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The Effect Of Physical Activity On Span Of Attention In Boys With Adhd

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Abstract

This study investigates the impact of a structured 12-week physical activity program on the span of attention in boys diagnosed with Attention Deficit Hyperactivity Disorder (ADHD), aged 11 to 14 years. Forty participants were randomly assigned into two equal groups: an experimental group that underwent a regular physical activity regimen and a control group that continued their usual routine. A tachistoscope-based test was administered pre- and post-intervention to measure attention span. Each test involved recalling alphanumeric characters flashed briefly on a screen, scored out of 50. Data were analyzed using paired and independent t-tests, and one-way ANOVA. Statistical analysis revealed significant improvement in the experimental group ($t = 58.02$, $p < 0.001$), while the control group showed a smaller yet statistically significant gain ($t = 13.08$, $p < 0.001$). The experimental group's post-test scores were significantly higher than the control group ($t = 28.39$, $p < 0.001$), and ANOVA results confirmed significant differences across all groups ($F = 510.71$, $p < 0.001$).

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental condition characterized by persistent patterns of inattention, hyperactivity, and impulsivity that interfere with functioning and development (American Psychiatric Association [APA], 2013). Among the core cognitive impairments associated with ADHD, a reduced attention span is particularly problematic, affecting academic performance, social interactions, and task completion. Attention span refers to the duration an individual can maintain focus on a task without becoming distracted. Children with ADHD often struggle with sustaining attention, leading to significant functional impairments (Barkley, 2014). While pharmacological interventions—especially stimulant medications—are commonly prescribed and effective in managing

symptoms, they may cause side effects such as sleep disturbances and decreased appetite (Wilens et al., 2008). Consequently, there has been growing interest in non-pharmacological approaches that support cognitive development without adverse effects. One promising alternative is physical activity, which has been shown to enhance brain function, including attention, by promoting neurogenesis, increasing neurotransmitter levels, and improving executive function (Best, 2010; Halperin & Healey, 2011). Physical activity interventions have demonstrated significant benefits in improving attentional control, working memory, and cognitive flexibility among children with ADHD (Chang et al., 2012). These benefits are attributed to increased dopamine and norepinephrine levels, which play a key role in attention regulation (Smith et al., 2013). Given this background, the present study investigates whether a structured 12-week physical activity program can effectively improve the span of attention in boys diagnosed with ADHD, using a tachistoscope-based assessment to measure outcomes.

Methodology

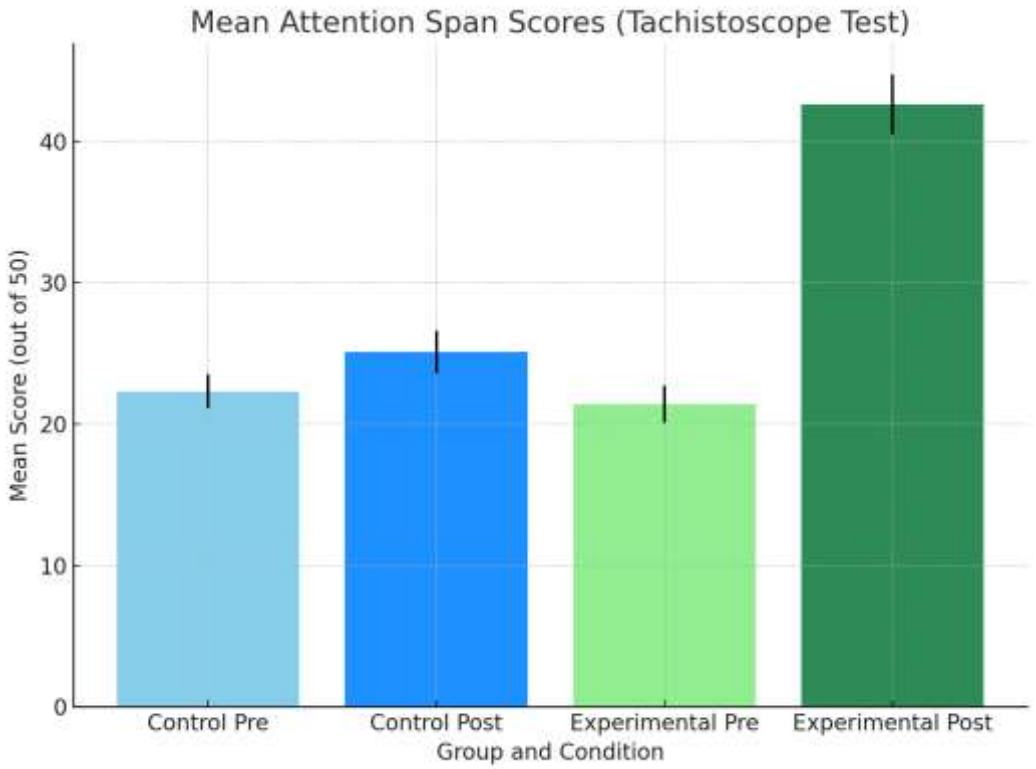
The study involved 40 boys aged 11 to 14 years, clinically diagnosed with ADHD, recruited from local schools and ADHD clinics. Participants were randomly assigned into two equal groups: an experimental group and a control group. The experimental group participated in a 12-week structured physical activity program involving aerobic exercises, coordination games, and group sports, conducted four times a week for 45–60 minutes per session. The control group maintained their normal school routines without any additional physical activity sessions. Span of attention was measured using a tachistoscope, which displayed 10 random alphanumeric characters for 0.1 seconds over five trials. Participants were instructed to recall and write down the characters in sequence. Each correct recall was awarded one point, with a maximum score of 50. Data were collected pre- and post-intervention and analyzed using paired t-tests (within groups), independent t-tests (between groups), and one-way ANOVA for group comparisons.

Results

Table1-Mean Scores and Standard Deviations

Group	Condition	Mean Score	Standard Deviation
Control	Pre	22.3	1.2
Control	Post	25.1	1.5
Experimental	Pre	21.4	1.3
Experimental	Post	42.6	2.1

The experimental group showed a significant improvement in their span of attention, with a mean score increase from 21.4 to 42.6 ($t = 58.02$, $p < 0.001$). The control group also exhibited a smaller improvement, with scores increasing from 22.3 to 25.1 ($t = 13.08$, $p < 0.001$). An independent samples t-test showed that the post-test scores of the experimental group were significantly higher than those of the control group ($t = 28.39$, $p < 0.001$). Additionally, one-way ANOVA revealed statistically significant differences among the four groups (pre- and post-tests of both groups) with an F-value of 510.71 ($p < 0.001$).



Discussion

The results of this study strongly support the hypothesis that structured physical activity significantly enhances attention span in boys with ADHD. The experimental group, which engaged in a 12-week physical activity program, exhibited a substantial increase in attention scores from a pre-test mean of 21.4 to a post-test mean of 42.6, representing a mean gain of 21.2 points ($t = 58.02$, $p < 0.001$). In contrast, the control group, which continued its normal routine, demonstrated only a modest improvement from 22.3 to 25.1 ($t = 13.08$, $p < 0.001$). These findings align with previous research that highlights the positive effects of physical activity on cognitive function and attention regulation in children with ADHD (Best, 2010; Chang et al., 2012).The mechanism by which physical activity influences attention may involve enhanced dopaminergic and noradrenergic activity, which are both implicated in attentional processes and executive functioning (Halperin & Healey, 2011; Smith et al., 2013). The significant difference in post-test scores between the experimental and control groups ($t = 28.39$, $p < 0.001$) further reinforces the efficacy of exercise as a cognitive intervention.

Although the control group also improved slightly, this could be attributed to test-retest familiarity rather than any true cognitive gain. Limitations include the exclusive focus on male participants and reliance on a single assessment tool. Future studies should incorporate diverse populations and multi-dimensional cognitive assessments to validate these outcomes.

Conclusion

The findings of this study provide strong evidence that a structured 12-week physical activity program significantly improves the span of attention in boys diagnosed with ADHD. The experimental group showed a remarkable increase in attention scores compared to the control group, highlighting the effectiveness of physical activity as a non-pharmacological intervention. These results support existing literature emphasizing the cognitive benefits of exercise, particularly in enhancing executive functions and attentional control. Given its accessibility and cost-effectiveness, physical activity should be integrated into educational and therapeutic programs for children with ADHD. Future research should include diverse populations and additional cognitive measures to further validate these findings and broaden their applicability

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