



REGENERATIVE
NEUROSCIENCE GROUP

Brain Training in Later Life

Brain training (also known as computerised cognitive training) involves repeated exercise on a range of tasks that require specific mental work. Brain training is becoming increasingly popular and there are now many products on the market promoting themselves as ways to restore and improve brain function. The universal idea is “*use it or lose it*”.

How does brain activity help?

The adult brain continues to change and develop across the lifespan. The dynamic capacity of the brain to change in response to stimulation is termed *neural plasticity*. In particular, neural plasticity refers to physical changes that occur to your brain cells, and the connections between them, in order to learn and process new information. For optimal neural plasticity and brain health, we need to stay mentally stimulated and active *especially after retirement*.

Does brain training work?

Many clinical trials (including our own) have shown that brain training that targets a combination of mental speed, attention, memory and problem solving can lead to **cognitive benefits** and may **help maintain mental function** in older persons.

These benefits refer to the “average” older person, and so there is no guarantee that you will improve in response to brain training. Also, no study has yet to show that brain training can help to prevent dementia, although there is research currently underway to test this idea.

In order to maximise the effectiveness of any brain training, our research has shown that it is important to follow evidence-based guidelines. These are listed in the panel on the right and are recommended for older persons.

How to Train Your Brain?

- 1. Training is effective only when conducted in groups.** Like any other type of exercise, group activity under expert supervision is much more likely to be beneficial than a do-it-yourself approach.
- 2. Do not train more than three times per week.** Training is effective only when conducted 1-3 times per week. Training more than 3 times per week neutralises any cognitive benefit.
- 3. Train for at least 45 minutes each time.** The brain requires a minimum level of stimulation in order to trigger neuroplasticity. Try to complete at least 45 minutes of training per session, preferably without taking breaks.
- 4. Train multiple cognitive domains.** Gains are linked to the cognitive domains targeted by the regimen – therefore it is preferable to train multiple cognitive domains rather than just one. The main domains to target are memory, attention, problem solving, speed and visuospatial skills.

Key reference (available free online):
Lampit, Hallock & Valenzuela.
Computerized Cognitive Training in Cognitively Healthy Older Adults: A Systematic Review and Meta-Analysis of Effect Modifiers. *PLoS Medicine* 11(11): e1001756.

What works and what doesn't?

The most effective approach to brain training is in a group format, typically in designated training centres ('brain gyms') under the supervision of an instructor. The recommended dose is 1-3 sessions per week, 45-60 minutes per session.

Solo training at home has been found to be *ineffective* in general. Training programs that only target one specific cognitive domain or skillset tend to also be ineffective. In particular, training working memory by itself is ineffective. Also ineffective are training regimes that include more than 3 sessions per week or that use individual sessions less than 30 minutes each.

What is not brain training?

There are other types of products available in bookshops and educational stores that claim to provide brain-stimulating activities, however, these have no clear supporting evidence. Books offering mental challenges in the form of game cards, puzzles and other activities may be fun and entertaining, but have no direct evidence base. Several books are also available that provide strategies to help improve memory, such as developing mnemonics. These strategies can be helpful but are not the same as brain training.

Playing video or computer games is also not the same as brain training. There are a limited number of studies suggesting that playing video or computer games may be beneficial to some cognitive skills, however, as yet there is insufficient evidence to recommend their use.

Are there other options besides brain training?

Yes. Research indicates that participation in leisure activities with a mental, social and physical dimension can help maintain brain health and reduce dementia risk. Trying something new is very stimulating for the brain, particularly if it means learning new information and skills and ongoing practice. Examples include:

- Volunteer
- Learn to dance
- Learn Tai-Chi
- Learn a new language
- Learn a musical instrument
- Teach others something you are good at

This consumer information was approved by Associate Professor Michael Valenzuela, Leader of the Regenerative Neuroscience Group, Brain and Mind Research Institute, University of Sydney. Expert contributions by Dr Amit Lampit. This version updated April 2015.