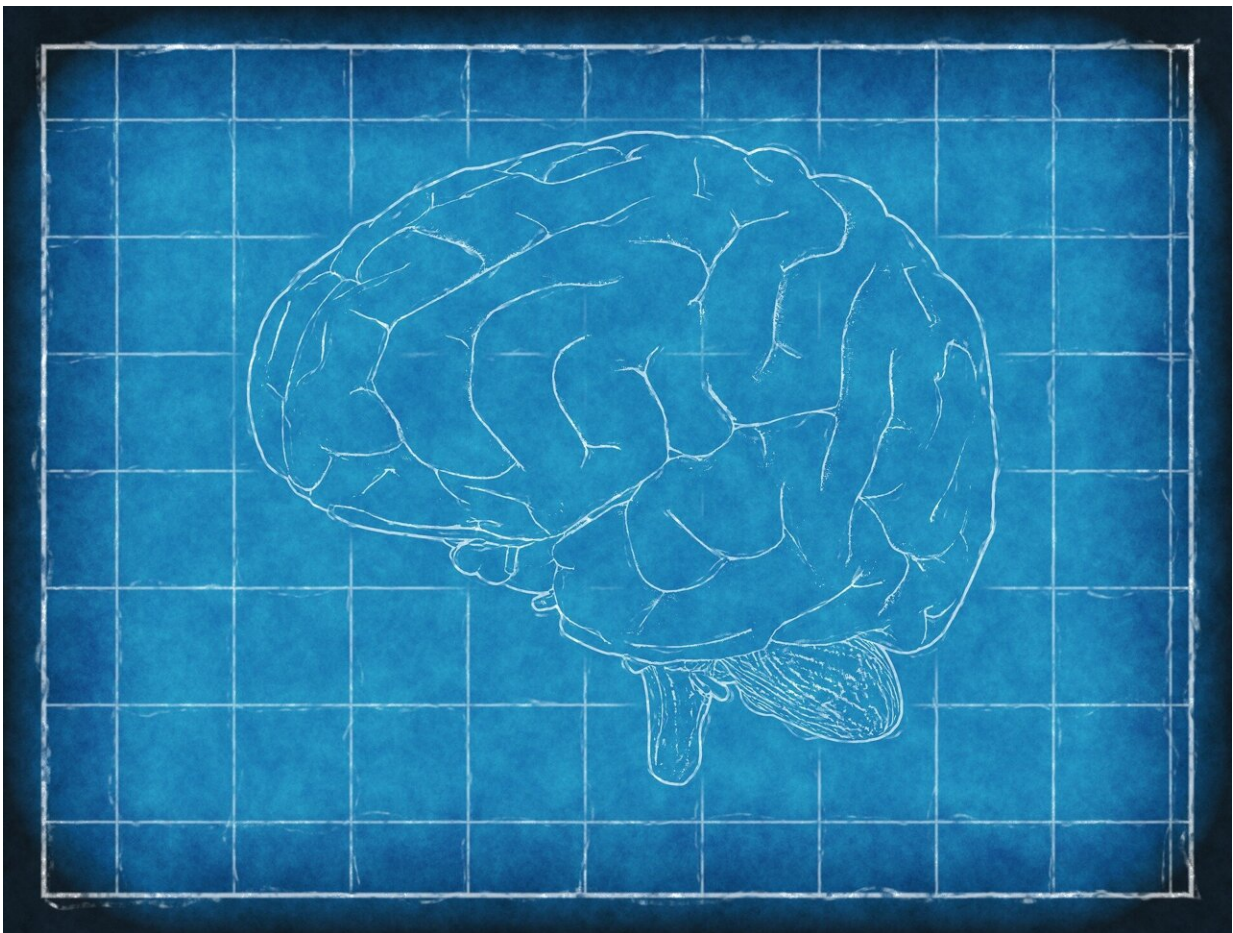


Sound cues during sleep could help people to forget specific memories, researchers discover

October 17 2022



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Playing sounds to people while they sleep can be used to help them to forget specific memories, a new study published in *Learning and Memory* has revealed.

The early-stage discovery, by researchers at the University of York, could potentially be developed into techniques to help weaken traumatic and [intrusive memories](#), the authors of the study say.

Previous research found that playing "sound cues" during [sleep](#) can be used to boost specific memories, but this latest study provides the first strong evidence that the technique can also be used to help people to forget.

First author of the study, Dr. Bardur Joensen, a former Ph.D. student at the Department of Psychology, University of York, said, "Although still highly experimental at this stage, the results of our study raise the possibility that we can both increase and decrease the ability to recall specific memories by playing sound cues when an individual is asleep.

"People who have experienced trauma can suffer a wide range of distressing symptoms due to their memories of those events. Though still a long way off, our discovery could potentially pave the way to new techniques for weakening those memories that could be used alongside existing therapies."

For the study, 29 participants learned associations between overlapping pairs of words. For example, they were asked to learn the word pairs "hammer—office" and "hammer—Cardi B."

The participants then slept overnight in the University of York's sleep lab. The research team analyzed their brainwaves and when they reached deep or slow-wave sleep (also known as stage-three sleep) they were quietly played the word denoting the object (e.g., hammer).

Previous research had found that learning a pair of words, and playing a sound associated with that pair during sleep, improved participants' [memory](#) for the word pair when they woke in the morning. This time, when the pairs of words were overlapping, they found an increase in memory for one pair, but a decrease in memory for the other pair. This suggests it is possible to cause selective forgetting by playing associated sounds during sleep.

According to the researchers, sleep played a crucial role in the effects they observed in their study.

Senior author of the study, Dr. Aidan Horner from the Department of Psychology at the University of York, said, "The relationship between sleep and memory is fascinating. We know that sleep is critical for memory processing, and our memories are typically better following a period of sleep. The exact mechanisms at play remain unclear, but during sleep it seems that important connections are strengthened and unimportant ones are discarded.

"This research raises the possibility that this process could be manipulated so that sleep could be used to help weaken painful memories.

"The next steps for our research team are to establish how these cues cause forgetting, so that we can turn the effect on and off, and whether we can use the same technique to weaken existing real-world memories."

More information: Bardur Hofgaard Joensen et al, Targeted memory reactivation during sleep can induce forgetting of overlapping memories *Learning and Memory* (2022). [DOI: 10.31234/osf.io/bx3ew](https://doi.org/10.31234/osf.io/bx3ew). [learnmem.cshlp.org/content/29/ ... 86-96fa-ee1ee6ec714d](https://learnmem.cshlp.org/content/29/.../86-96fa-ee1ee6ec714d)

Provided by University of York

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