

Skills tests like 'connect the dots' may be early Alzheimer's indicator

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(PhysOrg.com) -- A study of mental decline in the years prior to diagnosis of Alzheimer's disease suggests that changing the focus of testing may help physicians detect signs of the disease much earlier. School of Medicine researchers have found that visuospatial skills, evaluated with tasks such as connecting the dots or using a guide to build a structure with blocks, begin to deteriorate up to three years prior to a diagnosis of Alzheimer's.

A study of mental decline in the years prior to diagnosis of Alzheimer's disease suggests that changing the focus of testing may allow physicians to detect signs of the disease three years earlier.

Current cognitive testing typically focuses on episodic memory, or the ability to remember things like word lists or information from a reading. But scientists at Washington University School of Medicine in St. Louis found that another class of mental abilities known as [visuospatial skills](#) begins to deteriorate up to three years prior to diagnosis. These skills are tested with tasks such as connecting the dots or using a guide to build a structure with blocks.

"We may need to rethink what we look for as the earliest signs of mental change associated with Alzheimer's disease," says senior author James Galvin, M.D., a Washington University neurologist who is also on staff at Barnes-Jewish Hospital. "If we can better recognize the first signs of disease, we can start treating patients earlier and hopefully with new treatments we can slow or perhaps even stop their progress into

dementia."

The results are published in the October issue of *Archives of Neurology*.

Galvin and his coauthors analyzed long-term data from volunteers at the Memory and Aging Project at Washington University's Alzheimer's Disease Research Center (ADRC). For three decades, researchers have been regularly conducting extensive testing of volunteers to uncover the factors associated with the normal, healthy retention of mental function in seniors. The new study analyzes data on 444 volunteers aged 60 to 101 that were gathered between 1979 and 2006.

Scientists categorized cognitive testing results into a global measure of cognitive abilities as well as three specific types of mental skills: episodic memory, visuospatial skills and working memory, which assesses the ability to manipulate facts from memory, such as repeating a list of numbers backwards.

Declines in episodic memory and working memory became discernible a year before volunteers were diagnosed with Alzheimer's disease. Losses in the composite assessment of cognitive abilities were detectable two years prior to diagnosis, and visuospatial skills began to decay three years earlier. According to Galvin, the losses in visuospatial skills were particularly noticeable if testing tasks were timed.

Researchers also analyzed the data using a new model that not only tracks the speed of decline in a mental ability but also the acceleration of the decline. Episodic memory's decline accelerated more slowly than that of both visuospatial skills and working memory, which declined fastest.

The new perspective may allow doctors to detect signs of Alzheimer's earlier, but more information will be needed to make a firm diagnosis.

To make that possible, researchers at the ADRC are trying to take what they've learned in the new study and correlate it with biomarkers, which are physical changes associated with preclinical Alzheimer's disease. These include such tests as scanning the brain for amyloid plaques or analyzing the levels of proteins in the cerebrospinal fluid.

Amyloid brain plaques, a primary characteristic of Alzheimer's disease, can begin building in patients 10 years or more before clinical symptoms become apparent, Galvin notes.

"The new findings raise the question of what changes are occurring in the brain during the one- to three-year period prior to [diagnosis](#)," Galvin says. "Patients have had plaques in their brain for years, and suddenly their cognitive abilities begin to deteriorate. Is a threshold being crossed where brain cell death begins to occur or really starts to pick up speed?"

Galvin and his coauthors also plan to apply their new approach for assessing mental decline to other dementias including Lewy body dementia and the form of [dementia](#) associated with Parkinson's disease.

More information: Johnson DK, Storandt M, Morris JC, Galvin JE. Longitudinal study of the transition from healthy aging to [Alzheimer's disease](#). *Archives of Neurology*, 2009; 66[10]:1254-1259.

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