Title: Exploratory Factor Analysis of Two Measures of Behavior in Children with Autism Spectrum Disorder

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Introduction: Children with Autism Spectrum Disorder (ASD) demonstrate varying degrees of impairments in social communication. Social communication includes verbal and non-verbal abilities central to social interactions (Wetherby, Watt, Morgan & Shumway, 2006). Considered one of the core features of ASD, children’s social communication abilities are frequently targets for intervention. Employing reliable and valid measures of social communication is vital to evaluation and dissemination of effective treatments. A recent extensive review on measurement of social communication evaluated 38 measures and deemed 6 appropriate for use, with limitations (Anagnostou et al., 2015). Authors posited the Aberrant Behavior Checklist (ABC), originally designed to measure treatment effectiveness through overall psychological and behavioral disturbances, has potential for measuring social impairments through its’ social withdrawal scale (Aman, et al., 1985). Although items on this measure may not capture the whole construct of social communication it has been widely validated for use in children with ASD and used extensively in clinical trials. Conversely, the Social Responsiveness Scale is a reliable and valid measure of social impairment and repetitive/stereotypic behavior as a single trait but authors caution against its use as an outcome measure citing the lack of factor analysis and need for further validation (Anagnostou et al., 2015). The purpose of this study was to complete the first step in the complex process of scale development through factor analysis and item selection of both the ABC and the SRS.

Methods: Data utilized came from the Simon Simplex Collection which includes data from children with ASD ages 4-18 years and their siblings. Participants completed the Social Responsiveness Scale (SRS) and the Aberrant Behavior Checklist (ABC) among other measures. Total participants were 2851 children with ASD. First items solely focused on repetitive behaviors were removed. Commonly accepted guidelines on exploratory factor analysis suggest items with loadings above .60 are reliable regardless of sample size (Fabrigar, Wegener, MacCallum & Strahan, 1999). Additionally, it was necessary to examine cross loadings to ensure items did not load highly on multiple factors. Finally, it is beneficial to examine face validity of the item and the contribution it makes to the larger factor. Authors used these procedures to guide which items to remove.

Results: Exploratory Factor Analysis (EFA) was performed to assess the structure of the subscales of the SRS as well as item-analysis of the ABC. Factor analysis also enabled authors to extract socially-related items from these measures. Normality and linearity were examined, the anti-image matrix showed all correlations well above .5 and Bartlett’s test for sphericity was significant. After several iterations of EFA, a single factor explained approximately 25% of total variance, with additional factors representing relatively low percentages of variance (e.g., ~6%).

Discussion: These preliminary results suggest that social communication may be best represented by a single factor, at least in children with ASD, and that items tapping a number of differently labeled social constructs (defined on these measures as “social withdrawal,” “social cognition” and “social awareness”) have substantial overlap. These results also suggest that a unidimensional IRT model is likely to be adequate for conceptualizing social communication.

References/Citations: