Medical Xpress

Cognitive test can differentiate between Alzheimer's and normal aging

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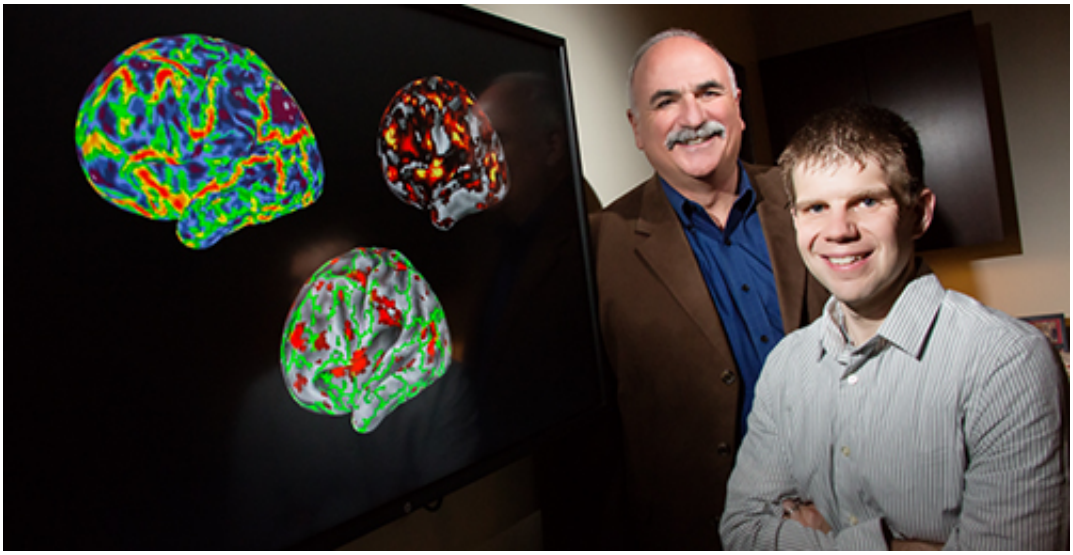


Jim Monti (right), a postdoctoral research associate in the lab of Illinois psychology professor Neal Cohen (left), developed a cognitive task that helps differentiate older adults with very early Alzheimer's disease from those experiencing normal aging. Credit: L. Brian Stauffer

Researchers have developed a new cognitive test that can better determine whether memory impairments are due to very mild Alzheimer's disease or the normal aging process.

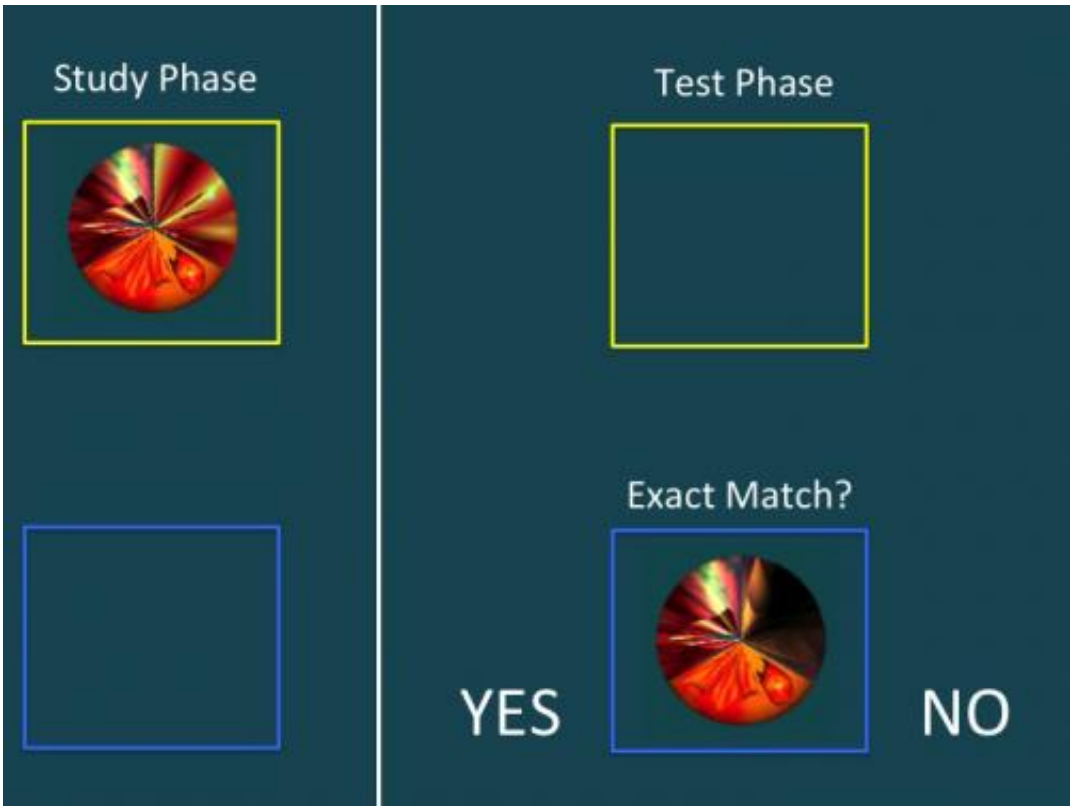
Their study appears in the journal *Neuropsychologia*.

The Alzheimer's Association estimates that the number of Americans

living with Alzheimer's disease will increase from 5 million in 2014 to as many as 16 million by 2050. Memory impairments and other early symptoms of Alzheimer's are often difficult to differentiate from the effects of normal aging, making it hard for doctors to recommend treatment for those affected until the disease has progressed substantially.

Previous studies have shown that a part of the brain called the hippocampus is important to relational memory – the "ability to bind together various items of an event," said Jim Monti, a University of Illinois postdoctoral research associate who led the work with psychology professor Neal Cohen, who is affiliated with the Beckman Institute at Illinois. Being able to connect a person's name with his or her face is one example of relational memory. These two pieces of information are stored in different parts of the brain, but the hippocampus "binds" them so that the next time you see that person, you remember his or her name, Monti said.

Previous research has shown that people with Alzheimer's disease often have impairments in hippocampal function. So the team designed a task that tested participants' relational memory abilities.



Researchers asked participants to study a circle divided into three patterned parts then pick an exact match from a series of 10 other circles. This task measures the performance of a part of the brain called the hippocampus, which has been shown to sustain damage in Alzheimer's disease. Credit: Jim Monti

Participants were shown a circle divided into three parts, each having a unique design. Similar to the process of name-and-face binding, the hippocampus works to bind these three pieces of the circle together. After the participants studied a circle, they would pick its exact match from a series of 10 circles, presented one at a time.

People with very mild Alzheimer's disease did worse overall on the task than those in the healthy aging group, who, in turn, did worse than a group of young adults. The task also revealed an additional memory impairment unique to those with very mild Alzheimer's disease,

indicating the changes in cognition that result from Alzheimer's are qualitatively different than healthy aging. This unique impairment allows researchers to statistically differentiate between those who did and those who did not have Alzheimer's more accurately than some of the classical tests used for Alzheimer's diagnosis, Monti said.

"That was illuminating and will serve to inform future work aimed at understanding and detecting the earliest cognitive manifestations of Alzheimer's disease," Monti said.

Although this new tool could eventually be used in clinical practice, more studies need to be done to refine the test, he said.

"We'd like to eventually study populations with fewer impairments and bring in neuroimaging techniques to better understand the initial changes in brain and cognition that are due to Alzheimer's disease," Monti said.

More information: The paper, "Very mild Alzheimer's disease is characterized by increased sensitivity to mnemonic interference" is available online: www.sciencedirect.com/science/ … ii/S0028393214001213

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