

Psychologists develop tools to predict cognitive impairment

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(PhysOrg.com) -- Psychologists Charles Brainerd and Valerie Reyna are looking for ways to identify people at risk for developing cognitive impairment - early on, when chances for successful intervention are highest.

For most, misplacing the car keys or forgetting a name is an occasional annoyance of normal aging. But sometimes [forgetfulness](#) can signal the beginning of deterioration in language, attention, reasoning, judgment or memory.

Charles Brainerd, professor of human development and psychology, and Valerie Reyna, professor of human development and of psychology, are looking for ways to identify people at high risk for developing [cognitive impairment](#) -- early on, when chances for successful intervention are highest.

With a grant of \$756,523 over two years from the American Recovery and Reinvestment Act via the National Institutes of Health, Brainerd and Reyna are investigating whether a decline in a particular type of memory, called reconstructive memory, presages cognitive impairment in the elderly.

If the hypothesis bears out, it could lead to the more widespread use of a simple, reliable and inexpensive test that will detect [cognitive decline](#) years before the onset of major symptoms.

According to data from other studies, healthy elderly adults become mildly cognitively impaired at a rate of about 10 percent per year after age 70.

Clinicians use a variety of neuropsychological tests to predict and diagnose the condition, but the most reliable single test -- a basic verbal recall task in which a subject hears a sequence of words and then is asked to recall them -- is also one of the simplest, Brainerd said.

"They really tap into what's going on somehow," he said. But even so, the tests have less than 50 percent sensitivity in predicting future impairment.

That could be because people use three distinct strategies -- verbatim recall, reconstruction and familiarity judgment -- to retrieve information from memory.

Brainerd's earlier studies have shown that verbatim recall, in which subjects mentally picture or hear the actual word, declines with age. To compensate, older adults use reconstruction, in which they remember something about the word (it was an animal, for example; or it started with the letter "p"), and then familiarity judgment, in which they sift through possible candidate words until they identify the right one.

Since reconstructive memory relies on associations and experiences, which can be accessed through multiple pathways and networks in the brain, it is more robust and usually spared in healthy aging, Brainerd said. But a decline in reconstructive memory could be an important and more accurate indicator of the extensive deterioration throughout the brain that causes cognitive impairment.

To test the hypothesis, Brainerd and Reyna developed a mathematical model that analyzes data from verbal recall tests and estimates the

amount a subject relies on each of the three memory processes.

In the first phase of the study, currently in progress, the researchers are using the model to analyze data from more than 800 previously tested adults --some healthy and others already diagnosed with cognitive impairment -- and examining whether a decline in reconstructive memory is more closely linked with cognitive impairment among groups of people.

In a second phase, they will test and track 200 older adults over 18 months to see if performance in reconstructive memory predicts later emergence of impairment on an individual level.

The findings could improve testing and treatment for impairment dramatically, Brainerd said.

"Like any disease, the sooner you can identify it the better," he said.
"The goal here is not only to be able to identify this as quickly as possible, but also to be able to identify people at much younger ages."

Provided by Cornell University

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