Introduction

Working memory (WM) and inhibitory functions (IF) are cognitive functions related to ADHD (Attention Deficit Hyperactivity Disorder). Previous studies have shown that it is possible to improve WM capacity through computerized training in children, adolescents and adults (Klingberg et al., 2002; 2005; Olesen et al. 2004; Westerberg et al., 2008). This has not yet been shown for inhibitory functions.

Objectives

The purpose of this study was to investigate whether it is possible to improve WM capacity or inhibitory control in preschool children through computerized training programs targeting WM or IF (Fig. 1). An additional aim was to determine the extent to which any training effects generalize to other executive functions.

Methods

64 children aged 4-5 (mean=4y, 4m), semi-randomly divided into 4 groups, participated in the study. The intervention groups (WM, n=17 and IF, n=18) were compared with two control groups, one active (AC, n=13) (playing a commercially available computer game) and one passive (PC, n=16) (participating only in pre- and post-testing). The computerized training programs used in the study were developed by the authors in collaboration with the company Cogmed systems (Stockholm, Sweden).

Results

Analysis of the training tasks revealed an improvement from the average of the highest level reached during days 2-4 compared to the last 3 days, for all WM tasks, $t >1.96, p <.05$. For the inhibition training, the children improved significantly on the go/no-go tasks, $t > 3.70, p < .01$, and the flanker task, $t = 2.92, p < .05$, but not on the stop signal tasks, $t > 1.13, n.s.$

Conclusions

Results show that WM training can be successful even in children as young as 4 years, and improves both WM and attention. Training IF did not lead to significant improvements on any of the tests compared to controls.

References