

Memories of Things Unseen

Elizabeth F. Loftus

University of California, Irvine

ABSTRACT—*New findings reveal more about the malleability of memory. Not only is it possible to change details of memories for previously experienced events, but one can sometimes also plant entirely false memories into the minds of unsuspecting individuals, even if the events would be highly implausible or even impossible. False memories might differ statistically from true ones, in terms of certain characteristics such as confidence or vividness, but some false memories are held with a great degree of confidence and expressed with much emotion. Moreover, false memories can have consequences for later thoughts and behaviors, sometimes rather serious ones.*

KEYWORDS—*memory; false memory; suggestibility*

Faulty memory has led to more than its share of heartbreak. The cases of individuals who have been released from prison after DNA evidence revealed their innocence make compelling examples. Larry Mayes of Indiana had the dubious distinction of being the 100th such person to be freed in the United States. He was convicted of raping a gas station cashier after the victim positively identified him in court. Apparently it did not matter that she had failed to identify him in two earlier lineups and did so in court only after she was hypnotized by the police. Mayes spent 21 years in prison for a crime he did not commit. Attorney Thomas Vanes had prosecuted Mayes, believing at the time that Mayes was guilty. But two decades later, after Vanes saw the result of old evidence being subjected to new DNA testing, he changed his mind. “He was right, and I was wrong,” wrote Vanes (2003), in a newspaper op-ed piece arguing for the DNA testing of another individual who was awaiting execution for an ugly robbery-murder of an elderly couple. For Vanes, it was a “sobering lesson.”

The DNA exonerations have taught all of us a sobering lesson, namely, that faulty memory is the major cause of wrongful convictions. Concerns about justice are but one reason why the study of memory is so important.

MEMORY DISTORTION: FROM CHANGING DETAILS TO PLANTING FALSE MEMORIES

Pick up any textbook in the field of memory or cognition, and you will invariably find mention of faulty memory. That has been true for decades. But lately, the study of memory distortion has been thriving.

Address correspondence to Elizabeth F. Loftus, 2393 Social Ecology II, University of California, Irvine, CA 92697-7085; e-mail: eloftus@uci.edu.

In the 1970s through 1990s, hundreds of studies showed the power of new information to contaminate memory reports. Stop signs became yield signs, hammers turned into screwdrivers, and broken glass got “added” to memories for accidents. The inaccuracies in memory caused by erroneous information provided after the event became known as the “misinformation effect.”

In the mid 1990s, memory investigators went further. It was one thing to change a detail in memory for a previously experienced event, but quite another thing to plant an entirely false memory into the mind. Using fairly strong suggestions, investigators succeeded in getting people to incorrectly believe that when they were children, they had been lost in a shopping mall for an extended time, hospitalized overnight, or involved in an unfortunate accident at a family wedding (see Loftus, 1997). The “strong suggestion” involved enlisting the help of family members to construct scenarios describing true and false experiences and feeding these scenarios to the subjects as if they were all true. The method was later dubbed the “familial-informant false-narrative procedure” (Lindsay, Hagen, Read, Wade, & Garry, 2004), but it is easier to call it the “lost in the mall” procedure. After being fed suggestive information that ostensibly came from their relatives, a significant minority of subjects came to accept all or part of the suggestion and claimed it as their own experience.

Would people also fall sway to suggestion if the to-be-planted event was particularly horrible? The answer is yes, as revealed in one study that convinced one third of subjects that when they were children they had nearly drowned and had to be rescued by a lifeguard (Heaps & Nash, 2001). Another research group convinced about half of their subjects that they had had particularly awful experiences as children, such as being a victim of a vicious animal attack (Porter, Yuille, & Lehman, 1999).

The suggestion used in these lost-in-the-mall studies was strong. In the real world, some forms of suggestion that are used are far more subtle. Perhaps their persuasive powers would be weaker. Take *guided imagination*, a technique in which individuals are led to imagine that they have had experiences (like breaking a window) that they have previously denied. Even a minute’s worth of such imagination can increase people’s confidence that in the past they had an experience like the imagined one—a phenomenon called *imagination inflation*. (See Garry & Polaschek, 2000, for an excellent review.) Imagining another person engaged in an event can also increase your confidence that it happened to you. Finally, some individuals, such as those who tend to have lapses in memory and attention, are more susceptible to imagination inflation than others. The clinical implications are evident—many therapy techniques involve imagination-based interventions; their capacity for distorting autobiography (an unexpected side effect?) needs to be appreciated.

PLANTING FALSE MEMORIES OR EXTRACTING TRUE MEMORIES?

When people claim, after suggestion, that they were lost in a mall, or attacked by an animal, perhaps the suggestive manipulation has extracted true memories rather than planting false ones. This quite-legitimate challenge has been met with research efforts to plant memories of events that would be highly implausible or even impossible.

In one such study, subjects evaluated advertisements under a pretense. One of the ads was for Disneyland and featured Bugs Bunny by the magic castle. The text made reference to meeting Bugs—the perfect end to the perfect day. After evaluating this ad, or a control ad, subjects were asked about their own childhood experiences at Disneyland (Braun, Ellis, & Loftus, 2002). About 16% of those who had been exposed to the fake Bugs ad later said they had personally met Bugs Bunny at Disneyland. Later studies showed that with multiple exposures to fake Disney ads that mentioned Bugs Bunny, the percentages rose even higher. Many of those subjects who fell sway to the suggestion remembered the impossible encounter in quite a bit of detail (e.g., they hugged Bugs or touched his ear). Of course, this memory is impossible because Bugs Bunny is a Warner Bros. character and would not be found at a Disney theme park. But the study shows that suggestive methods are indeed capable of leading to false beliefs or memories.

Other efforts to plant impossible or implausible memories show just how far one can go in tampering with people’s autobiographies. In one case, people were led to believe that they had witnessed a person being demonically possessed as a child (Mazzoni, Loftus, & Kirsch, 2001). In the most powerful of these studies, subjects read articles that described demonic possession and were designed to increase its plausibility. One article was a testimonial from a prominent individual describing his own childhood experience with witnessing a possession. Subjects also received false feedback about causes of certain fears; they were told that witnessing a possession probably led to their particular childhood fears. Finally, they answered questions about their own childhood experiences. Relative to control subjects, those who had received the suggestion were more confident that they had witnessed possession as a child.

In yet another study, subjects were led to remember an event that never occurs in the country in which they lived, namely, “having a nurse remove a skin sample from my little finger” before age 6 (Mazzoni & Memon, 2003, p. 187). The most powerful method of suggestion in this study involved having subjects imagine that they had had the experience.

Perhaps you are thinking that these events are not sufficiently implausible—that Bugs might not be at Disneyland but other rabbits are, that demonic possession may not have been witnessed but other bizarre behavior was. Such critiques have encouraged researchers to come up with new pseudoevents that are less susceptible to these charges. Some researchers have also tried to make the false event so specific that it is unlikely to have happened to large numbers of people. So, in another study, subjects were persuaded that they had gotten in trouble with a friend for putting Slime (a brightly colored gelatinous substance manufactured as a toy) in their teacher’s desk when in the first or second grade (Lindsay et al., 2004). The pseudoevent was chosen to be distinctive and memorable, and neither entirely implausible nor likely actually to have occurred. What was surprising about the findings was the sheer number of people who were

led to believe that they had “Slimed” their teacher. The most powerful method of suggestion in this study involved the combination of a narrative and a photo ostensibly provided by the subject’s parents. The narrative for the pseudoevent was customized for each subject by inserting the subject’s name and the teacher’s name into it:

I remember when Jane was in Grade 1, and like all kids back then, Jane had one of those revolting Slime toys that kids used to play with. I remember her telling me one day that she had taken the Slime to school and slid it into the teacher’s desk before she arrived. Jane claimed it wasn’t her idea and that her friend decided they should do it. I think the teacher, Mrs. Smollett, wasn’t very happy and made Jane and her friend sit with their arms folded and legs crossed, facing a wall for the next half hour. (Lindsay et al., 2004, p. 150)

The photo provided was the subject’s actual class photo for Grade 1 or 2.

Using a fairly strict criterion for classifying a response as a pseudomemory, Lindsay and his colleagues found that when subjects returned to the lab for a second interview, more than 65% of subjects had developed such memories. Moreover, when debriefed and told their memories were false, some individuals expressed great surprise, as revealed in their verbalizations: “You mean that didn’t happen to me?” and “No way! I remember it! That is so weird!” (Lindsay et al., 2004, pp. 152–153).

So (almost certainly), false memories do get planted by suggestion. Some methods are more powerful than others, leading to very high rates of false-memory reports. In the Slime study, the suggestion included a suggestive narrative ostensibly provided by an authoritative figure, namely, the subject’s parent. Moreover, the class photo may have added to the authoritativeness of the suggestive narrative and increased the subject’s confidence that the Slime event happened. The photo may have further encouraged speculation about the details of the pseudoevent. So, for example, a subject looking at the photo might have mused over who the co-perpetrator might have been in the Slime prank and even picked out a likely candidate. Finally, these studies indicate that rather unlikely events can be planted in the mind, and they counter the criticism that the events planted in such studies revive true memories.

CHARACTERISTICS OF FALSE MEMORIES

Can we tell the difference between true memories and false ones? Many studies show that there are some statistical differences, that true memories are held with more confidence or seem more vivid than false ones. But other studies do not demonstrate such differences. In the Slime study, for example, subjects rated their memories on a number of scales, including scales indicating their confidence that the event actually took place and the extent to which they felt their memory experience resembled reliving the event. False memories were as compelling as true memories, at least on these dimensions.

Are false memories felt with as much emotion as true ones? One answer to this question comes from research on individuals who presumably have false memories of events not planted experimentally. In a study of people who have memories of abduction by space aliens (McNally et al., 2004), physiological measures (e.g., heart rate and electrical conductance of the skin) were taken while abductees listened to tape-recorded accounts of their reported alien encounters.

The abductees showed greater reactivity to their abduction scripts than to other scripts (positive and neutral). Moreover, this effect was more pronounced among the abductees than among control subjects who did not have abduction memories and listened to the same accounts. Assuming no one was actually abducted, these results suggest that false memories of abduction can produce very strong physiological responses. Thus, a memory report accompanied by strong emotion is not good evidence that the memory report reflects a genuine experience (see also McNally, 2003).

CONSEQUENCES OF FALSE MEMORIES

Changing beliefs or memories can influence what people think or do later. In one study, people who were led by a fake advertisement to believe that they met Bugs at Disneyland were later asked to say how associated various pairs of characters were in their minds (e.g., How associated are Mickey Mouse and Minnie Mouse? How associated are Bugs Bunny and Mickey Mouse?). Those who fell for the fake ad and believed that they had met Bugs later on claimed that Bugs Bunny was more highly related to various Disney characters than did people who were not exposed to the fake ad. This suggests that the thought processes of ad-exposed individuals can be influenced (see Loftus, 2003, for other examples).

There are also real-world examples showing how false memories can have repercussions. Recall the Heaven's Gate cult, a group whose members had been led to believe they were in telepathic contact with aliens. Apparently the cult members had taken out an insurance policy, to insure against being abducted, impregnated, or killed by aliens. The group paid \$1,000 a year for this coverage. So clearly their (presumably false) beliefs had economic consequences (Siepel, 1997). Thirty-nine members of the cult participated in the ultimate act of consequence: They partook in a mass suicide in 1997, killing themselves under the belief that to do so would free their souls.

FINAL REMARKS

There is now ample evidence that people can be led to believe that they experienced things that never happened. In some instances, these beliefs are wrapped in a fair amount of sensory detail and give the impression of being genuine recollections. Some researchers have suggested that implausible or unlikely events will be hard to plant into the minds of adults or children, but in fact people can be led to believe in experiences that are highly unlikely to be true (e.g., witnessing demonic possession, being abducted by aliens, being hugged by Bugs Bunny at Disneyland). In one recent study of false memories in children, the children came up with elaborate stories for such unlikely events as helping a woman find her lost monkey and helping a person who injured her ankle after spilling Play-Doh (Scullin, Kanaya, & Ceci, 2002). These "rich" false memories can have repercussions down the line, affecting later thoughts and behaviors.

A half century ago, Frederic C. Bartlett, the psychologist from Cambridge, England, shared his important insights about memory. He posited that remembering is "imaginative reconstruction, or construction," and "it is thus hardly ever exact" (Bartlett, 1932, p. 213). His insights link up directly with contemporary research on memory distortion, although even he might have been surprised to find out

just how inexact memory can be. He might have also relished the contemporary research, which has brought us quite a ways toward understanding what it is like for people when they experience "imaginative construction" in both experimental and real-world settings. Bartlett died in 1969, just missing the beginning of a vast effort to investigate the memory processes that he so intelligently foreshadowed, and that show unequivocally how humans are the authors or creators of their own memories. They can also be the authors or creators of someone else's memory.

Recommended Reading

- Lindsay, D.S., Hagen, L., Read, J.D., Wade, K.A., & Garry, M. (2004). (See References)
- Loftus, E.F. (2002). Memory faults and fixes. *Issues in Science and Technology*, 18, 41–50.
- Loftus, E.F. (2003). (See References)
- McNally, R.J. (2003). (See References)
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REFERENCES

- Bartlett, F.C. (1932). *Remembering: A study in experimental and social psychology*. Cambridge, England: Cambridge University Press.
- Braun, K.A., Ellis, R., & Loftus, E.F. (2002). Make my memory: How advertising can change our memories of the past. *Psychology and Marketing*, 19, 1–23.
- Garry, M., & Polaschek, D.L.L. (2000). Imagination and memory. *Current Directions in Psychological Science*, 9, 6–10.
- Heaps, C.M., & Nash, M. (2001). Comparing recollective experience in true and false autobiographical memories. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 27, 920–930.
- Lindsay, D.S., Hagen, L., Read, J.D., Wade, K.A., & Garry, M. (2004). True photographs and false memories. *Psychological Science*, 15, 149–154.
- Loftus, E.F. (1997). Creating false memories. *Scientific American*, 277(3), 70–75.
- Loftus, E.F. (2003). Make-believe memories. *American Psychologist*, 58, 864–873.
- Mazzoni, G., & Memon, A. (2003). Imagination can create false autobiographical memories. *Psychological Science*, 14, 186–188.
- Mazzoni, G.A.L., Loftus, E.F., & Kirsch, I. (2001). Changing beliefs about implausible autobiographical events. *Journal of Experimental Psychology: Applied*, 7, 51–59.
- McNally, R.J. (2003). *Remembering trauma*. Cambridge, MA: Harvard University Press.
- McNally, R.J., Lasko, N.B., Clancy, S.A., Macklin, M.L., Pitman, R.K., & Orr, S.P. (2004). Psychophysiological responding during script-driven imagery in people reporting abduction by space aliens. *Psychological Science*, 15, 493–497.
- Porter, S., Yuille, J.C., & Lehman, D.R. (1999). The nature of real, implanted, and fabricated memories for emotional childhood events: Implications for the recovered memory debate. *Law and Human Behavior*, 23, 517–537.
- Scullin, M.H., Kanaya, T., & Ceci, S.J. (2002). Measurement of individual differences in children's suggestibility across situations. *Journal of Experimental Psychology: Applied*, 8, 233–246.
- Siepel, T. (1997, March 31). Leader's health tied to deaths. *San Jose Mercury News*. Retrieved June 24, 2003, from <http://www.sacred-texts.com/ufo/39dead16.htm>
- Vanes, T. (2003, July 28). Let DNA close door on doubt in murder cases. *Los Angeles Times*, p. B11.

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