

# How Malleable Are Eyewitness Memories?

As a mound of clay reveals new forms in the hands of a sculptor, so are memories of an event molded and transformed by information and experiences that follow the event. That, at least, is the claim of a widely accepted memory theory developed by psychologists over the last decade. Its influence extends to the courtroom, where psychological testimony on the malleability of eyewitness memories is increasingly being sought.

But two researchers at Johns Hopkins University in Baltimore have some advice for psychologists, judges and lawyers who subscribe to the theory of pliable memory: Forget it, at least until better studies are done.

"Psychologists shouldn't be giving expert testimony in court on how eyewitness memories change over time," says psychologist Michael McCloskey. "If there is an effect [of subsequent information on memories for an event], I'm convinced it's very small."

The bulk of data supporting the view that memory is malleable comes from Elizabeth Loftus and colleagues of the

University of Washington in Seattle. In a typical study, subjects see a series of slides showing a traffic accident. They then receive written information about the accident, but some subjects are misled about what they saw. For example, a stop sign in the slides might be described as a yield sign. When asked whether they originally saw a stop sign or a yield sign, the misled subjects perform more poorly than controls. This, says Loftus, indicates that the misleading information replaces the original memory, which is permanently lost. Other researchers contend that the original information is not lost but rendered inaccessible by the misleading information.

Neither explanation holds up, argue McCloskey and Maria Zaragoza in the March *JOURNAL OF EXPERIMENTAL PSYCHOLOGY: GENERAL*. Misleading information can cause poorer performance on memory tests if some subjects forget the original information before being misled, they say; these subjects pick the misleading information when they see it on a test because it is all they can remember. And,

they note, even a misled subject who remembers originally seeing a stop sign might reason that the experimenter who prepared misleading information knows what is in the slides—hence, the sign must have been a yield sign.

A better experiment, says McCloskey, would be much the same as Loftus's, but subjects would not pick between the original (stop sign) and the misleading (yield sign) information. Instead, they would choose between the original information and a new item (such as a no parking sign). In this way, subjects are tested for what they initially saw, and their responses are not biased by the misleading information, explains McCloskey. In six replications of this test using 792 college students, the investigators find that misled and control subjects perform about equally on recognition tests, averaging 72 percent and 75 percent correct, respectively.

"These results strongly suggest that misleading information has no effect on a person's ability to remember the original event," says McCloskey. The memory of an eyewitness who is hypnotized in order to stir up recollections, or who is shown a photograph of a suspect before seeing a police lineup, may be altered in some way, "but we don't really know how witnesses' memories change over time," he asserts.

"That's a ridiculous thing to say," responds Loftus. The data clearly show, she says, that the memory of an eyewitness who sees a picture of Mr. X in the newspaper and then sees Mr. X and several others in a lineup is dramatically affected. The test used by the Hopkins scientists, adds Loftus, does not pick up the more subtle effects of misinformation on memory. She and her colleagues believe that information about an event obtained from various sources over time is blended into a composite memory.

"McCloskey and Zaragoza have shown that at least some of the effects of misinformation are due to altering a response, not a memory," notes Loftus. "But memories can still be slightly altered by postevent information."

The results have deeper implications, answers McCloskey. "There don't seem to be simple effects [of misinformation on memory]," he points out. "Is an eyewitness's memory really altered by what they see in the paper, or have they already forgotten the face they originally saw? I'm not aware of any good research on this."

In addition, observes McCloskey, it is not known whether misleading information impairs a person's ability to recall information without any aids. So far, researchers have only tested recognition of two or more choices presented to subjects.

—B. Bower

## Slave-making ants rob the cradle

Driven by hunger and guided by the sun, swarms of red western ants indulge in daring kidnapping raids against a neighboring species. So reports Howard Topoff, a psychologist at Hunter College in New York City, who has been analyzing the behavior of the western slave-making ant, *Polyergus breviceps*, in an Arizona mountain desert.

These ants are dependent for survival on their slaves, a related species *Formica gnava*. The slaves are captured young, as pupae, and they emerge as adults in the slave-makers' nest. The slaves forage, defend the nest and feed and groom their masters. If the colony relocates, they carry the slave-makers one by one to the new site. A colony of 3,000 slave-making ants may have more than 6,000 slaves.

Topoff has observed the events leading to the capture of pupae. First, scouts search for *Formica* nests. A successful scout returns to its colony and uses tactile and chemical means to recruit raiders. The swarm of raiders may number 2,500, and advance in a phalanx 3 feet wide and 16 feet long. Topoff finds that the scout and its followers rely on sun position, as well as on a chemical trail previously left by the scout, to find their way. With a mirror held to change the apparent position of the sun, Topoff can make the raiding party reverse direction.



Topoff/National Geographic Society

*The beginnings of bondage: Slave-making ants kidnap a pupa of a related species. These ants may collect 2,000 pupae in a single raid and sometimes return to the plundered nest to take an additional 2,000.*

When the slave-makers reach the target nest, they spray it with a chemical that forces the *Formica* adults to flee, leaving behind most of the young. The raiders then capture thousands of pupae, some to eat and others to raise as slaves. A single *Polyergus* colony may steal as many as 30,000 *Formica* pupae each year. Topoff finds that need for food is a stimulus for the raids. If he overfeeds a colony, kidnapping raids become less frequent.

—J. A. Miller