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Short training regimen improves long-term memory

Three half-hour sessions using feedback from monitoring of brain waves found to increase memories retained for a week

Similar to how people hit the weights to strengthen their muscles, new research suggests that people in the future might find themselves hitting the electroencephalograph to strengthen their memories.

In a paper published in [Scientific Reports](#), researchers from Kyushu University report that three sessions of brain-wave training over the course of a week were enough to improve the ability of study participants to recall information six days after first seeing it.

Brain-wave training is a method in which people train themselves to increase specific electrical signals produced by the brain.

In the study, the trainees focused on brain waves with frequencies in ranges referred to as the theta (4–8 Hz) and low-beta (14–18 Hz) bands with the help of audible feedback determined by processing electroencephalograms—measurements of brain activity—that were taken at the surface of the scalp.

During each day's training, which lasted 35 minutes and included five one-minute rests, trainees would hear a higher pitched sound as they increased the strength of brain waves in the desired bands.

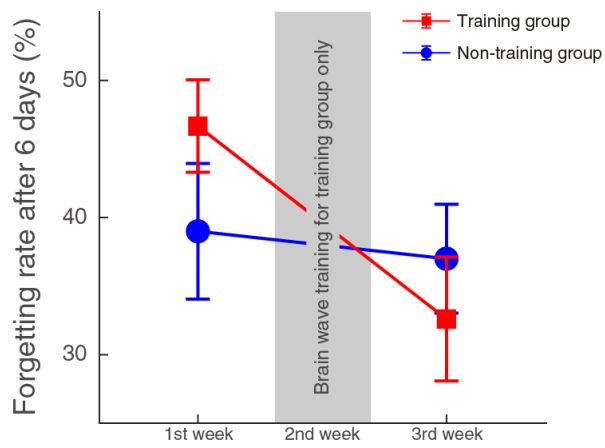
Compared to their performance on memory tests taken a week before the training, the trained participants were able to recall more items after a week in tests performed the week following the training.

The trained group also retained information better than a group that did not undergo training, and the trainees exhibited significant differences in brain activity during recall tests designed to access different types of memory.

While previous studies of such neurofeedback training have primarily focused on short-term memory, these findings suggest that it is possible to improve long-term memory abilities through theta/low-beta brain-wave training.

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For more information about this research, see "Neurofeedback training improves episodic and semantic long-term memory performance," Yu-Hsuan Tseng, Kaori Tamura, and Tsuyoshi Okamoto, *Scientific Reports* (2021). <https://doi.org/10.1038/s41598-021-96726-5>



Changes of forgetting rate in different experimental stages.

The forgetting rate of the training group in the third week (after training) was lower than that of the first week (before training), while the forgetting rate of the non-training group did not significantly change.

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