



# Social Cognition and Social Anxiety in Neurodevelopmental Disorders

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## INTRODUCTION

- Youth with neurodevelopmental disorders (ND), specifically Autism Spectrum Disorder (ASD) and Attention-Deficit Hyperactivity Disorder (ADHD) present with:
  - Notable social impairment<sup>1,2</sup>
  - Heightened rates of social anxiety<sup>3,4,5</sup>
  - Deficits in social cognition<sup>6,7,8</sup>
- Social anxiety and social cognitive deficits linked to poor functional outcomes in youth with NDs<sup>9</sup>
- Exploration of the impact of social anxiety and social cognition on functional impairment in youth with neurodevelopmental disorders is critical to ongoing work in implementation science

## METHODS

- 34 participants referred to a university-affiliated clinic for comprehensive diagnostic assessment services (Table 1)
- 50% diagnosed with ASD; 50% with ADHD *without* ASD
  - Matched on parent-reported degree of social anxiety

Table 1. Demographic Data

(n = 34)			
Race	N (%)	Mother Education	N (%)
Caucasian/White	31 (91.2%)	Completed 10 <sup>th</sup> grade	1 (2.9%)
Other	1 (2.9%)	Graduated High School/GED	5 (14.7%)
		Trade/Business School	1 (2.9%)
		College/Specialized Training Program	11 (32.4%)
Ethnicity		Graduated College	10 (29.4%)
Hispanic	2 (5.9%)	Completed Graduate School	6 (17.6%)
Non-Hispanic	32 (94.1%)		
Gender		Father Education (n = 30)	
Male	24 (70.6%)	Completed 10 <sup>th</sup> grade	1 (3.3%)
Female	10 (29.4%)	Graduated High School/GED	5 (14.7%)
		Trade/Business School	5 (14.7%)
		College/Specialized Training Program	8 (23.5%)
Diagnoses		Graduated College	7 (20.6%)
ASD	17 (50%)	Completed Graduate School	4 (11.8%)
ADHD	26 (76.5%)		
		M (SD)	Range
Age		12.35 (2.77)	7 – 17
Full Scale IQ (FSIQ) <sup>1</sup>		95.59 (17.23)	50 - 132
Family Income (n = 23)		\$82,135 (43,784)	\$13,525 – \$200,000

Notes. 1. FSIQ measured by the WISC-IV<sup>10</sup>; WISC-5<sup>11</sup>; or WAIS-IV<sup>12</sup>

## METHODS: MEASURES

- Screen for Child Anxiety and Related Emotional Disorders (SCARED)<sup>13</sup>
  - 7-item index of social anxiety (SA-Parent); ↑ scores = ↑ anxiety
- Social Responsiveness Scale, Second Edition (SRS-2)<sup>14</sup>
  - 12-item social cognition subscale (SRS-2-SC); ↑ scores = ↑ impairment
- Vineland Adaptive Behavior Scales, 2<sup>nd</sup> Ed.<sup>15</sup> and 3<sup>rd</sup> Ed.<sup>16</sup>
  - Vineland Adaptive Behavior Composite (VABC): index of communication, socialization, and daily living skills; ↑ scores = ↑ adaptive functioning

Table 2. Descriptive Data

	Youth with ASD (n = 17)			Youth with ADHD (n = 17)		
		%			%	
	α	M (SD)	Clinical Range	M (SD)	% Clinical Range	Range
SCARED Total	.945	35.71 (14.96)	76.5%	23.29 (16.22)*	29.4%	2 – 66
SA-Parent	.935	8.71 (4.90)	58.8%	8.52 (4.72)	58.8%	0 – 14
SRS-2 Total (T-Score)	.964	76.24 (11.96)	88.2%	62.24 (9.80)**	64.7%	39 – 90+
SRS-2-SC (T-Score)	.866	73.88 (14.16)	-	60.53 (10.39)*	-	41 – 90+
VABC	-	77.82 (14.34)	-	84.53 (12.19)	-	55 – 125

Notes.

Comparisons using paired-sample *t*-tests, adjusted for multiple analyses<sup>17</sup>; \**p* < .05; \*\**p* < .01

## RESULTS

Examining social anxiety and sociocognitive impairment in ASD and ADHD

Hierarchical linear regression: Youth with ASD (Table 3; Figure 1):

- SRS-2-SC and SA-Parent significantly predicted VABC

Hierarchical linear regression: Youth with ADHD (Table 4; Figure 1):

- Only SRS-2-SC significantly predicted VABC

Table 3. SA-Parent & SRS-2-SC as Predictors of VABC in youth with ASD

(n = 17)	Adj. R <sup>2</sup>	F	p	β	t	p	Cohen's f <sup>2</sup>
Step 1	.236	5.93	.028				
FSIQ				.53	2.44	.028	.37
Step 2 <sup>a</sup>	.778	19.70	<.001				
SA-Parent				-.40	-3.29	.006	.67
SRS-2-SC				-.54	-4.52	<.001	1.28

Table 4. SA-Parent & SRS-2-SC as Predictors of VABC in youth with ADHD

(n = 17)	Adj. R <sup>2</sup>	F	p	β	t	p	Cohen's f <sup>2</sup>
Step 1	-.041	.363	.556				
FSIQ				.15	.602	.556	.023
Step 2 <sup>a</sup>	.515	6.65	.006				
SA-Parent				.19	1.05	.312	.069
SRS-2-SC				-.80	-4.38	<.001	1.20

Notes a. Steps include model covariates, omitted from the table for clarity.

## RESULTS: Continued

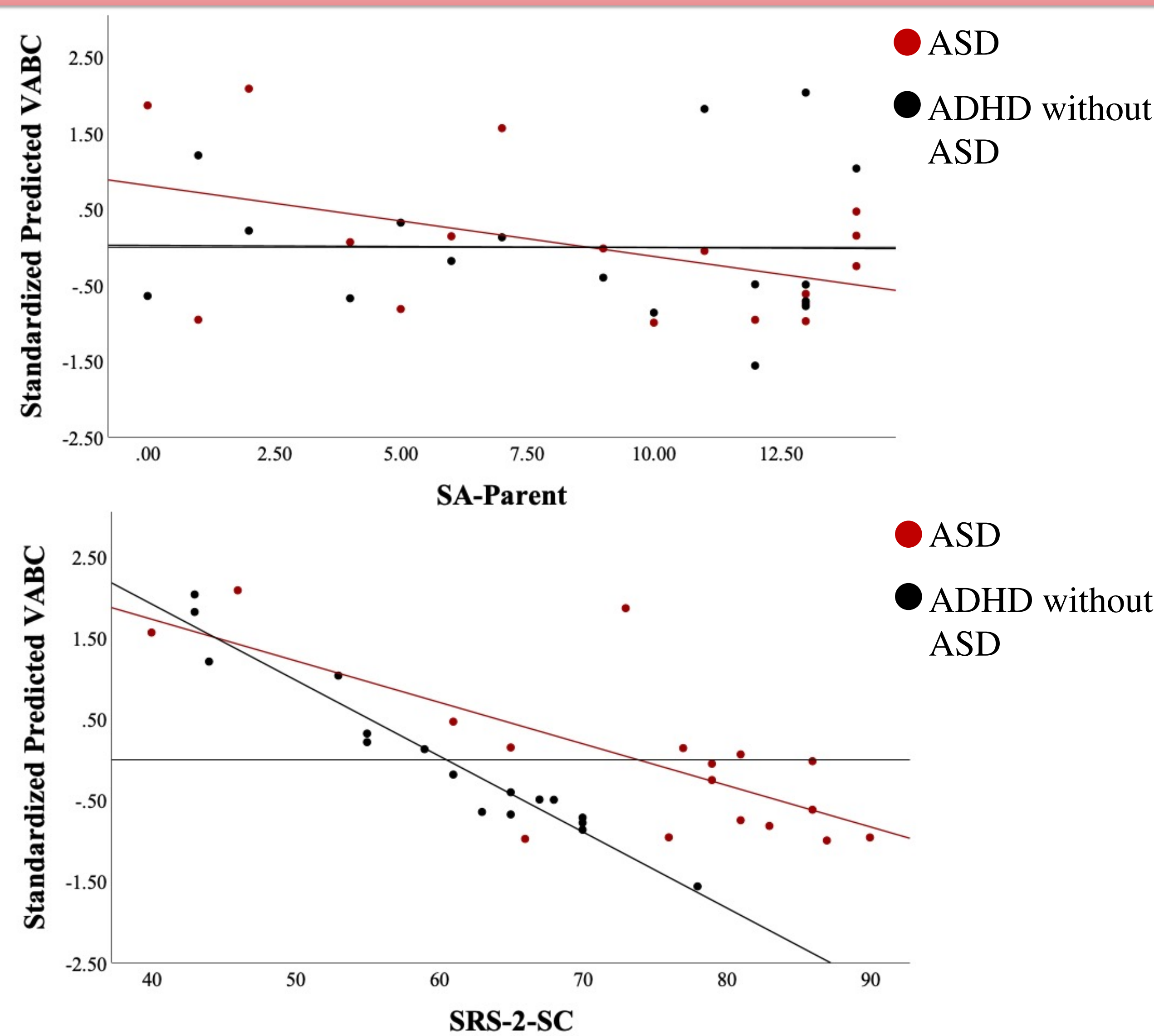


Figure 1. Standardized Predicted VABC as a function of SA-Parent and SRS-2-SC in youth with ASD and ADHD

## DISCUSSION

- Parent-rated social anxiety and sociocognitive impairment each predicted adaptive functioning in youth with ASD, even when controlling for cognitive ability
- Only sociocognitive impairment predicted adaptive functioning in youth with ADHD matched on parent-reported social anxiety
- Moderate to large effect sizes emphasize contribution of sociocognitive impairment to adaptive functioning
- Findings build on prior work examining social impairments and adaptive functioning in youth with ASD and ADHD<sup>18</sup>

### Implications & Future Directions

- Findings highlight differential correlates of impairment in youth with ASD and ADHD<sup>19</sup>
- Future research may leverage predictive value of sociocognitive impairment when examining/intervening on broader outcomes in youth with ASD and ADHD

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Code

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