

Underlying contribution of executive functioning to cognition and academic achievement in individuals with dystrophinopathy

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Abstract: Dystrophinopathy is a genetic disorder that results in the lack of or abnormal expression of the protein dystrophin. It is a disorder that alters cell structure and function, impacts the developing brain and brain function, presents with multi-domain cognitive deficits, and influences both mood and behavior. Cognitive impairments appear to be more localized to specific areas of functioning rather than a global deficit; however, deficits have been identified across multiple cognitive domains including language and aspects of executive functioning. A careful examination of the cognitive phenotype and its association to mutations affecting CNS isoforms is necessary to clarify the neuropsychological profile. Executive functions that may contribute to overall IQ performance have not been fully examined for their contribution to cognitive efficiency as well as to real world functioning. A three-step investigation was used to examine potential areas of executive weakness, the association with mutation position, and their impact on everyday functioning for children with dystrophinopathy. First, an investigation of executive skills including behavior was conducted in children with dystrophinopathy. Additionally, the association between these executive skills and the dystrophin gene mutation position was studied. Second, the implications of these executive deficits to real world functioning were studied by examining academic performance in boys with dystrophinopathy as well as the association with mutation position. Finally, given the consistent finding of reduced digit span, specific executive weaknesses were examined for their contribution to digit span performance to further specify compromised cognitive constructs. Clearly defining cognitive functioning among individuals affected by the dystrophinopathies and the association with molecular abnormalities will help to further understand how the absence of dystrophin in the central nervous system (CNS) impacts brain development and function, influencing cognition and everyday functioning for individuals with the disorder.

Keywords: *Dystrophinopathies, dystrophin, executive skills, verbal span, verbal working memory, academics*