



## BACKGROUND

- Autism Spectrum Disorders (ASD) and Schizophrenia Spectrum Disorders (SZS) are heterogeneous clinical disorders that shared a long history of diagnostic confusion.
- ASD and SZS overlap in symptoms such as blunted affect, atypical eye contact, and reduced spontaneous communication and conversation flow (Konstantareas & Hewitt, 2001; Rapoport et al., 2009).
- SZS symptoms are commonly differentiated by *positive* and *negative* symptom domains:
  - Positive symptoms** represent the presence of atypical characteristics or behaviors.
  - Negative symptoms** represent the absence or reduction of characteristics or behaviors that are present in typical development.
- We apply this framework from the SZS literature to parse ASD characteristics into positive and negative symptom domains (Foss-Feig et al., 2016).

## RESEARCH QUESTIONS

- What is the sensitivity and specificity of the Autism Diagnostic Observation Schedule-2 (ADOS; Lord et al., 2012) among samples of DSM-5 confirmed ASD, SZS, and typical development?
- In which symptom domains of gold-standard ASD and SZS diagnostic tools do respective ASD and SZS groups overlap and diverge?

## METHOD

### Participants

Participants were community samples of adults aged 18-48 who were recruited for this study after seeking treatment services and/or research participation at clinics and research labs in New Haven, CT. There were no group differences in age, but the SZS group had significantly lower IQ (see Table 1).

Table 1. Participant Characteristics

	ASD (n = 54)	SZS (n = 40)	TD (n = 54)
Age	24.97 (5.72)	25.65 (6.08)	25.83 (6.17)
Full-scale IQ	106.02 (16.64)	96.95 (10.38)	110.46 (16.07)
Verbal IQ	105.70 (17.58)	97.88 (11.72)	111.22 (17.32)
Nonverbal IQ	104.94 (16.09)	97.10 (10.71)	107.65 (14.75)

### Measures

- ASD symptoms** were assessed using the ADOS-2, a behavioral assessment tool used to assist clinician judgment in making decisions about a possible ASD diagnosis. We categorized ADOS items into positive and negative symptom domains consistent with the SZS literature.
- SZS symptoms** were assessed using a structured clinical interview - the Positive and Negative Syndrome Scale (PANSS; Opler et al., 1999).
- IQ** was assessed using the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 2011).

## RESULTS

- The ADOS adequately classified individuals by disorder status (see Table 2). However, there was a high rate of false positives with SZS. Seventeen of 40 participants (42.5%) with a SZS diagnosis met ADOS criteria for autism or autism-spectrum, despite the absence of a comorbid ASD diagnosis based on clinician judgment.

Table 2. Sensitivity and Specificity of ADOS

	DSM-5 Diagnosis (clinician judgment)			
	ASD	SZS	TD	
ADOS 'autism'	27	10	1	PPV = 70.9%
ADOS 'autism-spectrum'	12	7	1	
ADOS 'non-spectrum'	15	23	52	NPV = 83.3%
	Sensitivity = 72.2%	SZS Specificity = 57.5%	TD Specificity = 96.3%	Total Specificity = 79.8%

Note. PPV = Positive Predictive Value; NPV = Negative Predictive Value

### Examples of Symptoms by Domain

- SZS Positive:** Delusions, conceptual disorganization, hallucinations, excitement, grandiosity, suspiciousness, hostility.
- SZS Negative:** Blunted affect, emotional withdrawal, poor rapport, passive/apathetic social withdrawal, lack of spontaneity and conversation flow.
- ASD Positive:** Speech abnormalities (e.g., echolalia, unusual intonation, stereotyped speech), repetitive behaviors, sensory sensitivities, repetitive hand/body movements, circumscribed interests, inappropriate overtures, frequent demands for attention.
- ASD Negative:** Reduced sharing of emotion, lack of social initiation, reduced eye contact, limited use of gesture, limited range of facial expressions, reduced spontaneous communication and conversation flow.

### Key Findings in Group Differences of Symptom Domains (see Figure 1)

- There were non-significant group differences between the ASD and SZS on Negative symptoms for both the PANSS-Negative and the ADOS-Negative ( $p = .089$ ).
- However, group differences emerged in ADOS-Negative when controlling for IQ ( $p = .011$ ).
- The ASD group scored significantly higher on ADOS-Positive than the SZS group ( $p < .001$ ).
- The SZS group scored significantly higher on PANNS-Positive than the ASD group ( $p = .004$ ).
- The TD group scored significantly lower than the SZS and ASD groups on all measures (except ADOS-Positive where TD and SZS scored close to 0).

## CONCLUSION

- Consistent with prior work (Bastiaansen et al., 2011), administration of the ADOS to SZS participants resulted in a high rate of false positives in our sample.
- This lack of specificity appears to be due to high overlap in negative symptomology between ASD and SZS.
- When distinguishing between ASD and SZS diagnoses, clinicians may benefit from focusing on the presence or absence of positive symptom domains of either disorder.
- It is important to consider the influence of IQ when determining diagnoses with assistance of the ADOS.

### Future Research

- Many ADOS items did not easily fit into positive or negative dimensions (e.g., unusual eye contact could represent absence of eye contact (negative symptom) or staring (positive symptom)).
- There is a need for measures that classify ASD symptoms into positive and negative dimensions.

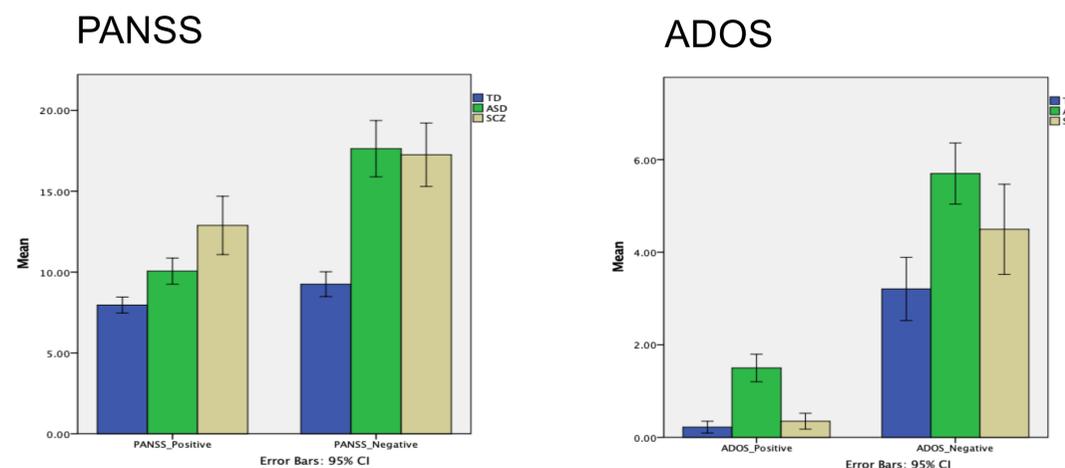


Figure 1. Group Differences in Positive and Negative Symptoms

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