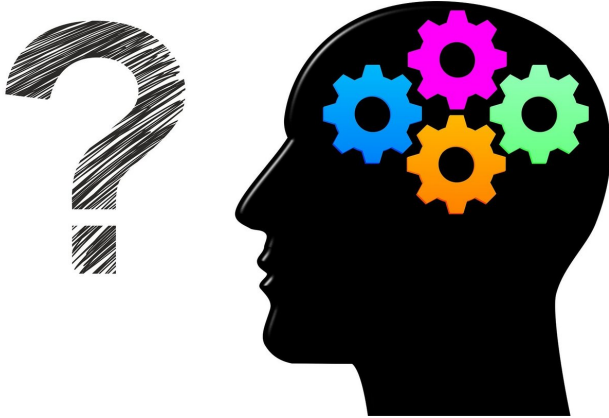


Memory boost with just one look

15 January 2020



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HRL Laboratories, LLC, researchers have published results showing that targeted transcranial electrical stimulation during slow-wave sleep can improve metamemories of specific episodes by nearly 20 percent after only one viewing of the episode, compared to controls. Metamemory describes the sensitivity of whether memories are recalled accurately, such as during eyewitness testimony.

Unique patterns of transcranial electrical stimulation can be cued during [slow-wave sleep](#) to boost consolidation of new memories into the brain's permanent long-term [memory](#). Known as spatiotemporal amplitude-modulated patterns or STAMPS, these stimulation patterns can be targeted to affect particular memories. In [immersive virtual reality](#) experiments, one-minute episodes were first paired with arbitrary STAMPS once during viewing. With subsequent stimulation during sleep, targeted memories were measurably improved after just one viewing. Before this study, general belief was that targeting individual naturalistic memories would require invasive interventions at the single-neuron scale in the hippocampus.

"Our results suggest that, unlike relatively localized brain circuits responsible for regulating mood and movement, episodic memories are processed by a much more widespread network of brain areas," said HRL principal investigator and lead author Praveen Pilly. "We believe our study will pave the way for next-generation transcranial brain-machine interfaces that can boost learning and memory in healthy humans for real-world tasks, such as language attainment or piloting skills. Such a non-invasive approach can also potentially benefit a majority of patients with learning and memory deficits at much lower cost and risk than required for implanting intracranial electrode arrays. It could also be possible to enhance the efficacy of exposure [behavioral therapy](#) with immersive virtual reality using STAMP-based tagging and cuing for the treatment of PTSD."

The paper, "One-shot tagging during wake and cuing during sleep with spatiotemporal patterns of transcranial electrical [stimulation](#) can boost long-term metamemory of individual episodes in humans," was published in *Frontiers in Neuroscience*.

More information: Praveen K. Pilly et al, One-Shot Tagging During Wake and Cueing During Sleep With Spatiotemporal Patterns of Transcranial Electrical Stimulation Can Boost Long-Term Metamemory of Individual Episodes in Humans, *Frontiers in Neuroscience* (2020). [DOI: 10.3389/fnins.2019.01416](#)

Provided by HRL Laboratories

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