Evidence against paired brain training and stimulation for older adults

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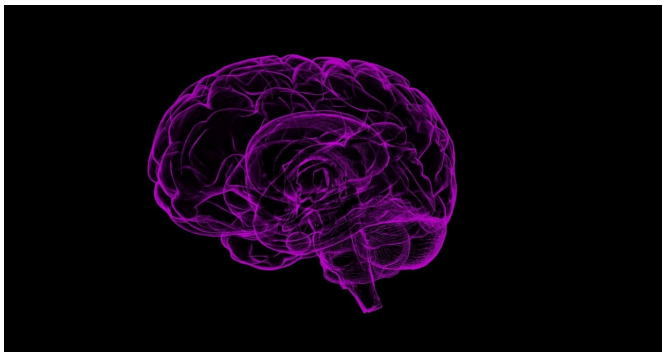

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Brain training and electrical stimulation may not enhance cognition in older adults, according to a University of Queensland study.

UQ School of Psychology researchers conducted the largest study to date to determine whether combined brain training and electrical stimulation would improve a range of cognitive functions, such as attention, decision making and memory, in older adults.

Professor Paul Dux said the results showed that older adults did not receive the same benefit from brain training and electrical stimulation as younger adults.

"Work in younger adults showed that combining this cognitive training with non-invasive brain stimulation, where a mild electrical current was delivered to the scalp while individuals completed a task, improved brain function, and that these improvements persisted over time," Professor Dux said.

"In this study we found that older participants improved their performance on most tasks over time whether they received brain training paired with stimulation or not. There were some improvements in working memory and episodic memory for a small group of participants at follow-up assessments, but this came down to their aptitude for performing the training task and genetic factors. For example, individuals who received the electrical stimulation and had a specific gene associated with memory and learning showed improved memory recall at a three month follow-up compared to a control group."

The researchers studied a broad range of cognitive abilities and everyday functioning of 131 people, aged 60–75, to determine if the training and electrical stimulation led to generalized cognitive improvement over time.

They also collected saliva samples for analysis of two types of genes which have been shown to influence responses to electrical stimulation in previous studies.

Ph.D. candidate Kristina Horne said research into preventing cognitive decline was expanding due to increased global concerns of the world's aging population.

"Our findings support an increasing body of evidence that shows older adults differ in their responses to training and brain stimulation, where previous studies have found differences based on age, education, genetics and baseline ability," Ms Horne said.

"The results continue to show that effective methods for younger adults do not necessarily translate to older adults, which could be due to structural and functional neural differences. More work will need to focus on optimizing research methods for older adults and testing individual differences to figure out those most likely to benefit."

Ms Horne said the study was published in a new

scientific format known as a registered report.

"The method and analysis plan for the proposed research undergoes peer review prior to the study being conducted, and the research is published regardless of the results," she said.

"This helps ensure the quality of the research and prevents what is known as 'publication bias' where the outcome of a study influences the decision to publish the research."

The research is published in *Nature Human Behavior*.

More information: Kristina S. Horne et al. Evidence against benefits from cognitive training and transcranial direct current stimulation in healthy older adults, *Nature Human Behavior* (2020). DOI: 10.1038/s41562-020-00979-5