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Enhancing children's ability to self-regulate through interactive stories

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Abstract
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**Title:** “Combined cognitive and neurofeedback training for children with AD/HD”

**Abstract:** Objectives: There is increasing evidence that working memory and inhibitory control training can lead to behavioural improvement in children with Attention-Deficit/Hyperactivity Disorder (AD/HD). State-regulation theories of AD/HD suggest that an inability to adjust energetic state level, and consequent executive functioning issues, are at the core of the disorder. Accordingly, the present study examined the efficacy of a combined cognitive and neurofeedback training program for children with AD/HD using a randomised control design. Methods: The final sample consisted of 90 children aged 7-12 years, 45 in the training and 45 in the waitlist (WL) condition. Wizard-themed training games (Focus Pocus) took place in the children’s home, with participants required to complete between 20 and 25 sessions over a 6-8 week period. Outcomes examined included questionnaires assessing AD/HD symptom severity and frequency, performance on a digit span and counting span task, and EEG topography and power during a 2-minute eyes-open (EO) and one minute Focus task before and after training. Results: Compared to the WL condition, children in the training condition showed significant reductions in AD/HD symptoms overall and specifically for the hyperactivity/impulsivity symptom of AD/HD. There was also a significant increase in digit length recall post-training for the digit span task. EEG power for the two EEG tasks showed typical AD/HD topographical differences at Time 1, while post-training there was evidence of a directional trend towards EEG normalisation for children in the training condition, with more support for the active Focus than the resting EO task. Conclusions: Overall the results provide support for the efficacy of a combined cognitive and neurofeedback training for children with AD/HD.

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**Abstract:** Early childhood represents an important stage in the development of one’s ability to self-regulate, as increases in children’s capacity to control their thoughts, behaviours, and emotions are met with increased demands for such control in the classroom (McClelland, et al., 2000; Posner & Rothbart, 2009). Indeed, these control abilities have been related to behavioural, social, and academic competence in primary school (Blair, 2002) and future health and lifestyle outcomes (Moffitt, et al., 2011). However, not all children have mastered these skills upon entry to formal schooling (Rimm-Kaufman, et al., 2000) suggesting the need for early intervention. Recent models suggest that children’s executive functions (EFs) and problem solving abilities may uniquely contribute to self-regulation (Hofmann, et al., 2012) with studies reporting improvements in control-related behavioural outcomes following EF training (e.g. van der Oord, et al., 2014). However, many of these training methods are expensive, difficult to access, and are not designed for the early years. The present study thus sought to investigate: 1) The feasibility of a low-cost intervention that enhances a shared reading program with tasks that either engage preschool children’s EFs or problem solving strategy skills in order to improve behavioural self-regulation; 2) whether self-regulation can be improved through multiple pathways. Though data collection is currently being completed, results will be available in time for this conference. Thus, in a sample of 43 preschool children, the comparative effects of executive function tasks embedded in a storybook (Quincey Quokka’s Quest) and a dialogic reading of the same story on children’s EFs and behavioural self-regulation will be examined.