

Reconstructing Memory

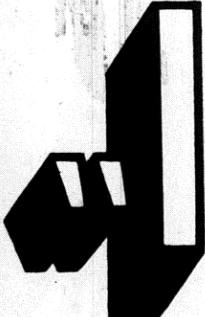
Incredible Eyewitness

Seeing is not
believing when
we can't trust
the seer.

Eyewitnesses
can and will
identify people
they've never
seen, and change
their story
according to
the wording
of questions
they're asked.

Remember what
happened to
Sacco and
Vanzetti?





SAW IT WITH MY OWN EYES." That statement has ended many an argument, since for most people seeing is believing. But it shouldn't be. Between the time you first witness an event and the time you recount it to someone else, your memory of the event may change drastically. Many factors can affect the accuracy of your report. I have found that the questions asked about an event influence the way a witness "remembers" what he saw. Changing even one word in a single question can systematically alter an eyewitness account.

Most previous research on this topic has been directed toward demonstrating how poor eyewitness testimony is, without exploring why people make the errors they do. One favorite method of study has been to stage an incident, then interrogate all the witnesses about what happened. Typically, everyone tells a different story.

In a study conducted at Dartmouth in the 1930s, some students unknowingly became subjects in such an experiment. While a class was in session, a man dressed in workman's overalls entered the room, made some remarks about the heat, tinkered with the radiator for a minute or two, and left. About two weeks later he returned with five other men of similar appearance, and the students were asked to

pick him out from a lineup of all six individuals. Seventeen percent of the students chose the wrong man.

Another group of students, who had not witnessed the event but who were told they had seen it, also had to make a selection. Seventy percent of these subjects reported (correctly) that they could not recall the incident, but 29 percent did point to one of the men. That is, they "identified" a man they had never seen.

In a more recent study by Robert Buckhout and his colleagues at California State University, Hayward, 141 students witnessed a staged assault on a professor. Seven weeks later they were asked to pick out the assailant from a group of six photographs. Although the episode had been a dramatic one that could hardly have gone unnoticed, 60 percent of the witnesses, including the professor who had been attacked, chose the wrong man. Twenty-five percent selected an individual who had been at the scene of the crime, but as an innocent bystander.

Tragic Mistakes. This kind of demonstration is rather entertaining, but when something similar happens in real life, the results can be serious. A few months ago, the *Los Angeles Times* reported the erroneous conviction of a man whom seven witnesses had identified as the robber of a bank. In a similar case last year, 17 wit-

nesses identified a man charged with shooting a police officer; later it turned out the man had not even been in the vicinity of the crime while it was going on. Innocent people have sat in prison for years on the strength of eyewitness testimony. The witnesses in these cases probably were all honest people, but they were tragically wrong.

Yet, despite the poor performance of eyewitnesses, judges and juries continue to place great faith in them. My colleagues and I recently studied the influence a single eyewitness can have in the courtroom. We simulated a criminal trial, using 150 students as jurors. The students received a written description of a grocery-store robbery in which the owner and his granddaughter were killed. They also received a summary of the evidence and arguments presented at the defendant's trial. Each juror had to arrive at a verdict, guilty or not guilty.

We told some of the jurors that there had been no eyewitnesses to the crime. We told others that a store clerk testified he saw the defendant shoot the two victims, although the defense attorney claimed he was mistaken. Finally, we told a third group of students that the store clerk had testified to seeing the shootings, but the defense attorney had discredited him. The attorney claimed the witness

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had not been wearing his glasses on the day of the robbery, and since he had vision poorer than 20/400 he could not possibly have seen the face of the robber from where he stood.

That's the Man. When we analyzed our results, we found that 82 percent of the jurors who had not heard about an eyewitness voted for acquittal, while 72 percent of those who thought there was a credible witness voted guilty. Most important, 68 percent of the jurors who had heard about the discredited witness still voted for conviction, in spite of the defense attorney's remarks. It seems that people are convinced by a witness who declares with conviction, "That's the man."

Percentage of Guilty Verdicts

No Eyewitness	Eyewitness	Discredited Eyewitness
18%	72%	68%

Since eyewitness testimony carries so much weight, it is important to find out why distortion occurs in a witness' memory. I would like to know what goes on in a person's mind when he is trying to make a truthful report but makes a false one. To find the answer, one must consider the nature of human memory.

Studies of memory for sentences and pictures indicate that when we experience an event, we do not simply file a memory, then on some later occasion retrieve it and read off what we've stored. Rather, at the time of recall or recognition, we reconstruct the event, using information from many sources. These include both the original perception of the event and inferences drawn later, after the fact. Over a period of time, information from these sources may integrate, so that a witness becomes unable to say how he knows a specific detail. He has only a single, unified memory.

I studied the way leading questions can introduce new information that alters one's memory of an event. A leading question is one that by its form or content suggests to a witness the answer he should

give, as in the classic "When did you stop beating your wife?" We all probably ask leading questions without realizing we are doing so. Lawyers, though, have long recognized the usefulness of deliberately asking such questions. They know that by the time the opposing lawyer objects and the judge rules the question improper, a suggestion may already have taken hold in the minds of the jurors.

Police undoubtedly use leading questions too, when they are interrogating witnesses to a crime. If they influence a witness to make a false statement (and that can happen easily, even with well-intentioned police officers), chances are good he will repeat the error later when a trial lawyer asks him to "tell in your own words what happened."

A famous example of police suggestion occurred in the 1921 case of Nicola Sacco and Bartolomeo Vanzetti, two Italian anarchists tried for murder and robbery in Massachusetts, at the height of nationwide hysteria over radicalism. Five prosecution witnesses identified Sacco at the trial, yet most of these witnesses had originally told police they could not identify anyone. Four witnesses identified Vanzetti, although one of them had earlier told police he had been unable to get a good look at the robbers. This same witness stated at the trial that he had had a very good look, after all. In fact, he was able to recall that the gunman had a dark complexion, high cheek bones, red cheeks, short hair, a trimmed mustache, a high forehead, and a hard, broad face. Sacco and Vanzetti were convicted of the crime, and eventually executed. A later investigation of the identification techniques used in this case indicated that witnesses had been subject to enormous suggestion from the police.

Traffic Accidents. Such cases, while instructive, do not prove conclusively that leading questions affect testimony. In order to examine more carefully the influence of the interrogator's language on an eyewitness, I took the problem into the

laboratory. My assistants and I conducted several experiments, using students as eyewitnesses, and films of automobile accidents as the events they had to remember and report. Since we had a permanent record of each event, and we asked specially constructed questions, we were able to pinpoint the sources and types of inaccuracies.

In our first study, we showed 100 students a short film segment depicting a multiple-car accident. In the film, a car makes a right-hand turn into the main stream of traffic. The turn causes oncoming cars to stop suddenly, and there is a five-car, bumper-to-bumper collision. After our subjects viewed this film, they filled out a 22-item questionnaire containing 16 fillers and six critical questions. Three of the key questions asked about items that had appeared in the film, while three others asked about items that had not actually been present. For half the subjects, the critical questions began with the words *Did you see a*, as in "Did you see a broken headlight?" For the rest, the critical questions began with the words *Did you see the*, as in "Did you see the broken headlight?" Thus the sentences differed only in the form of the article, *the* or *a*.

We had a good reason to look at this contrast. A speaker uses *the* when he assumes the object referred to exists and may be familiar to the listener. An investigator who asks, "Did you see the broken headlight?" essentially says, "There was a broken headlight. Did you happen to see it?" His assumption may influence the witness. But *a* requires no such assumption.

When we tabulated the percentage of "yes," "no," and "don't know" responses, we found that witnesses who received questions with *the* were much more likely to report having seen something that had not really appeared in the film; 15 percent in the *the* group said "yes" when asked about a nonexistent item; while only seven percent in the *a* group made that error. On the other hand, witnesses who

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received questions with *a* were more likely to respond "don't know," both when the object had been present and when it had not. We see, then, that even this subtle change in wording can influence eyewitness reports.

Percentage of "Don't Know" Responses to Questions With "A" Or "The"

Item Present		Item Not Present	
<i>the</i>	<i>a</i>	<i>the</i>	<i>a</i>
23%	51%	13%	38%

Some Got Smashed. We also wanted to know whether the substitution of one word for another could affect quantitative judgments, e.g., judgments of speed. We showed 45 subjects seven films of traffic accidents, again varying the form of the questions we asked after the film. For some of our subject-witnesses, the critical question was "About how fast were the cars going when they hit each other?" For others we replaced the verb *hit* with *smashed*, *collided*, *bumped* or *contacted*. Although these words all refer to the coming together of two objects, they differ in what they imply about speed and force of impact. We wondered if these differences would affect judgments about velocity.

They did. Our subjects' estimates varied considerably, depending on which question they had to answer. Those questioned with *contacted* gave the lowest speed estimates, while those questioned with *smashed* gave the highest.

Average Speed Estimates for Different Verbs

smashed	40.8 mph
collided	39.3 mph
bumped	38.1 mph
hit	34.0 mph
contacted	31.8 mph

Four of our films involved staged crashes, and we knew exactly how fast the cars had been traveling: one 20 mph, another 30 mph, and two others 40 mph. The average estimates for these collisions were 37.7, 35.2, 39.7 and 36.1 mph, respectively. These figures bear out previous findings that people are not very good at judging the speed of a vehicle, and increase our

confidence that our results were due to the way our questions were worded.

The studies I've described so far do not tell us why people are influenced by leading questions. Perhaps they are merely biased by the form of the question to give one answer instead of another. For example, a witness might be uncertain whether to say 30 mph or 40 mph, but the verb *smashed* could sway him toward the higher estimate. In that case, we could not say that his memory of the event had changed, only that his answer had.

To find out if our subjects were really misremembering, we ran one more experiment. Again, we showed subjects a short film of a traffic accident. A third of them answered the question, "About how fast were the cars going when they smashed into each other?" Another third answered the same question with *hit* instead of *smashed*. The remaining third, which acted as a control group, did not get a question about automobile speed. As in our previous study, witnesses who saw *smashed* gave higher estimates than those who saw *hit*.

A week later our subjects returned. Without viewing the film again, they answered a new series of questions about it. This time, the critical question asked whether the witness had seen any broken glass, although, in fact, there had been none in the film. If *smashed* really influenced subjects to remember the accident as more severe than it had been, they might also "remember" details that were not shown but were commensurate with an accident occurring at high speed—like broken glass.

Our analysis showed that more than twice as many subjects queried with *smashed* reported seeing the nonexistent glass as those queried with *hit*. This result is consistent with our interpretation that memory itself undergoes a change as a result of the type of question asked.

Murder or Self-Defense? Eyewitnesses are inaccurate in estimating not only speed, but also time and distance. Yet in

courts of law they must make quantitative judgments all the time. Last year I worked with the Seattle Public Defender's office on a case involving a young woman who had killed her boy friend. The prosecutor called it first-degree murder, but her lawyer claimed she had acted in self-defense. What was clear was that during an argument, the defendant ran to the bedroom, grabbed a gun, and shot her boy friend six times. At the trial, a dispute arose about the time that had elapsed between the grabbing of the gun and the first shot. The defendant and her sister said two seconds, while another witness said five minutes. The exact amount of elapsed time made all the difference in the world to the defense, which insisted the killing had occurred suddenly, in fear, and without a moment's hesitation. In the end the jury must have believed the defendant; it acquitted her.

I do not know whether leading questions played a role in this case, but I am sure they have in others. Accident investigators, police officers, lawyers, reporters and others who must interrogate eyewitnesses would do well to keep in mind the subtle suggestibility that words carry with them. When you question an eyewitness, what he saw may not be what you get. □

Elizabeth Loftus, who received her Ph.D. from Stanford University in 1970, has published numerous articles on human memory and learning. In 1973 she coauthored *Learning* with Sarnoff Mednick and Howard Pollio (Prentice-Hall), and she is now completing a second book, *Memory and Information Processing*, with her husband Geoffrey. Loftus' recent work on eyewitness testimony, which was supported by a grant from the Department of Transportation, developed from a desire to do some applied research. Loftus is assistant professor of psychology at the University of Washington, and is on the editorial board of the *Journal of Experimental Psychology: Human Learning and Memory*.

