

Study shows benefits of multi-tasking on exercise

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Credit: Peter Griffin/Public Domain

Who says you can't do two things at once and do them both well? A new University of Florida study challenges the notion that multi-tasking causes one or both activities to suffer. In a study of older adults who completed cognitive tasks while cycling on a stationary bike, UF researchers found that participants' cycling speed improved while multi-tasking with no cost to their cognitive performance.

Results of the study, which was supported by a grant from the National Institute on Aging, were published May 13 in the journal *PLOS ONE*.

The discovery was a surprise finding for investigators Lori Altmann, an associate professor of speech, language and hearing sciences at the College of Public Health and Health Professions, and Chris Hass, an associate professor of applied physiology and kinesiology in the College of Health and Human Performance. They originally set out to determine the degree to which dual task performance suffers in patients with Parkinson's disease. To do this, the researchers had a group of patients with Parkinson's and a group of healthy older adults complete a series of increasingly difficult cognitive tests while cycling.

"Every dual-task study that I'm aware of shows when people are doing two things at once they get worse," Altmann said. "Everybody has experienced walking somewhere in a hurry when the person in front of them pulls out a phone, and that person just slows to a crawl. Frankly, that's what we were expecting."

Participants' cycling speed was about 25 percent faster while doing the easiest cognitive tasks but became slower as the cognitive tasks became more difficult. Yet, the hardest tasks only brought [participants](#) back to the speeds at which they were cycling before beginning the cognitive tasks. The findings suggest that combining the easier cognitive tasks with physical activity may be a way to get people to exercise more vigorously. The researchers plan to make this a topic for future research.

"As participants were doing the easy tasks, they were really going to town on the bikes, and they didn't even realize it," Altmann said. "It was as if the cognitive tasks took their minds off the fact that they were pedaling."

During the study, 28 participants with Parkinson's disease and 20 healthy

older adults completed 12 cognitive tasks while sitting in a quiet room and again while cycling. Tasks ranged in difficulty from saying the word 'go' when a blue star was shown on a projection screen to repeating increasingly long lists of numbers in reverse order of presentation. A video motion capture system recorded participants' cycling speed.

Their cycling speed was faster while performing the cognitive tasks, with the most improvement during the six easiest cognitive tasks. Cognitive performance while cycling was similar to baseline across all tasks.

The reasons for participants' multi-tasking success most likely include multiple factors, the researchers say, but they hypothesize that one explanation could be the cognitive arousal that happens when people anticipate completing a difficult cognitive task. Similarly, exercise increases arousal in regions of the brain that control movement. Arousal increases the release of neurotransmitters that improve speed and efficiency of the brain, particularly the frontal lobes, thus improving performance in motor and cognitive tasks.

"What arousal does is give you more attention to focus on a task," Altmann said. "When the tasks were really easy, we saw the effect of that attention as people cycled very fast. As the [cognitive tasks](#) got harder, they started impinging on the amount of attention available to perform both tasks, so participants didn't cycle quite so fast."

Study participants with Parkinson's disease cycled slower overall and didn't speed up as much as the healthy older adults. That could be because arousal that stems from cognitive and physical exercise is dependent on dopamine and other neurotransmitters, which are impaired in people with Parkinson's.

Altmann and Hass are currently studying whether multi-tasking benefits will extend to other types of exercise, including use of an elliptical

trainer. They hope to eventually examine whether pairing [mental tasks](#) with exercise can lead to both cognitive and fitness improvements in [older adults](#).

More information: *PLOS ONE*, journals.plos.org/plosone/article?id=10.1371/journal.pone.0125470

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