

A Comparison of the ADI-R and CARS2-QPC in Its Application to Individuals with Fragile X Syndrome

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Background

- The gold standard for diagnosing autism spectrum disorder (ASD) includes use of the Autism Diagnostic Interview – Revised (ADI-R; Rutter, Le Couteur, & Lord, 2003), the Autism Diagnostic Observation Schedule -2nd Edition (ADOS-2; Lord et al., 2012), and clinical observations based on the DSM-V criteria.
 - Though well validated, the ADOS-2 and ADI-R are expensive in terms of time and resources
- There are other tools available for evaluating autism, including the Childhood Autism Rating Scale – 2nd Edition (CARS2; Schopler, van Bourgondien, Wellman, Love, 2010).
 - The CARS2 includes a parent questionnaire checklist (CARS2-QPC).
 - The CARS2 is a screener and is not meant to be a diagnostic.
- The current assessment tools were developed for use in idiopathic autism, not in other developmental disorders.
- Individuals with fragile X syndrome (FXS) share many behavioral characteristics with individuals with ASD, and an estimated 25 to 33% of males with FXS meet the criteria for a co-diagnosis of ASD (Hatton et al., 2006).
- The current study compared the items in the CARS2-QPC to diagnostic algorithm items on the ADI-R that were used to assess autism characteristics in adolescents with FXS.

Research Questions:

- How do items included in the diagnostic algorithm for the ADI-R compare to items representing similar content on the CARS2-QPC?
- When assigned a numerical value, do scores on the CARS2-QPC relate to ratings on the ADI-R algorithm items?

Methods

- Participants
 - Adolescents with FXS (n = 34)
- Parent-Completed Autism Assessments
 - ADI-R – parent interview
 - CARS2-QPC – parent questionnaire
 - Qualitative Analysis: identified ADI-R algorithm items and CARS2-QPC items that covered similar topics.
 - Quantitative Analysis: CARS2-QPC items that matched content in the algorithm items on the ADI-R were identified and assigned a numerical value with larger numbers indicating greater severity, similar to the ADI-R scores. These scores were then summed and analyzed.
- Nonverbal Cognition: Leiter-R Brief Report
- Vocabulary: PPVT-4 & EVT-2
- Direct Child Autism Assessments: ADOS-2 & CARS2

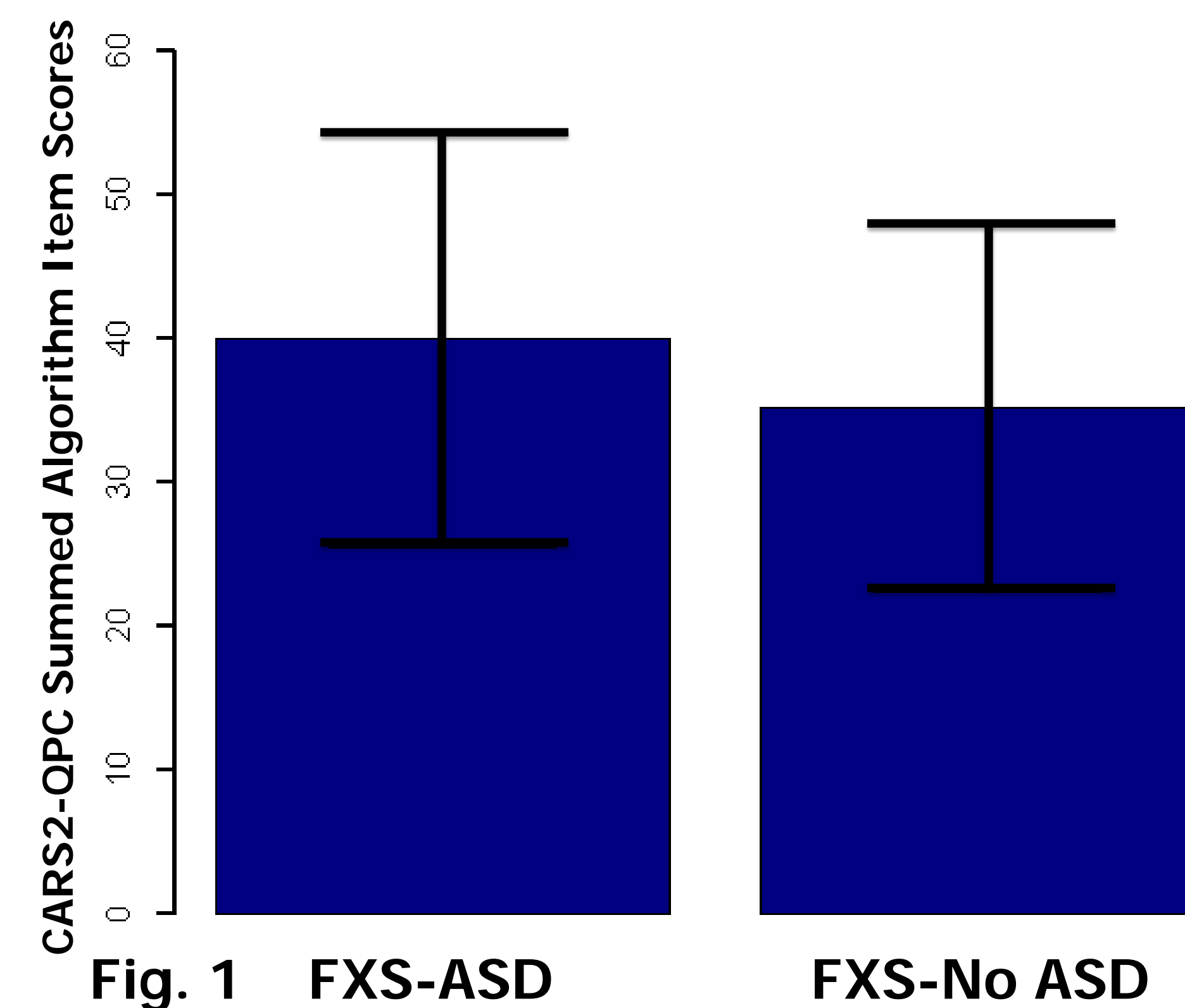
Results

	Mean	SD	Range
Chronological Age	12.29	1.94	9.00 - 16.42
Nonverbal Cognition (Leiter-R Brief Report)	45.26	8.47	36 - 65
Receptive Vocabulary (PPVT-4)	56.24	17.77	20 - 82
Expressive Vocabulary (EVT-2)	57.59	17.06	20 - 84

Qualitative Results

The diagnostic algorithm of the ADI-R is broken into 12 subtopics. At least one item on the CARS2-QPC asked information about each of the 12 subtopics (see Table 2).

ADI-R Algorithm Items	CARS2-QPC Items
Subtopic: Stereotyped/Repetitive Motor Mannerisms Item: 77 "Does [subject] have any mannerisms or odd ways of moving her/his hands or fingers? Such as twisting or flicking her/his fingers in front of her/his eyes? p. 72	3;1 "Has unusual ways of moving fingers, hands, arms, legs, or spins or rocks body" p. 4
Subtopic: Failure to use nonverbal behaviors to regulate social interaction Item 57. "Does [Subject] show a normal range of facial expressions? For example, does s/he frown or pout or look embarrassed as well as laugh or cry?" p. 51	2;8 "Shows a range of emotional expressions that match the situation (for example, smiles, frowns, conveys different emotions through eyes and facial expressions, etc." p. 3
Subtopic: Stereotyped, repetitive, or idiosyncratic speech Item 33: "Has s/he ever tended to use rather odd phrases or say the same thing over and over in almost exactly the same way? That is, either phrases s/he has heard other people use or ones s/he has made up." p. 28 Item 38. "Does s/he ever use words that s/he seems to have invented or made up?" p. 33	1;6 "Uses made up words or repeats specific words or phrases" p. 2



Quantitative Results

Numerical values for CARS2-QPC items that asked information about the ADI-R algorithm items were summed and analyzed.

Children with FXS who met criteria for ASD on the ADI-R did not have significantly higher parent ratings on the CARS2-QPC than children with FXS that did not meet the ADI-R's criteria for ASD (respectively, n = 27, M = 40, SD = 14.5; n = 7, M = 35.1, SD = 12.8; $p > .05$; see Figure 1).

Results

Quantitative Results

Correlations: ADI-R lifetime scores within algorithm subtopics were summed and compared to CARS2-QPC summed scores on items covering similar subtopic content. Scores on items covering similar content on the two measures were significantly correlated for only 4 of the 12 subtopics in the FXS group.

- A1: Failure to use nonverbal behaviors to regulate social interaction. $r = 0.338 \ p < .05$
- A4: Lack of socioemotional reciprocity $r = 0.440 \ p < .05$
- B1: Lack of, or delay in, spoken language and failure to compensate through gesture $r = 0.479 \ p < .05$
- B3: Stereotyped, repetitive, or idiosyncratic speech $r = -0.348 \ p < .05$

Discussion

- Though the CARS2-QPC covers all of the topics on the ADI-R algorithm, it gathers information with broad questions, in comparison to specific questions found in the ADI-R.
- The broad questions on the CARS2-QPC may have played a role in the limited number of subtopic scores that correlated between the assessments.
- Though well validated, the ADI-R was designed to diagnose idiopathic autism. The utility of the ADI-R in identifying autism as a concomitant diagnosis in populations with other developmental disabilities is questionable.
 - The number of children with FXS in this study who met criteria for an ASD diagnosis on the ADI-R is higher than what is reported in the literature (Hatton et al., 2006).
- The CARS2-QPC is useful to quickly gather information on autism characteristics in children with FXS, but is not a replacement for the ADI-R.

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