**Title:** Sensory Experiences as They Relate to Naturalistic Social Engagement in Children with Neurogenetic Conditions

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**Introduction:** Children with Neurogenetic Conditions (NGC) have been shown to exhibit a range of sensory profiles and abilities regarding social communication1,2. A subset of profiles are similar to those reported among children with autism spectrum disorder (ASD), and it is known that sensory processing difficulties predicts later social communication deficits in ASD3,4. Although these associations are well established in children with ASD, it is less clear how sensory experiences may intersect with social communication in children with NGC, especially during everyday experiences such as play. The current study aims to identify how sensory profiles in children with NGC differ from those of typically developing children. Secondarily, this study aims to understand how naturalistic social engagement with a caregiver differs for children with sensory processing difficulties within NGC groups.

**Methods:** Caregivers of children diagnosed with Angelman Syndrome (AS; n=51), Down Syndrome (DS; n=37), and typically developing children (TD; n=69) were invited to participate in two studies aimed at developing appropriate and accessible remote assessment tools for children with NGC. Across both studies, caregivers completed the Sensory Experiences Questionnaire (SEQ) when their child was approximately 24 months (M=28.75, sd=9.64)5. A subset of participants (AS=11, DS=22, TD=14) participated in an additional telehealth-based assessment. Here, participants were mailed video equipment and a standardized set of toys and, as part of the session, were asked to engage in a 10-minute, play based, naturalistic parent-child interaction (PCI). Participants repeated the activities up to 3 times at six months intervals and completed an average of 1.91 PCI, resulting in a total of 99 PCI recordings (AS=21, DS=47, TD=31). Parent and child behaviors were coded frame by frame to identify states of joint engagement throughout the session. Participants were dichotomized based on SEQ subscale scores (hyperresponsive, hyporesponsive, social, and nonsocial) to identify typical or atypical sensory processing patterns. Analyses included the one-sample median test to test for presence of sensory profiles within groups, and Mann-Whitney U to test for within group differences in coordinated joint engagement dependent on sensory profiles.

**Results:** Atypical sensory profiles were present across all groups (AS=56.9%, DS=35.1%, LRC=11.6%) at rates statistically greater than 0 (*p’s*<.001). Participants in the AS group with total sensory profiles in the “typical” range spent a greater percentage of time in coordinated joint attention than those in the “atypical” range (*p*=0.052). Participants in the DS group with hyperresponsive and nonsocial sensory profiles in the “typical” range spent a greater percentage of time in coordinated joint attention than those in the “atypical” range (hyperresponsive; *p=*.048, nonsocial; *p=*.034), respectively. No differences in percentage of time in coordinated joint attention were seen in the TD group across sensory profiles.

**Discussion:** The goals of this study were to first identify the presence of sensory processing difficulties in children with NGC. We then aimed to examine naturalistic play to understand how social engagement within NGC groups differs when sensory processing difficulties are present. As expected, children with AS and DS exhibited higher base rates of sensory processing difficulties than TD children. To better understand the impact of atypical sensory processing on children with AS and DS, behavioral observations were examined. Sensory processing difficulties within the NGC groups associated with less time spent in coordinated joint engagement. However, different patterns emerged for the two groups. Global sensory processing difficulties showed associations with lower coordinated joint engagement for children in the AS group, while only hyperresponsivity and nonsocial sensory processing difficulties were significant for the DS group. These findings show that for children with DS, nonsocial sensory stimuli such as environmental noise, bright lights, and new textures may interfere with their social communication abilities. Future work should extend these findings beyond parent report of sensory profiles by examining behavioral responses to naturalistic sensory stimulation during play. This work may inform sensory based interventions for social communication in NGC groups.

**References/Citations**

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