

Brain study uncovers new clues on how cues may affect memory

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Credit: Human Brain Project

A new study from the UT Dallas Center for Vital Longevity shows that the brain activity prior to seeing an item is related to how well it is later remembered.

In the study published online in *NeuroImage*, the researchers showed that

receiving [information](#) about a pair of items before seeing them may affect how well they are remembered.

Moreover, the researchers also found that the activity in different areas of the brain was unexpectedly related to how the information was remembered.

"If you're interested in memory, you want to know the factors that are associated with it being worse as well as what makes it better," said Dr. Richard Addante, a senior lecturer in the School of Behavioral and Brain Sciences and lead author of the paper. "Knowledge of these factors can lead to developing ways to help improve memory."

The researchers used functional magnetic resonance imaging to look for activity in different areas of the brain as a participant decided which of two words or pictures would fit inside the other—for example, a dog and a house. But moments before the task participants were shown a cue—an "X" if the items would be presented as words or an "O" if they would be presented as pictures. About 20 minutes later, outside of the MRI scanner, the participants were tested on how well they remembered the pairs of items.

"We found that the brain activity before people were presented with information predicted how well people ended up remembering that information on a later memory test," Addante said. "What was really interesting was that brain activity wasn't just predictive of if they remembered the information later, but how they remembered it."

Prior research suggested that seeing the cues would trigger more brain activity in the hippocampus and provide a better chance of remembering the information. Activity in the hippocampus during learning is generally associated with better memory. This study found the opposite.

Greater activity in the hippocampus before a participant saw the two items predicted that the subject was more likely to forget which items were in a pair. In addition, increased [brain activity](#) in the frontal and parietal cortices, areas usually associated with memory maintenance, predicted a greater likelihood that the subject would falsely identify items as previously paired even though they were not.

"We were initially only expecting pre-stimulus [memory](#) activity in the hippocampus, as indicated in previous studies, which we did," Addante said. "But when we turned our analysis to the whole brain, we found an extensive pattern of activity that also predicted aspects of later behavior."

The results suggest that how the brain prepares to study an event can affect how well it is remembered.

More information: *NeuroImage*, [www.sciencedirect.com/science/ ... ii/S1053811914008726](http://www.sciencedirect.com/science/article/pii/S1053811914008726)

Provided by University of Texas at Dallas

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