

BrainTrain Bugle

Brains Matter!

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Neurofeedback shows promise for improving reading



Research has shown that children with the Inattentive sub-type of ADHD perform significantly slower on tasks of processing speed, written language, and motor speed. Specifically, it is impairments in attention and not hyperactivity/impulsivity that result in learning problems for these students. A recently published study (LaMarca & O'Connor, 2016) examined whether neurofeedback might be an effective intervention to improve reading. The authors state that they chose to do their research specifically in a school, since, one, there is a lack of research on using neurofeedback in the school setting, and, two, school is where neurofeedback could potentially have the greatest impact. The authors selected reading outcome as their key measure, since reading is the foundation skill for so many other academic areas. If neurofeedback training in the school setting could lead to gains in academic achievement, this would demonstrate to educators its benefit for enhancing academic learning in general.

The five students who participated in this study were fourth graders who had both attention and reading deficits. Pre and post assessment measures included the Gray Oral Reading Tests-Fifth Edition (GORT-5) and the Integrated Visual and Auditory CPT (IVA), which was used to evaluate their combined visual and auditory sustained attention. In addition, their teachers completed the Conners ADHD Rating Scales. The students then received forty neurofeedback training sessions using BrainTrain's SmartMind neurofeedback system.

An important question that always arises in clinical research is whether the intervention has lasting beneficial effects. The five students treated in this study were followed up approximately 5-1/2 months after the study was completed. At follow-up, all of the students showed improvements in reading based on their scores on the GORT-5 tests. In the pretest, four out of the five students had scores on the test's Oral Reading Index that were below the Average range; the fifth student's scores fell within the Average range. At follow-up, all but one of the students' standard scores fell within the Average range, and one student's score was just one point below the Average range.

The greatest improvement for these students occurred in their reading comprehension. Before the neurofeedback training, all of the students except one had Moderate to Severe reading comprehension deficits. At follow-up, the reading comprehension scale scores of all of the students fell in the Average range, reflecting a significant improvement of a standard deviation. In respect to their combined sustained attention score on the IVA, four out of the five students showed improvement greater than one standard deviation at the 5-1/2 month mark, and the fifth student showed improvement but remained within the Average range both during the study and at follow-up.

The Conners ADHD rating scales had originally been completed by the students' fourth grade teachers in a pre-test assessment; at follow-up, they were completed by their fifth grade teachers. Initially, all five students had a T-score greater than 90 on the Conners rating scale, showing an extreme degree of ADHD symptomatology. At follow-up, four of the five students had significant declines in the Conners ADHD scale scores by three or more standard deviations. In addition, three of the subjects no longer exhibited any significant attention problems, based on the stu-

dents' fifth grade teachers' ratings. This finding shows that the neurofeedback treatment generalized to significant improvement in their ability to sustain their attention in the classroom, demonstrating "real world" effects.

This study suggests that for students with attention problems, neurofeedback training could be highly beneficial in helping to improve attentional functioning, as well as reading comprehension. Although in this case the number of participants was small, a growing body of scientific literature supports the efficacy of neurofeedback as an intervention for people with attention deficits. In conclusion, this study strongly supports the continued exploration of using neurofeedback to help students with ADHD succeed academically.

Reference:

LaMarca, J.P. & O'Connor, R.E. (2016). Neurofeedback as an Intervention to Improve Reading Achievement in Students with Attention-Deficit/Hyperactivity Disorder, Inattentive Subtype. *Neuroregulation*, 3(2), 55-77.



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