Medical Xpress

Researchers use new method to probe recollections in memory-impaired patients

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Neuroscientists continue to debate whether or not long-term memory always depends on a region of the brain called the medial temporal lobe, which contains the brain's memory-processing center, the hippocampus. A new study of brain-damaged patients by researchers at the University of California, San Diego (UCSD) School of Medicine readdresses the issue using a new method to elicit more detailed long-term memories.

The study, led by Larry R. Squire, Ph.D., professor of psychiatry, neurosciences and psychology at UCSD School of Medicine and research career scientist at the San Diego Veterans Affairs Health System, supports the theory that remote, or very long-term, memory remains intact after the medial temporal lobe is damaged. The results will be published in the early on-line edition of *Proceedings of the National Academy of Sciences* the week of February 4-8.

In 2005, a study led by Squire and published in the journal Neuron, studied the ability of patients with selective brain damage to recall events in their past. The findings strongly suggested that the ability to recollect "remote autobiographic events," or distant memories, gradually becomes independent of the medial temporal lobe as time passes.

However, proponents of an opposing theory – that retention of distant memories requires the continued involvement of the hippocampus – suggested that these findings were flawed because the measurement techniques used to elicit remote memories weren't sensitive enough.

The PNAS study looked at the ability of patients with selective brain damage to recall events from their past using a new method, called the Autobiographic Interview, which uses extensive probing to elicit an average of 50 or more details per memory.

“Using this more sensitive testing method, we found that autobiographical recollection was impaired in patients with medial temporal lobe damage when memories were drawn from the recent past, but fully intact when memories came from the remote past,” said Squire.

The new approach used tape-recorded narratives of extended recollections and determined the number of details that patients produced about events from their early lives. The Autobiographical Interview was administered to three patients with limited hippocampal damage, two with large medial temporal lobe lesions and five controls without any brain damage. Participants were asked to provide one memory from each of five time periods: childhood to age 11, teenage years, early adulthood, middle age and the year immediately prior to testing.

“Each of the amnesic patients was able to provide detailed autobiographical memories, with an average of 50 details per memory, from the three most remote time periods that were sampled,” said first author C. Brock Kirwan, Ph.D., postdoctoral fellow in UCSD’s Institute for Neural Computation.

Previous methods looked at a larger number of remote memories, prompting recollection of approximately 20 details per memory. Kirwan theorized that earlier studies elicited fewer details because it is difficult to produce a large number of details when asked about 24 different episodes. “In any case, we have found remote autobiographical memory to be intact after medial temporal lobe damage, whether patients produce memories with more or fewer details,” he said.

The researchers also conclude that impairment to such remote memories that have sometimes been reported using the Autobiographical Interview or other tests is likely due to significant damage outside the medial temporal lobe.

Source: University of California - San Diego