



Treatments

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# A Tiny Pulse Of Electricity Can Help The Brain Form Lasting Memories

A little electrical brain stimulation can go a long way in boosting memory.



Brain MRI - BSIP/Collection Mix: Sub/Getty Images

The key is to deliver a tiny pulse of electricity to exactly the right place at exactly the right moment, a team **reports** in Tuesday's *Nature Communications*.

"We saw a 15 percent improvement in memory," says **Michael Kahana**, a professor of psychology at the University of Pennsylvania and an author of the study.

The approach hints at a new way of treating people with memory problems caused by a brain injury or Alzheimer's disease, Kahana says. But the technology is still far from widespread use.

Kahana has spent years trying to understand why the brain often fails to store information we want it to keep.

*"When we're trying to study a list of items, sometimes the items stick and sometimes we have momentary lapses where we don't seem to remember anything," he says.*

Kahana and a team of researchers thought there must be a way to help the brain do better. So they had a computer learn to recognize patterns of electrical activity indicating that the brain was about to have a memory lapse.

Then the team had the computer intervene by delivering a pulse of electricity to different areas of the brain just before the lapse was going to occur. And in the area involved in recalling words, the approach worked.

*"When we stimulated the left temporal cortex, we found that memory was improved significantly," Kahana says. "When we stimulated other parts of the brain, memory was, by and large, impaired."*

The experiment was done with 25 patients with epilepsy who were in the hospital awaiting surgery to treat their seizures. That meant doctors had already inserted wires into their brains to monitor electrical activity.

But epilepsy patients tend to have memory problems and other brain anomalies, says **Michael Sperling**, an author of the study and director of the Comprehensive Epilepsy Center at Thomas Jefferson University in Philadelphia.

*"We still really lack any experiments in people with other conditions to know for certain whether [the treatment] would prove effective or not," Sperling says.*

Even so, Sperling is optimistic that the research will lead to an implantable device that can improve memory in at least some patients.

*"There's a good chance that something like this will come available," he says, "I would hope within the next half dozen years, or so."*

The memory research is being funded by the military's Defense Advanced Research Projects Agency. It's part of an effort by the agency to develop technologies to help military personnel and veterans with memory problems caused by brain injuries.

*"We didn't just do this for the sake of science," says **Justin Sanchez**, who directs DARPA's biological technologies office. "We wanted a real technology that could ultimately make its way out into the world."*

DARPA-funded scientists are already working on a version of the brain stimulation system that could be implanted in a person, Sanchez says. And this sort of technology could eventually extend beyond people who have memory impairments, he says.

*"If any of us could get a 15 percent boost in our memory, that would be transformative," Sanchez says.*