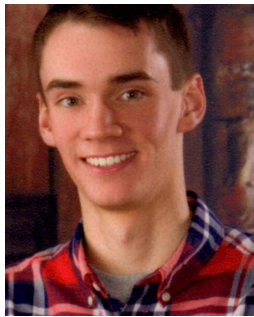


What is 'brain training' and does it work?

Ray Newins



Brain training is one of the newer fads that have come out in the past few years. The idea – similar to the traditional “fad diet” idea – is to put a little bit of work in, and receive a whole lot of results. A number of companies have tried to capitalise on the brain training idea, including Luminosity, Cogmed, and BrainHQ. These companies have created games that are supposed to change the neural functioning of the users in ways that will improve their everyday life.

Often, these games are targeted at older adults as ways of staving off the effects of ageing. Brain training is believed to work on the idea of neuroplasticity – is the ability of the brain to adapt to environmental change by modifying neural connectivity and function¹.

So the real question is: does brain training work? The answer is not really. Studies by multiple labs^{1,2} have found that participants using these brain games show a significant improvement in their ability to play these brain training games as the study progresses. However, skills they learned playing these games do not transfer to cognitive abilities related to the games. Furthermore, even their proficiency at these games wears off a couple of months after they stop playing. This means that not only do these games fail to help participants with skills outside of the games such as memory, reaction time, and information processing, but brain training games cannot even keep their players skilled at the games themselves after they have stopped for a few months.

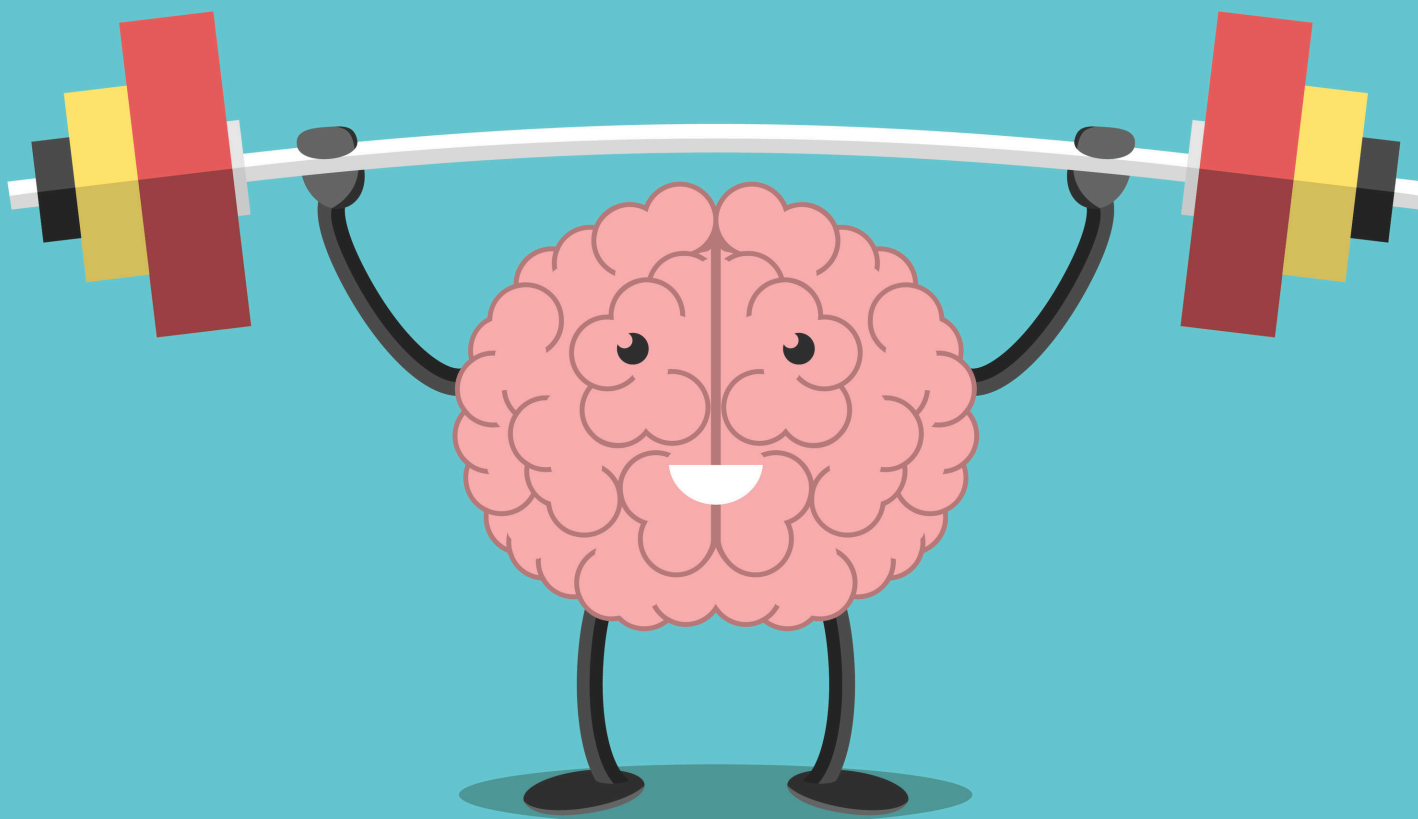
To add further fuel to the fire that is starting to envelop brain training, a statement was released by the Stanford University Center on Longevity and the Berlin Max Planck Institute for Human Development. The statement asserted that there is no solid evidence that brain training works, and was signed by 70 of the world’s leading cognitive psychologists and neuroscientists. Specifically the statement says:

“The strong consensus of this group is that the scientific literature does not support claims that the use of software-based ‘brain games’ alters neural functioning in ways that improve general cognitive performance in everyday life, or prevent cognitive slowing and brain disease.”

The statement goes on to caution people to the kinds of research that brain training companies cite as evidence that their games work:

“[Companies] present lists of credentialled scientific consultants and keep registries of scientific studies pertinent to cognitive training ... the cited research is [often] only tangentially related to the scientific claims of the company, and to the games they sell.”

This means that oftentimes, the sources that are being cited by brain training companies barely relate to the actual topics of whether or not brain training really works. These tangential sources only make the companies seem



more reputable to those who do not look into what they are actually about.

A final nail in the coffin comes from a team of researchers who reviewed hundreds of studies and concluded that brain training does not work³. This review (see also Daniel Willingham’s *New York Daily Times* piece) found that many studies did not account for the placebo effect – when the expectation that you should improve actually results in improvement. In the case of brain training, the placebo effect would play out by people testing better because they think they are playing a game that is supposed to make them smarter.

So why might brain training not work? Ballesteros and colleagues suggest that brain training may not be effective due to the principles of the Scaffolding Theory of Aging and Cognition or (STAC-r)¹. The STAC-r theory posits that the human brain adapts and reorganises itself with new learning and cognitive training. This is thought to improve the ability to scaffold and develop new neural circuitry, which can compensate for cognitive declines. The researchers hypothesised that brain training can

only support general scaffolding, therefore the benefits are too fragile to remain over time.

So if brain training does not work, then what does? Fortunately, science has long known how to ward off cognitive decline. One important factor is physical exercise. In a long set of studies⁴, Kramer and colleagues have demonstrated that aerobic exercise improves cognitive functioning.

Another helpful activity is learning new things. While fluid intelligence – that is, the general ability to think abstractly, identify patterns, solve problems, and recognise relationships – is hard to change, crystallised intelligence – a person’s knowledge and skills – is malleable. So instead of jumping on the newest fad supported by sketchy science, keep doing aerobic exercise, and never lose your love of learning.

References

¹ Ballesteros, S., Mayas, J., Prieto, A., Toril, P., Pita, C., Laura, P. de L., Reales, J.M., and Waterworth, J. A. (2015). A randomized controlled trial of brain training with non-action video games in older adults: Results

of the 3-month follow-up. *Frontiers in Aging Neuroscience*, 7, 45.

² Ackerman, P. L., Kanfer, R., & Calderwood, C. (2010). Use it or lose it? Wii brain exercise practice and reading for domain knowledge. *Psychology and Aging*, 25, 753-766.

³ Simons, D. J., Boot, W. R., Charness, N., Gathercole, S. E., Chabris, C. F., Hambrick, D. Z., & Stine-Morrow, E. A. (2016). Do “brain training” programs work? *Psychological Science in the Public Interest*, 17, 103-186.

⁴ Colcombe, S., & Kramer, A. F. (2003). Fitness effects on the cognitive function of older adults: a meta-analytic study. *Psychological Science*, 14, 125-130.

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