



WEB OF SCIENCE

## IMPROVING BRAIN PROCESSING IN CHILDREN WITH ADHD USING EEG BIOFEEDBACK

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### Abstract

The diagnosis and treatment of behaviors associated with attention-deficit/hyperactivity disorder (ADHD) predominantly involves pharmacological or behavioral interventions. Many children experience significant negative side effects (e.g., appetite suppression, insomnia, headaches, stomachaches, irritability, and impaired height) from the initial and continued use of stimulant medication. And behavioral interventions have likewise shown limited long-term effectiveness. Consequently, many parents seek alternative treatments for ADHD, such as neurofeedback (EEG biofeedback).

Using EEG biofeedback interventions, improvements were achieved in auditory and visual attention and response control after 40 sessions of artifact-corrected EEG biofeedback for 51 children ages 6 to 17 with ADHD.

Initially, the majority of these children were identified as having severe to extreme auditory and visual attention impairments based on the Integrated Visual and Auditory Continuous Performance Test (IVA-2 CPT) assessment, which was administered prior to treatment and after 20 and 40 treatment sessions were completed. The EEG biofeedback was administered in 30-minute treatment sessions at least two times per week for a total of either 20 or 40 sessions.

After 20 sessions of neurofeedback significant improvements of both auditory and visual attention and response control were found with small to large size effects. The children continued to improve after an additional 20 sessions, with medium to large size effects after 40 sessions. At completion of treatment, the mean of eight of the nine attention and response control scores fell within the “normal” range.

The results of this study supported the hypothesis that EEG biofeedback would significantly improve both auditory and visual attention of children with symptoms of ADHD. The children’s improvement in their auditory and visual attention scores revealed they achieved clinically significant improvements after 40 half-hour treatment sessions. Artifact corrected neurofeedback proved to be a clinically efficacious intervention helping normalize the significant attentional impairments symptomatic of ADHD in children ages 6 to 17.