Credo Reference

Childhood Autism Rating Scale, Second Edition

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The Childhood Autism Rating Scale, Second Edition (CARS2, 2010) is a rating scale completed by an examiner (on the basis of direct observations of the child, parent interviews, record review, etc.) in order to identify behaviors associated with *autism spectrum disorders* (ASDs) in children ages 2 and older, and to differentiate between children exhibiting mild symptoms of ASDs and children exhibiting severe symptoms of ASDs. The CARS2 includes three different forms, one of which is consistent with the older edition of the CARS (i.e., Standard Version Rating Booklet; CARS2-ST). Whereas the original CARS focused specifically on the diagnosis of autism, this new version of the instrument includes a separate form for assessing verbally fluent individuals, children 6 years of age and older, and children with IQ scores above 80 (i.e., High-Functioning Version Rating Booklet; CARS2-HF), as well as an unscored Questionnaire for Parents or Caregivers (CARS2-QPC), used to assist examiners in making their ratings and in structuring follow-up interviews.

The CARS2-ST is comprised of 15 items on which a child's behavior is rated on a Likert scale ranging from within normal limits (1) to severely abnormal (4) for the child's chronological age. The behaviors rated include: (1) Relating to People, (2) Imitation, (3) Emotional Response, (4) Body Use, (5) Object Use, (6) Adaptation to Change, (7) Visual Response, (8) Listening Response, (9) Taste/Smell/Touch Response and Use, (10) Fear or Nervousness, (11) Verbal Communication, (12) Nonverbal Communication, (13) Activity Level, (14) Level and Consistency of Intellectual Response, and (15) General Impressions. The CARS-HF is structured very similarly, although many of the scales are altered slightly to reflect aspects of ASDs not captured in the other scale. The behaviors rated include: (1) Social-Emotional Understanding, (2) Emotional Expression and Regulation of Emotions, (3) Relating to People, (4) Body Use, (5) Object Use in Play, (6) Adaptation to Change/Restricted Interests, (7) Visual Response, (8) Listening Response, (9) Taste/Smell/Touch Response and Use, (10) Fear or Anxiety, (11) Verbal Communication, (12) Nonverbal Communication, (13) Thinking/Cognitive Integration Skills, (14) Level and Consistency of Intellectual Response, and (15) General Impressions.

This instrument was first published in 1988, and the norm data were collected on a sample of 1,606 individuals who had been referred for ASD evaluation in the early 1980s. Two updated studies, both a verification sample used to assess the reliability and validity of the CARS2-ST (N = 1,034) and a CARS2-HF development sample (N = 994), were conducted in order to evaluate the psychometric properties of the revised instrument. For the CARS2-ST, the sample is predominantly male (78%) and all participants' IQ scores are 85 or lower (and in these ways, the sample is representative of the population diagnosed with ASDs). In contrast, all participants who were administered the CARS2-HF instrument had IQs of 80 or higher. Again, this sample was predominantly (78%) male, and participants in this group had a variety of clinical diagnoses (e.g., PDD-NOS, ADHD).

Internal consistency estimates for both instruments are high (i.e., CARS2-ST = .93, CARS2-HF = .96). Because the CARS instruments require examiners to use their clinical judgment in scoring, interrater reliability is a particularly important construct to consider when assessing the instrument. The authors rely on the original interrater reliability data from the CARS when discussing the reliability of the CARS2-ST; this measure has a median correlation of .71. On the CARS2-HF, data was collected on 239 individuals. Total scores across two raters were correlated .95, and interrater reliability estimates for particular items range from .53 (for Level and Consistency of Intellectual Response) to .93 (for General Impressions), indicating an overall acceptable level of agreement across raters. The authors again rely on the original CARS data when discussing interrater reliability of professionals in different professions (e.g., school psychologists, audiologists, medical students) and from different sources of clinical information; reevaluating interrater reliability in these areas using the more recent samples would be helpful.

The validity of these instruments is discussed in depth in the examiner's manual, and includes a discussion of the varied factor analyses that have been conducted using these measures. The authors also discuss the convergent and divergent validity of these scales by comparing child performance on the CARS-ST and CARS2-HF to performance on other measures such as the Autism Diagnostic Observation Schedule and the Social Responsiveness Scale. Globally, the authors demonstrate that these measures have the potential to accurately identify students with ASDs and to adequately differentiate between children exhibiting varying levels of symptoms. This updated version of the CARS has not yet been reviewed in the *Mental Measurements Yearbook*. However, past reviewers endorsed the original measure strongly (although noting concerns about the potentially outdated normative sample, even at that time).

Citation Information:

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