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Because of an error in the version of the PDDST used, we were unable to calculate summary scores for this tool. Consequently, only item-by-item analyses can be completed with the PDDST. These analyses are underway but were not ready for presentation here. The remainder of this poster shows findings from the SCQ only. The study population here comprised children aged 3 to 5 years of age. Information from this analysis adds to the body of data on the utility of the SCQ in young populations. Clinical assessments of select participants are now underway but data were not available for presentation.

BACKGROUND:

The Social Communication Questionnaire (SCQ) was developed as a screening instrument to identify children that should undergo additional assessment for autism spectrum disorders (ASD). The 40-question instrument has been validated for populations age 4 and above (Berument et al, 1999). The version recommended for this age group is the "Lifetime" version where a number of questions ask parents whether particular behaviors have "ever" been observed while others focus particularly on the time period between the 4th and 5th birthdays. An alternate version of the SCQ, the "current" version, asks the same questions as the lifetime version, but focus on behaviors observed in the last three months. A standard scoring algorithm has been developed with a recommended cutoff of ≥ 15 .

There has, however, been interest in using the SCQ in younger populations. Hanson et al (2002) made minor adaptations to the lifetime version (changed question order, modified instructions to focus on the 4th to 5th year if the child has turned 4, otherwise to focus on last three months) and tested its performance in a population of 42 children aged 1.6 to 4.5 years old. 33 of these children had clinical diagnoses. Sensitivity for ASD was 68%, specificity was 48%. Lowering the cutoff to 14 improved sensitivity and maintained specificity. However, sample size in this report was quite small and more work is clearly needed to explore the SCQ's effectiveness in younger populations.

In this analysis we report on the sensitivity, specificity, positive and negative predictive value of the SCQ in a sample of 284 children receiving preschool special education services, ages 3 to 5, in two school districts.

METHODS:

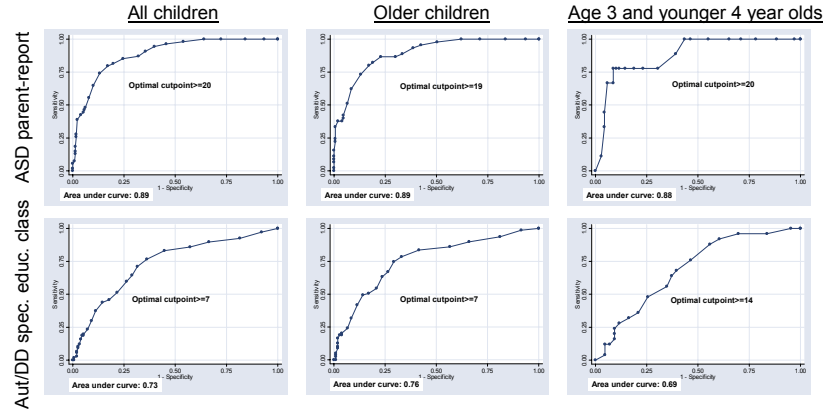
Surveys containing SCQ questions were mailed to 1,013 parents of children receiving special education services in Howard County, MD and Christina School District, DE. Parents or guardians completed surveys and returned them by mail. 284 (28.0%) surveys were received.

WPS, the publisher of the SCQ, would not grant us permission to use the SCQ as modified by Hanson et al. After WPS consulted with SCQ authors, permission was given to use the "current" version (which does not target questions to the period between 4th and 5th birthdays).

In these analyses, we considered two imperfect gold standards for ASD diagnosis: 1) parent self-report of either a clinical ASD diagnosis or an autism special education classification, and 2) for the Howard County subsample only, a special education classification of either autism or developmental delay (DD) as reported by the Department of Education. Both of these approaches are imperfect and ongoing clinical validation studies are being conducted to assess the impact using these measures have on estimates of SCQ performance.

Using each measure of ASD, we calculated estimates of sensitivity, specificity, positive predictive value, and negative predictive value for the standard cutoff of ≥ 15 and for optimal cutpoints (based on greatest proportion correctly classified) determined from ROC analyses. We did this for the full sample and separately for the older and younger (age three and younger four year-olds) subgroups.

ROC curves by age group and alloyed gold standard with area under curve and optimal cutpoint



Sensitivity, Specificity, PV+, and PV- by age group and gold standard for alternative cutpoints

Age group	Imperfect Gold Standard	ASD	Not ASD	Cutpoint	Sensitivity (95% CI)	Specificity (95% CI)	Positive PV (95% CI)	Negative PV (95% CI)
All	ASD parent report	55	229	≥ 15	56 (51,52)	92 (89,95)	62 (56,68)	90 (86,93)
				Optimal (≥ 20)	40 (34,46)	97 (96,99)	79 (74,83)	87 (83,91)
	Aut/DD Spec. ed.	107	152	≥ 15	23 (18,29)	93 (90,96)	69 (64,75)	63 (57,69)
				Optimal (≥ 7)	71 (66,77)	68 (63,74)	61 (55,67)	79 (72,82)
Older	ASD parent report	45	154	≥ 15	51 (44,58)	93 (89,96)	68 (61,74)	87 (82,91)
				Optimal (≥ 19)	38 (31,45)	97 (95,100)	81 (75,86)	84 (79,89)
	Aut/DD spec. ed.	79	106	≥ 15	24 (18,30)	93 (90,97)	73 (67,79)	62 (55,69)
				Optimal (≥ 8)	75 (68,81)	71 (64,77)	66 (59,72)	79 (73,85)
Younger	ASD parent report	9	69	≥ 15	78 (69,87)	88 (81,96)	47 (36,58)	97 (93,100)
				Optimal (≥ 20)	67 (56,77)	94 (89,97)	60 (49,71)	96 (91,100)
	Aut/DD spec. ed.	25	43	≥ 15	24 (14,34)	91 (84,98)	60 (48,72)	67 (56,78)
				Optimal (≥ 14)	28 (17,39)	88 (81,96)	58 (42,70)	68 (57,74)

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RESULTS

The figure shows the area under the curve and the optimal (based on maximizing number correctly classified) SCQ cutpoints for different age groups using alternative imperfect gold standards. Using parental self-report of ASD as a gold standard, the SCQ had similar predictive abilities in both age groups. Optimal cutpoints were also similar. The optimal cutpoints were substantially greater than the recommended cutpoint of ≥ 15 . This is because using the maximum correctly classified criterion in a population where ASD prevalence under the gold standard was 19% places a premium on specificity. Using the special education gold standard, the SCQ had lower predictive power and optimal cutpoints were below ≥ 15 . The SCQ does not predict as well here because we included children with a DD, a portion of whom will not have ASD, as "cases" under this gold standard. Similarly, the inclusion of DD effectively drives the prevalence up, so sensitivity is more of a concern when setting cutpoints.

The table shows sensitivities, specificities and predictive values for using the different imperfect gold standards in the different age groups. With the parent-reported ASD gold standard in the full sample, the recommended ≥ 15 cutpoint performs comparably to that reported by Hanson et al (2002) - with slightly worse sensitivity but better specificity. In our youngest group, with this same gold standard, SCQ sensitivity was actually better than in the older group (78% vs 51%) and specificity was comparable.

DISCUSSION

The SCQ continues to show signs of having utility in younger populations. Overall predictive power using the "current" as opposed to "lifetime" version was reasonable. Care must be taken, however, in the establishment of cutpoints. ROC curve algorithms that maximize number correctly classified will be influenced strongly by the prevalence of ASD in the study population. Also, depending on the circumstances, false positives and false negatives may not be errors of equal weight. For example, the SCQ is being proposed as a screening tool in a 3-5 year old population with mixed special education classifications and clinical diagnoses being recruited into a large etiologic case-cohort study. In this circumstance, because we want to identify most potential ASD cases, and because false positives may still be eligible to participate in a comparison group, the premium is on sensitivity (a lower cutpoint of ≥ 13 is being recommended). In the data here for all ages, using parent-report as the gold standard, this cutpoint has 75% sensitivity and 87% specificity.

There were a number of limitations to this analysis. First, the gold standards used were imperfect. Clinical validation, now underway, is designed to help understand the potential impact of use of these imperfect gold standards. Second, response rate to the survey was fairly low. However, similar proportions of parents of children with autism and DD special education classifications responded as were in the sampling frame (7% responders with autism classification vs 6% in frame and 34% responders with DD vs 32% in frame).