

Cross-sectional Developmental Trajectories of Executive Function and Relations to Theory of Mind in Autism Spectrum Disorder

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Abstract : Executive Function (EF) is a set of goal-directed cognitive skills essentially needed in problem-solving and social behavior. Developmental EF research has indicated that EF emerges early in life and marks dramatic changes before the age of 5. Research evidence has suggested that it may continue to develop up to adolescence as well, following the development of the prefrontal cortex. Over the last decade, research evidence has suggested distinguished domains of cool and hot EF, but traditionally the development of EF in Autism Spectrum Disorder (ASD) has been examined mainly with tasks that address the “cool” cognitive aspects of EF. Thus, very little is known about the development of “hot” affective EF processes and whether the cross-sectional developmental pathways of cool and hot EF present similarities in ASD. Cool EF has also been proven to have a strong correlation with Theory of Mind (ToM) in young and middle childhood in typical development and in ASD, but information about the relationship of hot EF to ToM skills is minimal. The present study’s objective was to explore the age-related changes of cool and hot EF in ASD participants from middle childhood to adolescence, as well as their relationship to ToM. This study employed an approach of cross-sectional developmental trajectories to investigate patterns of cool and hot EF relative to chronological age within ASD. Eighty-two participants between 7 and 16 years of age were recruited to undertake measures that assessed cool EF (working memory, cognitive flexibility, planning & inhibition), hot EF (affective decision making & delay discounting) and ToM (false belief and mental state/emotion recognition). Results demonstrated that trajectories of all cool EF presented age-related changes in ASD (improvements with age). With regards to hot EF, affective decision-making presented age-related changes, but for delay discounting, there were no statistically significant changes found across younger and older ASD participants. ToM was correlated only to cool EF. Theoretical implications are discussed as the investigation of the cross-sectional developmental trajectories of the broader EF (cool and hot domains) may contribute to better defining cognitive phenotypes in ASD. These findings highlight the need to examine developmental trajectories of both hot and cool EF in research and clinical practice as they may aid in enhancing diagnosis or better-informed intervention programs.

Keywords : autism spectrum disorder, developmental trajectories, executive function, theory of mind

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