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, theADOS-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, Wiltman, 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% have a diagnosis of autism, not in other developmental disorders.

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.

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?

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Results

Table 1: Participant Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronological Age</td>
<td>12.29</td>
<td>1.94</td>
<td>9.00 - 16.42</td>
</tr>
<tr>
<td>Nonverbal Cognition (Leiter-R Brief Report)</td>
<td>45.26</td>
<td>8.47</td>
<td>36 - 65</td>
</tr>
<tr>
<td>Receptive Vocabulary (PPVT-4)</td>
<td>56.24</td>
<td>17.77</td>
<td>20 - 82</td>
</tr>
<tr>
<td>Expressive Vocabulary (EVT-2)</td>
<td>57.59</td>
<td>17.06</td>
<td>20 - 84</td>
</tr>
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Table 2: Corresponding CARS2-QPC and ADI-R Items

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<tr>
<th>ADI-R Algorithm Item</th>
<th>CARS2-QPC Items</th>
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<tr>
<td>Subtopic: Stereotyped/Repetitive Motor Mannerisms Item 7: “Does [Subject] have any mannerisms or odd ways of moving her/his hands or fingers? Such as twisting or flapping her/his fingers in front of her/his eyes?” p. 72</td>
<td></td>
</tr>
<tr>
<td>Subtopic: Failure to use nonverbal behaviors to regulate social interaction Item 51: “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</td>
<td></td>
</tr>
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<td>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</td>
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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.

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
A2: 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
B2: Stereotyped, repetitive, or idiosyncratic speech
r = 0.348 p < .05

Acknowledgments

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