Title: Longitudinal Patterns of Parent-Reported Sensory Responsiveness in Toddlers with Autism

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Introduction: Atypical behavioral responses to external stimuli are a common feature of autism spectrum disorder (ASD) (Baranek et al. 2006). There is some evidence suggesting that these behaviors may emerge early in development and before the average age of diagnosis (Freuler et al., 2012; Wolff et al., 2017). Sensory responsiveness and unusual sensory interests have only recently been included as part of diagnostic criteria under DSM 5, where they appear under the domain of restricted and repetitive behaviors. In the present study, we sought to further elucidate the early development of sensory responsiveness through two aims: 1) characterize patterns of sensory responsiveness across ages 12 to 24 months in toddlers with and without ASD, and 2) examine the relation of sensory response measures to subtypes of restricted and repetitive behavior.

Method: Participants were part of an ongoing longitudinal study of infants at high and low familial risk for autism. Children were categorized into three groups based on risk and diagnostic status at age 2 years: high-risk with ASD (HR-ASD; n = 74), high-risk not meeting diagnostic criteria for ASD (HR-Neg; n=257), and low-risk controls without ASD (LR-control; n = 135). Parents completed the Sensory Experiences Questionnaire, version 2.1 (SEQ; Baranek et al. 2006), and the Repetitive Behavior Scale – Revised (RBS-R; Bodfish et al. 2000) at 12 months and 24 months of age. Longitudinal profiles for the SEQ were analyzed using a linear mixed model framework.

Results: At age 12 months, omnibus tests indicated that the groups differed from one another on for Total SEQ score ($F = 9.6, p < 0.0001$), hyper-responsivity ($F = 8.8, p = 0.0002$), hypo-responsivity ($F = 3.1, p = 0.047$), sensory seeking ($F = 12.7, p < 0.0001$), and auditory ($F = 7.3, p = 0.0008$) and tactile ($F = 8.7, p = 0.0002$) modality scores. At age 24 months, omnibus test results indicated that groups differed from one another on all scales derived from the SEQ at $p < 0.0001$. Post-hoc tests indicated that the HR-ASD group scored uniformly higher than HR-Neg, with differences increasing over time. Unexpectedly, low risk controls scored significantly higher than HR-Neg on all scales and were overall intermediate to HR-Neg and HR-ASD. At both the 12 and 24-month time points, most subscale scores from the RBS-R were correlated with most measures derived from the SEQ, with Time 2 associated with stronger and more uniformly significant correlations across scores.

Discussion: We found that parent-reported sensory responsiveness differed between high-familial risk toddlers who did and did not later meet diagnostic criteria for ASD as early as age 12 months. Differences were characterized at both 12 and 24 months of age by higher parent reported frequency of responses to sensory stimuli among children who developed ASD relative to high risk children who did not. Results from our longitudinal analyses indicated that frequency of sensory responsiveness increased overall for children with ASD over the second year of life, while decreasing for children who did not develop the disorder. In contrast to studies of older children with ASD (e.g. Boyd et al. 2010), we did not see specificity with regard to relations between repetitive behavior and sensory response subtypes, but rather a general pattern of association. While there are several advantages to the use of parent-reported scales, there are also inherent limitations. Measures such as the SEQ and RBS-R are indirect and thus vulnerable to rater bias, and this may have contributed to the unexpected pattern of results seen in LR-controls.

References/Citations: