

# Study Shows Young Runners Have Stronger Brain Connections

Most previous work on exercise and brain function has been with older subjects.

By [Amby Burfoot](#)



Many runners enjoy the sport for its elemental simplicity. You don't have to learn how to hit a backhand or a curveball or a sand wedge. You don't have to master the butterfly. You just lace on your shoes and head out the door.

Or so it seems.

However, appearances may represent only a small sliver of cognitive reality. A research group at the University of Arizona has a new view. To them, running requires a surprisingly high level of cognitive skill, particularly if you are running fast or on a challenging trail.

The team, which includes a neuroscientist, has recently completed the first functional connectivity magnetic resonance imaging (fcMRI) study of young, highly fit runners and non-runners of the same age.

They concluded that the runners had "clear differences in resting state functional connectivity" and believe that the differences might extend to "activities that are unrelated to sports." In other words: Running could make you smarter.

“Our study suggests that high levels of aerobic exercise, like endurance running, might benefit brain function, particularly complex cognitive abilities like planning, switching between tasks, and multitasking,” said Gene Alexander, Ph.D., director of the University of Arizona’s Brain Imaging, Behavior, and Aging Lab.

Just as important, Alexander and his colleagues believe that running could build brain function to a high-enough level in midlife that the benefits might continue in old age. That, of course, is when cognitive decline and Alzheimers can become major problems.

The Arizona researchers compared resting brain scans of 11 college-age distance runners with 11 non runners of essentially the same age. According to their VO<sub>2</sub> max tests, the runners were capable of about 16:30 for a 5K race, while the non-runners would have covered the distance in about 24 minutes. The runners also reported engaging in much more physical activity. The brain scans showed that the runners had significant differences from the non-runners, including increases in brain areas that might reflect improved cognitive abilities.

The youthful age of all subjects—about 21 to 22 years old—is a key part of the new results. Most previous work on exercise and brain function has been conducted with older subjects.

In their report, published in *Frontiers in Human Neuroscience*, the study team wrote: “Midlife physical activity has been associated with a reduced risk of developing neurodegenerative diseases.” Also, the enhanced brain connections seen in runners could “allow for improved cognitive function later in life.” The full text of the study is available for free here.

“This work shows for the first time that we can observe differences in functional connectivity in the brains of young adult endurance runners,” Alexander said. “A growing body of research has suggested that aerobically challenging exercise can enhance brain structure and function in older adults. We wanted to see if we could detect brain differences in highly active young adults compared to those who don’t engage in regular exercise, and we did.”

Much of the new paper involves differences in MRI brain scans between the runners and nonrunners—stuff that only a neuroscience expert could “see” and appreciate. Alexander offers the following translation: “We were able to observe differences in specific brain regions including some known to be important for executive functions such as the ability to plan, to switch from one task to another, and to solve complex problems.”

So the next time you head out for a run, there’s no reason to cart along a foreign-language tape. Just let your brain run wild.