# Study shows exercise can help older adults retain their memories

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We all know exercise is good for us, but that still leaves plenty of questions. How much exercise? Who benefits the most? And when in our lives? New research led by University of Pittsburgh psychologists

pools data from dozens of studies to answer these questions, showing that older adults may be able to prevent declines in a certain kind of memory by sticking to regular exercise.

"Everyone always asks, 'How much should I be exercising? What's the bare minimum to see improvement?' " said lead author Sarah Aghjayan, a Clinical and Biological Health Psychology Ph.D. student in the Kenneth P. Dietrich School of Arts and Sciences. "From our study, it seems like exercising about three times a week for at least four months is how much you need to reap the benefits in episodic memory."

Episodic memory is the kind that deals with events that happened to you in the past. It's also one of the first to decline with age. "I usually like to talk about the first time you got behind the wheel of a car," said Aghjayan. "So you might remember where you were, how old you were, who was in the passenger seat explaining things to you, that feeling of excitement."

Exercise that gets the heart pumping has shown promise in increasing brain health, and experiments in mice show that it improves memory—but studies looking at the same link in humans have come out mixed.

Seeking clarity in the muddy waters of the scientific literature, the team pored over 1,279 studies, eventually narrowing them down to just 36 that met specific criteria. Then they used specialized software and no small number of Excel spreadsheets to transform the data info a form where the different studies could be directly compared.

That work paid off when they found that pooling together those 36 studies was enough to show that for older adults, exercise can indeed benefit their memory. The team, including Aghjayan's advisor Kirk Erickson in the Department of Psychology and other researchers from

Pitt, Carnegie Mellon University and the University of Iowa, published their results in the journal *Communications Medicine* on Feb. 17.

Past analyses looking at connections between exercise and memory didn't find one, but Aghjayan and her team took several extra steps to give them the best chance of finding a link if one did exist. They limited their search to particular groups and age brackets as well as a specific kind of rigorous experimental setup. Another key was focusing specifically on episodic memory, which is supported by a part of the brain that's known to benefit from exercise.

"When we combine and merge all this data, it allows us to examine almost 3,000 participants," Aghjayan said. "Each individual study is very important: They all contribute to science in a meaningful way." Individual studies, however, may fail to find patterns that actually exist because of a lack of resources to run a big enough experiment. The studies individually couldn't find a link between exercise and memory—it took looking at the whole body of research to bring the pattern into focus.

With that much larger pool of participants, the team was able to show a link between exercise and episodic memory, but also was able to start to answer more specific questions about who benefits and how.

"We found that there were greater improvements in memory among those who are age 55 to 68 years compared to those who are 69 to 85 years old—so intervening earlier is better," Aghjayan said. The team also found the greatest effects of exercise in those who hadn't yet experienced any cognitive decline, and in studies where participants exercised consistently several times a week.

There are still questions left to be answered. The team's analysis couldn't answer how the intensity of exercise affects the memory benefits, and

there's plenty to learn about the mechanism behind the link. But the implications for public health are clear: Exercise is an accessible way older adults can stave off memory declines, benefiting themselves, their caretakers and the healthcare system, Aghjayan said.

"You just need a good pair of walking shoes, and you can get out there and move your body."

The papers' coauthors include Kirk Erickson, Chaeryon Kang, Xueping Zhou, Chelsea Stillman, Shannon Donofry, Thomas W Kamarck, Anna L Marsland and Scott H Fraundorf at the University of Pittsburgh, Themistokles Bournias at Carnegie Mellon University and Michelle Voss at the University of Iowa.

**More information:** Aerobic exercise improves episodic memory in late adulthood: a systematic review and meta-analysis, *Communications Medicine* (2022) DOI: 10.1038/s43856-022-00079-7

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