

Study highlights the importance of physical activity and aerobic exercise for healthy brain function

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Credit: public domain

Regardless of gender, young adults who have greater aerobic fitness also have greater volume of their entorhinal cortex, an area of the brain responsible for memory. Better aerobic fitness however does not appear to impact hippocampal volume, another area in the brain responsible for memory.

While [aerobic fitness](#) is not directly associated with performance on a [recognition memory](#) task, the participants with a larger [entorhinal cortex](#) also performed better on the recognition memory task. These findings by Boston University School of medicine (BUSM) researchers appear in the journal *NeuroImage*.

The entorhinal cortex is a brain area known to show early pathology in Alzheimer's disease, which is characterized by profound memory impairment. Because of the strong association between hippocampal cell growth and exercise in models, previous work on exercise and the brain has not focused on the entorhinal cortex, despite its critical role in learning and memory until now.

The researchers recruited healthy [young adults](#) (ages 18-35 years) who underwent a treadmill test to measure [aerobic capacity](#). During this test, the amount of oxygen and carbon dioxide in the participants' breath as they walked or ran on a treadmill was measured. Participants then underwent magnetic resonance imaging and performed a recognition memory task. Entorhinal and [hippocampal volume](#) was determined using a method known as voxel-based morphometry and then regression analysis to examine whether recognition memory and aerobic fitness predicted brain volumes.

"Our results suggest that aerobic exercise may have a positive effect on the medial temporal lobe memory system (which includes the entorhinal cortex) in healthy young adults. This suggests that exercise training, when designed to increase aerobic fitness, might have a positive effect on the brain in healthy young adults," explained corresponding author and principal investigator Karin Schon, PhD, BUSM assistant professor of anatomy and neurobiology. The researchers point out that unlike previous work done in older adults, in this young adult sample hippocampal volume does not show an association with aerobic fitness.

Researchers said this work could support previous studies that suggest [aerobic exercise](#) may forestall cognitive decline in older individuals at risk of dementia, and extends the idea that exercise may be beneficial for brain health to younger adults. "This is critical given that obesity, which has recently been linked with cognitive deficits in young and middle-aged adults, and physical inactivity are on the rise in young adults," Schon said.

Provided by Boston University Medical Center

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