

Power naps produce a significant improvement in memory performance

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Credit: xiaphias/Wikipedia

A team of researchers at Saarland University headed by Professor Axel Mecklinger have shown that a short nap lasting about an hour can significantly improve memory performance. The study, which was coordinated by graduate research student Sara Studte, involved examination of memory recall in 41 participants. The volunteers had to learn single words and word pairs. Once the learning phase was over, the

participants were tested to determine how much information they could remember. About half of the participants were then allowed to sleep, while the others watched a DVD. After that, the participants were re-tested and those who had taken a nap were shown to have retained substantially more word pairs in memory than the participants in the control group who had watched a DVD. The results of the study have been published in the respected academic journal *Neurobiology of Learning and Memory*.

Generations of school students have gone to bed the night before a maths exam or a vocabulary test with their algebra book or vocabulary notes tucked under their pillow in the hope that the knowledge would somehow be magically transferred into their brains while they slept. That they were not completely taken in by a superstitious belief has now been demonstrated by a team of neuropsychologists at Saarland University, who have shown that even a brief sleep can significantly improve retention of learned material in memory.

Sara Studte, a graduate biologist specializing in neuropsychology, working with her PhD supervisor Axel Mecklinger and co-researcher Emma Bridger, is examining how power naps influence [memory performance](#). The results are clear: 'Even a short sleep lasting 45 to 60 minutes produces a five-fold improvement in information retrieval from memory,' explains Axel Mecklinger.

Strictly speaking, memory performance did not improve in the nap group relative to the levels measured immediately after the learning phase, but they did remain constant. 'The control group, whose members watched DVDs while the other group slept, performed significantly worse than the nap group when it came to remembering the word pairs. The memory performance of the participants who had a power nap was just as good as it was before sleeping, that is, immediately after completing the learning phase, says Professor Mecklinger.

The researchers were particularly focused on the role of the hippocampus – a region of the brain in which memories are 'consolidated' – the process by which previously learned information is transferred into long-term memory storage. 'We examined a particular type of brain activity, known as "sleep spindles", that plays an important role in memory consolidation during sleep,' explains Sara Studte. A sleep spindle is a short burst of rapid oscillations in the electroencephalogram (EEG). 'We suspect that certain types of memory content, particularly information that was previously tagged, is preferentially consolidated during this type of brain activity,' says Mecklinger. Newly learned information is effectively given a label, making it easier to recall that information at some later time. In short, a person's memory of something is stronger, the greater the number of sleep spindles appearing in the EEG.

In order to exclude the possibility that the participants only recall the learned items due to a feeling of familiarity, the researchers used the following trick: the test subjects were required to learn not only 90 single words, but also 120 word pairs, where the [word pairs](#) were essentially meaningless. Axel Mecklinger explains the method: 'A word pair might, for example, be "milk-taxi". Familiarity is of no use here when [participants](#) try to remember this word pair, because they have never heard this particular word combination before and it is essentially without meaning. They therefore need to access the specific [memory](#) of the corresponding episode in the hippocampus.'

The research teams draws a clear conclusion from its study: 'A short nap at the office or in school is enough to significantly improve learning success. Wherever people are in a learning environment, we should think seriously about the positive effects of sleep,' says Axel Mecklinger. Enhancing information recall through sleeping doesn't require us to stuff bulky tomes under our pillow. A concentrated period of learning followed by a short relaxing [sleep](#) is all that's needed.

More information: The publication can be accessed via:
[www.sciencedirect.com/science/ ... ii/S1074742715000362](https://www.sciencedirect.com/science/.../S1074742715000362)

Provided by Saarland University

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