

# Brain state affects memory recall

June 13 2011

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Lost your keys? Your brain might be in a better state to recall where you put them at some times than at others, according to new research from UC Davis. A paper describing the work is published June 13 in the journal *Proceedings of the National Academy of Sciences*.

"It's been assumed that the process of retrieving a [memory](#) is cued by an external stimulus," said Charan Ranganath, professor at the UC Davis Center for [Neuroscience](#) and Department of Psychology. "But we found that the levels of [brain activity](#) before items came up were correlated with memory."

Graduate students Richard Addante and Andrew Watrous; Ranganath; Andrew Yonelinas, professor of psychology at the UC Davis Center for Mind and [Brain](#); and Arne Ekstrom, assistant professor of psychology at the Center for Neuroscience, measured a particular frequency of brainwaves called theta oscillations in the brains of volunteers during a memory test.

Theta waves are associated with a brain that is actively monitoring something, Ranganath said. For example, rats show high theta waves while exploring a maze.

In the [memory test](#), the volunteers had to memorize a series of words with a related context. They later had to recall whether they had seen the word previously and the context in which the word was seen.

High theta waves immediately before being prompted to remember an

item were associated with better performance.

The work goes against the assumption that the brain is waiting to react to the external world, Ranganath said. In fact, most of the brain is busy with internal activity that is not related to the outside world – and when external stimuli come in, they interact with these spontaneous patterns of activity.

It's not clear whether it is possible to deliberately put your brain into a better state for memory recall, Ranganath said. The laboratory is currently investigating that area – with the hope that it might lead to better treatments for memory loss.

Provided by University of California - Davis

Citation: Brain state affects memory recall (2011, June 13) retrieved 24 April 2024 from <https://medicalxpress.com/news/2011-06-brain-state-affects-memory-recall.html>

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