

Brain May Be Able to Suppress Memories

July 13 (HealthDay News) -- Unwanted memories might be willfully banished from human consciousness, according to a new study that also outlines just how the brain might accomplish this feat.

The research, published in the July 13 issue of *Science*, may help end the debate as to how much control people have over their memories, scientists say.

It might also lead to treatments for individuals battling psychological ills tied to past traumatic events -- illnesses such as post-traumatic stress disorder (PTSD), chronic anxiety, depression, phobias and obsessive-compulsive disorder.

"These are people who have problems in clearing their consciousness -- at that moment in time -- of these reoccurring traumatic events," explained lead researcher Brendan Depue, a graduate student in the department of psychology at the University of Colorado, Boulder.

Depue stressed that the idea of suppressed memory does not include the controversial notion of "repressed memory," where the mind suddenly recalls a past trauma after a period of years or even decades.

Instead, his team looked at the ability of humans to consciously erase a memory they've only just made.

To do so, they presented healthy adults with 40 pairs of pictures. One picture in each pair depicted a person's face and was the "cue" photo. It was matched with a "target" image -- usually a picture of a disturbing, emotion-laden scene, such as a wounded soldier, an empty electric chair, or a grisly car crash.

Participants were shown these cue-target picture pairs until they appeared to know them all by heart.

In the second phase of the experiment, participants were hooked up to a functional MRI (fMRI) brain scanner and then presented with only the "cue" photos of people's faces. They were instructed that if the

photo was contained within a green border, this meant that they should try and think of the matched target picture. However, if it was presented inside a red border, that meant they should try not to think of the matched picture.

Participants performed this "think/don't think" exercise 12 times for each picture.

Finally, at the end of the experiment, they were tested on whether they could still remember all the matched pairs -- something they had been able to do with ease before.

The result: Participants had much more trouble remembering paired photos they had tried not to think of in the second phase of the experiment. They had no trouble recalling the other photo match-ups, however.

"So, when individuals invoke this suppressive control, the items are recalled less frequently," Depue concluded. "It looks like individuals have gained some control over the [memories], and they actually are suppressed," he said.

How might the brain do this? According to fMRI brain images recorded during the think/don't think task, "what seems to occur is that the prefrontal cortex -- what neuroscientists consider the center of cognitive control -- becomes more active in the case of suppression," Depue said.

At the same time, "you see deactivation in areas of the visual cortex, which is normally active when someone is remembering a picture," he said.

Two other brain areas central to memory and emotion -- the hippocampus and the amygdala -- were also quieted down during the "don't think" test. "Those two areas are interconnected greatly and have to do with memorizing and retrieving emotional memories," Depue explained.

He said decisions made in the prefrontal cortex appear to be "modulating" the more primitive areas of the brain, regions that would normally leap to retrieve a memory.

"I liken it to meditation," Depue said. "If you meditate, you continually practice to clear your mind from thoughts. It could be that when you are meditating, you are using part of this specific mechanism to do that."

Another brain expert was intrigued by the findings.

"It looks like they are confirming that humans can actively suppress memory," said Paul Sanberg, director of the Center for Excellence for Aging and Brain Repair at the University of South Florida College of Medicine, in Tampa.

It makes sense that the prefrontal cortex would take the lead in this type of activity, Sanberg said. "In our prefrontal cortex, we've evolved mechanisms to control older parts of the brain," he explained.

According to Depue, if people could harness the power of the mind to suppress traumatic, unwanted memories, it could pave the way to treatments against a range of psychiatric illnesses.

"The next step is to actually try and do this with clinical populations, looking specifically at whether they show some dysfunction in the neural mechanisms that we've outlined in this article," the researcher said. "Then we'd try and pinpoint just what in the brain is going wrong."

SOURCES: Brendan Depue, graduate student, department of psychology, University of Colorado, Boulder; Paul Sanberg, Ph.D., director, Center for Excellence for Aging and Brain Repair, University of South Florida College of Medicine, Tampa; July 13, 2007, Science

Publish Date: July 13, 2007