Influence on False Memories: Biology, Society, or Both?

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**Introduction**

Of all the structures of the human body, the brain can perhaps be called the most mysterious. Concepts like memories, dreams, and the subconscious have been the subject of endless research and received many cultural interpretations. Various civilizations have strived to understand the mind, and unlock its deepest secrets, seeking everything from internal peace to immortality. Descendants have been taught to remember the great deeds of their ancestors, and the horrific deeds of their enemies. The very understanding of human lives is built on memory. But while recalling the past may be part of human nature, things are much less clear when it comes to remembering what never was. This bizarre phenomenon, commonly known as a false memory, is still a subject of debate in the scientific community, fueling much scholarly research and experiments. Though their exact causes are still to be determined, false memories seem to be influenced by things like gender, semantic meaning, age, psychological trauma, and the ability to plan future tasks.

**False Memories: Definition and Biological Factors**

To unlock the secret behind false memories, their nature, including biological connections, must first be understood. Dang et al (2020), a team of researchers writing for the *Journal of Pacific Rim Psychology*, define false memory as “the phenomenon that people recall or recognize things that did not actually happen” (para.1). Explaining the context of their research, they divide false memory into suggestive, which is caused by incorrect information from outside sources, and spontaneous, occurring due to internal factors of the individual person (Brainerd & Pool, 1997, as cited in Dang et al, 2020). Based on this knowledge, the team conducted an experiment aimed at determining the connection between a person’s age, and their rate of false memories. After having participants from diverse age groups complete several visual memory tasks, and be tested on them, Dang et al (2020) concluded that age did have a significant impact on misremembering. Their results showed a lower tendency in children to develop false memories, and a bigger such tendency in adults (Dang et al, 2020). The discovery is certainly a significant one, as it offers powerful evidence for the influence of false memories by biological components.

The implications of the research above are further supported by the work of Spets et al (2021), who, documenting their findings in an article for *Neuroimage: Reports*, argue that another major influence on false memories is gender. Citing prior studies and experiment results, they claim that “the brain regions mediating true and false memories are not completely overlapping” (Spets et al, 2021, para.2), and that they differ between females and males. . Instructing representatives from the two genders to memorize shapes, and testing their memory, the scientists concluded that “Males produced greater activity than females in the [precuneus](https://www.sciencedirect.com/topics/neuroscience/precuneus), posterior [cingulate cortex](https://www.sciencedirect.com/topics/neuroscience/cingulate-cortex), parietooccipital sulcus, and [fusiform gyrus](https://www.sciencedirect.com/topics/neuroscience/fusiform-gyrus).” (Spets et al, 2021, Abstract). More intense female activity was noted in other areas of the brain as well, such as the hippocampus (Spets et al, 2021). The areas quoted above are all, in some capacity, involved with false memories. The results recorded serve as proof of the team’s hypothesis, tying the findings of both Dang et al (2020) and Spets et al (2021) with an intriguing common thread. Both studies indicate that false memories are influenced by two biological, non-environmental factors, a conclusion critical for the scientific community. Analyzing the biology of false memories can open doors to understanding their causes, and even potentially aid in their prevention.

**Social Influence on False Memories**

While exploration of the subject has certainly benefited from the above discoveries, they are not the definitive answer. Going beyond biology, some research suggests that the triggers for false memories come from one’s immediate surroundings. For instance, Alakbarova et al (2021), writing for *Memory & Cognition*, hypothesized that the presence of a specific meaning (semantic context) in objects or sentences increases the likelihood of incorrect identification, resulting in false memories. Their theory was tested by using a themed list, and showing participants sentences created using words from that list. Some of the sentences had significant meaning, and some did not. The experiment results confirmed the hypothesis, as reading a meaningful sentence made the subject more likely to focus on the meaning itself, rather than the images that the sentence may conjure (Alakbarova et al, 2021). Consequently, this would mean that human memory functions to store meaningful, valuable information, explaining the tendency of people to best remember important moments of their lives.

Links between everyday human surroundings and memory errors, like the one above, are further explored in another study, albeit with a different approach. While Alakbarova et al (2021) focused more on connecting memory and meaning, the experiments by research team Cohen et al (2020), described in the *Journal of Applied Research in Memory and Cognition*, shed light on the relationship between memories and tasks. By letting their subjects play the board game *Taboo*, they discovered that individuals have less of a chance to develop false memories about a future task that they still need to complete, than a future task which has been cancelled (Cohen et al, 2020). Therefore, unlike the research by Alakbarova et al (2021), where focusing on the meaning of something created false memories, the project by Cohen et al (2020) showed an increase in memory clarity with a “meaningful” future task, perhaps enhanced by the feeling of responsibility for completing it. The discoveries of these two studies contribute to a significant general conclusion: Whether influenced by biology or society, the human brain focuses on what is deemed more important, and stores information selectively. The possibility of a false memory can therefore be reduced if an individual pays close attention to their surroundings and situation.

**Psychological Trauma and False Memories**

As demonstrated by the conclusions above, both biological factors, and everyday situations, can lead to the formation of false memories. But what about uncommon situations? As shown by the results of several studies, experiencing an unpredictable, shocking, traumatic event can lead to misremembering its details. For instance, in *Applied Cognitive Psychology*, Oulton et al (2016) present their research on the repression of traumatic thoughts, and its influence on the recollection of traumatic events. Similar to Spets et al (2021), Oulton et al (2016) used a visual medium (film clips) for the purposes of their study. The team intentionally chose a film depicting a disturbing car crash, and surveyed participants on their reactions to it over a 24-hour period. In that timespan, the participants were split into three groups. One was instructed to monitor their thoughts related to the film, another was asked to both monitor their thoughts and suppress them, and a third group was asked to simply think freely (Oulton et al, 2016). After this, participants were shown clips from the film again, along with some that they had never seen before, and some that they had, but were now missing. The results showed that the subjects recognized 32.99% of the new clips as something that was previously shown, and were totally certain of that fact. It was also concluded that, unlike what the researchers hypothesized, thought suppression of a traumatic event did not cause more intense recollections of it later (Oulton et al, 2016). Therefore, in addition to being caused by everyday situations, as shown by the research of Cohen et al (2020) and Alakbarova et al (2021), memory distortion can also occur in relation to spontaneous, traumatic, and unexpected events. Being aware of such a fact can offer insight into conditions such as PTSD, potentially pointing to better treatment options.

The findings by Oulton et al (2016), however, are far from the only evidence for false memories and trauma being related. Reporting for the *British Journal of Developmental Psychology*, Otgaar et al (2017) investigate the presence of false memories in children that have been treated badly as opposed to children that haven’t. In fact, the team takes a similar approach to Dang et al (2020), examining suggestion-induced and spontaneous memory. In their research, Otgaar et al (2017) presented children with several lists of words, including neutral and negative words. This was done by using a Deese-Roediger-McDermott false memory paradigm. The scientists also used a video depicting a bank robbery, after which they intentionally gave the children suggestive misinformation about that robbery. (Otgaar et al, 2017). The results of the study demonstrated that, in children who were maltreated, the level of negative spontaneous false memories was higher, whereas suggestion-induced false memories were lower (Otgaar et al, 2017). This would mean that, although trauma and maltreatment certainly affect one’s false memory rate, that level of influence depends on the type of the memory itself. Overall, the stress of traumatic situations significantly increases the likelihood of false memories.

Despite being conducted for the common purpose of determining the mechanisms behind false memories, the studies of the people above have some significant differences between them. More precisely, they each focus on a different *category* of memory. Spets et al (2021), for example, conducted their gender-related research with emphasis on long-term and spatial memories. Both Dang et al (2020) and Otgaar et al (2017), on the other hand, divide the concept of false memories into spontaneous and suggestive (Dang et al, 2020, Otgaar et al, 2017). Cohen et al (2020) discuss the concept of prospective memory, while neither Alakbarova et al (2021), nor Oulton et al (2016) seem to have a specific focus. Because of such differences in their approach, the results of their research cannot be collectively taken as evidence for the explanation or origin of the false memory phenomenon but can rather be viewed as four different perspectives on the same topic. Furthermore, there isn’t even a clear-cut border between the biological and social influences on false memories. For instance, while examining age as a factor, Dang et al (2020) still touched on concepts like misinformation (suggestive memory), and employed visuals in their experiments, both of which are immediate part of the society a person lives in. Spets et al (2021) used shapes (a common everyday concept) in their gender research, and the disregard for biological factors could have been a potential bias to the social and situation-focused studies. Not to mention, participants of the biology-focused studies may have had psychological traumas unknown to the researchers, which may have contributed to their false memory rate. Therefore, however different the four studies might be, it was impossible for them to completely avoid common elements, proving that one factor never works without the other.

**Conclusion**

Just like about any scientific topic, false memories have not yet been completely understood. And just like with so many other things, humanity keeps on trying. Unlike chemistry or biology, where it is possible to touch, view, and visually observe results, studying memory only allows to make conclusions based on frequencies of the unseen. What’s more, invisible factors must constantly be considered for the data to remain accurate. The strength of studies like these seems to lie in their ability to continue. As long as teams like Alakbarova et al (2021) keep digging into the intricate details of the mind, the drive will exist to learn more. As research continues, perspectives grow, and with them, knowledge grows as well. It is this growing knowledge, and increasingly diverse perspectives, that can one day allow scientists to come to a better, more focused understanding of what is known as a false memory.

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