
**Aim**
To use MRI scans of H.M., an anterograde amnesia patient, to confirm the lesions and ablations done to the medical temporal lobe and use this data to establish correlations between the damaged brain tissue and amnesia (localization).

**Hypothesis**
Medial temporal lobe structures are critical for establishing long-term explicit /declarative memory.

**Method**

**Subjects:** H.M. (alias of Henry Gustav Molaison, name was not revealed until death). He underwent bilateral medial temporal lobe resection surgery in 1953, which removed brain tissue in the hippocampus and temporal lobe region. Afterwards, H.M. could not form new memories and could only recall events that happened before age nine.

**Design:** Case study of H.M. and his anterograde amnesia after brain surgery.

**Procedure:** Comprehensive MRI scan of H.M.’s brain to confirm the damage done to his brain from surgery.
- Scans results were compared to reports made by Scoville, the doctor that performed the surgery.
- Difference of H.M.’s Wechsler-Bellevue Scale Form I (IQ, Intelligence Quotient) and Wechsler Memory Scale Form II (MQ, Memory Quotient) scores compared with scores of patients with similar conditions.

**Results:**

**Exaggeration of brain tissue removal:**
- Appearance of the surface of the brain is normal for a man of H.M.’s age.
- Scoville documented that his resection was ~8cm, MRI showed resection was ~5cm.

**Affected Parts of the brain:**
- Temporal lobe resection included medial temporal polar cortex, most of amygdaloid complex, and entorhinal cortex.
- 2 cm of hippocampus body was intact, but it was atrophic.
- Lesions in the medial temporal lobe caused amnesic syndrome in H.M.

**Importance of Hippocampus:**
- Out of three patients, H.M. had the greatest difference between IQ and MQ.
- For normal people, the difference should be zero, but H.M. had 37 difference.
- Although 2 cm of hippocampus was left intact, it could not support normal memory function.
- Two other patients had more of their hippocampus intact. Therefore, it can be inferred that smaller hippocampal remove is less damaging to memory ability.

**Evaluation**

**Ethics:** Henry Gustav Molaison’s privacy was well respected by this study. There was no disclosure of any sensitive information that may be used to discover H.M.’s identity in this study. Only his current age, time of accident, and time of surgery were revealed. Henry Gustav Molaison’s status as H.M. was only revealed after his death in 2008.

**Validity:** Triangulation was extensively used to validate the findings. References to other case studies (Scoville, Amaral, Milner, Horel) contributed to rich data. The MRI scans provided qualitative (health of the brain) and quantitative (measurements of hippocampal resection). The findings are not proof that the hippocampus localizes memory. It is extremely likely that the temporal lobe region is important in making long-term memory, but it does not rule out the importance of other parts e.g. amygdala.

**Stimulates New Research:** The study compared the H.M.’s case with animal models of amnesia. It suggested that there should be comparative studies done with human patients and animal experiments.

**Inferential Generalization:** The results of this case study are extrinsic or instrumental. The patients that H.M. was compared to also had amnesia (although to a lesser degree). Localization of the function of memory is not exclusive to this case study; the data is transferable. Therefore, the findings are applicable to similar settings (inferential generalization). Information from H.M. is used to assist other people with amnesia and damaged hippocampi.