THANKS FOR THE MEMORIES!

Loftus, E. F. (1975). Leading questions and the eyewitness report. *Cognitive Psychology, 7,* 560–572.

PERRY MASON: Hamilton, I believe that my client is telling the truth when she says she was nowhere near the scene of the crime.

HAMILTON BURGER: Perry, why don't we let the jury decide?

PERRY MASON: Because, Hamilton, I don't believe there is going to be a trial. You haven't got a case. All you have is circumstantial evidence.

HAMILTON BURGER: Well, Perry, I suppose this is as good a time as any to tell you. We have someone who saw the whole thing, Perry. We have an *eyewitness!*

And as the mysterious music crescendos, we know that this is going to be another difficult case for Perry Mason. Even though we are reasonably certain he will prevail in the end, the presence of a single eyewitness to the crime has changed a weak case into a nearly airtight one for the district attorney. Why do eyewitness reports provide such strong evidence in criminal cases? The reason is that attorneys, judges, juries, and the general public believe that the way in which a person remembers an event, must be the way it actually happened. In other words, memory is thought of as a process of replaying an event similar to a video or DVD. However, psychologists who study memory have now drawn into question that and many other common beliefs about the reliability of human memory.

One of the leading researchers in the area of memory is Elizabeth Loftus at the University of Washington. She has found that when an event is recalled it is not accurately re-created. Instead, what is recalled is a memory that is a reconstruction of the actual event. Loftus's research has demonstrated that reconstructive memory is a result of your use of new and existing information to fill in the gaps in your recall of an experience. She maintains that your memories are not stable, as we commonly believe, but that they are malleable and changeable over time. So if you tell someone a story from your vacation five years ago, you think you are re-creating the experience just as it happened, but you probably are not. Instead, you have reconstructed the memory using information from many sources, such as the previous times you've told it, other experiences from the same or later vacations, perhaps a movie you saw last year that was shot in the same place as your vacation, and so on. You know this is true if you have ever recounted an experience in the presence of another person who was with you at the time. You are often surprised by how your stories can totally disagree about an event you both experienced at the same time!

Usually, these alterations in memory are harmless. However, in legal proceedings, when a defendant's fate may rest on the testimony of an eyewitness, memory reconstructions can be crucial. For this reason, most of Loftus's research in the area of memory has been connected to legal eyewitness testimony. In her early research, she found that very subtle influences in how a question is worded can alter a person's memory for an event. For example, if witnesses to an automobile accident are asked, "Did you see a broken headlight?" or "Did you see the broken headlight?" the question using the word *the* produced more positive responses than the question using the word *a*, even when there had been no broken headlight. The use of *the* presupposes

the presence of a broken headlight and this, in turn, causes witnesses to add a new feature to their memories of the event.

The article that is the focus of this discussion is one of the most often cited studies by Loftus because it reports on four related studies that took her theory one major step further. In these studies, she demonstrated that the wording of questions asked of eyewitnesses could alter their memories of events when they were asked other questions about the events at a later time. Keep in mind that this research influenced both memory theory and criminal law.

THEORETICAL PROPOSITIONS

This research focused on the power of questions containing presuppositions to alter a person's memory of an event. Loftus defines a presupposition as a condition that must be true in order for the question to make sense. For example, suppose you have witnessed an automobile accident and I ask you, "How many people were in the car that was speeding?" The question *presupposes* that the car was speeding. But what if the car was not actually speeding? Well, you might answer the question anyway because it was not a question about the speed of the car. Loftus proposed, however, that because of the way the question was worded, you might add the speeding information to your memory of the event. Consequently, if you are asked other questions later, you will be more likely to say the car was speeding. Loftus hypothesized that if eyewitnesses are asked questions that contain a false presupposition about the witnessed event, the new *false* information may be incorporated into the witness's memory of the event and appear subsequently in new testimony by the witness.

METHOD AND RESULTS

For each of the four experiments reported, the method and results will be summarized together.

Experiment 1

In the first study, 150 students in small groups saw a film of a five-car chain-reaction accident that occurs when a driver runs through a stop sign into oncoming traffic. The accident takes only four seconds and the entire film runs less than a minute. After the film, the subjects were given a questionnaire containing 10 questions. For half of the subjects, the first question was, "How fast was Car A [the car that ran the stop sign] going when it ran the stop sign?" For the other half of the subjects, the question read, "How fast was Car A going when it turned right?" The remaining questions were of little interest to the researchers until the last one, which was the same for both groups: "Did you see a stop sign for Car A?"

In the group that had been asked about the stop sign, 40 subjects (53%) said they saw a stop sign for Car A, while only 26 (35%) in the turned-right group claimed to have seen it. This difference was found to be statistically significant.

Experiment 2

The second study Loftus reported was the first in this series to involve a delayed memory test and was the only one of the four not to use an automobile accident as the witnessed event. For this study, 40 subjects were shown a three-minute segment from the film *Diary of a Student Revolution.* The clip showed a class being disrupted by eight demonstrators. After they viewed the film, the subjects were given questionnaires containing 20 questions relating to the film clip. For half of the subjects, one of the questions asked, "Was the leader of the four demonstrators who entered the classroom a male?" For the other half, the question asked, "Was the leader of the 12 demonstrators who entered the classroom a male?" All remaining questions were identical for the two groups.

One week after this initial test, the subjects from both groups returned and answered 20 new questions about the film (without seeing it again). The one question that provided the results of the study was, "How many demonstrators did you see entering the classroom?" Remember, both groups of subjects saw the same film and answered the same questions, except for the reference to 12 versus 4 demonstrators.

The group that had received the question presupposing 12 demonstrators reported seeing an average of 8.85. Those who had received the question asking about 4 demonstrators averaged 6.40. This was also a significant difference. Some of the subjects recalled the correct number of 8. However, this experiment showed that, on average, the wording of one question altered the way subjects remembered the basic characteristics of a witnessed event.

Experiment 3

This experiment was designed to see if false presuppositions inherent in questions could cause witnesses to reconstruct their memory of an event to include objects that were not there. The subjects (150 university students) watched a short video of an accident involving a white sports car and then answered 10 questions about the content of the video. One question included for half of the subjects was, "How fast was the white sports car going when it passed the barn while traveling along the country road?" The other half of the subjects were asked, "How fast was the white sports car going while traveling along the country road?" As in the previous study, the subjects returned a week later and answered 10 new questions about the accident. The question addressing the issue under study was, "Did you see a barn?"

Of those subjects who had previously answered a question in which a barn was mentioned, 13 (17.3%) of them answered *Yes* to the test question a week later, compared with only 2 (2.7%) in the no-barn group. Once again, this was a statistically significant difference.

Experiment 4

The final experiment reported in this article was a somewhat more elaborate study designed to meet two goals. First, Loftus wanted to further demonstrate the memory reconstruction effects found in Experiment 3. Second, she wondered if perhaps just the mention of an object, even if it was not included as part of a false presupposition, might be enough to cause the object to be added to memory. For example, you are asked directly, "Did you see a barn?" when there was no barn in the film. You will probably answer *No*. But if you are asked again a week later, might that barn have crept into your memory of the event? This was the idea Loftus tested in the fourth experiment.

Three groups of 50 subjects viewed a three-minute film shot from the inside of a car that ends with the car colliding with a baby carriage pushed by a man. The three groups then received booklets containing questions about the film. These booklets differed as follows:

Group D: The direct question group received booklets containing 40 "filler" questions and five key questions directly asking about nonexistent objects; for example, "Did you see a barn in the film?"

Group F: The false presupposition group received the same 40 filler questions and five key questions that contained presuppositions about the same nonexistent objects, such as, "Did you see a station wagon parked in front of the barn?"

Group C: The control group received only the 40 filler questions.

One week later all the subjects returned and answered 20 new questions about the film. Five of the questions were the exact same key questions as were asked of the direct-question group a week before. So group D saw those five questions twice. The measurement used was the percentage of subjects in each group who claimed to remember the nonexistent objects.

Table 1 summarizes the findings for all three groups. Remember, there was no school bus, truck, center line on the road, woman pushing the carriage, or barn in the film. Combining all the questions, the overall percentages of those subjects answering "yes" to the direct questions one week later were 29.2% for the false-presupposition group, 15.6% for the direct-question group, and 8.4% for the control group. The differences between the direct-question group and the false-presupposition group for each item as well as for all the items combined were statistically significant. However, while there is a trend to indicate a similar effect of the direct questions over controls, these differences were not large enough to reach statistical significance.

DISCUSSION

Based on these and other studies, Loftus argued that an accurate theory of memory and recall must include a process of reconstruction that occurs when new information is integrated into the original memory of an event. The findings of these studies cannot be explained by assuming that recall simply involves a mental replaying of an event, even with varying degrees of accuracy. To illustrate, Figure 1 compares the traditional view of recall with the reformulated process proposed by Loftus. As you can see, the extra step of integrating new information into memory has been added. This new information, in turn, causes your representation of the original memory to be altered or *reconstructed.* Later, if you are asked a question about the event, your recall will not be of the actual original event, but of your reconstruction of it. Loftus contended that this reconstruction process was the reason that barns, school busses, trucks, women pushing baby carriages, and center lines in roads were all conjured up in subjects' memories when they were not part of the original experience. The false presupposition in the questions, provided a subtle form of new information that was unintentionally integrated into the original memory of the event.

In applying this idea to eyewitnesses in criminal investigations, Loftus pointed out that often witnesses are questioned more than once. They might be asked questions by police at the scene of the crime, interviewed by the prosecuting attorney assigned to the case, and again examined if they testify in court. During these various sessions of questions, it is not unlikely that false presuppositions will be made, probably unintentionally. There are innumerable ways in which this might happen. Common, innocent-sounding questions such as "What did the guy's gun look like?" or "Where was the get-

TABLE 1 Appearance of Nonexistent Objects in Subjects' Recall of Filmed Accident Following Direct Questions and False Presuppositions

DIRECT QUESTION	FALSE PRESUPPOSITION	PERCENT OF "YES" RESPONSES TO DIRECT QUESTION ONE WEEK LATER C	D	F
Did you see a school bus in the film?	Did you see the children getting on the school bus?	6	12	26
Did you see a truck in the beginning of the film?	At the beginning of the film, was the truck parked beside the car?	0	8	22
Did you see a center line on the country road?	Did another car cross the center line on the country road?	8	14	26
Did you see a woman pushing the carriage?	Did the woman pushing the carriage cross into the road?	26	36	54
Did you see a barn in the film?	Did you see a station wagon parked in front of the barn?	2	8	18

C = control group
D = direct-question group
F = false-presupposition group
(From p. 568.)

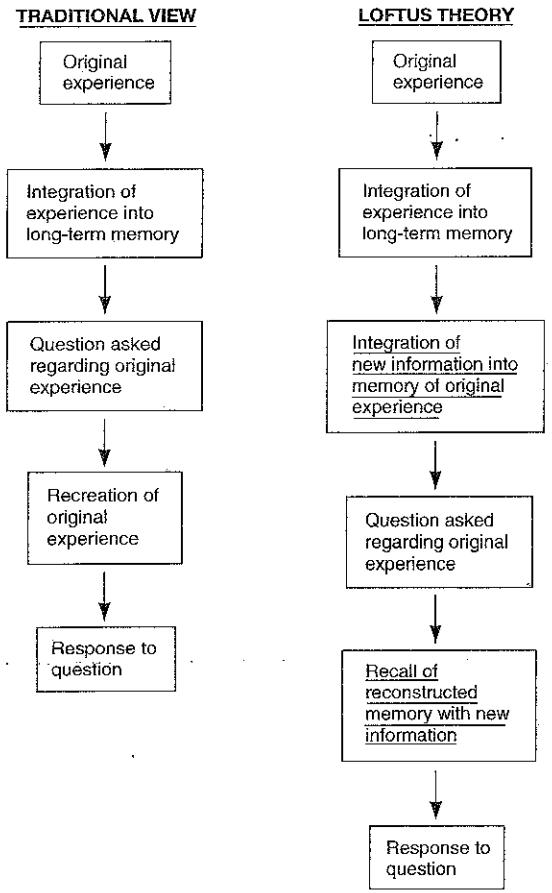

FIGURE 1 Recall of an event in response to a question.

away car parked?" have been shown to increase the chances that witnesses will remember a gun or a getaway car whether or not they were actually there (Smith & Ellsworth, 1987). So, while the attorneys, the judge, and the jury are making the assumption that the witness is re-creating what was actually seen, Loftus contends that what is being remembered by the witness is a "regenerated image based on the altered memorial representation" (p. 571).

RECENT APPLICATIONS

Several studies represent the ongoing influence of Loftus's impressive body of work on eyewitness testimony. One study citing her 1975 article examined how lawyers' complicated questions negatively affect eyewitness accuracy and confidence (Kebbell & Giles, 2000). All subjects watched identical videotaped events and were questioned a week later about what they saw. Half of the subjects were asked questions in confusing language (you know, that lawyer-speak of "Is it not true that . . . ?"), while others were asked the same questions in simple language. The results were clear: the subjects receiving the confusing form of the questions were less accurate in their eyewitness reports and were also less confident of their answers than those in the straightforward-question condition.

Another fascinating study applied Loftus's work to reports of "fantastic memories," that is, memories that bear greater similarity to fantasy than reality, such as alien abductions, out-of-body experiences, ESP events, encounters with ghosts, and so on (French, 2003). Clearly, if these reports of memories were true, they would provide proof that these "paranormal" occurrences are real. However, research tells us time and time again that such events have never been scientifically demonstrated. So, what accounts for the memories? The answer may be the fallibility and unreliability of human memory as discussed in this reading and, perhaps, the ability of our brains to *create* memories of events that never actually happened. As French points out, "a number of psychological variable that have been shown to correlate with susceptibility to false memories (e.g., hypnotic susceptibility, tendency to dissociate, etc.) also correlate with the tendency to report paranormal . . . experiences" (p. 153). We discuss this false memory issue next.

In addition to her ongoing work in the area of eyewitness testimony, Elizabeth Loftus is currently one of the leading experts in the heated controversy over repressed childhood memories. On one side of this new debate are those people who claim to have been abused, usually sexually, sometime in their past, but who have only recently, often with the help of a therapist, remembered the abuse because the traumatic memories have been repressed in their unconscious. On the other side are those who have been accused of this abuse, but who categorically deny it and claim that these memories have been either fantasized or implanted through the therapeutic process (see Garry & Loftus, 1994, for a popular press review of the controversy). This falls squarely into the area of Loftus's memory research.

Loftus's book *The Myth of Repressed Memories: False Memories and Allegations of Sexual Abuse* (Loftus & Ketcham, 1994; also, see Pope, 1995, for a review) summarized her findings in this area and combined them into a cohesive argument. Basically, Loftus contends, and appears to have demonstrated in numerous studies, that repressed memories simply do not exist. In fact, she is at the forefront of psychologists who question the entire notion and existence of an unconscious. A main feature of Loftus's argument is that experimental evidence repeatedly demonstrates that especially traumatic memories tend to be the ones we remember *best*. And yet, clinicians often report these instances of repressed memories of abuse that rise to the surface during specific and intense forms of therapy. How can these two seemingly opposing views be reconciled? Well, Loftus suggests three possible memory distortions that might explain what clinicians see as repression (Loftus,

Joslyn, & Polage, 1998). First, early sexual abuse may simply be forgotten, not repressed. She cites research demonstrating that when children do not understand the sexual nature of a potentially abusive event, it tends to be remembered poorly. Second, it is possible that people in therapy say they had forgotten a traumatic event, but, in reality, they never actually forgot it. Avoiding thinking about something is different from forgetting it. And finally, Loftus contends that some "people may *believe* that a particular traumatic event occurred and was repressed when, if fact, it did not happen in the first place. Under some circumstances, some combination of these distortions could lead to situations that are interpreted as repression" (p. 781).

You can imagine that Loftus's position on repressed and recovered memories is not without critics (e.g., Pezdek & Roe, 1997 Steinberg, 2000). After all, her rejection of the power of repression is directly opposed to models of psychology and the mind that have been around since Freud. Moreover, many therapists and victims have a very personal stake in the belief that one's memories of abuse can be repressed for years and later recovered. However, a careful reading of Loftus's thorough and careful scientific work should cause anyone to question this belief.

CONCLUSION

Elizabeth Loftus is considered by most to be the leading researcher in the areas of memory reconstruction and eyewitness inaccuracy. Her research in these areas continues. Her findings over the years have held up quite well to challenges and have been supported by other researchers in the field.

There is little doubt within the psychological and legal professions today that eyewitness reports are subject to many sources of error such as postevent information integration. It is because of the body of research by Loftus and others that the power and reliability of eyewitnesses in judicial proceedings is being seriously questioned. Loftus herself is one of the most sought-after expert witnesses (usually for the defense) to demonstrate to juries the care they must use when evaluating the testimony of eyewitnesses.

As Loftus herself puts it in her recent book, "I study memory and I am a skeptic" (Loftus & Ketcham, 1994, p. 7). Perhaps we all should be.

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