Title: Sensory Processing and Anxiety Symptoms in Preschool Children with Fragile X Syndrome and Autism Spectrum Disorder

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Introduction: Children with neurodevelopmental disorders such as Fragile X Syndrome (FXS) and Autism Spectrum Disorder (ASD) are at an increased risk for experiencing atypical sensory processing and anxiety symptoms (Sinclair, Oranje, Razak, Siegel, & Schmid, 2017). FXS is a monogenic disorder characterized by social communication deficits and intellectual disability. Children with FXS often show sensory processing difficulties that impact their adaptive skills and daily functioning (Baranek et al., 2002). ASD is a neurodevelopmental disorder characterized by the presence of social, communication difficulties and restrictive repetitive behaviors. Atypical sensory processing is evident and predictive of ASD diagnosis early in life (Zwaigenbaum et al., 2005) and is known to impact social and adaptive functioning abilities (Sinclair, Oranje, Razak, Siegel, & Schmid, 2017). In addition, FXS and ASD are both associated with elevated rates of anxiety, with prevalence estimates ranging from 50%-86% (Cordeiro, Ballinger, Hagerman, & Hessl, 2011; White, Oswald, Ollendick, & Scahill, 2009). While there is an established link between anxiety symptoms and atypical sensory processing in children with ASD, this has yet to be examined in children with FXS, or compared to children with ASD, despite high co-occurrence rates of anxiety (Green & Ben-Sasson, 2010; Lane, Reynolds, & Dumenci, 2012; Wigham, Rodgers, South, McConachie, & Freeston, 2015). The first purpose of this study is to determine whether children with FXS differ from children with non-syndromic ASD and low-risk typically developing controls in atypical sensory processing and anxiety symptomology. The second purpose is to determine the association between atypical sensory processing and anxiety symptoms in children with FXS and ASD contrasted to low-risk controls.

Method: Participants (n = 82) included 35 children with FXS, 20 children with non-syndromic ASD, and 27 typically developing (TD) controls between the ages of 3-6 years old who are participating in an ongoing study. Parents of participants completed the Sensory Experiences Questionnaire (SEQ), a parent-report measure designed to characterize sensory behaviors in young children with ASD, developmental delay, or typically developing (Baranek, David, Poe, Stone, & Watson, 2006). The total sensory raw score was used for analysis. The Anxiety, Depression, and Mood Scale (ADAMS) is a parent-reported screening measure for symptoms of anxiety and depression for typically developing individuals and those with developmental disabilities (Esbensen, Rojahn, Aman, & Ruedrich, 2003). The General Anxiety subscale was used for analysis. We tested group differences in levels of sensory processing behaviors and anxiety symptoms across the FXS, ASD, and the TD group using a one-way analysis of variance (ANOVA). We then assessed the association between sensory behaviors and anxiety symptoms across all groups using a multiple regression approach with group as a moderator.

Result: Results indicated significant differences in atypical sensory processing ($F(2, 79) = 11.68, p < 0.01$) and anxiety symptoms ($F(2, 79) = 17.26, p < 0.01$) between all groups. FXS and ASD were both significantly higher in sensory processing difficulties and anxiety than the TD group, and the ASD group demonstrating the highest levels of sensory and anxiety symptoms overall. Results of the multiple regression model showed that the overall model was significant and accounted for approximately 44% of the variance in anxiety symptomatology ($F(5, 76) = 11.93, p < 0.01$, $R^2 = .44$). There were significant group differences for anxiety symptoms between FXS and TD ($b = -2.74, p < .001$), with the FXS group predicted to score approximately 3-points higher on anxiety symptoms than the TD group, but no differences between FXS and ASD ($b = 0.89, p = 0.398$), when holding sensory processing constant at the mean. In addition, there was no difference in the effect of sensory processing on anxiety as a function of group, between either the FXS and TD ($b = -1.00; p = 0.612$), or the FXS and ASD ($b = 2.48; p = 0.176$).

Discussion: These preliminary findings are consistent with previous research showing elevated atypical sensory processing and anxiety symptoms in clinical samples with FXS and ASD compared to TD children. These results
support prior research in ASD, and provide novel findings for FXS, that a relationship between atypical sensory processing and anxiety symptoms are present in the first 5 years of life. This association indicates that atypical sensory processing may serve as an early indicator of subsequent anxiety for children with neurodevelopmental disorders. Identification of early indicators of anxiety can aid in the early diagnosis and treatment of anxiety disorders, in turn, reducing the negative impact on quality of life and functional skills in children with neurodevelopmental disabilities. Further research is necessary to examine what additional factors may contribute to elevated levels of atypical sensory processing and anxiety symptoms in children with FXS.

References/Citations:


