

Memory trick shows brain organization

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A simple memory trick has helped show UC Davis researchers how an area of the brain called the perirhinal cortex can contribute to forming memories. The finding expands our understanding of how those brain areas that form memories are organized.

The brain puts together different items -- the what, who, where and when -- to form a complete memory. It was previously thought that this association process occurred entirely in a brain structure called the hippocampus, but this appears not to be the case, said Charan Ranganath, a professor at the UC Davis Center for Neuroscience and the Department of Psychology who led the research.

"We want to know how the brain areas that encode memory are organized," Ranganath said. "If your memory is affected by aging or Alzheimer's disease, is there a way to learn that can capitalize on the brain structures that may still be working well?"

Ranganath, along with graduate student Andrew Logan Haskins, Andrew Yonelinas, a UC Davis psychology professor and associate director of the Center for Mind and Brain, and Joel Quamme, a former UC Davis graduate student now at Princeton University, used functional magnetic resonance imaging (fMRI) to see which parts of the brain were active when volunteers memorized pairs of words such as "motor/bear" or "liver/tree." In this experiment, the volunteers either learned the pairs as separate words that could be fitted into a sentence, or as a new compound word, for example "motorbear," defined as a motorized stuffed toy.

"It's a sort of memory trick," Ranganath said.

When volunteers memorized word pairs as a compound word, the perirhinal cortex lit up, and this activity predicted whether the volunteers would be able to successfully remember the pairs in the future. The results suggest that the perirhinal

cortex probably can form simple associations, such as between the parts of a complex object. This information is probably passed up to the hippocampus, which may create more complex memories, such as the place and time a specific object was seen.

Source: University of California - Davis

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