MedicalXpress

Learn that tune while fast asleep

June 24 2012

Want to nail that tune that you've practiced and practiced? Maybe you should take a nap with the same melody playing during your sleep, new provocative Northwestern University research suggests.

The research grows out of exciting existing evidence that suggests that memories can be reactivated during sleep and storage of them can be strengthened in the process.

In the Northwestern study, research participants learned how to play two artificially generated musical tunes with well-timed key presses. Then while the participants took a 90-minute nap, the researchers presented one of the tunes that had been practiced, but not the other.

"Our results extend prior research by showing that external stimulation during sleep can influence a complex skill," said Ken A. Paller, professor of psychology in the Weinberg College of Arts and Sciences at Northwestern and senior author of the study.

By using EEG methods to record the brain's electrical activity, the researchers ensured that the soft musical "cues" were presented during slow-wave sleep, a stage of sleep previously linked to cementing memories. Participants made fewer errors when pressing the keys to produce the melody that had been presented while they slept, compared to the melody not presented.

"We also found that electrophysiological signals during sleep correlated with the extent to which memory improved," said lead author James

Antony of the Interdepartmental Neuroscience Program at Northwestern. "These signals may thus be measuring the brain events that produce memory improvement during sleep."

The age-old myth that you can learn a foreign language while you sleep is sure to come to mind, said Paul J. Reber, associate professor of psychology at Northwestern and a co-author of the study.

"The critical difference is that our research shows that memory is strengthened for something you've already learned," Reber said. "Rather than learning something new in your sleep, we're talking about enhancing an existing memory by re-activating information recently acquired."

The researchers, he said, are now thinking about how their findings could apply to many other types of learning.

"If you were learning how to speak in a foreign language during the day, for example, and then tried to reactivate those memories during sleep, perhaps you might enhance your learning."

Paller said he hopes the study will help them learn more about the basic brain mechanisms that transpire during sleep to help preserve memory storage.

"These same mechanisms may not only allow an abundance of memories to be maintained throughout a lifetime, but they may also allow memory storage to be enriched through the generation of novel connections among memories," he said.

The study opens the door for future studies of sleep-based memory processing for many different types of motor skills, habits and behavioral dispositions, Paller said.

Provided by Northwestern University