

Researchers reveal new insights into why sleep is good for our memory

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Researchers at the University of York have shed new light on sleep's vital role in helping us make the most of our memory.

Sleep, they show, helps us to use our memory in the most flexible and adaptable manner possible by strengthening new and old versions of the same memory to similar extents.

The researchers also demonstrate that when a memory is retrieved - when we remember something - it is updated with new information present at the time of remembering. The brain appears not to 'overwrite' the old version of the memory, but instead generates and stores multiple (new and old) versions of the same experience.

The results of the research, carried out at York's Sleep, Language and Memory (SLAM) Laboratory, are presented in the journal *Cortex* today.

Lead researcher Dr Scott Cairney of York's Department of Psychology said: "Previous studies have shown sleep's importance for memory. Our research takes this a step further by demonstrating that sleep strengthens both old and new versions of an experience, helping us to use our memories adaptively.

"In this way, sleep is allowing us to use our memory in the most efficient way possible, enabling us to update our knowledge of the world and to adapt our memories for future [experiences](#)."

In the study, two groups of subjects learned the [location](#) of words on a computer screen. In a test phase, participants were presented with each of the words in the centre of the screen and had to indicate where they thought they belonged.

One group then slept for 90 minutes while a second group remained awake before each group repeated the test. In both groups, the location recalled at the second test was closer to that recalled at the first test than to the originally-learned location, indicating that memory updating had taken place and new memory traces had been formed.

However, when comparing the sleep and wake groups directly, the locations recalled by the sleep group were closer in distance to both the updated location (i.e. previously retrieved) and the original location, suggesting that sleep had strengthened both the new and old [version](#) of the memory.

Corresponding author Professor Gareth Gaskell of York's Department of Psychology said: "Our study reveals that sleep has a protective effect on memory and facilitates the adaptive updating of memories.

"For the sleep group, we found that sleep strengthened both their memory of the original location as well as the new location. In this way, we were able to demonstrate that [sleep](#) benefits all the multiple representations of the same experience in our brain."

The researchers point out that although this process helps us by allowing our memories to adapt to changes in the world around us, it can also hinder us by incorporating incorrect information into our memory stores. Over time, our [memory](#) will draw on both accurate and inaccurate versions of the same experience, causing distortions in how we remember previous events.

More information: Scott A. Cairney et al. Sleep preserves original and distorted memory traces, *Cortex* (2017). [DOI: 10.1016/j.cortex.2017.10.005](#)

Provided by University of York

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