

Scientists explore signs of healthy brain aging

March 7 2017



Credit: Human Brain Project

Younger people efficiently engage brain processes necessary to perform a task, while at the same time "shut down" processes irrelevant to the task, according to new research from the Center for Vital Longevity (CVL) at UT Dallas.

In addition, this ability to modulate, or control, [brain activity](#) appears compromised in older adults, said Dr. Kristen Kennedy, assistant professor at the center and the School of Behavioral and Brain Sciences.

"To use a car analogy, the 'neuroflexibility' involved in pressing on the gas to meet a cognitive task, while simultaneously tapping on the brakes on anything that doesn't help you get to the finish line of a task at hand, is one of the neural phenomena we've singled out," said Kennedy, who led the research published in the February issue of *NeuroImage*.

By tracking the patterns of "neuroflexibility" and how more flexibility generally correlates with better cognitive performance, and vice versa, researchers may one day be able to develop a more precise diagnostic criterion for determining which middle-age adults may be at risk of cognitive decline later in life.

The CVL findings were based on a study of 161 healthy adults ages 20 to 94 from the Dallas-Fort Worth area. Participants were given a battery of neuropsychological tests before they were placed in a functional [magnetic resonance imaging](#) (fMRI) scanner, which measures brain activity. While in the scanner, participants were then asked to perform a simple spatial distance judgment task that involved discerning whether a dot was to the left or right of a horizontal bar. A second task involved dots that were either very far from the horizontal line or increasingly near or far, representing various levels of difficulty.

Upon scanning, the researchers found that activation in one set of regions in the young adult brains, as measured by [blood oxygen levels](#) there, increased with [task difficulty](#). Young adults who engaged in more difficult tasks tended to display increased activity in the fronto-parietal regions of the brain and decreased activity in regions more often associated with daydreaming.

"The flexibility for healthy brains to ramp up in support of a goal, while suppressing activity in areas of the brain that generally do not serve a given task, may separate those whose brain function is aging well from those who may be prone to cognitive loss later in life," Kennedy said.

The research team found that a reduced ability to modulate activity was predictive of poorer performance on the fMRI task. Older adults tended to "over-recruit" in the right fronto-parietal network regions of the brain in order to perform at a similar level as young adults.

Although functional differences were evident as early as middle age—around 35 years old—behavioral changes might not be observed until much later in life, Kennedy said, suggesting there is a delay between changes in how an aging [brain](#) rises to meet the demands of a task, and any detectable decline in performance.

"The mechanisms and timing of how and when these changes translate to observable changes in [task](#) performance across the lifespan definitely merits further study," she said.

More information: Jenny R. Rieck et al. Age-related reduction of BOLD modulation to cognitive difficulty predicts poorer task accuracy and poorer fluid reasoning ability, *NeuroImage* (2017). [DOI: 10.1016/j.neuroimage.2016.12.022](#)

Provided by University of Texas at Dallas

Citation: Scientists explore signs of healthy brain aging (2017, March 7) retrieved 25 April 2024 from <https://medicalxpress.com/news/2017-03-scientists-explore-healthy-brain-aging.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private

study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.