

REFLECTIONS FROM
PIONEERING WOMEN
IN PSYCHOLOGY

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Tricked by Memory

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Two things happened to me recently, one good and one bad. Which should I tell you about first? Let's get the bad out of the way. It came in the form of an email, and the subject line looked hopeful: "fan letter." But the content was not: "You're unethical trash." Not the kind of message that was intended to improve my mood that day.

Now for the good. I got a much nicer email from a teacher named Michael Berndt who teaches AP Psychology at Apollo High School in St. Cloud, Minnesota. He explained a tradition between rival high schools in the area. Whichever of two high schools has a higher grade average and percentage of students passing the national AP Psychology Exam, they get to keep a special "trophy" and hang it on the wall for the upcoming year. He went on to recount how students really get into the competition, and students from the rival school even sometimes try to steal the trophy. But these rivaling students agreed on one thing; after a vote at both schools, they wanted the next trophy to be the "Loftus trophy." They asked for a signed photo to be used on the trophy. What an adorable idea. I sent it right away.

The clash of views about my work was not something I ever anticipated. Nor could I have anticipated the rewarding career I would find as a psychological scientist. I entered the world the same year that 15-year-old Dutch-Jewish diarist Anne Frank was discovered by the Nazis and transported to a concentration camp. Franklin Roosevelt was the US president. Life expectancy back then was 62.9 years, so I beat that one as I write now. First class postage stamps were 3 cents, and a year's tuition at Harvard was \$420.

Skipping the personal tragedies of my early years, which I recount elsewhere (Loftus, 2007), I jump to age 17 when I entered college at the University of California Los Angeles (UCLA) as a math major. I loved algebra. I loved geometry. But when it came to calculus, not so much.

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I took an elective in psychology and got hooked on the material. I ended up graduating with a double major – mathematics and psychology.

During my last years at UCLA, I heard of a field called “mathematical psychology,” and it sounded perfect for someone with my double major. Luckily, I got into Stanford, the top school in psychology and super-strong in mathematical psychology, and began my graduate studies in 1966. It was the first time I had lived away from home, and I sobbed when my younger brother David dropped me off on his way up to Berkeley, where he was continuing his undergraduate studies.

Once at Stanford, I began working with Richard Atkinson on his project on computer-assisted instruction, teaching spelling to fifth-grade students. We found some ways of improving the performance of these students, which was gratifying, especially since they came from a population that tended to score poorly on standardized reading tests. We published an article in the *Journal of Educational Psychology* soon thereafter; I was proud of my first publication (Fishman et al., 1968). Thinking back, I don’t quite remember what I was proud about; perhaps it was just seeing the final product in black and white... a real, honest-to-goodness publication. It would be my only publication under my maiden name, for that same year I married fellow graduate student, Geoffrey Loftus. We studied for our comprehensive exams the same year. We kept him out of the Vietnam War. We finished our graduate studies and then experienced a traditional conundrum that many married professional couples face: namely, that of trying to find jobs near one another. After three years of difficulty, mostly living on opposite sides of the country and seeing each other during school breaks, we each found jobs at the University of Washington.

The story of Washington is a story in itself. At first, Washington offered Geoff a tenure-track faculty position, but all they could come up with for me was a position as a postdoc. I did not want to leave my assistant professorship in New York for a postdoc, so we had one more year of living apart. The following year, Harvard offered me a job, and Washington suddenly came through with a job offer for me. This presented a painful career decision and taught me that approach-approach conflicts that I had read about in my learning courses were actually quite painful. Geoff wanted me to take the job at Washington, where we could finally live together; I was leaning toward Harvard, which seemed like the better career move. Geoff said that would mean divorce. So, what to do? Washington and marriage? Harvard and divorce? I spent a week trying to get advice. “If you have to give anything up for Harvard, don’t do it.

You’ll never get tenure,” said my faculty advisors. “If you have to give up anything for that odd marriage of yours, don’t do it,” said some of my friends. I ultimately decided on Washington and marriage and in 1973, we were finally living together again. Why did I make that choice? Geoff was a wonderful human being; I loved him and I wasn’t sure I’d ever be able to find another lasting relationship.

Over the years, Geoff and I mostly worked on our separate projects and published articles and a couple of books together. We would eventually have 23 glorious and not-so-glorious years together and divorce over my workaholic ways. At this stage I was pretty set in my career, having long been promoted to full professor, but I still missed him. Happily, we remain good friends today.

Turning back to graduate school days. The other professor at Stanford who was also working on computer-assisted instruction systems for classroom use was Patrick Suppes. But Suppes focused more on mathematical instruction, and that seemed to be a better fit for someone with a degree in math. So Suppes became my doctoral dissertation advisor. My dissertation project looked at sixth-grade students who were learning to solve word problems such as “Tom collected 500 seashells and placed 43 of them in a showcase. How many shells were not placed in the showcase” (Suppes et al., 1969, p. 1). We explored what made problems especially difficult for these students. But I never really developed a passion for it. Later, I would share with Suppes something I had written about my time on this project:

It was tedious work... I was just one of several graduate students, each of us plugged into a specific slot, computing our statistical analyses, feeding our results into a common pot. It occurred to me that my particular job was a little like cutting up carrots to put in a soup. To the left and right of me were other students, equally frenzied and meticulous about cutting up their onions, celery, potatoes, chunks of beef, and then tossing them into the same huge pot. And I couldn’t help thinking, “All I’ve done is cut up carrots” (Loftus & Ketcham, 1991, p. 5).

Fortunately, by the time I shared those early feelings with Suppes, I was also able to appreciate just how much I had learned from him. I learned how to do multiple regression analysis, which was the primary statistical method we used. I learned about stepwise multiple linear regression and how to obtain regression coefficients, multiple correlations, and variance. I would end up using these methods in other research projects and teaching them in various statistics courses, which I taught at graduate and undergraduate levels for many years as a professor.

Turning to Memory

Most people would be surprised to learn that my thesis was on computer-assisted instruction, since it is so different from the work on memory that I would become truly passionate about. So how did the switch happen? In my last year of graduate school, I started a side project on semantic memory with social psychologist Jonathan Freedman. Semantic memory refers to memory for words, concepts, and general knowledge about the world (as contrasted to episodic memory, which is memory for personal episodes of our lives). Freedman and I designed studies that would illuminate how general knowledge is stored. Our subjects answered questions like "What is the name of a fruit that is yellow?" and we measured how long it took them to answer. Our big discovery: People were faster to respond if the category cue came first – fruit–yellow – than if the category came second – yellow–fruit. They were faster by about 250 milliseconds, or a quarter of a second. These results were consistent with the idea that humans organize information according to categories (like fruits) rather than attributes (like yellow), and the search for an answer can get started faster if the category cue comes first. We published our results in numerous journals (e.g., Freedman & Loftus, 1971; Loftus & Freedman, 1972), and I got a number of job offers after giving job talks based on this work. But I was still yearning for something more. I remember asking myself, do I really deeply care about the structure of semantic memory? Or am I only working this hard for other reasons, like job security, jobs for my students, opportunity to belong to a scientific community? Would there be another topic that could bring these "rewards" but that I would get more passionate about? Eventually, I figured out that I wanted to do research with more obvious application to real-life problems. But what would it be?

Turning to Eyewitness Memory

I've always had a fascination with legal matters. I'm a bit of a true crime buff. This could be why I came up with the idea to study memory for crimes, accidents, and other legally relevant events. I still had some decisions to make. What aspect of eyewitness memory would I focus on? The passage of time? The stress of the witness? There were so many possibilities. I chose to study the questioning phase – that point in time when police or other investigators are asking people questions about what they remember about past events. At this point, I have no recollection of how I chose that factor, but for whatever reason, it worked out well.

In one of my earliest studies, we showed people films of traffic accidents and asked questions about the speed of the cars involved in the accident. I chose to use accidents for an odd reason. A former professor of mine was now working at the Department of Transportation (DOT) and told me there was grant funding available for researchers who studied accidents. So, I gathered together some films of accidents and began to show them to research participants. In one early study, I found that a question such as "How fast were the cars going when they smashed into each other?" led to higher estimates of speed than when the same question was asked with the verb "hit" in it instead. The more biased wording affected the immediate answer. But it also had a longer-range effect. It led witnesses to later claim that they had seen broken glass at the scene when there wasn't any broken glass at all. This study would be one of many to show that leading questions can alter a witness's actual memory, as could other forms of post-event information that witnesses encountered (Loftus & Palmer, 1974). The impairment in memory due to post-event misleading information – whether by leading questions or other sources – became known as the "misinformation effect" (Loftus & Hoffman, 1989). I was thankful for the DOT funding and, later, for grants from other agencies like the National Science Foundation.

Turning from the Science Lab to the Messy Legal World

All those laboratory studies of witness memory got me curious about real-world witnesses. So, I volunteered to help a local public defender with a court case in exchange for him letting me see, up close and personal, the interactions with actual witnesses. The case we worked on involved a female defendant who was accused of killing her boyfriend. The case hinged on whether the jury decided it was murder or self-defense. Our defendant was found not guilty of murder, and I wrote about her case, and the science behind it, for *Psychology Today* magazine (Loftus, 1974). In the article, I talked about the problems with eyewitness memory and some research findings, like how leading questions can contaminate memory. Within days of this popular magazine publication, I started hearing from lawyers who wanted me to work on their cases or wanted me to lecture to their particular group of lawyers.

Over the next many decades, my professional life would be filled with the usual tasks of a university professor (teaching, research, service) but also with consultations on legal cases. I did this by working most of the time. (This reminds me of a comment by a colleague, who once said

“Academia is a great job. You can work any 80 hours a week you want.” When I first started testifying on the science of memory, I had no “training” from any mentor on how to do this. I worked primarily with criminal defense attorneys, trying to figure out how to best present scientific information to a jury of lay people. I charged little or no money for my time at the start, since I felt I was learning in the process of doing. After a few experiences where judges refused to admit expert testimony on memory, one judge finally did say “yes.” It was June 3, 1975. I remember it well because it was the day my father died. And a short time after learning this, attorney David Allen called and said come to court now because the judge admitted my testimony. I’m not sure how I got through the day; it’s one big blur, after more than four decades.

Over the years, I have testified in trials involving some rather unpopular people. In 1976, I got a call from a lawyer representing a young law student who was accused of trying to kidnap a woman from a shopping mall parking lot in Salt Lake City. Almost a year after the crime, the woman would identify the student, after she had viewed hundreds of mugshot pictures and been interviewed in rather suggestive and leading ways. The student was eventually found guilty and sentenced to one to five years in prison. Oh, and his name was Ted Bundy. I consulted or testified in cases involving other unpopular people, like the owners, family members, and teachers at the McMartin Preschool in Manhattan Beach, California. Scores of children would say that they struck pencils, silverware, and other objects into vaginas and anuses. The accused were said to have killed a horse with a baseball bat. Kids were allegedly taken on trips to cemeteries. One of my closest childhood friends, who was a kindergarten teacher, hated the fact that I was working on this case. At lunch one day she said, “How could you? Do you have no morals, no conscience?” Of course, I felt bad at such sharp criticism from a childhood friend. I could only explain, as I’ve had to do many times, that people in our country are innocent until proven guilty. That even unpopular people deserve a defense. And this case especially cried out for some analysis of how the highly suggestive interactions with these children could have led them to make such preposterous allegations if they were false.

I’ve written a great deal about the courtroom experiences and the way I’ve managed to make it part of my scholarship or to communicate scientific ideas to a broader audience (e.g., Loftus & Ketcham, 1991). I’ve published examples of expert testimony so that my students don’t have to figure it out from scratch the way I had to. The case material provides

fascinating stories that I’ve been able to use in my classes and writings. Sometimes the articles are based on extensive analysis that I did, for example in the famous Lockerbie bombing case (Loftus, 2013). And the cases routinely find their way into my classes and my public talks (including the Ted Talk I gave a few years back, which has now been viewed more than 5 million times). Because it was primarily defense attorneys who sought this scientific expertise on memory, I was never popular with prosecutors. Some years ago, a prosecutor confronted me in the hallway outside the courtroom where I had testified for the defense in a rape case. With self-righteous fury, he said, “You’re nothing but a whore.” Happily, the defense attorney grabbed my arm and pulled me away. It’s never pleasant to get these kinds of reactions. In fact, I hate it. At times, the only thing I felt like doing was curling up in front of a Lifetime television movie and shutting out the rest of the world. But I didn’t hate it so much that it has stopped me from pursuing my passion of doing the science and communicating it to juries and other members of the public. For others thinking about entering this arena, you might first ask whether you are prepared to withstand these self-righteous attacks.

Prosecutors can dislike the idea of defense memory witnesses, but they can no longer ignore them. They were forced to be less dismissive and pay more attention to the basic science of memory when their trial convictions started getting overturned by higher courts after lower court judges refused to allow the memory expert testimony in court. This first happened in Arizona in the early 1980s and continued to occur in many states around the country in the succeeding four decades. (See more on this topic in my chapter in a recent volume on the history of modern psychology and law, Loftus, 2018.) During that time, I’ve contended with many an irritated prosecutor, most of whom behave much more civilly than the one who chose to call an opposing expert a “whore.” As it turned out, the challenges presented by irritated prosecutors would pale in comparison to the attacks that would occur later when we entered the “Memory Wars.”

Turning to the Memory Wars

It was a famous court case in the early 1990s that caused a shift in the kind of memory research I would do. George Franklin was accused of murdering an 8-year-old girl named Susie, based on the repressed and recovered memory of Franklin’s daughter Eileen, who had been Susie’s best friend. Eileen claimed that she had witnessed her father rape and kill not only Susie, but other individuals as well. George denied these accusations, was

convicted of Susie's murder, and spent more than five years in prison until his conviction was overturned. If he did not commit the murder, where did all these details that Eileen "remembered" come from? One answer is that virtually all of them were in the public domain, like the rock that crushed Susie's skull and the clothes that Susie had been wearing.

If Eileen had incorporated these details and constructed the entire memory, this was bigger memory construction than most of what I had previously studied. Yes, I could make witnesses remember broken glass when there wasn't any. Yes, I could make them remember that a car went through a stop sign when it was a yield sign, or that the thief's jacket was brown rather than green. But a whole memory like Eileen would have had to construct? Is this something I could experimentally study?

Eventually I came up with a way. We would plant a memory that when you were five or six you were lost in a shopping mall, frightened, and rescued by an elderly person and reunited with the family (Loftus & Ketcham, 1994, chapter 7). In a series of research studies, we successfully planted these detailed memories in about a quarter of our sample of ordinary adults using just a few suggestive interviews (Loftus & Pickrell, 1995). To give a bit more detail, the way we planted the false memories was to tell our research subjects that we had obtained information from their parents about their childhood experiences. We asked them to try to remember four experiences, three true ones and a completely false one about being lost in the mall created with the help of their parent. As noted, we found that about a quarter fell sway to the suggestion and developed a partial or complete false memory.

Later, other investigators would use the "lost in the mall technique" to plant even more upsetting false memories, like nearly drowning and being rescued by a lifeguard, or being attacked by a vicious animal as a child. The later studies found even higher rates of memory implantation. Just how often was this happening? To answer this, several scientists conducted one large-scale mega-analysis of over 400 subjects who had participated in one of these published rich false memory studies. The scientists found that 30% of the reports were false memories, and an additional 23% were classified as having accepted the event to some degree even if they didn't have a full-blown false memory (Scoboria et al., 2017). This collection of studies, inspired initially by the bizarre Franklin case, has revealed much about the processes by which entire events can be planted in the human mind.

Turning back to the Franklin case, another collection of attacks on scientists who expressed skepticism occurred. After Franklin, there were thousands of other claims of repressed memory. They often involved accusations of traumatic sexual abuse. They were frequently emerging after

highly suggestive psychotherapy. Families were being destroyed, and more than a few innocent people were being sued or going to jail. I tried to speak up about these injustices; I hated the idea that people could be convicted based on nothing other than a highly questionable claim of repressed memory. And some people didn't like what I had to say. Nasty letters and emails came my way: "You're unethical trash."

The worst that I had to deal with was a lawsuit brought by a woman (Jane Doe) who had accused her mother of sexual abuse when she was a child. My investigation of the case revealed that the accusation came in the midst of a nasty divorce and custody battle, and the mother lost custody after a psychiatrist "blessed" the abuse story. The psychiatrist would later show videotapes of Jane Doe's testimony about the abuse and her later attempt to remember the abuse. Although the case was being used as the new "proof" of repressed memories, I was skeptical. I was able to learn the identity of the Doe family and read thousands of pages in the divorce file. It was enough to convince me that the mother was probably innocent, and I published these findings with a lawyer-psychologist who was just as convinced (Loftus & Guyer, 2002a, 2002b). Even though we preserved the anonymity, still calling her Jane Doe, she sued us for defamation, invasion of privacy, and other claims. The case went all the way through the California Supreme Court, taking years, and eventually Jane Doe declared bankruptcy. I tried to find some enduring issues in this miserable legal process; we would not be the only scientists who have a profound need for protection of free speech rights when there is a matter of great public concern at stake (Loftus, 2003). The "Jane Doe" years were very stressful for me. I coped by watching a lot of Lifetime television on my cozy bed at home, when I wasn't at the university teaching classes. These cookie-cutter television dramas typically involved a woman who was duped by someone she trusted but who was now trying to kill her. In the end, she killed him. For some reason, these were incredibly soothing.

What did I learn from this stressful, costly experience? What hurts you can make you stronger. The little stresses that followed pale in comparison. A paper gets rejected by a journal. A dinner date cancels at the last minute. My dishwasher stops working. All seem so relatively trivial. I was just happy to get past the experience and get back to my research.

Memory Science Marches On

After hundreds of studies showing how memory can be contaminated by misinformation, and scores of studies showing that rich false memories can be planted, what's left to learn? We and others have shown that false

memories have repercussions – they can affect people's thoughts, intentions, and behaviors. Plant a false memory that you got sick on a particular food, like strawberry ice cream, and people don't want to eat it as much. Plant a warm fuzzy memory about a healthy food, like asparagus, and people want it more. We've found that even people with exceptional memories can be influenced. We've learned that people are more likely to accept misinformation if it fits with their preexisting biases, or if it makes someone they don't like much look bad. The findings have relevance to the serious problem our society now faces – the problem of fake news.

Ever since I first thought that I wanted to do research that has obvious practical applications, I've continued to be grateful that I chose this path. Of course, I don't like it when people throw their "unethical trash" comments at me. And I like it even less when I have to face complaints or litigation from someone who doesn't like what I've said. But in between these unpleasant experiences are wonderful ones, like the Loftus trophy, or an even more recent one – a prize from the American Philosophical Society, the oldest learned society in the United States, established in 1745 by Benjamin Franklin. But it's the particular name of the prize that matters so much to me: It's the 2020 Suppes Prize in Psychology. It was supposed to be presented to me at the annual meeting by a psychological scientist whom I have known since my graduate school days (Richard Shiffrin). He shared the remarks he had prepared, which end this way: "It is especially appropriate for Elizabeth Loftus to receive this prize because Pat Suppes was Dr. Loftus's thesis advisor. If Pat were living today he would be ecstatic to see Elizabeth receive this award." Sadly, the 2020 shutdown of the world due to the COVID-19 virus led to a cancellation of the annual meeting, but the organization still bestowed upon me the prize. And, by the way, did I mention that the prize came with a \$20,000 prize honorarium, which I decided to donate to my university? Thank you, Pat. And I'm sorry if I once compared working on your project to cutting up carrots to put in a soup.

As for the future, false memory research is thriving. I anticipate that we will become even more skilled at tampering with people's memories. We might see that the behavioral techniques, when combined with pharmaceutical elements, are especially powerful. And we will then be forced to grapple with a number of ethical questions. When, if ever, should we use this mind technology? Should we think about banning its use? As a memory scientist, I can't answer these questions for others. But I can provide data that improve discussions of these issues and permit an informed and astute public to decide for itself.

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