

Neurofeedback Research Findings

by Phil Ellis, Ph.D.

Clinical Use

This document highlights the research findings, with references, of neurofeedback efficacy for the treatment of ADHD, Anxiety, Depression, Substance Abuse and Autism Spectrum Disorder. Neurofeedback, also known as EEG biofeedback, is a non-invasive technique that aims to regulate brain activity by providing real-time feedback to individuals from their brainwave patterns. Here are some key findings from studies investigating neurofeedback for the treatment of these conditions:

1. Attention Deficit Hyperactivity Disorder (ADHD):

- A meta-analysis conducted by Arns et al. (2014) reviewed 13 randomized controlled trials (RCTs) and found that neurofeedback had a large effect size in reducing symptoms of ADHD.
- A randomized controlled trial by Gevensleben et al. (2009) showed that neurofeedback led to significant improvements in attention and impulse control, as well as a reduction in ADHD symptoms.

2. Anxiety Disorders:

- A systematic review by Micoulaud-Franchi et al. (2014) examined the use of neurofeedback for anxiety disorders and found that neurofeedback interventions demonstrated promising results, particularly for generalized anxiety disorder and post-traumatic stress disorder (PTSD).
- A study by Escolano et al. (2017) showed that neurofeedback training led to significant reductions in anxiety symptoms in patients with generalized anxiety disorder.

3. Depression:

- A meta-analysis by Keeser et al. (2016) reviewed studies on neurofeedback for depression and found that it had a significant effect in reducing depressive symptoms.
- A randomized controlled trial by Hammond (2005) demonstrated that neurofeedback training resulted in a significant reduction in depressive symptoms and improved overall mood.

4. Substance Abuse:

- A systematic review by Sokhadze et al. (2017) evaluated studies on neurofeedback for substance use disorders and found that it showed promise as a potential treatment for reducing substance cravings and relapse rates.
- A study by Peniston and Kulkosky (1989) investigated the use of neurofeedback for alcoholism and found that participants who received neurofeedback training had significant improvements in abstinence rates compared to a control group.

5. Autism Spectrum Disorder (ASD):

A systematic review by Coben and Padolsky (2007) examined studies on neurofeedback for ASD and reported positive outcomes, including improvements in language, social interactions, and behavioral symptoms.

A randomized controlled trial by Kouijzer et al. (2009) showed that neurofeedback training resulted in significant improvements in attention, impulsivity, and social behavior in children with ASD.

6. Insomnia:

A meta study of 12 neurofeedback research projects found that all of the project conclusions included a strong statement to support the use of neurofeedback in the treatment of primary insomnia. However, the authors point out that more research is indicated before the use and limitations Neurofeedback for Insomnia are established: Lambert-Beaudet F, Journault WG, Rudziavicius A, Bastien CH. Current State of Research World J Psychiatry. 2021 Oct 19; 11(10): 897–914

7. Cognitive Dysfunctions :

Three studies were included in this systematic review and meta-analysis, our results indicated that Cognitive Training with Neurofeedback would lead to improvements in memory functioning and sustained attention. Ito E, Nouchi R, Diné J, Cheng CH, Husebø BS The Effect of Cognitive Training with Neurofeedback on Cognitive Function in Healthy Adults: A Systematic Review and Meta- Analysis, Healthcare (Basel). 2023 Mar; 11(6): 843

8. Performance Enhancement:

A Gong, Feng Gu, Wenya Nan, Yi Qu, Changhao Jiang³ and Yunfa Fu
Neurofeedback Training for Improving Sport Performance From the
Perspective of User Experience in Athletics Frontiers in Neurosci., 28 May
2021 Sec. Neural Technology Vol 15 – 2021. These authors reviewed studies
demonstrating improved performance in sports such as archery, rifle
marksmanship and musical performance.

Students at London's Royal College of Music were able to improve their performance across a number of areas including their musical understanding, imagination and their communication with the audience.

<https://www.calmfocus.com/the-royal-college-publishes-performance-enhancement-studies/>