

# Study finds which brain skills are more likely to last over a lifetime

January 9 2015, by Alex Lyda

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Dr. Kristen Kennedy, an assistant professor in the School of Behavioral and Brain Sciences, was the study's primary investigator.

Research from the Center for Vital Longevity (CVL) at The University of Texas at Dallas has shed new light on which cognitive processes tend to be preserved with age and which ones decline.

Results from a study recently published in *NeuroImage* confirm behavioral findings that verbal ability—the accurate memory of words and vocabulary—remains intact during a lifetime while [reasoning ability](#) decreases in older adults.

In the study, participants— 316 individuals ages 20 to 89—made simple and difficult judgments about word meaning to test their [cognitive abilities](#) as scientists measured their brain responses with [functional magnetic resonance imaging](#) (fMRI). For difficult judgments, the brain regions that were activated and declined with age included those that are usually rich in a neurotransmitter substance called dopamine.

"Dopamine plays a critical role in orchestrating responses to cognitive demands or challenges, and levels of this neurotransmitter are known to decline with age," said Dr. Kristen Kennedy, the study's primary investigator and an assistant professor in the School of Behavioral and Brain Sciences.

Older participants in the study tended to activate additional brain regions beyond those used by younger participants during simple judgments, suggesting they either need more brain activity to maintain and access word and language knowledge, or a less-efficient processing, Kennedy said.

While the findings suggested that [brain responses](#) during a language task are largely preserved through age, responses to reasoning demands appear to decline beginning in middle age.

The decreases emerged primarily in the transition from [middle age](#) to older adulthood—after age 59. Further decreases in neural activity in response to reasoning tasks were seen into very old age—80 to 90 years old—particularly in regions of the midbrain where the dopamine system originates.

Participants in the study were from the Dallas Lifespan Brain Study, a CVL study that uses imaging and cognitive testing to examine the aging brains in a large group of healthy adults.

Provided by University of Texas at Dallas

Citation: Study finds which brain skills are more likely to last over a lifetime (2015, January 9) retrieved 25 April 2024 from <https://medicalxpress.com/news/2015-01-brain-skills-lifetime.html>

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