

Study shows exercise improves cognitive health for people with Down syndrome

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An exploratory study has shown that light, regular exercise can improve the cognitive as well as physical health of adults with Down syndrome.

The Mindsets study, published today in the *International Journal of Environmental Research and Public Health*, is the first to investigate the effects of physical and cognitive [exercise](#) on people with Down [syndrome](#), and it found that short bursts of walking can lead to improved [information processing](#) and attention after just eight weeks.

The role that exercise can play in cognitive growth represents a breakthrough in thinking about what's best for adults with Down syndrome, and there is evidence that people with Down syndrome do not typically meet the recommended levels of daily physical activity.

The new research involved 83 adult participants recruited following an international campaign by the Canadian Down Syndrome Society, and was led by Dr. Dan Gordon and Viviane Merzbach of Anglia Ruskin University (ARU) in Cambridge, United Kingdom.

Approximately one in every thousand children is born with Down syndrome. It is associated with an atypical chromosome arrangement, which leads to some degree of intellectual disability and delays in motor skills and speech development.

The participants in the Mindsets study—40 females and 43 males, aged between 18 and 48, from 10 countries—were assigned to one of four groups for an eight-week period.

Participants in an exercise-only group completed cardiorespiratory exercise, which involved walking three times a week for 30 minutes per session, while a second group took part in a series of cognitive and executive function exercises, provided by BrainHQ. A combined group did physical and cognitive exercises, while the fourth group did neither.

Participants were provided with a Fitbit to record steps completed, distances covered, speeds, and [heart rate](#), and they logged their activity

and communicated with the research team through a bespoke Mindsets app.

At the start and end of the eight-week period, all participants took physical and cognitive assessments. The positive effect of eight weeks of exercise on [physical fitness](#) was shown by significant increases in the total distance covered in a six-minute walk test, with the exercise-only and the combined groups improving by 11.4% and 9.9%, respectively.

The Sustained Attention to Response Test (SART) measures error rates during a cognitive activity. Researchers found a significant reduction in errors and an increase in correct responses in both the exercise-only and combined groups.

During the STROOP test, which measures the speed and accuracy of decision-making, researchers noted a significant improvement in the exercise-only group, the cognitive training group, and the combined group.

While walking is often a subconscious activity, the researchers noted that the activation of locomotive neural pathways through the process of walking drives cognitive development, as it necessitates people with Down syndrome to become more vigilant and pay attention to the task at hand.

Dr. Dan Gordon, Associate Professor in Cardiorespiratory Exercise Physiology at Anglia Ruskin University and senior author of the study, said, "Walking, and exercise in general, is not a natural activity for many people in the Down syndrome community, but this study shows walking is a powerful tool for developing cognitive and executive function.

"For most people, walking is a subconscious activity, but it still involves lots of information processing and decision-making. In our participants

with Down syndrome, we think walking has the effect of activating locomotive pathways, driving cognitive development, and improving information processing, vigilance, and attention.

"These findings are potentially huge for the Down syndrome community, particularly as walking is a free activity in which most people can engage. Improved cognitive function can lead to increased societal integration and quality of life, which is important, given this is the first generation of those with Down syndrome who will generally outlive their parents."

Dr. Henry Mahncke of Posit Science, the maker of BrainHQ, said, "These results remind us that every brain is plastic and capable of change. Even where there are differences that are genetic in origin, that doesn't mean that a brain can't change with exercise, whether physical or cognitive. We're excited to see these results and look forward to further research."

Laura LaChance, Executive Director of the Canadian Down Syndrome Society (CDSS), said, "The Mindsets study brings statistical evidence that exercise can provide multiple benefits to people with Down syndrome. The data collected will play a vital role in guiding CDSS's new Mindsets wellness program and improving the quality of life for people with Down syndrome throughout adulthood and aging."

More information: Impact of Prescribed Exercise on the Physical and Cognitive Health of Adults with Down Syndrome: The Mindsets Study, *International Journal of Environmental Research and Public Health* (2023). doi: 10.3390/ijerph20237121 , www.mdpi.com/1660-4601/20/23/7121

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