

New study suggests exercise is good for the aging brain

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University of Iowa researchers have found that a single bout of exercise benefits older people's brains. In experiments in which participants aged 60 to 80 exercised once and multiple times, the researchers found some individuals showed improved cognitive functions and working memory. Photo by Kalon/Unsplash.

Exercise seems to endow a wealth of benefits, from the release of happiness-inducing hormones to higher physical fitness. New research shows it may provide a boost to the mind too.

University of Iowa researchers have found that a single bout of [exercise](#) improves cognitive functions and working memory in some older people. In experiments that included [physical activity](#), [brain scans](#), and working [memory tests](#), the researchers also found that participants experienced the same [cognitive benefits](#) and improved memory from a single exercise session as they did from longer, regular exercise.

"One implication of this study is you could think of the benefits day by day," says Michelle Voss, assistant professor in the Department of Psychological and Brain Sciences and the study's corresponding author. "In terms of behavioral change and cognitive benefits from physical activity, you can say, 'I'm just going to be active today. I'll get a benefit.' So, you don't need to think of it like you're going to train for a marathon to get some sort of optimal peak of performance. You just could work at it day by day to gain those benefits."

Previous research has shown exercise can confer a mental boost. But the benefits vary: One person may improve cognitively and have improved memory, while another person may show little to no gain.

Limited research has been done on how a single bout of physical activity may affect cognition and working memory specifically in older populations, despite evidence that some brain functions slip as people age.

Voss wanted to tease out how a single session of exercise may affect older individuals. Her team enrolled 34 adults between 60 and 80 years of age who were healthy but not regularly active. Each participant rode a stationary bike on two separate occasions—with light and then more

strenuous resistance when pedaling—for 20 minutes. Before and after each exercise session, each participant underwent a brain scan and completed a memory test.

In the brain scan, the researchers examined bursts of activity in regions known to be involved in the collection and sharing of memories. In the working memory tests, each participant used a computer screen to look at a set of eight young adult faces that rotated every three seconds—flashcard style—and had to decide when a face seen two "cards" previously matched the one they were currently viewing.

After a single exercise session, the researchers found in some individuals increased connectivity between the medial temporal (which surrounds the brain's memory center, the hippocampus) and the parietal cortex and prefrontal cortex, two regions involved in cognition and memory. Those same individuals also performed better on the memory tests. Other individuals showed little to no gain.

The boost in cognition and memory from a single exercise session lasted only a short while for those who showed gains, the researchers found.

"The benefits can be there a lot more quickly than people think," Voss says. "The hope is that a lot of people will then keep it up because those benefits to the brain are temporary. Understanding exactly how long the benefits last after a single session, and why some benefit more than others, are exciting directions for future research."

The participants also engaged in regular exercise, pedaling on a stationary bike for 50 minutes three times a week for three months. One group engaged in moderate-intensity pedaling, while another group had a mostly lighter workout in which the bike pedals moved for them.

Most individuals in the moderate and lighter-intensity groups showed

mental benefits, judging by the brain scans and working [memory](#) tests given at the beginning and at the end of the three-month exercise period. But the [brain](#) gains were no greater than the improvements from when they had exercised a single time.

"The result that a single session of aerobic exercise mimics the effects of 12 weeks of training on performance has important implications both practically and theoretically," the authors write.

The researchers note their study had a small participant pool, with a homogenous population that excluded anyone with chronic health conditions or who were taking beta-blockers.

To address those limitations, Voss has expanded her participant pool in a current, five-year study to confirm the initial findings and learn more about how exercise alters older people's brains. The participants are healthy older individuals who are not physically active, similar to the participants' profile in the study's results reported here.

More information: Michelle W. Voss et al, Acute Exercise Effects Predict Training Change in Cognition and Connectivity, *Medicine & Science in Sports & Exercise* (2019). [DOI: 10.1249/MSS.0000000000002115](#)

Provided by University of Iowa

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