

Henry Molaison (HM) taught us about memory by losing his.
Published on January 16, 2012 by Jenni Ogden, Ph.D. in Trouble in Mind

Henry Molaison, known by thousands of psychology students as "HM," lost his memory on an operating table in a hospital in Hartford, in August 1953. He was 27 years old and had suffered from epileptic seizures for many years.



William Beecher Scoville, a Hartford neurosurgeon, stood above an awake Henry and skillfully suctioned out the seahorse-shaped brain structure called the hippocampus that lay within each temporal lobe. Henry would have been drowsy and probably didn't notice his memory vanishing as the operation proceeded. The operation was successful in that it significantly reduced Henry's seizures, but it left him with a dense memory loss. When Scoville realized his patient had become amnesic, he referred him to the eminent neurosurgeon, Dr. Wilder Penfield and neuropsychologist Dr. Brenda Milner of Montreal Neurological Institute (MNI) who assessed him in detail. Up until then it had not been known that the hippocampus was essential for making memories, and that if we lose both of them we will suffer a global amnesia. Once this was realized, the findings were widely publicized so that this operation to remove both hippocampi would never be done again.

Penfield and Milner had already been conducting memory experiments on other patients and they quickly realized that Henry's dense amnesia, his intact intelligence, and the precise neurosurgical lesions made him the perfect experimental subject. For 55 years Henry participated in numerous experiments, primarily at Massachusetts Institute of Technology (MIT) where Professor Suzanne Corkin and her team of neuropsychologists assessed him. MIT studies on HM taught us much of what we know about memory. Of course many other patients with memory impairments have since been studied, including a small number with amnesias almost as dense as Henry's, but it is to him we owe the greatest debt. His name (or initials!) has been mentioned in almost 12,000 journal articles, making him the most studied case in medical or psychological history. Henry died on December 2nd, 2008, at the age of 82. Until then, he was known to the world only as "HM" but on his death his name was revealed. A man with no memory is vulnerable, and his initials had been used while he lived in order to protect his identity.

Henry's memory loss was far from simple. Not only could he make no new conscious memories after his operation, he also suffered a **retrograde memory loss** (a loss of memories prior to brain damage) for an eleven year period before his surgery. It is not clear why this is so, although it is thought this is *not* because of his loss of the hippocampi on both sides of his brain. More likely it is a combination of his being on large doses of antiepileptic drugs and his frequent seizures prior to his surgery. His global amnesia for new material was the result of the loss of both hippocampi, and meant that he could not learn new words, songs or faces after his surgery, forgot who he was talking to as soon as he turned away, didn't know how old he was or if his parents were alive or dead, and never again clearly remembered an event, such as his birthday party, or who the current president of the United States was. In contrast, he did retain the ability to learn some new motor skills such as becoming faster at drawing a path through a picture of a maze, or learning to use a walking frame when he sprained his ankle, but this learning was at a subconscious level. He had no conscious memory that he had ever seen or done the maze test before, or used the walking frame previously.