Ten Weeks of Brain Training Can Reverse Brain Aging

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A new clinical trial shows that the right kind of brain training may actually rejuvenate the brain’s communication system.

For the first time, scientists have shown that a simple kind of mental training can recharge the brain’s natural messaging system, the one that helps you think fast, stay focused, and remember things clearly.

Researchers at McGill University ran a **randomized clinical trial** that tested whether a 10-week digital “speed training” program could change brain chemistry in healthy adults over 65. Using advanced brain scans, they found that people who practiced fast-paced visual and memory tasks for about 30 minutes a day (35 hours total) showed increased levels of the **neurotransmitter acetylcholine**, which is associated with attention and memory. The increase of 2.3% was roughly the same amount the brain loses to normal aging every decade.

In other words, ten weeks of training appeared to reverse about ten years of brain aging in the networks that handle attention, learning, and memory.

Brain Games for Neurotransmitter Rejuvenation

The trial, called INHANCE, included 92 older adults who trained at home using a commercial program known for its speed-of-processing exercises (based on **BrainHQ’**s “Double Decision” and “Freeze Frame” games). People spent about 30 minutes a day, five to seven days a week, playing tasks that forced them to react

quickly, focus on moving targets, and filter out distractions.

Another group spent the same amount of time on non-speeded games (think Solitaire and pattern-matching puzzles) so both groups got the same amount of screen time, feedback, and engagement.

After ten weeks, researchers scanned everyone's brains using PET imaging, which measures how actively neurons are sending chemical messages. They focused on regions that control attention, memory, and executive function, the "control centers" that tend to slow down with age.

Only the speed-training group showed measurable changes. Brain activity increased in the anterior cingulate cortex (attention and focus) and in the hippocampus (memory formation). Those improvements mirrored the kind of biological shifts seen with certain medications used to treat mild cognitive impairment, but achieved here through behavior alone.

Are these results sound?

This study was funded by the National Institute on Aging of the National Institutes of Health, but also included scientists from the company that develops BrainHQ's cognitive training and assessment programs (who have shares in the company). But it was also a double-blind, controlled clinical trial, meaning neither people nor researchers knew who got the "real" training. Both groups used visually similar programs to avoid placebo effects.

The study used one of the most sophisticated imaging tools available ([18F]FEOBV PET) to measure the brain's "messenger" system directly, rather than relying only on self-report or memory tests. Adherence was high (nearly 90%), and the effect size, around 2.3%, matches what you'd expect from reversing a decade of natural decline.

Taken together, the study lays out compelling data that fast, adaptive brain training

doesn’t just sharpen mental skills, it may restore the underlying brain chemistry that supports them.

The people in the study were mostly white, college-educated, and Canadian, so it’s not yet clear how results generalize across populations. The improvements were measured over a short time window (10 weeks, with a 3-month follow-up). We still need to know how long the gains last and whether combining this type of training with exercise or sleep optimization amplifies the effects.

Still, the trial met gold-standard scientific criteria, and it’s the first to prove that behavioral training can physically rejuvenate aging brain systems.

Here’s What They Tested:

Train your brain for speed, and know what that actually means. This study used two specific exercises designed around these brain training principles:

- *Speed pressure that adapts to you*. The tasks got faster as people improved, forcing the brain to process information at the edge of its capacity. That’s the mechanism. If a brain game lets you work at your own comfortable pace, it’s probably not doing this.
- *Dual-task visual processing*. One exercise required identifying a central image while tracking a target in the peripheral visual field under time pressure that shortened as you got better. This trains the brain to take in more, faster.
- *Inhibitory control under pressure.* The other required rapid responses to distractors while *withholding* responses to targets training the brain’s braking system at speed.

The exercises used in this study are part of a commercial platform called **BrainHQ**. Three of the study’s authors are employees and shareholders of the company that makes it, which is worth knowing. The trial itself was NIH-funded, independently

conducted at McGill, double-blinded, and peer-reviewed , which is the most rigorous design available. We think the science is solid enough to share, and that you’re smart enough to weigh the conflict for yourself.

Train Your Brain In Real Life

The study found that training for just 30 minutes a day increases acetylcholine (the neurotransmitter that drives attention, learning, and memory) by roughly the same amount the brain loses to normal aging every decade. In other words, ten weeks of practice appeared to reverse about ten years of neurochemical decline in the networks that keep you sharp. The good news: you don’t need an app to train these same pathways. Activities that demand rapid visual processing, pattern recognition, and working memory activate similar circuits.

1) Timed visual search = Table tennis, pickleball, or badminton

The time pressure and full visual field scanning are what matter. Fast-moving sports that require tracking a small object, splitting attention between your opponent and the ball, and making rapid go/no-go decisions (hit or hold?) under time pressure train many of the same visual processing and inhibitory control circuits. They also add the aerobic component the researchers suggest may amplify results.

2) Dual-task drills = Learn a musical instrument (especially sight-reading)

Track two things at once. Reading sheet music requires rapid visual scanning, processing symbols in the periphery while maintaining central focus, and making fast

motor responses, all under adaptive difficulty as pieces get harder. It's one of the few activities that challenges dual-task visual processing in a way that roughly parallels the study's mechanism.

3) Reaction-time games with inhibition = Martial arts or sports like basketball and hockey

Activities that require fast responses to some stimuli and withheld responses to others. Boxing, kickboxing, or fencing, where you're reading your partner's movements, deciding in milliseconds whether to respond (strike, block) or withhold (feint recognition, don't take the bait). Basketball, soccer, hockey., where you're scanning the field, deciding pass/don't pass, shoot/hold, while suppressing reactions to decoy movements from defenders. The difficulty adapts naturally as your partner adjusts.

4) Novel skill learning under speed = Learn a new language in a live setting

A conversation class or language exchange partner forces you to process unfamiliar information under real-time pressure, parsing new sounds, deciding when to respond, retrieving vocabulary before the moment passes. Apps let you pause; a human conversation partner doesn't. The novelty of the material is what makes this different from the other recommendations, your brain is building new processing pathways *and* running them under speed, which compounds the neuroplastic demand.

None of these are exact substitutes for the studied protocol. But they share the core principle: push your brain to process faster, more accurately, at the edge of what it can do.

Our brains never stop adapting. This study shows that the right kind of mental training can physically rejuvenate the circuits that power attention and memory, and now you know exactly what "right kind" means. Brain age isn't fixed. You can strengthen the

chemistry of focus and learning with the right challenge, consistency, and care.

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