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Title: Executive Functioning in Children with Developmental Delays: An Examination of Profiles

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Introduction: Executive functioning (EF) refers to higher order cognitive processes implicated in daily life such as adaptive skills and behavioral regulation. Differences in EF have been measured in children and adults with intellectual and developmental disabilities (IDD), specifically in individuals with attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD; Semrud-Clikeman et al., 2010). Minimal research has been conducted with children with intellectual disabilities (ID; Memisevic & Sinanovic, 2014) and even less research has been focused on children with developmental delays (DD). The purpose of the present study was to contribute to the emerging research on EF profiles in children with ID using a clinical comparison sample of children with DD. In addition, the impact of EF on adaptive and challenging behavior was investigated for the entire sample. This study aimed to continue the research on the role of, and common profiles of, EF in children with IDD.

Method: Ninety-three children identified with DD in early childhood were administered measures of general intelligence and neuropsychological EF tasks. Caregivers completed ratings of EF, adaptive, and challenging behavior. Data were collected as a part of a larger investigation of functional connectivity neural networks, behavior, and symptoms of children with DD (R21 MH114075; MPIS L. L. McIntyre & F. W. Sabb). Children were placed in two groups based on their Full Scale Intelligence Quotient (FSIQ) and general adaptive behavior rating. The “ID” group included children who demonstrated significant deficits in cognitive functioning and whose adaptive behavior ratings were consistent with the DSM-V diagnostic criteria for ID (i.e., full scale intelligence quotient [FSIQ] and adaptive behavior < 75). The “no ID” group included children who did not demonstrate significant deficits in cognitive functioning and whose adaptive behavior ratings were inconsistent with the DSM-V diagnostic criteria for ID (i.e., FSIQ and adaptive behavior \geq 76). Independent sample *t*-tests were used to compare EF (neuropsychological tasks and caregiver-reported) between groups. Next, the impact of EF on the sample’s adaptive and challenging behavior was measured using hierarchical linear regressions after accounting for child sex and age.

Results: Statistically significant differences were not observed in caregiver-reported EF between the ID and no ID group; however, deficits in caregiver-reported EF was noted in both groups. Notably, 28% of the ID group completed direct neuropsychological tasks whereas 74% of the no ID group successfully completed performance tasks. EF significantly contributed to models of adaptive and challenging behavior in the overall sample. EF accounted for an additional 22% of the variance in adaptive behavior and an additional 68% of the variance in challenging behavior after accounting for child age and sex.

Discussion: While no significant differences in EF were observed between children with and without behaviors consistent with ID, deficits in global EF and emotional regulation were reported by caregivers as well as deficits in behavior regulation and cognition. Notably, EF was potentially elevated to clinically elevated for the entire sample. This indicates that EF is an area of concern not only for children with ID but for children with DD. After controlling for child age and sex, EF explained unique variance on both adaptive behavior and challenging behavior. These results highlight the importance of EF in daily living skills as well as problem behavior. Given the deficits in emotional regulation across groups the variance in challenging behavior in the sample may highlight a distinct adaptive aspect of EF. Additional research is needed on the role, and profiles, associated with EF in children with ID as well as in children with DD.

References: Memisevic, H. & Sinanovic, O. (2014). Executive function in children with intellectual disability—the effects of sex, level and aetiology of intellectual disability. *Journal of Intellectual Disability Research*, 58(9), 830-837.

Semrud-Clikeman, M., Walkowiak, J., Wilkinson, A., & Butcher, B. (2010). Executive functioning in children with Asperger syndrome, ADHD-combined type, ADHD-predominately inattentive type, and controls. *Journal of Autism and Developmental Disorders*, 40(8), 1017-1027.

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