

# Memory tests predict brain atrophy and Alzheimer's disease

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Mild cognitive impairment is a heterogeneous condition; it may be reversible or permanent. but it is also associated with a higher risk of dementia, Alzheimer's disease in particular. Mild cognitive impairment refers to impairment of memory or other cognitive domains in a situation where the individual remains capable of independently

conducting daily activities and not fulfilling the criteria of dementia.

The study conducted at the University of Helsinki and the University of California found that the use of two [memory](#) tests assessing [episodic memory](#) made the diagnosing of mild cognitive impairment due to Alzheimer's disease more precise. Memory tests helped identify those individuals with an increased risk of receiving an Alzheimer's diagnosis within the next three years.

"The use of two memory tests markedly improved the accuracy of the prognosis for an Alzheimer's disease diagnosis and [brain atrophy](#) in the medial temporal lobes during a three-year follow-up period," says Eero Vuoksima, an Academy of Finland research fellow at the University of Helsinki.

"The results highlight the importance of neuropsychological assessment as a cost-effective method of diagnosing mild cognitive impairment due to Alzheimer's disease."

## **Poor performance in two tests predicted faster brain atrophy**

The study used data collected in the United States under the Alzheimer's Disease Neuroimaging Initiative (ADNI), comprising 230 cognitively normal individuals and 394 individuals with mild cognitive impairment on the basis of poor memory performance in one episodic memory measure, namely in story recall. Those with [mild cognitive impairment](#) were further divided into two groups based on whether their memory performance was impaired only in one (story recall) or two (story recall and word list recall) tests.

The researchers investigated baseline differences between the groups in

terms of Alzheimer's disease cerebrospinal fluid biomarkers, finding that those who performed poorly in both episodic memory tests more closely resembled Alzheimer's patients than those who only did poorly in the story recall test.

"During the follow-up stage, brain atrophy in the [medial temporal lobes](#) of those who only performed poorly in the story recall test did not differ from the cognitively healthy participants, whereas in those who had poor performance in both the story and word list recall tests, brain atrophy was faster," Vuoksima explains.

Alzheimer's disease was diagnosed in approximately half of the participants who performed poorly in both episodic memory tests within the three-year study period, whereas only 16% of those with a poor performance in only one memory test received diagnosis of Alzheimer's Disease.

More comprehensive assessment of memory to become part of the health check-up of the ageing population?

Several prior studies have shown that word list recall tests predict the risk of Alzheimer's disease as well as or even better than [brain](#) imaging or cerebrospinal fluid biomarkers.

"In this study, we employed age adjusted cut-off points for memory, which produces a diagnostic method directly adaptable to clinical use," Vuoksima says.

"Indeed, more comprehensive neuropsychological assessment including at least two episodic memory tests could be introduced as part of the health evaluation of the ageing population, particularly in cases where memory impairment is suspected. Our method could also be used when selecting participants for clinical drug trials. When looking for

preventive drug therapy for Alzheimer's disease, it would be important to be able to identify those individuals whose early cognitive [impairment](#) is due to Alzheimer's [disease](#)."

The study was published in the *Brain Imaging and Behavior* journal.

**More information:** Modifying the minimum criteria for diagnosing amnesic MCI to improve prediction of brain atrophy and progression to Alzheimer's disease, *Brain Imaging and Behavior* (2018). [DOI: 10.1007/s11682-018-0019-6](#)

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