

Your memory is no video camera, it edits the past with present experiences

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Your memory is a wily time traveler, plucking fragments of the present and inserting them into the past, reports a new Northwestern Medicine study. In terms of accuracy, it's no video camera.

Rather, the memory rewrites the past with current information, updating your recollections with new experiences.

Love at first sight, for example, is more likely a trick of your memory than a Hollywood-worthy moment.

"When you think back to when you met your current partner, you may recall this feeling of love and euphoria," said lead author Donna Jo

Bridge, a postdoctoral fellow in medical social sciences at Northwestern University Feinberg School of Medicine. "But you may be projecting your current feelings back to the original encounter with this person."

The study will be published Feb. 5 in the *Journal of Neuroscience*.

This the first study to show specifically how memory is faulty, and how it can insert things from the present into memories of the past when those memories are retrieved. The study shows the exact point in time when that incorrectly recalled information gets implanted into an existing memory.

To help us survive, Bridge said, our memories adapt to an ever-changing environment and help us deal with what's important now.

"Our memory is not like a video camera," Bridge said. "Your memory reframes and edits events to create a story to fit your current world. It's built to be current."

All that editing happens in the hippocampus, the new study found. The hippocampus, in this function, is the memory's equivalent of a film editor and special effects team.

For the experiment, 17 men and women studied 168 object locations on a computer screen with varied backgrounds such as an underwater ocean scene or an aerial view of Midwest farmland. Next, researchers asked participants to try to place the object in the original location but on a new background screen. Participants would always place the objects in an incorrect location.

For the final part of the study, participants were shown the object in three locations on the original screen and asked to choose the correct location. Their choices were: the location they originally saw the object,

the location they placed it in part 2 or a brand new location.

"People always chose the location they picked in part 2," Bridge said. "This shows their original memory of the location has changed to reflect the location they recalled on the new background screen. Their memory has updated the information by inserting the new information into the old memory."

Participants took the test in an MRI scanner so scientists could observe their brain activity. Scientists also tracked participants' eye movements, which sometimes were more revealing about the content of their memories – and if there was conflict in their choices—than the actual location they ended up choosing.

The notion of a perfect memory is a myth, said Joel Voss, senior author of the paper and an assistant professor of medical social sciences and of neurology at Feinberg.

"Everyone likes to think of memory as this thing that lets us vividly remember our childhoods or what we did last week," Voss said. "But memory is designed to help us make good decisions in the moment and, therefore, memory has to stay up-to-date. The information that is relevant right now can overwrite what was there to begin with."

Bridge noted the study's implications for eyewitness court testimony. "Our memory is built to change, not regurgitate facts, so we are not very reliable witnesses," she said.

A caveat of the research is that it was done in a controlled experimental setting and shows how memories changed within the experiment.

"Although this occurred in a laboratory setting, it's reasonable to think the [memory](#) behaves like this in the real world," Bridge said.

Provided by Northwestern University

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