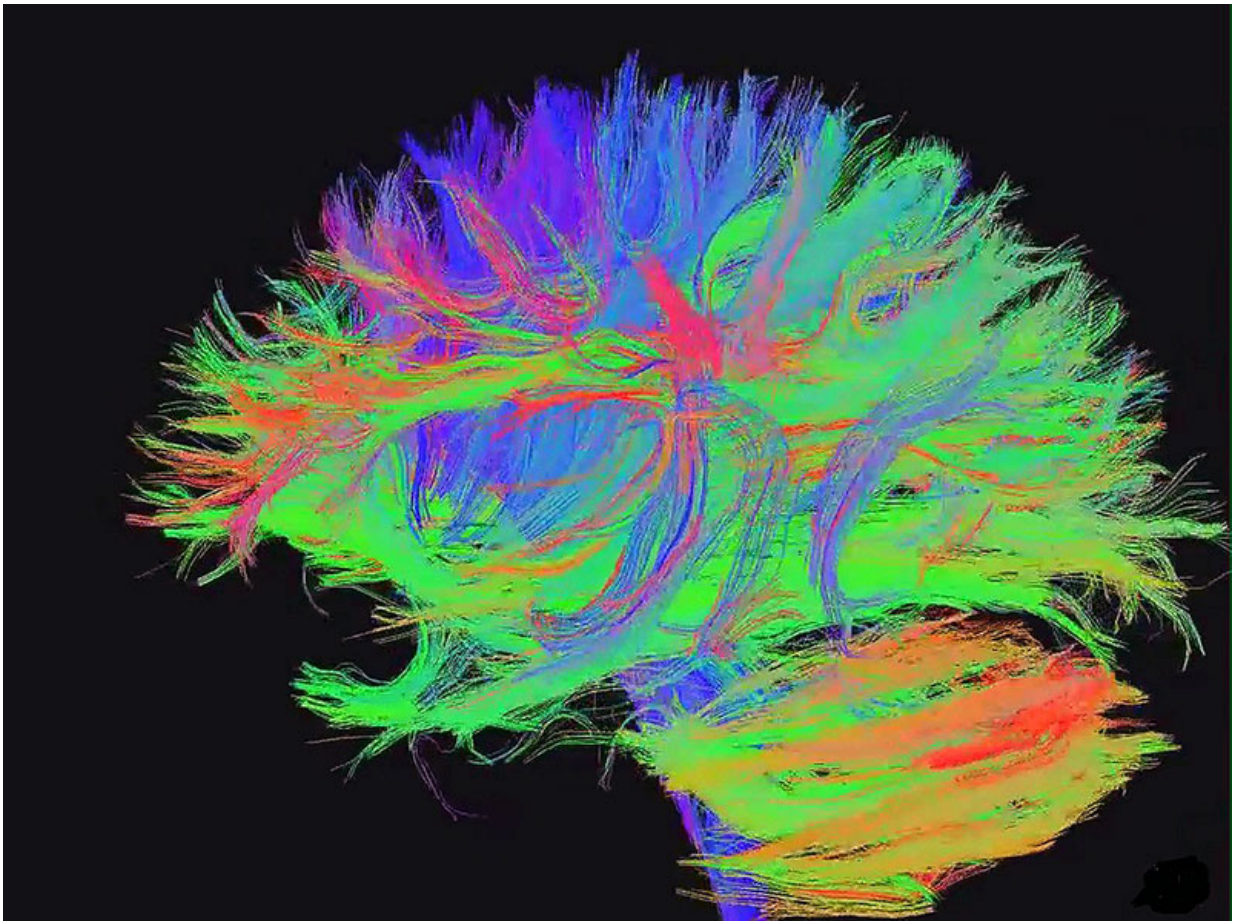


Alzheimer's study delves into degraded brain connections

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As part of the study, researchers used diffusion-tensor imaging to determine the integrity of white matter connections in the brain. Credit: University of Texas at Dallas

A new study from the Center for Vital Longevity at The University of Texas at Dallas is among the first to investigate how degraded connections in certain parts of the adult brain might affect the ability to perform the financial calculations that are vital to everyday life among older adults.

The results, published in the most recent issue of the *Journal of Alzheimer's Disease*, relied on imaging the [white matter](#) connections within the [brain](#) and measuring how intact the connections are. Researchers found a correlation between the integrity of white matter—the tracts that allow communication between different brain regions—and the ability to calculate finances.

"As we age, we tend to see a degradation of the connective fibers that wire the brain, much like a vacuum cleaner cord that has been run over too much with years of housecleaning," said Dr. Kristen Kennedy, senior author of the paper and assistant professor at the center and the School of Behavioral and Brain Sciences. "The insulation of the cord gets worn, and the electrical signal may not be conducted as well, or as rapidly. It's a similar principle with conduction velocity across white matter brain connections."

The study, conducted in collaboration with Drs. Dan Marson and Adam Gerstenecker at the University of Alabama at Birmingham, included more than 100 participants who were either healthy and elderly, had [mild cognitive impairment](#) (MCI) or had Alzheimer's disease (AD). David Hoagey, a doctoral student in Kennedy's lab, analyzed diffusion-tensor images of the brain and compared them to each individual's performance on tests that measured a variety of financial skills.

Researchers found that participants' financial skills varied according to the severity of their cognitive impairment. Participants with Alzheimer's scored lower on all measures than participants with mild cognitive

impairment, who also scored lower in most areas than healthy controls. Furthermore, both of the cognitively impaired groups showed more severe white matter degradation than the healthy elderly group. Also, beyond the expected level of white matter degradation that typically comes with age, white matter integrity predicted financial ability in the MCI and AD groups.

Areas that connect the prefrontal and parietal cortex showed degradation of white matter that correlated with problems performing financial calculations. The degraded white matter pathways that result in a measurable behavioral change—in this case, the inability to complete the financial transactions associated with everyday life—is evidence of what researchers call "disconnection syndrome."

"Whether the loss of white matter connectivity is causal or consequential to loss of neurons remains to be seen," Kennedy said. "Either way, it seems that loss of or inefficiency of connections across the brain in MCI and AD individuals is linked to their ability to manage their financial affairs and maintain independence."

Provided by University of Texas at Dallas

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