

## **ABSTRACT**

Neurofeedback is a biofeedback training of EEG activity through an operant conditioning process by which the individual is trained to increase or inhibit the brain's production of electrical activity in specific frequency ranges. Studies have demonstrated its efficacy to reduce inattention, impulsivity and hyperactivity in children with ADHD, with the mostly used training protocols focus on modulation of theta/beta ratio. Given the co-morbidity and common cognitive deficits between ADHD and developmental dyslexia in children, this study aimed to explore effects of theta/beta neurofeedback on cognitive deficits in Chinese dyslexic children. In the present case study, a multiple-baseline design was adopted, and the effects of training were investigated from both neurophysiological and cognitive levels. Four dyslexic children completed 10 weekly sessions of theta suppression and beta enhancement neurofeedback training at the sensorimotor cortex. Pre- and post- assessments consisted of neurophysiological measures, cognitive assessments and parental reports. Neurofeedback training reduced theta/beta ratios, improved reaction time and error commissions on cognitive assessments, and enhanced attention and speed of response from parents' observations. All participants improved in vigilance and response inhibition whereas some showed improvements in sustained attention, selective

attention and attentional switching. Results showed that neurofeedback training improved attention and inhibitory control though further investigations are needed to verify these preliminary treatment outcomes. Arguments that supported the continuation or abortion of neurofeedback training on dyslexic children were illustrated from clinical, theoretical and practical perspectives along with recommendations. Feasibility of home-based neurofeedback training was also discussed.

