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Neurocognitive Subgrouping of Attention-Deficit/Hyperactivity Disorder: A Cluster Analysis

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Introduction

Neurocognitive deficits are assumed to underlie the behavioral symptoms of attention-deficit/hyperactivity disorder (ADHD). Research over the years has indicated a variety of these neurocognitive deficits, but no single one deficit appears to be dominant in all children with ADHD. This raises the question of whether there can be further subgrouping of ADHD children at the neurocognitive level.

Objectives

This study aimed to disentangle the heterogeneous neurocognitive deficits underlying ADHD. To achieve this, this study explored the possible existence of separable neurocognitive subgroups in children with ADHD.

Methodology

One hundred and sixty-four ADHD boys and 163 typically developing boys, ages 6 to 12, were recruited. A battery of neurocognitive measures was administered. Cluster analysis was first conducted to identify subgroups of ADHD children based on their neurocognitive deficient profiles. Multivariate analysis of variance (MANOVA) or chi-square test was then employed to further explore the differences between subgroups.

Result

Two ADHD subgroups are identified. One subgroup showed multiple executive function (EF) deficits, including inhibition deficit, poor interference control, distorted temporal information processing, slow processing speed, and delay aversion. The other subgroup, on the contrary, has intact EF but showed increased response variability. The two subgroups have comparable ADHD phenotypic severity and comorbidity patterns. However, ADHD children in the Executive Function Deficits subgroup are more responsive to medication (i.e., methylphenidate). Results support the neurocognitive heterogeneity of ADHD. EF deficits and response variability are two discernable neurocognitive profiles underlying and subgrouping ADHD children of comparable severity. This subgrouping has implications for medication response, and it offers potential endophenotypes for neuroimaging and

genetic study.