

# Having a poor score on a simple memory test may be linked to Alzheimer's biomarkers

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PET scan of a human brain with Alzheimer's disease. Credit: public domain

Among people with no memory or thinking problems, having a poor score on a simple memory test may be linked to biomarkers in the brain associated with Alzheimer's disease as well as very early signs of

memory impairment that precede dementia by several years, according to a study published in the February 23, 2022, online issue of *Neurology*.

"These findings suggest that this test can be used to improve our ability to detect cognitive decline in the stage before people are diagnosed with Alzheimer's disease," said study author Ellen Grober, Ph.D., of Albert Einstein College of Medicine in the Bronx, New York. "This could be helpful in determining who to enroll in clinical trials for prevention of [cognitive decline](#). It could also help by narrowing down those who already have signs of Alzheimer's in the [brain](#) with a simple test rather than expensive or invasive scans or lumbar punctures."

For the test, people are shown pictures of items and given cues about the item's category, such as a picture of grapes with the cue of "fruit." Then participants are asked to remember the items, first on their own, then with the category cues for any items they did not remember. This type of controlled learning helps with the mild memory retrieval problems that occur in many healthy elderly people but does not have much impact on memory for people with dementia, Grober said.

The study involved 4,484 people with no cognitive problems and an average age of 71. The participants were divided into five groups based on their scores on the test, or stages zero through four. Stages zero through two reflect increasing difficulty with retrieving memories or items learned and precede dementia by five to eight years. In these stages, people have increasing trouble remembering the items on their own, but they continue to be able to remember items when given cues. In the third and fourth stages, people cannot remember all of the items even after they are given cues. These stages precede dementia by one to three years.

The study participants also had [brain scans](#) to look for the beta-amyloid plaques in the brain that are markers of Alzheimer's disease, as well as to

measure the volume of areas of the brain associated with Alzheimer's pathology.

Half of the participants had no memory issues. Half had retrieval issues, issues for storage of memories or both.

The researchers found that people who tested in the third and fourth stages were likely to have higher amounts of beta-amyloid in their brains than people in the lower stages. They were also more likely to have a lower volume in the hippocampus and other areas of the brain associated with Alzheimer's pathology.

At stage zero, 30% of people had [beta-amyloid plaques](#), compared to 31% at stage one, 35% at stage two, 40% at stage three and 44% at stage four.

Grober said, "This system allows us to distinguish between the following: the difficulty people have retrieving memories when they are still able to create and store memories in their brains, which occurs in the very early stages before dementia can be diagnosed; and the [memory](#) storage problems that occur later in this predementia phase when people can no longer store the memories in their brains."

A limitation of the study was that the participants had a high level of education, so the results may not be applicable to the general population.

Provided by American Academy of Neurology

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