

Attentional functioning of children with ADHD in a natural and non-natural setting

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Introduction

Attention-deficit hyperactivity disorder (ADHD) is a common disorder affecting 3 to 5 percent of children worldwide. Children with ADHD display deficits in the capacity to exert executive attention, which may cause impairments in self-regulation skills, such as planning and controlling emotions. Stimulant medications are widely used and highly effective in the treatment of ADHD, but they cannot eliminate all symptoms and may cause side-effects. Consequently, many parents of children with ADHD seek for alternative and complementary treatments.

According to Attention Restoration Theory (cf. Kaplan & Berman, 2010) exposure to nature provides an effective means to replenish the capacity for executive (or directed) attention. This notion has received initial support from research showing that children with ADHD perform better on a task for executive attention after a walk through a park as compared to a walk through built areas (Faber Taylor & Kuo, 2009).

A recent study by our own group showed that children with ADHD displayed better attentional functioning while they were in a natural environment (Van den Berg & Van den Berg, 2011). However, the exploratory nature of our study did not afford causal conclusions. We therefore conducted a controlled experiment that examined attentional functioning of children with ADHD in a natural and non-natural setting.

Method

Sixteen children with ADHD (14 boys, 2 girls, age 8-12, no co-morbidity) participated in the experiment. Each child carried out, without medication, four cognitive tests in a natural setting (indoor garden) and in a non-natural setting (conference room). In each

setting, the children performed a verbal memory test (15-word test), a visual memory test (Rey's complex figure), a test for inhibitory executive function (Stroop task) and an executive flexibility test (Trail Making Test). The order in which the settings were visited was systematically and randomly varied, with a 2-3 week interval between sessions.

Results and Discussion

The children generally scored better on the delayed recall measures of the verbal memory test in the conference room than in the indoor garden, independent of order. Children's performance on the visual memory task deteriorated over time. However, during the first session, the children in the conference room displayed better visual memory than the children in the garden. Performance on the executive function tasks showed the reverse pattern. Children generally scored better on the test for executive flexibility in the indoor garden, independent of order. Scores on the inhibition task showed a learning effect over time. However, during the first session, the children in the garden performed better than the children in the conference room.

These findings suggest that a natural environment can support the performance on complex executive tasks in children with ADHD. A non-natural environment may enhance the execution of simple memory tasks. These findings may inform the design of classrooms and other settings that impose cognitive demands on children with ADHD.

References

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