

# In Defense of Suzanne Corkin

September 30, 2016



In “The Brain That Couldn’t Remember,” published in *The New York Times Magazine*\* on August 7, 2016, journalist Luke Dittrich raises what he suggests are ethical issues surrounding the testing of Henry Molaison, the well-known amnesic patient referred to as H. M. in the scientific literature. Proper scientific procedures and the responsible use of humans as research participants are critically important topics, and a scholarly analysis of the history of developments in these areas could be applied usefully to the case of H. M. Instead, Dittrich crafts a portrayal of Massachusetts Institute of Technology (MIT) neuroscientist Suzanne Corkin’s work with H. M. that utilizes personal opinion and innuendo. Dittrich’s sensational accusations run counter to all we witnessed first-hand during Corkin’s life and all that we have known about her as a scientist, mentor, and colleague.



Suzanne Corkin was a pioneer in the study of the cognitive neuroscience of memory, an advocate for women in science, an extraordinary mentor, and a compassionate individual.

Sadly, she passed away on May 24, 2016, so we will not be able to hear from her directly. However, in response to the article, we have heard from more than 200 scientific colleagues who signed a letter to *The New York Times* supporting Corkin (posted [here](#); Flaherty, 2016), and we have heard separately from the MIT department and Corkin's colleagues at the Massachusetts General Hospital, who rebutted several of Dittrich's claims (DiCarlo, 2016; van der Kouwe et al., 2016). Here, as Corkin's former research collaborators, we expand on these rebuttals and present an alternate and documented perspective for some of Dittrich's claims.

## Identity Protection

One of the issues Dittrich raised was about the intensity with which H. M.'s identity was guarded. Dittrich states: "It was an odd sort of fame: The scientists kept even his first name a closely guarded secret from the outside world and didn't reveal it until after his death, when it was unveiled in a front-page obituary in this newspaper." It is standard practice in psychological research to refer to participants only by initials, and it is required by most human ethics committees to keep the identity of individual participants confidential. (In this article, we refer to Molaison as H. M. out of respect for the scientific contributions he enabled by his participation in research.) Probably every researcher who met H. M. was approached by people — ranging from undergraduate students to journalists — who were curious about the personal life of the man referred to in text books as H. M. It is unclear to us why Dittrich would think that publicly revealing H. M.'s identity during his lifetime would have augmented his quality of life or would have prioritized his interests. The fact that his identity was protected for decades is a testament to Corkin's deep respect for H. M. as a person and her fidelity to research ethics.

## Treatment of H. M.

Throughout the article, Dittrich paints an unsettling portrait of Corkin's treatment of H. M. as a research participant, at multiple points exaggerating the truth in service of this portraiture. For example, Dittrich states: "Corkin and her colleagues learned that if you placed a pain-inflicting device called a dolorimeter to Henry's chest, he wouldn't complain even as his skin began to turn red and burn." Although Dittrich provides no citation for this statement, based on the details he provides it is reasonable to assume that he is referring to the published report of Hebben et al. (1985). If so, his statement represents a fundamental mischaracterization of how this experiment was conducted; the publication describes these experiments in detail. The heat was never raised to the level of skin burning and, importantly, each participant held the dolorimeter to their own skin and were free to withdraw the device at any time (labels including "withdrawal" were placed in front of participants to ensure they knew their options). In addition, H. M. was among six participants with global amnesia and 15 normal control participants who underwent this standard thermal-pain-perception test.

At another point, Dittrich characterizes researchers as questioning H. M. "relentlessly." The reality was far more benign. H. M. visited the Clinical Research Center at MIT, which was staffed with nurses and provided around-the-clock care. (Corkin gives detailed descriptions of this center in her 2013 book, *Permanent Present Tense: The Unforgettable Life of the Amnesic Patient*.) It was evident to those of us who worked with H. M. that he received affectionate attention from the staff and researchers in the center, and his demeanor during these visits suggested that he enjoyed himself. During his visits, he was tested for only a few hours each day. He was given leisurely breaks between testing sessions, during

which he would return to his private room or spend time in a lounge talking with the nursing staff or with other research participants. Much of the time, the testing simply consisted of conversations between H. M. and researchers. For example, he might be asked what he remembered about his past or what he knew about particular events, people, or words. In later years, he also played computerized games designed to assess different aspects of cognitive function. Research staff were trained to give H. M. frequent breaks because he would not be able to determine how much time had passed, and to ask him at regular intervals if he would like to stop. Tremendous thought — by Corkin in consultation with MIT's Committee on the Use of Humans as Experimental Subjects — went into ensuring that H. M.'s assent was meaningful.

Even more pernicious than these exaggerations is Dittrich's use of the phrase "chief inquisitor" to describe Corkin's relationship with H. M. While this stylism certainly draws attention, we believe that, in the context of a discussion of how H. M. was treated, allusion to an era when human beings were physically and mentally tortured for the sake of dogma is inappropriate.

Dittrich alleged that there was something improper in the selection of H. M.'s legal guardian. In her book, Corkin described the events and process in detail. From the time of his surgery until 1974, H.M. was cared for by his mother, who accompanied him on visits to Corkin's laboratory at MIT, as well as to Brenda Milner's laboratory in Montreal, Canada. When his mother's health was failing, H. M. moved in with Lillian Herrick, whose first husband was related to H. M.'s mother. In 1980, when Herrick's health also failed, H. M. was admitted to a nursing home founded by her brother. In 1991, the Probate Court in Windsor Locks, Connecticut, appointed Herrick's son, Tom Mooney, as H. M.'s conservator after a valid legal process, which included providing notice of a hearing and appointment of counsel. No evidence has come to light about anything untoward or inappropriate about the course of H. M.'s guardianship.

## **Disposition of H. M.'s Brain**

Dittrich also tells the story of a so-called "secret custody war" between Corkin and neuroanatomist Jacopo Annese over the ownership of H. M.'s brain after his death. (She earlier had arranged to have Annese perform anatomical studies on H. M.'s brain.) Indeed, the scientists' relationship did become contentious, but the dispute regarding the custody of H. M.'s brain was resolved amicably between the institutional parties. They agreed to transfer the brain to David Amaral, a well-known expert on medial temporal lobe anatomy at the University of California, Davis, who will pursue the histological findings in maximum detail (DiCarlo, 2016).

## **The Shredding Conversation**

Dittrich also reports a verbatim exchange in which he asks Corkin about the shredding of some data. The specifics are hard to understand and Dittrich concludes by stating: "Elements of her story seemed to be shifting and flexing in real time. Whatever the details, though — whatever Corkin had or hadn't yet shredded — the whole idea of willfully shredding any of Henry's data struck me as deeply troubling." Adding to the ambiguity, the tape-recorded interview that Dittrich himself [posted online](#), ended with Corkin saying, "We kept the H. M. stuff."

Given that Corkin made herself available for his interview despite ill health and ongoing chemotherapy, and given the puzzling and seemingly contradictory remarks she made, it is unfortunate that Dittrich did not clarify her statements using other sources. MIT has confirmed that it still has a room full of files (see also Connally, 2016) and indicates that Corkin clearly instructed her assistant to preserve all materials related to H. M. (Begley, 2016). Corkin's preservation of these data would be consistent with the meticulous way she had organized and stored them over many decades.

## **Damage to Prefrontal Cortex**

The article additionally implies that Corkin had a rigid storyline for H. M.'s abilities, and that she was willing to go to great lengths to ensure that this storyline was not broken. In particular, Dittrich suggests that Corkin attempted to suppress recent evidence of a small lesion in the left orbital prefrontal cortex for fear that it would threaten her long-held conclusions. Dittrich states: "...for the previous six decades, neuropsychologists like Corkin had interpreted their experimental results with Henry under the working assumption that his lesions were restricted to the medial temporal lobes. The discovery of this new lesion might call some of their conclusions about the functions of the medial temporal lobes into question and require a reexamination of all that old data." This statement may reflect Dittrich's perception, but in fact, Corkin and her colleagues never worked under the assumption that H. M.'s lesions were restricted to the medial temporal lobes. In published articles, Corkin and her colleagues reported that H. M.'s lesions involved multiple portions of the medial temporal-lobe area that serve distinct functions, including extensive damage to hippocampal areas thought to be the basis of the memory deficit, plus removal of the amygdala and temporal polar neocortex, and his cerebellum also was extensively atrophied (Corkin et al., 1997).

The notion that Corkin would have suppressed evidence of an orbitofrontal lesion is incompatible with the fact that she and her colleagues had forecast the presence of such a lesion in an earlier study (Eichenbaum et al., 1983). The results of this study revealed a deficit in odor discrimination and identification that was similar to that observed in patients with orbitofrontal lesions in other reports. Based on this evidence, Corkin and her coauthors suspected H. M.'s olfactory abnormality was due to orbitofrontal damage during the surgical approach — a hypothesis that will or will not be verified by continuing progress in the histological examination of his brain. Therefore, Corkin had indeed already considered the implications of a potential orbital prefrontal lesion, just as she also pursued the consequences of H. M.'s lesion in the amygdala (Hebben et al., 1985).

## **Corkin's Role in Scientific Discovery**

More broadly, Dittrich's statements seem to reflect a fundamental misunderstanding about the nature of the science of human memory and Corkin's contributions in this scientific progress. H. M. provided a core foundation on which the cognitive neuroscientific study of memory was built, and Corkin's work with H. M. was key in advancing these foundational discoveries. Dittrich implies that Corkin championed these discoveries, then resisted evidence contrary to early conclusions. In truth, Corkin's later studies on H. M. led her to extend and revise those conclusions (e.g., O'Kane et al., 2004). By no means was she one to maintain dogma and resist contrary evidence with regard to either the anatomical or psychological aspects of H. M.'s case. Corkin studied H. M. as a landmark case of amnesia, but at the same time understood that he was not the best case for anatomical localization of the memory deficit.

The scientific understanding of memory has progressed through decades of research on humans with brain damage limited to the medial temporal lobes and areas within the medial temporal lobes, as well as with animal model studies that can pinpoint specific medial temporal areas. These studies have refined and extended the observations on H. M. Corkin elegantly discusses these advances in research on the medial temporal lobes and memory in her recently published book (Corkin, 2013).

Suzanne Corkin's research with H. M. was only one facet of her research; by her own account, her research with H. M. resulted in only 22% of all of the output from her laboratory (Corkin, 2013). She made important contributions to the understanding of human memory through her research with many patient populations, including those with Alzheimer's disease and Parkinson's disease, and by utilizing neuroimaging methods. She was respected by her colleagues for her exacting standards and her meticulous attention to detail. Dittrich's portrayal of her in *The New York Times Magazine* may have served as a promotional advertisement for his new book on H. M., but in so doing it sacrificed facts.

Dittrich's article does not discuss extensive relevant literatures on the ethics and approved procedures for use of humans as research participants, including the protection of their identities, and he does not report any discussions with the ethics committees that reviewed Corkin's submitted research protocols. Similarly, he does not discuss a large literature on the proper maintenance of raw data from experiments nor consider reasons why ethical guidelines may require the responsible disposal (i.e., shredding) of some confidential files. Dittrich provides no citations to the scientific literature referred to him by Corkin. He could have contacted any of the 200 scientists who signed the letter to *The New York Times* about the potential scientific relevance of H. M.'s orbital prefrontal lesion. The absence of these straightforward additional steps leaves the impression that Dittrich's article capitalized on innuendo to create a narrative that implied malfeasance.

For more informed and comprehensive treatments of Corkin's contributions, please see a recent summary of her career (Postle & Kensinger, 2016) and the obituary for Corkin, also published in *The New York Times* (Carey, 2016).

\*Among those signing the Letter to the Editor to *The New York Times Magazine* were a number of prominent APS leaders, including President-Elect **Suparna Rajaram**; Past Presidents **Henry L. Roediger, III**, and **Elizabeth A. Phelps**; and Past Board Members **Lisa Feldman Barrett**, **Morris Moscovitch**, and **Sharon L. Thompson-Schill**. Another noteworthy signatory is APS William James Fellow **Brenda Milner**, who was Corkin's graduate school advisor at McGill University and who conducted the foundational research on H. M. Also signing the letter were APS William James Fellows **James. L. McClelland**, **Marcia K. Johnson**, and **Daniel L. Schacter**. The full list of signatories is available [here](#).

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