

Validity testing of a social communication classification system of functioning for preschool children with autism spectrum disorder (ASD)

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Background

- The Autism Classification System of Functioning: Social Communication (ACSF:SC) is a 5 level descriptive system (Figure 1) based on the ICF with evidence of consistency in ratings of capacity and typical performance by parents and professionals of preschool children with ASD^{1,2}.
- Aim - to examine the construct validity of the ACSF:SC from the parents' perspective across home and clinical settings of ASD preschoolers.

Figure 1: ACSF:SC Tool (www.canchild.ca/en/diagnosis/autism-spectrum-disorders)

Level V - In the last month, a Child in Level V may be observed...
Playing with objects or talking to themselves.
Trying to initiate or react to other people's specific words or physical actions. The purpose of their communication may only be understood by their primary caregiver or highly experienced teacher/therapist.

Level IV - In the last month, a Child in Level IV has been observed...
Trying to initiate communication with their primary caregiver(s) by requesting to have their needs met.
Trying to respond to communication initiated by people they know (could be as simple as the use of a facial expression) but may not be responding to people they don't know.

Level III - In the last month, a Child in Level III has been observed...
Initiating communication with people they know, mostly to request having their needs met.
Trying to initiate communication for social purposes using simple, practiced or scripted requests (verbally or non-verbally) about their preferred interests/activities.

Level II - In the last month, a Child in Level II has been observed...
Initiating and responding to communicate for social purposes about their preferred interests/activities with most people.
Sustaining communication until the other person changes the topic/activity or they are not being understood.

Level I - In the last month, a Child in Level I has been observed...
Initiating and responding to communicate for social purposes about more than just their preferred interests/activities with most people.
Sustaining communication with most people. Although they may have some difficulty, they will try to respond to the change in topic/activity or use effective communication strategies to be understood.

Distinction between Levels

Distinctions between Level V and IV
A child in Level V is simply REACTING to communication from others & the PURPOSE of their communication is at best only known by their primary caregiver or highly experienced teacher/therapist, whereas a child in Level IV is TRYING to initiate for their needs and TRYING to respond with people they know.

Distinctions between Level IV and III
A child in Level IV may be TRYING to initiate and respond to people they know to have their needs met, whereas a child in Level III is doing those things for their own needs as well as TRYING to initiate to communicate for social purposes about their preferred interests. They may respond to requests of others, but communication is scripted and not easily sustained.

Distinctions between Level III and II
A child in Level III is TRYING to initiate and respond for social purposes about their preferred interests/activities, whereas a child in Level II is initiating and responding to most people for social purposes, which may continue the interaction. However, if anything changes or they aren't understood the communication doesn't last.

Distinctions between Level II and I
A child in Level II is communicating with others for social purposes but has problems sustaining the interaction if there are changes, whereas although the interaction may not look perfect, a child in Level I attempts to sustain the interaction by using effective communication strategies to be understood and adapt to changes.

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We tested a priori hypotheses based on Pearson correlation coefficients between concurrent ACSF:SC ratings with sub-domains of other measures to assess:

- convergent validity: ACSF:SC with domains related to social communication;
 - discriminant validity: ACSF:SC with functional domains unrelated to social communication
- Professionals and parents completed the ACSF:SC, and a concurrent self-report measure (Social Responsiveness Scale 2nd edition [SRS-2])³.
 - Parents also completed two interview-based measures: the Vineland Adaptive Behavior Scales 2nd edition (VABS-2)⁴ and the Autism Diagnostic Interview-Revised (ADI-R) algorithm⁵ (only Social Interactions and Communication).

Results

- Sample included 36 children whose ACSF:SC and SRS-2 were by their parents. Mean age (SD) was 4.3 (0.9) years (85% male).
- 27 (75%) parents completed the VABS-2 and ADI-R algorithm.
- 33 professionals completed ACSF:SC and SRS-2 ratings.
- Children categorized as either verbal or non-verbal based on the ADI-R algorithm had ACSF:SC across all of the 5 levels (Table 1).

Table 1: Frequency of ACSF:SC rating across raters for capacity

Rater	Sample Size	Level V	Level IV	Level III	Level II	Level I
Parent	36	5	1	11	13	6
Verbal Child*	15	1	0	5	7	2
Non-Verbal Child*	12	3	1	5	3	0
Professional	33	5	4	11	3	9

Note: *=Based on ADI-R

- Mean composite parent scores on the SRS-2 and VABS-2 were generally increasing across improved functioning on the 5 ACSF:SC levels (i.e., ACSF:SC rating of I= best ability) (Table 2).

Table 2: SRS-2 & VABS-2 scores across parent-rated ACSF:SC capacity

Rater	Level V	Level IV	Level III	Level II	Level I
SRS-2*	76.6(8.9),n=5	85(--),n=1	74(13.4),n=11	69.1(10.4),n=13	57.3(10.8),n=6
VABS-2**	61(13.7),n=4	59(--),n=1	65.7(7.2),n=10	74.8(14.4),n=10	82.5(17.7),n=2

Note: *=T-score; **=Composite Standard Score

Table 3: Pearson Correlation Coefficients (95% C.I.) between ACSF:SC and sub-domains of measures

	ACSF:SC Rating	SRS-2 (DSM-5 Sub-score)	ADI-R (Reciprocal Social Interactions)	VABS-2 (Socialization Domain)	VABS-2 (Motor Skills Domain)
Parent	Capacity	0.52(0.23,0.73)* n=36	0.38(0.004, 0.67)* n=27	-0.42(0.69,-0.04) n=27	-0.34(-0.64, 0.04) n=27
	Typical Performance	0.44(0.13,0.67)* n=29	0.28 (-0.11,0.60) n=27	-0.31 (-.62,0.08) n=27	-0.41 (-0.68,-0.04)* n=27
Professional	Capacity	0.63(0.36, 0.80)* n=33	0.42(-.001, 0.71) n=22		
	Typical Performance	0.59(0.31, 0.78)* n=33	0.44 (0.02,0.72)* n=22		

Note: Parent and professional ACSF:SC ratings correlated by scores from the same rater.
*= Significant coefficients where point estimates do not cross zero.

- Convergent validity testing between the SRS-2 subdomain (Social Communication and Interaction [SCI] and ACSF:SC showed statistically significant correlations for capacity (95% confidence interval [CI]), for parents: 0.52 (0.23,0.73) and for professionals: 0.63 (0.36,0.80), respectively.
- Discriminant validity comparing ACSF:SC with an unrelated sub-domain of function on the VABS-2 (Motor Skills) demonstrated no significant correlations for capacity,-0.34(-0.64, 0.04).

Conclusions

- Without a gold standard, testing validity of a novel tool is challenging, requiring construct validation against other measures that may be only partly related to its core constructs (i.e., Social Communication Functioning).
- ACSF:SC ratings by both parents and professionals were related to SRS-2-defined social communication.
- Parent ratings of children identified as having both verbal and non-verbal abilities also demonstrated abilities across most of the 5 ACSF:SC levels, indicating that social communication ability is not contingent on verbal ability.
- These data are a promising starting point for an ongoing validation process of the ACSF:SC.

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