

# Researchers show limits of brain scans as legal evidence

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(PhysOrg.com) -- Two psychologists and a law expert were able to see how much information about memories can be seen in brain activity.

It can happen in any criminal trial. A witness is being questioned about her recollection of a suspect, an event or a key piece of evidence. She insists the details are right, but the jury is missing solid proof that her memory is accurate.

What if there were a way to peek inside her brain and read her memory to see if she was telling the truth? A judge in India did that in 2008 when he convicted a woman of murdering her fiancé based partly on brain scan evidence that gauged her ability to remember details of the crime.

As technology allows scientists and investigators to glean more about how we record, store and recall memories, Stanford [psychologists](#) and law experts are studying how reliable that information is. So far, they say it's not accurate enough to be used as legal evidence.

Using functional magnetic resonance imaging (fMRI) to scan the brains of healthy adults, the researchers were able to measure how strong their subjects' sense of a specific memory was. But they could not tell for sure whether the memories themselves were based on a recollection of an actual experience.

"We were able to differentiate between rich recollection, strong familiarity or a weak memory," said Anthony Wagner, an associate

professor of psychology who conducted the experiments with postdoctoral fellow Jesse Rissman and law Professor Hank Greely. "But there was very weak evidence that what the subject actually experienced was etched in the brain."

The team's findings are being published in this week's edition of the *Proceedings of the National Academy of Sciences*.

In the first of two experiments, the researchers had 16 subjects study photographs of 200 faces. During an fMRI scan, the subjects were shown each of those 200 faces again, plus another 200 faces they had never seen. Every time someone looked at a face, they were asked to rate how well they recognized that image.

"Based on these [brain activity](#) patterns, we could decode the subject's sense of recognition with remarkable accuracy," Rissman said.

But the researchers found that memories could play tricks on people's brains. Sometimes a picture of a face would spark a memory even if the subject had never before seen that face, and in these cases the brain activity pattern closely mimicked that of a real memory. In other words, the brain scans were not very good at distinguishing between true and false memories.

A second experiment was designed to gauge people's memories when they weren't being asked to remember anything. In contrast to the first experiment, when the subjects weren't prompted to say how well they remembered a face they were shown, their brain activity failed to indicate whether or not they had a memory related to the image.

"We are by no means at the level you'd want for a technique that might be used in a courtroom to probe a defendant's [memory](#) and uncover the truth about his or her past experiences," Rissman said. "Brain imaging

analysis will definitely develop, but I'm doubtful that the technology will ever be capable of providing a 100 percent reliable determination of whether somebody actually had a particular experience."

**More information:** PNAS paper: [www.pnas.org/content/early/2010/05/10/1001028107.abstract](http://www.pnas.org/content/early/2010/05/10/1001028107.abstract)

Provided by Stanford University

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