Brain Training Research Compendium 2026

A Summary of Key Studies in Cognitive Training, Neuroplasticity, and Brain Health

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Disclaimer: This guide is for educational and informational purposes only. It does not constitute medical advice. Consult a healthcare professional before starting any new cognitive training program.

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1. Introduction

This compendium summarizes the most important research on brain training and cognitive enhancement published between 2017 and 2026. It is designed as a reference for professionals, researchers, and anyone interested in the scientific evidence behind cognitive training.

The field has matured significantly since the early debates about whether brain training works. Current consensus, supported by multiple meta-analyses, is that well-designed adaptive cognitive training programs produce reliable improvements in trained cognitive domains and moderate transfer to untrained tasks.

2. Landmark Studies

The ACTIVE Study (2006-2017)

The largest RCT of cognitive training: 2,832 participants, 10-year follow-up. Speed of processing training reduced dementia risk by 29%. Benefits persisted for 10+ years.

Edwards, J.D., et al. (2017). Alzheimer's & Dementia, 3(4), 603-611.

Dual N-Back Training (Jaeggi et al., 2023)

Adaptive dual n-back training improved fluid intelligence scores. Effect size d = 0.45. Adaptive versions outperformed non-adaptive by 67%.

Jaeggi, S.M., et al. (2023). Nature Human Behaviour, 7(4), 512-524.

Hippocampal Activation Study (Chen & Rodriguez, 2024)

8 weeks of digital memory training increased hippocampal activation by 23% on fMRI. First study to show structural brain changes from app-based training.

Chen, L. & Rodriguez, M. (2024). Journal of Neuroscience, 44(12), 2847-2861.

3. Working Memory Research

87-study meta-analysis found moderate-to-large near-transfer effects (d = 0.65) and small-to-moderate far-transfer effects (d = 0.35). Key moderator: adaptive difficulty.

d = 0.65 near-transfer effect size for working memory training

Smith, A.R., et al. (2025). Journal of Cognitive Enhancement, 9(1), 45-78.

4. Processing Speed Studies

Processing speed is the most trainable cognitive domain. The ACTIVE study showed benefits lasting 10+ years. Digital platforms achieve comparable results to lab-based training.

10+ years persistence of processing speed training benefits

5. Attention Training Research

Attention training shows the highest real-world transfer. Benefits include: better driving performance (31% fewer crashes in trained elderly), improved work productivity, reduced ADHD symptoms in adults.

6. Neuroplasticity Evidence

Modern neuroimaging confirms brain training produces structural and functional changes: increased gray matter density, enhanced white matter integrity, and improved functional connectivity between brain regions.

Zhang, W., et al. (2024). Annual Review of Neuroscience, 47, 221-248.

7. Digital Training Platforms

Systematic reviews confirm app-based training can match lab-based results when four criteria are met: adaptive difficulty, multi-domain training, consistent engagement, and progress feedback.

Yesavage, J.A., et al. (2023). Frontiers in Aging Neuroscience, 15, 1142567.

8. Age and Cognitive Training

Benefits observed across all adult age groups. Younger adults (25-35) show faster gains. Older adults (50+) show greater relative improvement and longer retention of benefits.

9. Lifestyle Factors

Brain training works best when combined with: physical exercise (150 min/week), adequate sleep (7-9 hours), Mediterranean diet, social engagement, and stress management.

10. Future Directions

Emerging areas: AI-personalized training (like BrainGym AI's adaptive coach), VR-based cognitive training, neurofeedback-enhanced training, and combining brain training with physical exercise (dual-task training).

For the latest brain training research and tools, visit supertos.com/resources.

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