

Use of the Differential Abilities Scale for the Assessment of Children with Autism Spectrum Disorders

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INTRODUCTION

Given their difficulties in social interaction, communication skills, and associated disruptive behaviors, children with autism spectrum disorders (ASD) can be particularly challenging to assess using standardized measures when one considers the type of behavior required for a psychological evaluation (Ozonoff et al., 2005).

■ For example, many intelligence assessments require participants to imitate the actions of the administrator, to answer questions verbally, to understand the directions given by the administrator, and to follow nonverbal cues prompted by the administrator.

■ An apparent lack of motivation has also been emphasized as playing a major role in the reduced responding of children with ASD (Koegel et al., 1997).

It is imperative that intelligence assessments not only provide a valid and reliable assessment of ability levels, but that they also allow for administration that minimizes disruptive behaviors and maximizes attention during the process.

■ Much emphasis is placed on the scores obtained from intelligence assessments when differentially diagnosing ASD from intellectual disabilities as well as in the consideration of least restrictive environment for educational placements (Oti et al., 2004; Williams White et al., 2007).

■ Knowing how each assessment measures an examinee's intelligence allows psychologists to make informed decisions regarding the selection and interpretation of the test as well as the placement of students.

■ Unfortunately, few studies have documented the behavior of children with ASD during the assessment process or the relationship between behavior during testing and resultant scores.

OBJECTIVES

In order to better understand the assessment process and characteristics of intelligence tests for children with autism spectrum disorders, the following research questions are posed:

■ What is the relationship between scores on the *Differential Abilities Scale* (DAS) and language abilities for children with ASD?

■ What is the relationship between scores and autism severity for children with ASD?

■ What are the patterns of test session behavior displayed by children with ASD during the assessment?

■ Are observed testing behaviors related to the level of performance on the intelligence assessment?

METHODS

The DAS was administered to 45 children with ASD who were between the ages of 3 and 8 years old as part of a study investigating teacher consultation services (Ruble, Dalrymple, & McGrew, 2010).

■ In order to examine the relationship between language abilities and intelligence, the Listening Comprehension Scale and the Oral Expression Scale from the *Oral and Written Language Scales* (OWLS) was administered to all participants.

■ The *Childhood Autism Rating Scales* (CARS) was completed during the assessment sessions in order to examine the relationship between autism severity and intelligence amongst the participants.

All assessments were videotaped further analysis by two raters who coded for both off-task and on-task behaviors in 10-second intervals using the procedure and coding manual detailed by Akshoomoff (2006).

■ Behaviors coded included: Engaging, break, out of position, whining/crying, looking away, setting up, and other off-task behaviors. A summative off-task total variable was created by combining scores from break, out of position, whining/crying, looking away, and other off-task behavior codes for comparison purposes.

■ Using Cohen's kappa, the two coders achieved .85 inter-rater reliability across 50% of the assessments applying the coding procedure.

RESULTS

Participant Characteristics

■ A total of 45 children ($n=38$ males, $n=7$ females, $M_{age} = 5.8$) completed the assessments.

■ 48.8% of the participants' caregivers complete high school or some college, 24.4% of the participants' caregivers earned \$25,000-\$49,999 for household income, and 78% of the participants were Caucasian.

■ All participants in the study met DSM-IV TR criteria for an autism spectrum disorder, were screened with the MCHAT or SCQ, and diagnoses were confirmed with the ADOS and CARS.

■ Mean scores across the assessments are provided in Table 1.

Language Abilities and Intelligence

■ Results demonstrated a significant association between performance on the OWLS and DAS GCA, $r = .746$, $p = .000$

■ Simple linear regression demonstrated that scores obtained on the OWLS accounted for 55.7% of the variance of performance on the DAS GCA, $F(1, 42) = 52.7$, $p = .000$.

Autism Severity and Intelligence

■ Results demonstrated a negative correlation between ratings on the CARS and the DAS GCA, indicating that decreased, or less severe, autism ratings, were associated with greater performance on the intelligence assessment, $r = -.323$, $p = .032$.

■ However, simple linear regression demonstrated that autism severity ratings accounted for only 10.5% of the variance in DAS GCA performance, $F(1, 42) = 4.90$, $p = .032$.

Test Session Behavior

■ Descriptive statistics and definitions of the behaviors coded are provided in Table 2.

■ The average duration of the intelligence assessments was 27.7 minutes ($SD = 14.1$).

■ A paired samples t-test was conducted to evaluate the difference between time spent in engaging versus off-task behaviors during the DAS assessment, and results demonstrated that the children spent significantly more time engaging ($M = 18.1$) in the assessment than in off-task ($M = 5.66$) behaviors, $t(42) = -5.96$, $p = .000$. The eta squared statistic (.464) indicated a large effect.

Test Session Behavior and Intelligence

■ Pearson's correlations between minutes of engaging behavior, minutes of off-task behavior, and DAS GCA scores were performed. Results demonstrated a significant positive correlation between engaging behavior and DAS GCA scores, $r = .622$, $p = .000$.

■ Simple linear regression was performed between engaging behavior and DAS GCA scores, and the results indicated that engaging behavior accounted for 38.7% of the variance in DAS GCA performance, $F(1, 42) = 25.9$, $p = .000$.

■ Partial correlations were also conducted between engaging behavior and DAS GCA scores, while controlling for language skills on the OWLS. This analysis resulted in the association between engaging behavior and DAS GCA scores to disappear, which suggests that language abilities are a mediating variable to this relationship.

Table 1. Assessment Descriptive Statistics

Assessment	M	SD
Autism Diagnostic Observation Schedule	18.4	3.53
Childhood Autism Rating Scale	35.0	8.49
Differential Abilities Scale	56.0	21.9
Oral and Written Language Scales	53.4	13.1

Table 2. Definitions and Descriptive Statistics for Test Session Behaviors

Behavior	Definition	M	SD
Engaging	Scored when the child actively attends to the task that is presented appropriately.	18.1	12.3
Set Up	Scored when the examiner is organizing or setting up materials and the child is not required to be actively engaged in the assessment.	3.96	3.21
Break	Scored when the assessment was temporarily stopped so the child could take a short break.	2.09	3.29
Out of Position	Scored when the child leaves his/her seat or standing position at the assessment area.	1.17	1.32
Whining/Crying	Scored when the child whines, whimpers, cries, or tantrums for longer than 3 seconds.	.542	1.20
Looking Away	Scored when the child actively looks away from the test items in an attempt to not engage in the test item while still in the testing position.	1.76	1.47
Other Behavior	Scored when the child's behavior is not described by the other off-task behaviors. Example: Excessive, irrelevant comments.	.101	.520
Off-Task Total	Summative form of all off-task behaviors (e.g. break, out of position, whining/crying, looking away, and other behavior)	5.66	8.57

DISCUSSION

Results indicated that language abilities are important to consider when assessing the intelligence of children with ASD.

■ Given that language abilities accounted for a significant level of variance in intelligence scores, the results suggest that the DAS may be more appropriate for use with children who have greater language abilities.

Although autism severity was found to be associated with intelligence, the results of the study also demonstrated that other variables, such as language abilities, may better account for performance on the DAS.

■ These results are supported by the literature on the widely differential intelligence abilities that are present across the autism spectrum (Charman et al., 2010; Fombonne, 2009).

Results from the study also demonstrated that the participants displayed significantly more engaging behaviors than off-task behaviors during the testing, and that this engagement was related to performance on the DAS.

■ While standardized administration rules of the DAS were always attempted, in order to convey subtest task demands, some participants required testing-of-limits, hand-over-hand modeling, shortened directions, repeated verbal and gestural prompts, and other modifications.

■ These modifications to the standardized administration rules may have led to increased engagement in the subtests, decreased off-task behaviors, and facilitated comprehension of subtest task demands, thus potentially limiting the results obtained in this study.

■ Future research is needed to better understand the effect of modifications to standardized administration rules on resultant performance from intelligence assessments.

Previous research has also demonstrated that children with autism spectrum disorders display significantly more off-task behaviors during intelligence assessment as compared to their typically developing peers (Akshoomoff, 2006), and the lack of a comparison group is a limitation to the current study.

■ Additional research is needed to better understand differences in engagement during intelligence assessment between children with ASD and typical peers as well as compared to children with other disabilities.

This work was supported by Grant Numbers R34MH073071 and 1RC1MH089760 from the National Institute of Mental Health.