A midday nap markedly boosts the brain's learning capacity

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If you see a student dozing in the library or a co-worker catching 40 winks in her cubicle, don't roll your eyes. New research from the University of California, Berkeley, shows that an hour's nap can dramatically boost and restore your brain power. Indeed, the findings suggest that a biphasic sleep schedule not only refreshes the mind, but can make you smarter.

Conversely, the more hours we spend awake, the more sluggish our minds become, according to the findings. The results support previous data from the same research team that pulling an all-nighter - a common practice at college during midterms and finals -- decreases the ability to cram in new facts by nearly 40 percent, due to a shutdown of brain regions during sleep deprivation.

"Sleep not only rights the wrong of prolonged wakefulness but, at a neurocognitive level, it moves you beyond where you were before you took a nap," said Matthew Walker, an assistant professor of psychology at UC Berkeley and the lead investigator of these studies.

In the recent UC Berkeley sleep study, 39 healthy young adults were divided into two groups - nap and no-nap. At noon, all the participants were subjected to a rigorous learning task intended to tax the hippocampus, a region of the brain that helps store fact-based memories. Both groups performed at comparable levels.

At 2 p.m., the nap group took a 90-minute siesta while the no-nap group

stayed awake. Later that day, at 6 p.m., participants performed a new round of learning exercises. Those who remained awake throughout the day became worse at learning. In contrast, those who napped did markedly better and actually improved in their capacity to learn.

These findings reinforce the researchers' hypothesis that sleep is needed to clear the brain's short-term memory storage and make room for new information, said Walker, who is presenting his preliminary findings on Sunday, Feb. 21, at the annual meeting of the American Association of the Advancement of Science (AAAS) in San Diego, Calif.

Since 2007, Walker and other sleep researchers have established that fact-based memories are temporarily stored in the hippocampus before being sent to the brain's prefrontal cortex, which may have more storage space.

"It's as though the e-mail inbox in your hippocampus is full and, until you sleep and clear out those fact e-mails, you're not going to receive any more mail. It's just going to bounce until you sleep and move it into another folder," Walker said.

In the latest study, Walker and his team have broken new ground in discovering that this memory- refreshing process occurs when nappers are engaged in a specific stage of sleep. Electroencephalogram tests, which measure electrical activity in the brain, indicated that this refreshing of memory capacity is related to Stage 2 non-REM sleep, which takes place between deep sleep (non-REM) and the dream state known as Rapid Eye Movement (REM). Previously, the purpose of this stage was unclear, but the new results offer evidence as to why humans spend at least half their sleeping hours in Stage 2, non-REM, Walker said.

"I can't imagine Mother Nature would have us spend 50 percent of the

night going from one sleep stage to another for no reason," Walker said. "Sleep is sophisticated. It acts locally to give us what we need."

Walker and his team will go on to investigate whether the reduction of sleep experienced by people as they get older is related to the documented decrease in our ability to learn as we age. Finding that link may be helpful in understanding such neurodegenerative conditions as Alzheimer's disease, Walker said.

Provided by University of California - Berkeley