

Training can improve memory and increase brain activity in mild cognitive impairment

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If someone has trouble remembering where the car keys or the cheese grater are, new research shows that a memory training strategy can help. Memory training can even re-engage the hippocampus, part of the brain critical for memory formation, the results suggest.

Researchers at Emory University School of Medicine and Atlanta Veterans Affairs Medical Center have been investigating memory-building strategies for people with MCI ([mild cognitive impairment](#)). The techniques used in the study were known to be effective for healthy people, but it has been uncertain how they could affect [brain function](#) in people with MCI.

The results are published online in the journal *Hippocampus*.

"Our results suggest that these strategies can help patients remember specific information, such as the locations of objects, " says lead author Benjamin Hampstead, PhD, assistant professor of rehabilitation medicine at Emory University School of Medicine. "This is the first [randomized controlled trial](#) to show that these techniques are not only effective in MCI patients, but that they can also re-engage the hippocampus, which is a brain region that is critical for forming new memories."

Hampstead is a clinical neuropsychologist at the Atlanta VA Rehabilitation, Research and Development Center of Excellence. Study co-authors included Krish Sathian, MD, PhD, professor of neurology,

rehabilitation medicine, and psychology, and director of the Rehabilitation R&D Center of Excellence at the Atlanta VAMC; and Anthony Stringer, PhD, professor of [rehabilitation medicine](#) and psychology.

MCI is a diagnosis meant to identify those at increased risk of eventually converting to Alzheimer's disease. People with MCI have difficulty forming [new memories](#) but are still able to handle tasks of daily living. The difficulty learning and remembering new information is because of impaired function in parts of the brain including the hippocampus.

The study focused on how well participants could remember the locations of common household objects. The memory-building strategy involves three steps. First, participants focused on a feature of the room that stood out and was close to the object, then they learned a short explanation for why the object was in that location. Finally, they created a mental picture to tie the information together.

In several sessions, study participants were shown household objects one at a time, each object followed by its location in a computer-simulated room. An hour later, they were asked to identify the location of each object from among three choices.

After the first visit, participants returned to the laboratory for three training sessions. On a fifth visit two weeks later, they were evaluated on how well they could remember the objects' locations. A control group received the same amount of exposure to the objects and their locations, but was not given explicit training.

As expected, at the start of the study MCI patients had more difficulty remembering where objects were and showed less brain activity in the hippocampus (measured through functional magnetic resonance imaging) when compared with healthy people.

Both people with MCI and healthy controls benefitted significantly more from using memory strategies than from mere exposure. In addition, MCI patients in the memory strategy-training group showed increased activity in the hippocampus as they learned and remembered the location of the objects. Participants in the training group showed increases in hippocampal activity, even when trying to remember the locations of new objects.

"This is an initial, albeit encouraging, step in determining methods that can help these patients function better in their everyday lives," says Stringer, who originally developed the strategies on which training in this study was based.

"These techniques may hold particular promise given that they appear to promote neuroplastic changes in key [brain regions](#)," Sathian says.

This team has also tested the effectiveness of the memory-building techniques for associating faces and names, in another set of studies. They are continuing the study of the memory-building techniques, with the aim of determining how long the benefits of training last, and whether participants can use the strategies independently outside the laboratory.

More information: B.M. Hampstead, A.Y. Stringer, R.F. Stilla, M. Giddens and K. Sathian. Mnemonic strategy training partially restores hippocampal activity in patients with mild cognitive impairment.

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