



Scientists find how relaxed minds remember better

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By Kate Kelland

LONDON (Reuters) - Stronger and more lasting memories are likely to be formed when a person is relaxed and the memory-related neurons in the brain fire in sync with certain brain waves, scientists said on Wednesday.

Researchers from the United States said their findings could help develop new therapies for people with learning disabilities and some types of dementia.

"This study establishes a direct relationship between events at the circuit level of the brain...and their effects on human behavior," said Ueli Rutishauser of the California Institute of Technology, who worked on the study.

Synchronization in the brain is influenced by "theta waves" which are associated with relaxation, daydreaming and drowsiness, but also with learning and memory formation, the scientists explained in the study in the journal *Nature*.

While scientists already know that relaxed minds are better at receiving new information, this study pinpoints a mechanism by which relaxation neurons work together to improve memory.

"Our research shows that when memory-related neurons are well coordinated to theta waves during the learning process, memories are stronger," said Adam Mamelak, a neurosurgeon at Cedars-Sinai Medical Center in Los Angeles.

PHOTOGRAPHIC MEMORIES

Erin Schuman of the California Institute of Technology, who also worked on the study, said many learning disabilities appear to be linked to deficiencies in sensory processing and timing.

"These results provide a potential explanation for these deficits," she said in an email to Reuters.

The findings suggest that if doctors were able to optimize the state of the brain, by ensuring it was relaxed, and then synchronize the delivery of the things it needed to learn, the outcome, or memory, might be better, she said.

The research team studied eight volunteers who were shown 100 photos of a range of objects and allowed to view each for one second. Fifteen to 30 minutes later they were shown another 100 photos -- 50 new ones and 50 from the first set -- and asked to recall which ones they had seen before and say how confident they were in their answers.

Using electroencephalogram (EEG) electrodes, the researchers recorded neuron activity and the "background" electrical signals in regions of the brain where memories are formed. They found that recognition was stronger when the learning took place while neurons were firing in sync with theta waves.

Most studies of theta waves are conducted in rats, with only a few in humans, partly because EEG electrodes need to be placed directly on the brain's surface to get precise measurements.

This study was conducted with volunteers with epilepsy and who were undergoing EEGs, which are often used to find the source of epileptic seizure activity. The researchers said steps were taken to ensure the patients' underlying medical condition did not affect the outcome of the study.

(Editing by Ralph Boulton)



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