Title: Prevalence and Differentiating Patterns of Sensory Symptoms Among 3-year-olds With and Without ASD

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Introduction: Sensory symptoms have been frequently observed in children with autism spectrum disorder (ASD) and considered as central to the diagnosis of ASD (Robertson & Baron-Cohen, 2017). Given the great heterogeneity in atypical sensory features reported in both ASD and non-ASD populations (Baranek et al., 2014; Little et al., 2016), large-scale epidemiological studies are needed to examine how ASD can be distinguished from other conditions based on sensory features. A recent general-population-based study reported a large difference in the prevalence of sensory symptoms in 8-year-olds with ASD (53.6%) vs. non-ASD conditions (8.0%), and found that tactile and auditory hypersensitivity predicted an ASD diagnosis (Jussila et al., 2019). To add to the evidence, the current study used the Sensory Experiences Questionnaire (SEQ v2.1; Baranek, 1999), a well-validated parent-report measure of children's responses to sensory stimuli in the contexts of daily activities, to examine the prevalence of sensory symptoms across a community sample of 3-year-olds. We also aimed to clarify whether differentiating patterns of sensory symptoms were present among ASD and non-ASD conditions.

Method: 6,657 parents who participated in a previous data collection of a longitudinal study were invited to complete a set of online surveys when their child reached 3 years of age: the SEQ, the Developmental Concerns Questionnaire (DCQ; Reznick et al., 2005), and the Social Responsiveness Scale (SRS-2; Constantino & Gruber, 2012). A total of 2,198 parents returned complete responses. The DCQ and SRS were used for determining the child’s diagnostic status (i.e., ASD and/or other non-ASD diagnoses, resulting in 3 diagnostics groups: ASD (N=71), other diagnoses (OD, N=131), and no diagnosis (ND, N=1,996). Wald chi-square tests were used to detect diagnostic group differences in the proportion of participants with various levels of severity (SEQ total score ≤1, >1 or >2 standard deviations [SD] of the mean). The main effects of diagnostic group on the SEQ subscale scores by sensory response patterns (hyperresponsiveness, hyporesponsiveness, and sensory seeking), by contexts (social and non-social), and by modalities (tactile, auditory, visual, gustatory/olfactory, and vestibular/propr ioceptive) were assessed using analysis of covariance (ANCOVA) with sex as a covariate.

Results: 77.5% of children with ASD in our sample had elevated sensory symptoms (i.e., SEQ total score >1 SD) in contrast to the overall prevalence of 16.0%. 59.2% of children with ASD had a total score >2 SD, as compared to 2.3% and 2.8% in the OD and ND groups (odds ratio [OR]=61.8 for ASD vs. OD, and 51.1 for ASD vs. ND, p<.001). The ASD group scored significantly higher in all the subscales than the other two groups (F=71.0-332.3, p all<.001) when adjusting for sex. The main effects of diagnostic group are particularly large for hyperresponsiveness, hyporesponsiveness, social context, tactile and visual stimuli (F all>300, p all<.001). The OD group did not differ from the ND group in the subscales of sensory seeking, auditory, and vestibular/propr ioceptive stimuli, while scoring significantly higher in all the other subscales (p all<.05).

Discussion: The estimated prevalence of sensory deficits was significantly higher in 3-year-olds with ASD, consistent with previous findings on a school-aged general population (Jussila et al., 2019). 2.7% of the children with non-ASD conditions did show severe sensory symptoms (total score >2 SD), indicating the possibility of sensory processing disorder in the preschool-aged general population. The results also revealed that ASD can be distinguished from non-ASD based on parent-report sensory symptoms. Specifically, largest group differences were found in hyperresponsiveness and hyporesponsiveness, consistent with the findings of Baranek et al. (2006) using the same measure with a smaller convenient sample. The group differences observed in both social and non-social contexts might indicate more general deficits in sensory responsiveness regardless of social factors in children with ASD. These differentiating sensory patterns across diagnostic groups may have implications for the etiology of sensory challenges comorbid with different developmental conditions, as well as for assessments and interventions.
References:


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