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# Where unconscious memories form

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A small area deep in the brain called the perirhinal cortex is critical for forming unconscious conceptual memories, researchers at the UC Davis Center for Mind and Brain have found.

The perirhinal cortex was thought to be involved, like the neighboring hippocampus, in "declarative" or conscious memories, but the new results show that the picture is more complex, said lead author Wei-chun Wang, a graduate student at UC Davis.

The results were published Dec. 9 in the journal *Neuron*.

We're all familiar with memories that rise from the unconscious mind. Imagine looking at a beach scene, said Wang. A little later, someone mentions surfing, and the beach scene pops back into your head.

Declarative memories, in contrast, are those where we recall being on that beach and watching that surf competition: "I remember being there."

Damage to a structure called the hippocampus affects such declarative "I remember" memories, but not conceptual memories, Wang said. Neuroscientists had previously thought the same was true for the perirhinal cortex, which is located immediately next to the hippocampus.

Wang and colleagues carried out memory tests on people diagnosed with amnesia, who had known damage to the perirhinal cortex or other brain areas. They also carried out functional magnetic resonance imaging

(fMRI) scans of healthy volunteers while they performed memory tests.

In a typical test, they gave the subjects a long list of words, such as chair, table or spoon, and asked them to think about how pleasant they were.

Later, they asked the subjects to think up words in different categories, such as "furniture."

Amnesiacs with damage to the perirhinal cortex performed poorly on the tests, while the same brain area lit up in fMRI scans of the healthy control subjects.

The study helps us understand how memories are assembled in the brain and how different types of brain damage might impair memory, Wang said. For example, Alzheimer's disease often attacks the hippocampus and perirhinal cortex before other brain areas.

Provided by University of California - Davis