

Mental rest and reflection boost learning, study suggests

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The patterns of brain activity recorded in this fMRI scanner revealed how mental rest and reflection on past learning activities can boost future learning. Credit: Jeff Luci/Univ. of Texas at Austin.

A new study, which may have implications for approaches to education, finds that brain mechanisms engaged when people allow their minds to rest and reflect on things they've learned before may boost later learning.

Scientists have already established that resting the mind, as in

daydreaming, helps strengthen memories of events and retention of [information](#). In a new twist, researchers at The University of Texas at Austin have shown that the right kind of mental rest, which strengthens and consolidates memories from recent [learning](#) tasks, helps boost future learning.

The results appear online this week in the journal *Proceedings of the National Academy of Sciences*.

Margaret Schlichting, a graduate student researcher, and Alison Preston, an associate professor of psychology and neuroscience, gave participants in the study two learning tasks in which participants were asked to memorize different series of associated photo pairs. Between the tasks, participants rested and could think about anything they chose, but brain scans found that the ones who used that time to reflect on what they had learned earlier in the day fared better on tests pertaining to what they learned later, especially where small threads of information between the two tasks overlapped. Participants seemed to be making connections that helped them absorb information later on, even if it was only loosely related to something they learned before.

"We've shown for the first time that how the brain processes information during rest can improve future learning," says Preston. "We think replaying memories during rest makes those earlier memories stronger, not just impacting the original content, but impacting the memories to come."

Until now, many scientists assumed that prior memories are more likely to interfere with new learning. This new study shows that at least in some situations, the opposite is true.

"Nothing happens in isolation," says Preston. "When you are learning something new, you bring to mind all of the things you know that are

related to that new information. In doing so, you embed the new information into your existing knowledge."

Preston described how this new understanding might help teachers design more effective ways of teaching. Imagine a college professor is teaching students about how neurons communicate in the human brain, a process that shares some common features with an [electric power grid](#). The professor might first cue the students to remember things they learned in a [high school physics](#) class about how electricity is conducted by wires.

"A professor might first get them thinking about the properties of electricity," says Preston. "Not necessarily in lecture form, but by asking questions to get students to recall what they already know. Then, the professor might begin the lecture on neuronal communication. By prompting them beforehand, the professor might help them reactivate relevant knowledge and make the new material more digestible for them."

More information: "Memory reactivation during rest supports upcoming learning of related content" *PNAS* Oct. 20, 2014:
www.pnas.org/content/early/2014/10/20/121396111.full.pdf+html

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