

## Memory researchers explain latest findings on improving the mind, stopping memory loss

August 13 2010

The ability to remember is not just to glimpse into the past; a sharp memory can help with creativity, productivity and even the ability to imagine the future, according to several psychologists.

Sleep, aging and <u>brain chemistry</u> research were all discussed during several presentations on <u>memory</u> at the 118th Annual Convention of the American Psychological Association.

The benefits of <u>sleep</u> are well-documented, but researcher Sara C. Mednick, PhD, and her colleagues are finding that certain stages of sleep actually have distinct roles in people's memory capacity. The REM (rapid eye movement) sleep stage -- where people's dreams are most vivid - is also important for people's memory systems, Mednick found.

Mednick, who is a leading sleep researcher at the University of California, San Diego, presented findings from a recent study during her presentation Friday. Using a creativity task called a Remote Associates Test, study participants were shown multiple groups of three words (e.g., cookie, heart, sixteen) and asked to find another word that can be associated with all three words. In this case, the answer would have been "sweet." Participants were tested once in the morning and again in the afternoon, either after a nap with REM sleep, one without REM sleep or a quiet rest period.



Although the quiet rest and non-REM sleep groups received the same words prior to the association task, they displayed no improvement on the Remote Associates Test. However, the REM sleep group improved by almost 40 percent over their morning performances. The authors hypothesize that the formation of associative networks from previously unassociated information in the brain, leading to creative problemsolving, is facilitated by changes to neurotransmitter systems during REM sleep.

"REM sleep is important for pulling together all the information we process on a daily basis and turning it into memories we can use later," said Mednick. "This helps us to understand more about the benefits of sleep and to help people maximize their sleep schedules for optimal productivity and memory retrieval."

People's memories may also help them imagine their future, according to researcher Daniel L. Schacter, PhD, a psychology professor at Harvard University. Schacter and his colleagues have been conducting brain imaging research that suggests that the ability to remember past events may be crucially involved in people's ability to imagine events that have not happened yet and even simulate these "future" occurrences.

Studies show certain brain regions that have traditionally been associated with memory, such as the medial temporal lobe, appear to be similarly activated when people imagine future experiences in brain imaging studies, according to Schacter. "Memories of things that have already happened to us apparently support the formation in our minds of future events by taking and recombining stored information into an event we imagine will happen," Schacter said during a plenary address. "This can have far-reaching implications for how we think about memory and its function."

The medial temporal lobe, which includes the hippocampus, is the



subject of further memory research by Michela Gallagher, PhD, a neuroscientist at Johns Hopkins University who also presented on Friday. The primary risk for Alzheimer's disease is advancing age and is frequently preceded by a condition known as amnestic mild cognitive impairment (aMCI) in which people have greater memory deficits than would be expected as they grow older. "These people may offer the best opportunity for intervention to treat symptoms and stem the tide of the disease," said Gallagher. Her research on memory loss in aged rats is providing clues about the condition of aMCI.

Gallagher's research has shown that a specific population of neurons in the hippocampus is excessively active in the brains of older rats with memory loss. Those neurons normally play a key role in encoding new information but fail to perform this function in older rats with poor <u>memory capacity</u>. In other words, older brains tend to have a hard time distinguishing a current event from a past one, and this condition is also showing up in human brains.

Using high-resolution brain imaging in older adults with aMCI, excess activity is localized to the same region of the hippocampus where hyperactive neurons were found in aged rats. People with this feature in the brain performed poorly on tests of memory that tax the special function of those neurons. "The changes in this neural network that are seen both in older animals and humans may shed light on a permissive condition in the aging brain that confers risk for Alzheimer's disease and the special vulnerability of memory in this most common form of dementia," said Gallagher, "and it is giving us new ideas about how to treat progressive memory loss in older adults."

Provided by American Psychological Association

Citation: Memory researchers explain latest findings on improving the mind, stopping memory



loss (2010, August 13) retrieved 15 May 2024 from https://medicalxpress.com/news/2010-08-memory-latest-mind-loss.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.