Title: Psychometric Analysis and Measurement Invariance of a Measure of Challenging Behavior in Infants and Toddlers with Autism Spectrum Disorder

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Introduction: Individuals diagnosed with Autism Spectrum Disorder (ASD) often present with high rates of challenging behavior and comorbid psychiatric disorders. Challenging behavior, which can take the form of tantrums, aggression, or self-injury (American Psychiatric Association, 2013) can occur in as many as 75-93% of school-age children with ASD (Chandler et al., 2015). Age at which children receive a diagnosis of ASD has steadily decreased. Research now supports that a reliable diagnosis can be made by the second year of life (Johnson et al., 2007). Similar to school-aged children and adolescents, many of these early-identified children present with challenges such as emotional dysregulation and behavior problems (Zwaigenbaum et al., 2015). While previous research has adeptly described the wide variety of challenging behaviors’ potential occurrence in adults, adolescents and school-aged children, there is inadequate information available on infants and toddlers with ASD. Contributing to the difficulty of collecting reliable data on this population is the variability among instruments used to assess challenging behavior. This study examines novel psychometric elements of a commonly used measure of challenging behavior, the Child Behavior Checklist (CBCL) in a group of very young children diagnosed with ASD.

Method: Charts from four-hundred, ninety-six toddlers aged 18-48 months with and without a diagnosis of ASD were examined for information on challenging behavior, cognitive ability, expressive language, adaptive behavior and other demographic information. In the ASD group, on average, children were 32.95 months old (SD=7.9), ranging from 18 to 48 months, 76.4% were male and 73.5% were White, not of Hispanic origin. The instrument examined in this study was the Child Behavior Checklist (CBCL). Informants rate child behavior on a 3-point Likert scale (0=not true, 1=somewhat or sometimes true, 2=very true or often true). Psychometrics of the CBCL were analyzed including internal consistency, factor structure in this population, and measurement invariance. The current study examines the previously established hierarchical factor structure of the CBCL. This consists of 2-higher order factors: internalizing and externalizing problems; each with respective lower order factors classified as subscales. Four lower-order factors contribute to the internalizing domain, while two lower-order factors contribute to the externalizing domain. After evaluating fit of the previously established factor structure in very young children with ASD, measurement invariance (MI) was evaluated, comparing ‘non-ASD’ and ‘ASD’ groups. MI is typically assessed through multigroup confirmatory factor analyses, which examines changes in various goodness-of-fit indices as increasing constraints are imposed on the models. Models are nested and examined in a progressive sequence starting with configural invariance, with each subsequent analysis (metric and scalar) dependent on fit statistics and direct comparisons of nested models. As all items are ordinal, robust weighted least squares (WLSMV) was used for all MI analyses.

Results: Internal consistency values were strong for externalizing, internalizing and total problems subscales for both the CBCL and C-TRF in the ASD group and the non-ASD group. Results from the CFA indicated acceptable fit for the tested model with 6-first order factors and 2-second order factors. Due to the complexity of the structure of the CBCL, large number of factors and items, as well as sample size of the non-ASD group, measurement invariance was assessed for each subscale individually (i.e. emotionally reactive, anxious/depressed, somatic complaints etc.). All three levels of measurement invariance were tested for each subscale. The Emotional Reactivity, Anxious/Depressed, Withdrawn, and Aggressive Behavior subscales achieved scalar invariance, while the attention problems subscale achieved metric invariance and somatic complaints subscale did not achieve configural invariance.

Discussion: Overall, the CBCL had strong internal consistency in both ASD and non-ASD samples, congruous with coefficient α scores from the normed sample. The overall high internal consistency values for the current sample imply reliability among the subscales and higher-order factors for these groups of very young children with and without ASD. This study is one of the only of its kind to evaluate the factor structure of the CBCL 1.5-5 in a large, well characterized sample of very young children with ASD. Previous work has either only examined the unidimensionality of individual scales due to small sample size or performed a
confirmatory factor analysis on the same sample for which an exploratory factor analysis was performed. Standardized item loading values indicated that the existing factor structure had good convergent validity. Good model fit by several fit statistics indicates the current CBCL constructs and conceptualization of challenging behavior specifically with a young group of children with ASD is consistent with the nature of the previously conceptualized constructs. These findings support the use of the CBCL in a clinical setting to assess level of challenging behavior in very young children with ASD. With regard to measurement invariance, a sufficient level of measurement invariance was established for the Emotionally Reactive subscale, Anxious/Depressed subscale, Withdrawn subscale, and Aggressive Behavior subscale, implying the subscales measure the constructs in similar enough ways that the resulting scores can be compared across groups. A child with ASD’s score on the Aggressive Behavior subscale should be just as informative as a child without ASD’s score. Due to the lack of scalar invariance on two subscales, using only item level data is appropriate when comparing children with and without ASD on the Somatic Complaints, and Attention Problems subscales. Overall, results demonstrated support for the construct validity of the CBCL in a group of very young children with ASD. Additionally, the structure of the subscales and higher order factors is effective in this group of young children. Interestingly, when comparing instrument properties directly between groups of children (ASD and non-ASD), results indicated some subscales may not be accessing the same constructs in each group. Although this sample of non-ASD children were unique, results provide support for continued examination of these properties in other groups of children to ensure researchers are making valid comparisons. In conclusion, from a clinical perspective, the CBCL can be considered a reliable instrument for identifying challenging behavior in very young children with ASD or other significant learning or behavioral concerns. This information can then be used to inform intervention planning and direct treatment goals.

References:


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