

# Passive exercise offers same brain health benefits as active movements, study finds

4 August 2022, by Kim McCready



Cycle pedals mechanically being pushed was used to determine effects of passive exercise on cognition. Credit: University of Western Ontario

A new study by kinesiology graduate students from Western has found passive exercise leads to increased cerebral blood flow and improved executive function, providing the same cognitive benefits as active exercise.

Published in *Psychophysiology*, the study is the first to look at whether there would be benefits to brain health during passive exercise where a person's limbs are moved via an external force—in this case, cycle pedals pushed by a mechanically driven flywheel.

During a 20-minute session with healthy young adults, the team assessed executive function at baseline, before participants exercised, and

compared the data post exercise. They found an improvement in executive function of the same magnitude for both the passive and the active exercise conditions, without an increase in [heart rate](#) or [diastolic blood pressure](#).

Executive function is a higher-order cognitive ability that allows people to make plans and supports the activities of daily living. People who have mild cognitive impairments, such as people experiencing symptoms of early-stage Alzheimer's, can find their executive function negatively affected.

Previous research has documented that active exercise, where a person activates their muscles of their own volition, can increase blood flow to the brain and improve executive function. Passive exercise also increases blood flow to the brain, but this is significantly less documented.

"In terms of passive exercise, we could only hypothesize the outcome because this type of research had not been done before," said Matthew Heath, professor in kinesiology and supervisor of the study.

During passive exercise, a person's limbs move and their muscle receptors are being stretched. That information is sent to the brain, indicating that more blood is needed in the moving areas of the body and in connected regions of the brain. This increase in [cerebral blood flow](#), while significantly less than with active exercise, produced executive function improvements of a similar magnitude—an exciting result for the researchers.

"The potential impact for people with limited or no mobility could be profound. If done regularly, the increase in [blood flow](#) to the brain and resultant improvement in executive function will, optimistically, become a compounding effect that has a significant impact on cognitive health and executive function," Heath explained.

Further study could be improved by looking at whether the benefit to [executive](#) function persists at longer intervals of time post-exercise, as well as by the inclusion of more diverse participants (those who are older or health-compromised, for example).

Heath and team see great potential in using passive exercise in long-term care homes or in [rehabilitation programs](#) for people recovering from musculoskeletal injuries, who cannot perform weight bearing [exercise](#).

The study was led by master's student Mustafa Shirzad, and co-authored by graduate students Benjamin Tar, Connor Dalton, James Van Riesen, and Michael Marsala. Heath was the corresponding author.

**More information:** Mustafa Shirzad et al, Passive exercise increases cerebral blood flow velocity and supports a postexercise executive function benefit, *Psychophysiology* (2022). [DOI: 10.1111/psyp.14132](#)

Provided by University of Western Ontario

APA citation: Passive exercise offers same brain health benefits as active movements, study finds (2022, August 4) retrieved 20 August 2022 from <https://medicalxpress.com/news/2022-08-passive-brain-health-benefits-movements.html>

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