A comparative randomized controlled pragmatic trial of neurofeedback and working memory training for children with attention-deficit/hyperactivity disorder: protocol

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ABSTRACT

Today, the treatment for children and adolescents with attention-deficit/hyperactivity disorder (ADHD) is predominantly pharmacological. However, not all individuals respond to medication or some may experience problematic side effects. In addition, the compliance and treatment fidelity to medication is sometimes limited; thus, effective non-pharmacological treatment options are desirable. Neurocognitive training (NCT) methods such neurofeedback (NF) and working memory (WMt) have shown efficacy treating the primary symptoms of ADHD in non-blinded trials. Still, larger, comparative, blinded, pragmatic randomized controlled trials (RCTs) are needed to ensure the efficacy and effectiveness of these methods, and to identify an optimal training variant. Furthermore, little is known about predictors of treatment response to NCTs, such as genetic variants. In this article, we present the protocol of a pragmatic RCT for three NCT methods: slow cortical potential (SCP) training and live z-score (LZS) training (two NF variants), and working memory training (WMt). These are evaluated against each other and a waiting list control/treatment as usual group. In a clinical outpatient setting, 200 children and adolescents with ADHD aged 9–17 years with common comorbidities are randomized to either one of the treatment groups or the waiting list control group (n=50/group). The treatment groups (SCP/LZS/WMt) receive a total of 25 highly frequent training sessions (5/week for 5 weeks). A comprehensive assessment comprising ADHD core symptoms, psychopathology, neuropsychology, neurophysiology, quality of life, and health-related measures are collected pre- and post-treatment and at a 6-month follow-up. Primary outcomes are blinded teacher and unblinded parent ratings on the Conners 3 for ADHD. We expect that participants receiving NCT will exhibit improved core ADHD symptomatology compared with waiting list controls. Moreover, we hypothesize that the type of NCT (i.e. SCP, LZS, WMt) and participant characteristics (e.g. genetic predisposition, age, IQ, gender, verbal skills, and comorbidity) will predict patterns of treatment effects on the various outcomes.