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Link Between Poor Sleep and Poor Learning in Older Adults Investigated

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(PhysOrg.com) -- Researchers at the University of Massachusetts Amherst are trying to decode why aging prevents sleep from enhancing memory. Rebecca Spencer, assistant professor of psychology, says she is trying to isolate the stage of sleep that provides the learning benefit and to discover more about the overall role sleep plays in learning.

Spencer, who is the director of the Cognition and Action Lab in the UMass Amherst department of psychology, says one key to understanding the sleep benefit in learning may be that as people age, they sleep less and some critical stages of sleep are interrupted more frequently. This suggests that it is not a change in the overall quantity of sleep that reduces the benefits sleep conveys on memory, but rather to the quality of specific sleep stages that makes the difference.

Motor learning, the processes underlying learning to play tennis, golf or the piano, is boosted during stage two of non-REM sleep (nREM-2), Spencer says. While older adults often sleep less than when they were young, nREM-2 is preserved and may even increase. The downside, however, is that this stage of sleep is interrupted more in older people. Older adults are defined in the study as being 54 to 80 years old.

“When you sleep, the brain replays the ‘movie’ from your day and we believe this is how sleep improves memory. As we grow old, that movie might play a bit longer, but it is also interrupted more frequently,” says Spencer. Current research points to the need for continuity in nREM-2 sleep to generate the sleep benefit, she says. Spencer and her colleagues

plan to conduct further studies to explore the broader role of sleep in the memory impairments commonly experiences by older adults.

"We're beginning to look at the role of sleep on 'cognitive' tasks," says Spencer. One area in particular is emotional memory. The advantage sleep has on storing memories is enhanced if the memory has emotional importance. In younger people, sleep primes those memories for storage before neutral memories. "We want to see if neutral and emotional memories are benefited by sleep in older adults."

Younger people appear to be better able to process and store strongly emotional memories than older people, according to Spencer. The reason for this isn't clear, but may again be linked the type and intensity of sleep they experience and the fact that young people tend to have longer and deeper sleep. Another factor may be that young people have stronger emotional responses to daily events, something older people don't do because they have more experience dealing with upsetting or even uplifting events.

Spencer says her research on both the learning boost from sleep and the ordering of memories during sleep suggests there is much to learn about why we sleep and the functions of various stages of sleep.

Provided by University of Massachusetts Amherst

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