

Relationship Between Parent-Reported Anxiety and Parent-Reported Sensory Sensitivity in Females with and Without Autism Spectrum Disorder (ASD)



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Background

Autism Spectrum Disorder

- Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by difficulties in social interaction, social reciprocity, and restrictive and repetitive behaviors (APA 2013). Autism Spectrum Disorder is more commonly diagnosed in males than in females; the current diagnostic ratio is 3:1 (Ratto 2017).

Sensory Sensitivity in Females with ASD

- Compared to typically developing (TD) females, females with ASD are more likely to demonstrate sensory hypersensitivity and hyperreactivity (Taylor, 2020).
- Sensory issues are more commonly found in females with ASD, while males typically demonstrate more stereotyped behaviors and restrictive interests (Taylor, 2020).
- Sensory sensitivity has been reported as overwhelming and affecting quality of life in females with ASD (Milner, 2019).

Elevated Anxiety in ASD

- Although TD females are more likely to be diagnosed with anxiety than TD males, ASD females and males are significantly more likely to be diagnosed with anxiety than their TD counterparts (Kirsh, 2019).
- Generalized anxiety disorder and social anxiety are common forms of anxiety experienced (Kirsh, 2019).

Sensory Sensitivity and Anxiety

- Previous studies have demonstrated a correlation between parent-reported sensory sensitivity and anxiety (Corbett, 2016).
- There is a link between sensory over-responsivity and anxiety, with hyperarousal co-occurring with sensory overstimulation frequently (Green, 2010).

Current Study

- The current study examined the correlation between parent-reported anxiety and sensory sensitivity in 4 adolescent groups: ASD females, typically developing (TD) females, ASD males, and TD males.
- Specifically, differences in anxiety and sensory sensitivity between ASD females and TD females were explored.
- It was hypothesized that ASD females will show significantly more anxiety and sensory sensitivity than TD females. ASD females and ASD males will demonstrate a significant correlation between sensory sensitivity and anxiety, while TD males and females will not.

Methods

Participants

- All participants were recruited through a 4-year longitudinal study between ages 10-13 years with an average age of 11.55 years. Assessment for ASD was conducted using the ADOS-2, and all subjects have an average to above average IQ (>70).

Figure 1: Participant Sex and Diagnosis

Group	Female	Male	Total
ASD	35	105	140
TD	44	60	104
Total (Within Sex)	79	165	244

Short Sensory Profile

- The Short Sensory Profile (SSP) is a parent report measuring overall sensory sensitivity in children ages 3-18 (Williams, 2018).
- There are seven domains: tactile sensitivity, taste/smell sensitivity, movement sensitivity, underresponsive/seeking sensation, auditory filtering, low energy/weak, and visual/audio sensitivity.
- In this project, overall sensory sensitivity is used.

Multidimensional Anxiety Scale for Children (Parent Report)

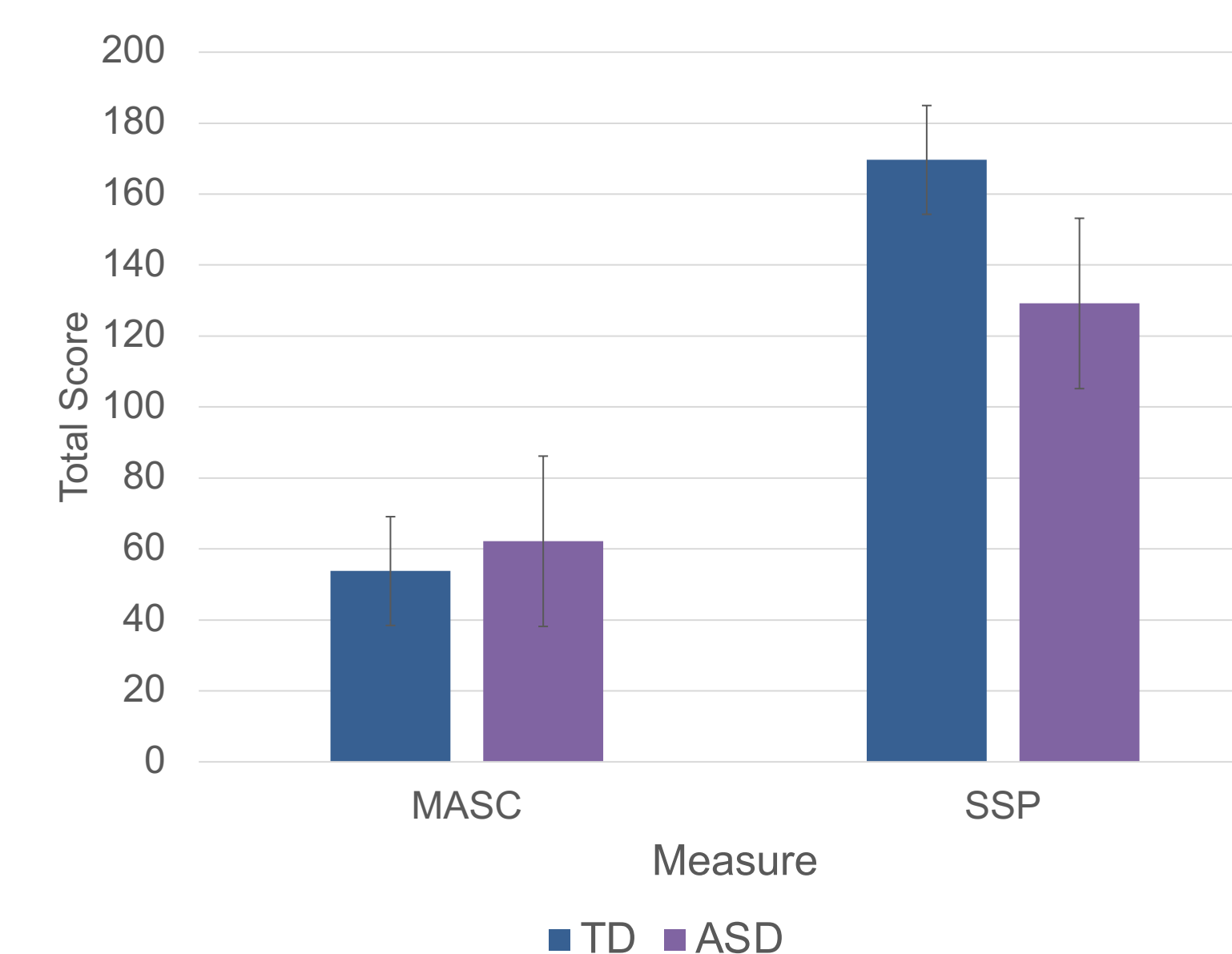
- The Multidimensional Anxiety Scale for Children Parent Report (MASC-P) is a parent report measuring anxiety symptoms in children up to 18 years (Wei, 2014). There is also a self report children can complete.
- The MASC is helpful in predicting diagnoses of Generalized Anxiety Disorder, as well as social anxiety (Wei, 2014).
- This measure provides a total anxiety score, along with subscales Physical Symptoms, Harm Avoidance, Social Anxiety and Separation/Panic (Wei, 2014).
- In this study, the overall total was used.

Statistics

- Independent sample t-tests were conducted to compare the anxiety scores and sensory sensitivity scores of the TD and ASD female groups.
- Pearson correlations were conducted to test the correlation between sensory sensitivity and anxiety in ASD females, TD females, ASD males, and TD males.

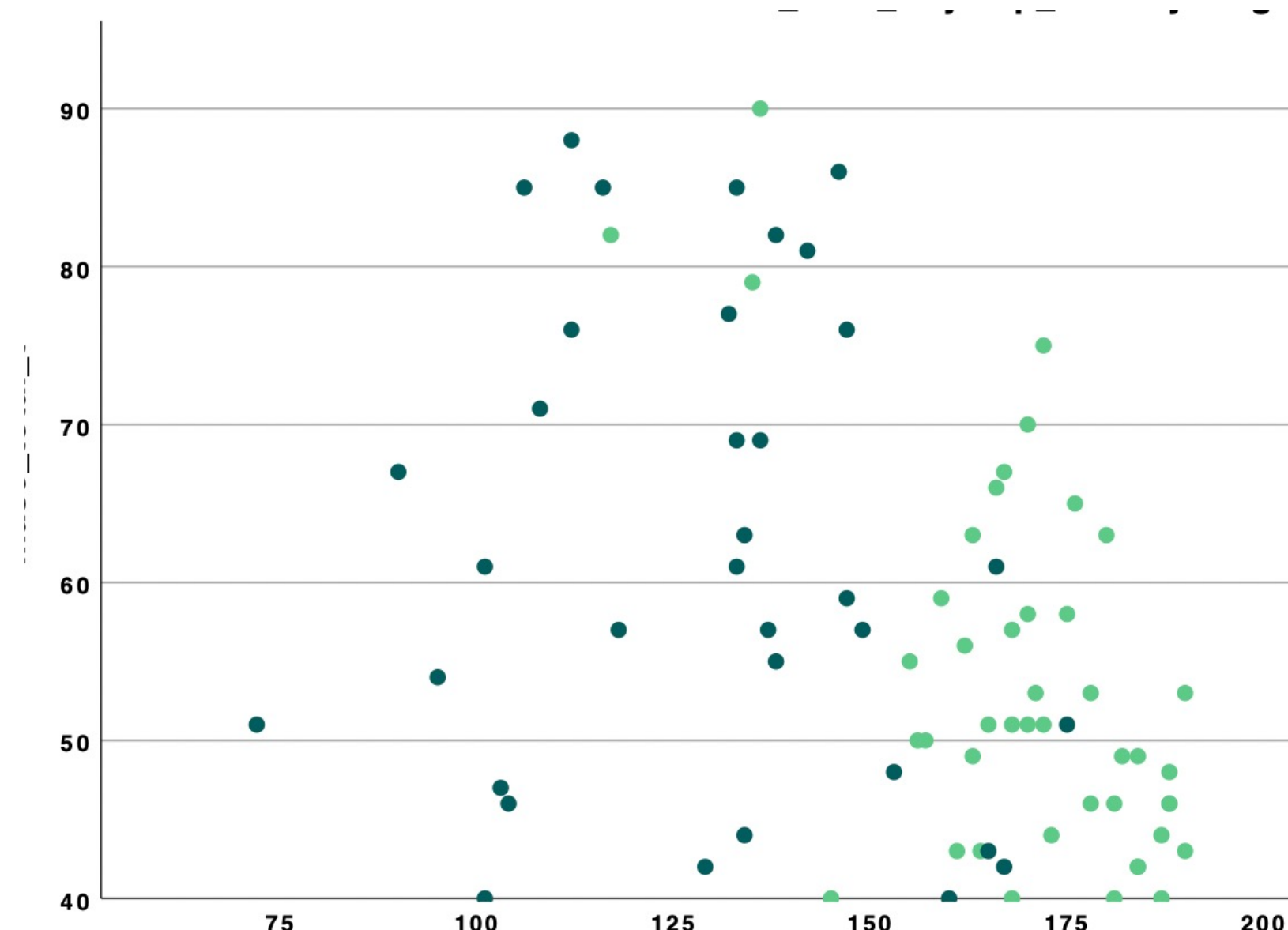
Results

Figure 2: MASC-P and SSP in ASD and TD Females



- There was a significant difference in anxiety total score $t(63.14) = 2.67, p=0.01$ and SSP total score $t(57.02) = 8.72, p<0.001$ between TD females and ASD females.

Figure 3: Correlation Between MASC-P Total and SSP Total in Females



There is a significant correlation between SSP total score and MASC-P score in TD females (green), while there is no noticeable correlation between these two variables in ASD females (blue).

Figure 4: Correlation Between MASC-P and SSP Total in ASD Females, TD Females, ASD Males and TD Males

Sex	Diagnosis	Correlation	Sig. (2-tailed)
Female	ASD	-0.13	0.45
Female	TD	-0.59	<0.001*
Male	ASD	-0.47	<0.001*
Male	TD	-0.51	<0.001*

- There is a significant correlation ($p<0.001$) between MASC-P score and SSP score in ASD males, TD males, and TD females.
- There is no significant correlation in ASD females.

Discussion

Summary

- As hypothesized, sensory sensitivity and anxiety were significantly elevated in ASD females, suggesting a significant impact on quality of life as reported by autistic adults.
- There was a strong correlation between sensory sensitivity and anxiety in ASD males, TD males, and TD females; yet, there was no significant correlation in ASD females.
- Examination of the data revealed the notable variability in the female ASD group highlighting the heterogeneity of the female phenotype of autism.
- The presence of a correlation in males with ASD and its agreement with prior research further underscores the need for focused studies on females with ASD.

Limitations

- The SSP only measures overall sensory sensitivity, and does not differentiate between hyperreactivity and hyporeactivity. In this project, specific categories were also not examined.
- The N of the ASD females was small and the smallest group in this sample.
- The MASC interrater reliability between parent and self-report is low. Children may perceive their own anxiety differently than what their parents observe.

Future Directions

- Measures specifically targeting hypersensitivity in ASD females may show different results or what domains may affect females more.
- Larger samples of females with ASD throughout childhood and puberty need to be studied to gain understanding of a female phenotype.
- Programs for teachers and new clinicians emphasizing female autism phenotype would help in diagnosing females earlier and learning about different symptoms (Whitlock, 2020).

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