Title: Predictors of Individual Differences in Language Abilities in Youth with Neurodevelopmental Disorders: Examining the Executive Function and Social Correlates of Structural and Pragmatic Language in Down Syndrome and Autism Spectrum Disorder

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Introduction: Language is a major impairment in Down syndrome (Abbeduto et al., 2007) and autism spectrum disorder (Tager-Flusberg, Paul, & Lord, 2005), and thus, has a profound impact on everyday abilities. Prior research has explored the neurocognitive associates of language and has identified executive function (EF; Schuh, Eigsti, & Mirman, 2016) and social abilities (Adamson, Bakeman, Deckner, & Romski, 2009) as domains associated with language in both groups. However, these relations have not been investigated using parent report measures, which permit a more ecologically valid description of everyday abilities in contrast to measurement techniques that are completed at one point in time in a research laboratory. Furthermore, studies examining biological correlates of language have yielded mixed findings on sex differences in language in these groups (Cuskelley, Povey, & Jobling, 2016; Martin et al., 2017; Howe et al., 2015). Thus, the current study utilizes informant report measures to examine the relations between both structural (non-social) and pragmatic (social) domains of language and executive and social functioning as well as the nature of sex differences in language in youth with DS and those with ASD.

Method: Participants included 68 individuals with Down syndrome (M_age = 12.9, 48% male) and 108 youth with autism spectrum disorder (M_age = 7.6; 81% male). Participants with DS were recruited from studies completed at the National Institute of Mental Health and Drexel University; data from participants with ASD were aggregated from the National Database of Autism Research. Parents of participants completed informant reports of language, using the Children’s Communication Checklist-II, EF, using the Behavior Rating Inventory of Executive Functioning, and social abilities, measured by the Vineland Adaptive Behavior Scale or the Adaptive Behavior Assessment System.

Result: Four multiple regression analyses (two per diagnostic group) were conducted in parallel to examine whether executive and social abilities predicted structural or pragmatic language in DS and ASD. Sex differences were investigated with a 2 x 2 univariate analysis of variance, in which the effects of sex (male v. female) and diagnostic group (DS v. ASD) on language were examined. In DS, social (β = .025, p=.006), but not executive (β = - .032, p>.05), abilities predicted structural language, whereas both social abilities (β = .378, p=.005) and EF (β = -.316, p=.017) predicted pragmatic language. In ASD, social and EF predicted both structural (social: β = .288, p=.01; EF: β = -.23, p=.04) and pragmatic (social: β = .421, p<.001; EF: β = -.384, p<.001) language. Finally, sex differences (males-females; p<.003) in structural language were found in Down syndrome, but not ASD (p>.8). Sex differences in pragmatic language abilities (males < females; p=.02) were observed in the entire sample, but sex differences didn’t vary as a function of diagnostic group (p>.7).

Discussion: Findings from the current study draw attention to the differential relations between language, social, and executive functioning in two neurodevelopmental disorders. In particular, EF was associated with structural language in ASD, but not DS. In ASD, social abilities contributed greater variance than EF to both structural and pragmatic language. Finally, sex differences in structural language were pronounced in DS, highlighting a particular vulnerability in language for boys in this group. These results have implications for informing the development of interventions targeted to improve these cognitive abilities and suggest that interventions targeting each of these domains may have reciprocal influences on the others. Future longitudinal and intervention research may inform our understanding of the directional relationship among these variables and prioritize interventions that not only improve language but related domains of functioning as well.

References/Citations:

