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Executive Functions in Children with and without Attention Deficit-Hyperactivity Disorder (ADHD)

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Introduction

Attention-deficit / hyperactivity disorder (ADHD) is a neurodevelopmental disorder that affects both children and adults. ADHD is characterized by symptoms of inattention, hyperactivity, and impulsivity that can interfere with a person's ability to function in their daily life. ADHD is one of the most common neurodevelopmental disorders, with an estimated prevalence of around 5-10% among school-aged children and approximately 4% among adults [1-4].

ADHD is a complex disorder that involves a combination of genetic, environmental, and developmental factors. It can affect people of all ages and can have significant effects on a person's social, academic, and occupational functioning if left untreated. However, with proper diagnosis and treatment, many people with ADHD can lead successful and fulfilling lives [5,6].

Types of ADHD

Inattentive type

This type of ADHD is characterized by symptoms of inattention, such as difficulty paying attention to details, difficulty sustaining attention, and forgetfulness [7].

Hyperactive-impulsive type

This type of ADHD is characterized by symptoms of hyperactivity and impulsivity, such as fidgeting, restlessness, interrupting others, and acting without thinking.

Combined type

This is the most common type of ADHD and involves symptoms of both inattention and hyperactivity-impulsivity [8].

It is important to note that the symptoms of ADHD can vary from person to person and can change over time. Additionally, some individuals with ADHD may also have other co-occurring conditions such as anxiety, depression, or learning disabilities.

Attention-Deficit/Hyperactivity Disorder Effects

ADHD can have a variety of effects on a person's daily life, including:

Academic difficulties

Children and adults with ADHD may struggle with academic tasks such as paying attention in class, organizing their work, and completing assignments on time [9].

Social difficulties: People with ADHD may have difficulty with social interactions, making and keeping friends, and understanding social cues.

Occupational difficulties

Adults with ADHD may have difficulty maintaining employment, staying organized at work, and completing tasks on time.

Emotional difficulties: Individuals with ADHD may experience emotional dysregulation, mood swings, and difficulty managing stress [10].

Risk-taking behaviour

Adolescents and adults with ADHD may engage in risky behaviors such as substance abuse, reckless driving, and unsafe sexual behavior.

It is important to note that not everyone with ADHD will experience all of these effects, and the severity of the effects can vary from person to person. With proper diagnosis and treatment, however, many of these effects can be managed and individuals with ADHD can lead fulfilling lives.

Relationship between Attention-Deficit/Hyperactivity Disorder and Addiction

There is a strong relationship between ADHD and addiction, with individuals with ADHD being at a higher risk for developing addiction than those without ADHD.

Studies have shown that individuals with ADHD are more likely to engage in risky behaviours such as substance abuse and addiction, which can lead to long-term negative consequences. This may be due to the fact that ADHD can cause difficulties with impulse control, emotional regulation, and reward processing, making individuals with ADHD more vulnerable to addiction.

Additionally, some individuals with ADHD may turn to substances as a way to self-medicate and manage their symptoms, leading to a cycle of addiction and worsening of ADHD symptoms.

It is important for individuals with ADHD who are struggling with addiction to receive specialized treatment that addresses both conditions simultaneously. This may involve medication management, therapy, and lifestyle changes to promote overall health and wellness [11].

Section Snippets

Children with ADHD experience a delayed development. Two domains of hot and cold executive functions (EFs) have been described as the underlying mechanisms of ADHD. An important matter of EFs is how interaction of various components of EFs occurs at each age, so that it leads to a purposeful behavior. Delayed development in one domain

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can overshadow other domains. Childhood is considered as a critical period in the development of cognitive functions, while maturation has a significant positive [12].

Participants and Procedure

Forty-six children with ADHD symptoms (56% boys) in the age range of 6-12 years were recruited from eight primary schools. Forty-four typically developing children (54% boys) were participated in the study from the same schools. children with and without ADHD symptoms were divided into three age groups of 6-8, 8-10 and 10-12 years. Demographic information of participants is present.

Children with ADHD symptoms were included in the experiment if they met a score above the clinical

Primary Analyses

Participant with and without ADHD symptoms, as can be seen from Table 1, were not significantly different on age and gender. Group differences on these variables were tested using an overall alpha level of.05. Three subtypes of ADHD (the inattentive subtype (ADHD-I), the hyperactive/impulsive subtype (ADHD-H), and the combined subtype (ADHD-C)) were not significantly different in three ADHD age groups of 6-8 (4 ADHD-I, 4 ADHD-H and 6 ADHD-C), 8-10 (3 ADHD-I, 5 ADHD-H and 8 ADHD-C) and 10-12.

Discussion

In the present study we aimed to the impact of age in hot and cold EFs in children with and without ADHD. Children with ADHD showed lower performance in inhibitory control, working memory, set shifting, and risky decision making but intact performance in delay discounting. In line with these findings, earlier accounts states that children with ADHD symptoms generally performed poorer than children without ADHD symptoms in all hot and cold executive function tasks (e.g., Dolan and Lennox, 2013;

Conclusions

We can conclude that our study supported the hypothesis that Children with ADHD experience impaired hot and cold EFs. The cognitive delay was found only in risky decision making as a hot executive function.

CREDIT Authorship Contribution Statement

V.N. were involved in planning and supervised the work. N. R carried out the experiment, processed the experimental data, performed the analysis with support from J.F., drafted the manuscript and designed the figures with support from N.S.

Declaration of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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