Autism Spectrum Disorder: Theory, assessment and practical interventions

Jack A. Naglieri, Ph.D.
Research Professor, *University of Virginia*
Senior Research Scientist, *Devereux Center for Resilient Children*
Emeritus Professor of Psychology, *George Mason University*
jnaglieri@gmail.com
www.jacknaglieri.com

Goldstein & Naglieri

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ASRS Authors

Sam Goldstein and Jack Naglieri (New Orleans, 2008)

For more information see:
www.samgoldstein.com
www.jacknaglieri.com

Goldstein & Naglieri

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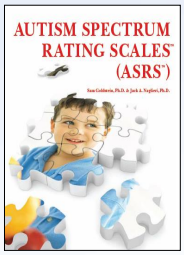
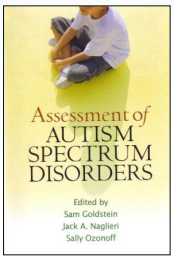
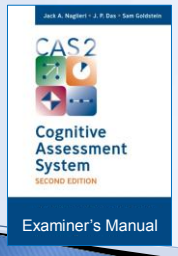
Relevant Disclosure

- Co-author of
  - Autism Spectrum Rating Scales (ASRS; Goldstein & Naglieri, 2009).
  - Assessment of Autism Spectrum Disorders text (Goldstein, Naglieri & Ozonoff, 2009).
  - Cognitive Assessment System (Naglieri & Das, 1997).

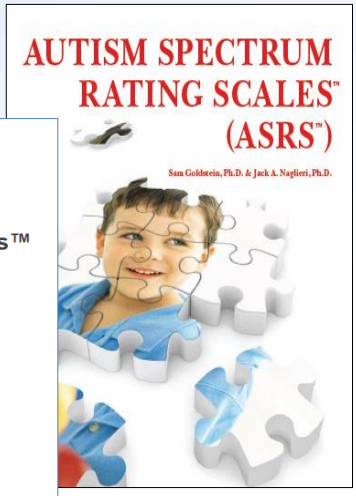






Development of the ASRS

- For a free trial go to http://www.mhs.com



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My Background

- Interest in intelligence and instruction
- Experiences at UGA
- Test development
- Need for science to support practice
- Psychometrics
- Evidence based interpretation
- My personal perspective on being a researcher and test developer
- Why this work?

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Presentation Outline

- An understanding of Autism Spectrum Disorders (ASD)
- Symptoms of ASD: Building the ASRS
- Methods for assessment
- Importance of psychometric quality and a national standardization sample
- Autism Spectrum Rating Scale (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- Autism Spectrum Rating Scale Short Form (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- ASRS Interpretation with other measures
- Conclusions

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DSM IV View of ASD

- In the DSM-IV Autism Spectrum Disorder (ASD) was referred to as the Pervasive Developmental Disorders (PDD)
  - The term PDD emphasizes the pervasiveness of disturbances over a wide range of different domains affecting the development.
  - Onset in infancy or early childhood.
  - Those with PDDs share certain clinical features but appear to have diverse etiologies and clusters of symptoms.

DSM IV View of ASD

- The DSM IV-TR definition of autistic disorder contains 12 criteria equally divided among three clusters of symptoms.
  1. Social interaction.
  2. Communication/play/social interaction.
  3. Limited patterns of interests and behavior.

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Gillberg's View of ASD

- Gillberg argued that communication and social are not separate behavioral clusters
- Social/Communication
  - Impaired social interaction
  - Non-verbal communication problems
  - Speech and language problems despite superficial language skills
- Unusual Behaviors
  - Odd interests and routines
  - Self absorbed behavior

Christopher Gillberg is the founding editor of the journal European Child & Adolescent Psychiatry, and is the author and editor of many scientific and educational books.

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Two Views of ASD

- DSM-IV-TR, diagnosis of ASD requires the presence of three clusters of behaviors:
  - (1) impairment in social interaction,
  - (2) impairment in communication, and
  - (3) repetitive and stereotypical patterns of behavior
- Researchers (Gillberg, Gotham et al., 2008; Gotham, Resi, Pickles, & Lord, 2007), suggests that a better conceptualization has two components:
  - Social and communication symptoms
  - Repetitive behaviors

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Views of ASD

- How can we test this?
  - Use a large sample of children, evaluate the inter-relationships among the symptoms using factor analysis – we did this with the ASRS data
- The ASRS items were subjected to a series of exploratory factor analyses in order to determine the extent to which symptoms of ASD form factors that support current understanding of the disorder
- We used...

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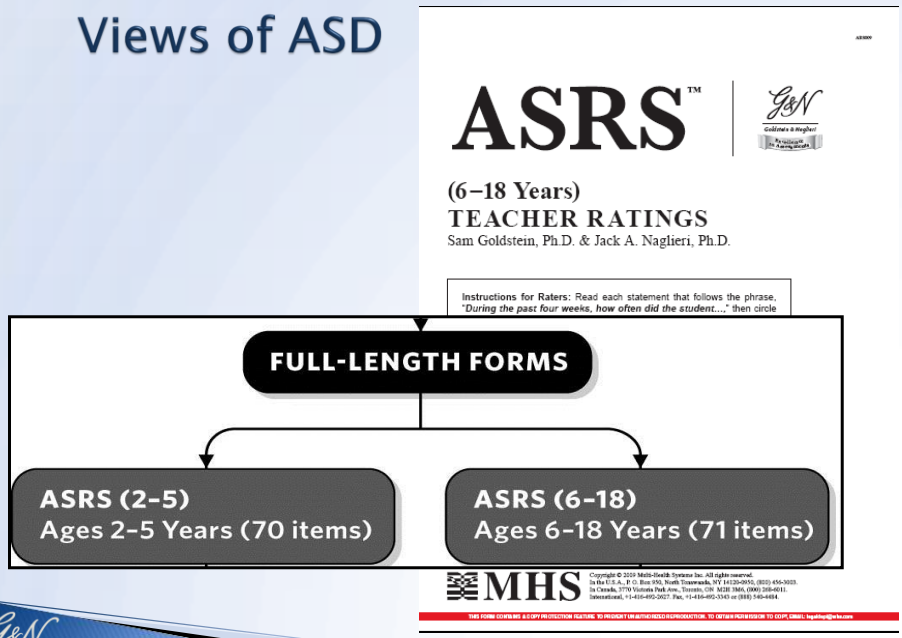
Views of ASD



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Factor Analysis for 2–5 Years

- A two-factor solution was best for parent and teacher raters
  - **Factor I**: included primarily items related to both socialization and communication (e.g., keep a conversation going, understand how someone else felt) – **Social/Communication**
  - **Factor II**: included items related to behavioral rigidity (e.g., insist on doing things the same way each time), stereotypical behaviors (e.g., flap his/her hands when excited), and overreactions to sensory stimulation (e.g., overreact to common smells)– **Unusual Behaviors**

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Social/Communication Factor

Table 8.18. Exploratory Factor Analysis Results: ASRS (2–5 Years) Parent Ratings

Item		Social/Communication
29.	keep a conversation going?	**-.916**
28.	start conversations with others?	**-.909**
3.	understand how someone else felt?	**-.908**
40.	respond when spoken to by other children?	**-.873**
54.	share his/her enjoyment with others?	**-.865**
50.	show an interest in the ideas of others?	**-.859**
14.	understand the point of view of others?	**-.831**
4.	play with others?	**-.830**
16.	share fun activities with others?	**-.829**
52.	understand age-appropriate humor or jokes?	**-.820**
49.	seek the company of other children?	**-.816**

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Factor Analysis for 2-5 Years

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Unusual Behaviors Factor

Item		Unusual Behaviors
27.	focus too much on details?	.735
8.	insist on doing things the same way each time?	.730
56.	insist on certain routines?	.698
9.	need things to happen just as expected?	.698
10.	have a strong reaction to any change in routine?	.689
70.	repeat or echo what others said?	.683
39.	become fascinated with parts of objects?	.660
12.	overreact to common smells?	.653
47.	focus on one subject for too much time?	.651

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Factor Analysis for 6-18 Years

- A three-factor solution was best for both parent and teachers versions of the ASRS
  - **Factor I**: included primarily items related to both socialization and communication – **Social/Communication**
  - **Factor II**: included items related to behavioral rigidity, stereotypical behaviors and overreactions to sensory –**Unusual Behaviors**
  - **Factor III**: included items related to attention problems (e.g., become distracted), impulsivity (e.g., have problems waiting his/her turn), and compliance (e.g., get into trouble with adults, argue and fight with other children) –**Self-Regulation**.

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Social / Communication Factor

Table 8.20. Exploratory Factor Analysis Results: ASRS (6–18 Years) Parent Ratings

Item	Social/Communication
28. start conversations with others?	-.925
29. keep a conversation going?	-.912
19. care about what other people think or feel?	-.899
3. understand how someone else felt?	-.877
14. understand the point of view of others?	-.860
16. share fun activities with others?	-.828
50. show an interest in the ideas of others?	-.824
54. share his/her enjoyment with others?	-.821
61. show good peer interactions?	-.801
49. seek the company of other children?	-.782
21. respond when spoken to by adults?	-.770
52. understand age-appropriate humor or jokes?	-.766

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Factor Analysis for 6–18 Years

- A three-factor solution was best for both parent and teachers versions of the ASRS
  - **Factor I**: included primarily items related to both socialization and communication – **Social/Communication**
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Unusual Behaviors Factor

Table 8.20. Exploratory Factor Analysis Results: ASRS (6–18 Years) Parent Ratings

Item	Unusual Behaviors
51. insist on certain routines?	.842
24. insist on doing things the same way each time?	.785
63. become upset if routines were changed?	.755
22. become obsessed with details?	.745
40. focus too much on details?	.736
49. need things to happen just as expected?	.722
62. overreact to loud noises?	.680
13. have a strong reaction to any change in routine?	.677
54. line up objects in a row?	.670
26. repeat or echo what others said?	.637
21. repeat certain words or phrases out of context?	.637
29. overreact to common smells?	.636

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Factor Analysis for 6–18 Years

- A three-factor solution was best for both parent and teachers versions of the ASRS
  - **Factor I**: included primarily items related to both socialization and communication – **Social/Communication**
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Self-Regulation Factor

Table 8.20. Exploratory Factor Analysis Results: ASRS (6–18 Years) Parent Ratings

Item	Self-Regulation
57. fail to complete tasks?	.852
44. leave homework or chores unfinished?	.847
35. have problems paying attention when doing homework or chores?	.800
36. make careless mistakes in school work?	.783
30. become distracted?	.743
1. appear disorganized?	.728
18. get into trouble with adults?	.681
60. interrupt or intrude on others?	.647
71. appear fidgety when asked to sit still?	.609
7. have problems waiting his/her turn?	.595
58. ask questions that were off-topic?	.545
6. argue and fight with other children?	.476

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Factor Consistency

- The consistency of the ASRS scale structure across several demographic groups (gender, age group, race, and clinical status) was studied
- The factor loadings for the groups were correlated using the coefficient of congruence
  - results revealed a very high degree of consistency between all groups
  - indicating that the factor structure of the forms generalized across the demographic groups
  - See ASRS Manual for details

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Factor Consistency Ages 2–5

Table 8.22. Factor Congruence Analyses Results: ASRS (2–5 Years)

Demographic	Form	Coefficient of Congruence			
		SC	UB	Level	Level
Gender	Parent	.98	.97	Male	Female
	Teacher	.98	.96		
Age Group	Parent	.97	.96	2–3 Years	4–5 Years
	Teacher	.98	.95		
Race	Parent	.98	.96	White	Non-White
	Teacher	.98	.96		
Clinical Status	Parent	.95	.94	Non-Clinical	Clinical
	Teacher	.95	.87		

Note. SC = Social/Communication; UB = Unusual Behaviors.

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Factor Consistency Ages 6–18

Demographic	Form	Coefficient of Congruence				
		SC	UB	SR	Level	Level
Gender	Parent	.98	.98	.98	Male	Female
	Teacher	.99	.99	.98		
Age Group	Parent	.89	.9	.93	6–11 Years	12–18 Years
	Teacher	.94	.96	.96		
Race	Parent	.97	.97	.98	White	Non-White
	Teacher	.98	.99	.98		
Clinical Status	Parent	.96	.96	.97	Non-Clinical	Clinical
	Teacher	.97	.97	.97		

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For More on Factor Analysis of ASRS

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A NATIONAL STUDY OF AUTISTIC SYMPTOMS IN THE GENERAL POPULATION OF SCHOOL-AGE CHILDREN AND THOSE DIAGNOSED WITH AUTISM SPECTRUM DISORDERS

SAM GOLDSTEIN

University of Utah

JACK A. NAGLIERI

University of Virginia and The Devereux Center for Resilient Children

SARA RZEPA AND KEVIN M. WILLIAMS

Multi-Health Systems

We examined the interrelationships among symptoms related to autism spectrum disorders (ASD) using a large representative sample and clinical groups of children aged 6 to 11 and youth aged 12 to 18 years rated by parents (N = 1,881) or teachers (N = 2,171). The samples included individuals from the United States and Canada from the standardization and validity studies for the Autism Spectrum Rating Scales. A three-factor solution comprising Social/Communication, Unusual Behaviors, and Self-Regulation provided the best fit to the data and was replicated across parent and teacher ratings. High coefficients of congruence across sexes, raters, ethnic groups, and age groups and for clinical groups were obtained. Implications for understanding the symptoms related to ASD and their use in practice are provided. © 2012 Wiley Periodicals, Inc.

Factorial View of ASD In ASRS

- Based on the factor analysis, we suggested that ASD is best described as having two clusters of behaviors for children ages 2–5 and three for those aged 6 to 18 years of age
  - Ages 2 – 5 years
    - Social / Communication
    - Unusual Behaviors
  - Ages 6 – 18 years
    - Social / Communication
    - Unusual Behaviors
    - Self-Regulation
- This is the organizational form of the ASRS

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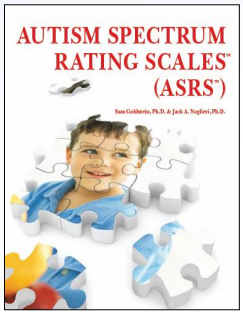
Scale Characteristics

Goldstein & Naglieri (2009)



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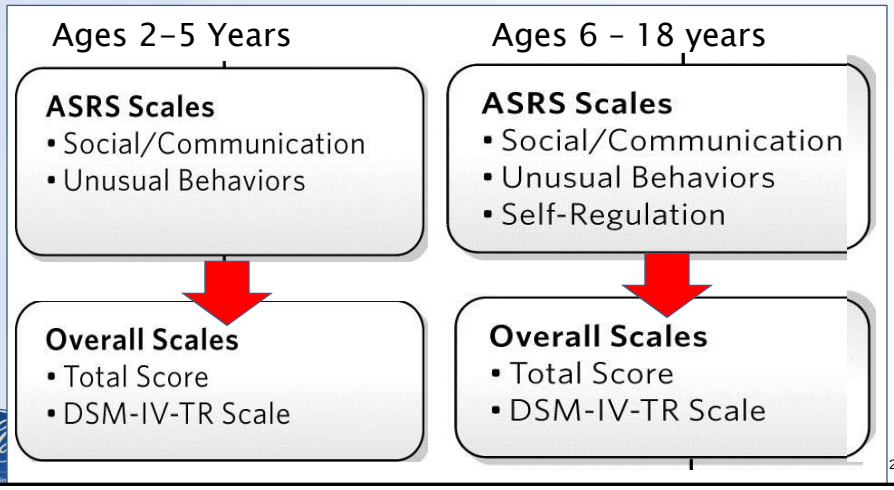
Goal #1

- Develop an empirically supported multi-factor scale that reflects the Autism spectrum



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Goal #2

Develop scales that were organized on the basis of the content of items for Treatment Planning

- Ages 2-5 Years
  - Peer Socialization
  - Adult Socialization
  - Social/Emotional Reciprocity
  - Atypical Language
  - Stereotypy
  - Behavioral Rigidity
  - Sensory Sensitivity
  - Attention / Self Regulation
- 6- 18 Years
  - Peer Socialization
  - Adult Socialization
  - Social/Emotional Reciprocity
  - Atypical Language
  - Stereotypy
  - Behavioral Rigidity
  - Sensory Sensitivity
  - Attention

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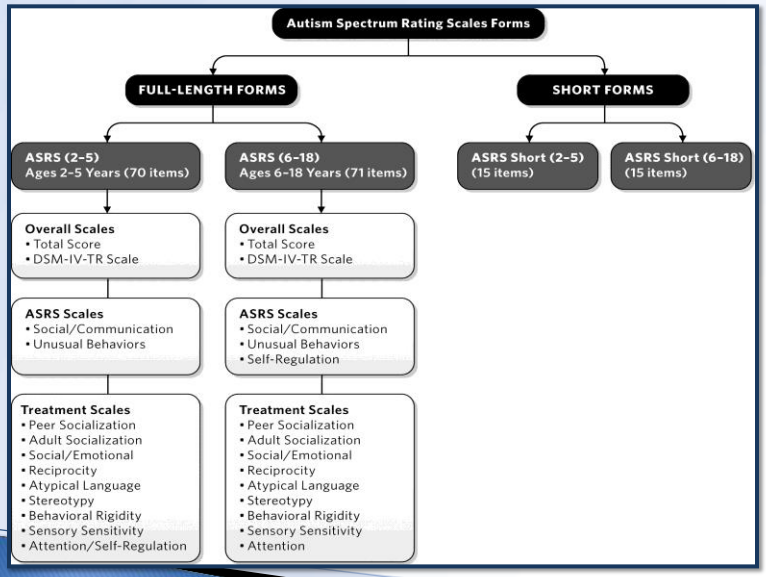
Autism Spectrum Rating Scales



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Goal #3

- Base standard scores on a national sample of individuals aged 2 – 18 years who represent the US on a number of key variables.
- Why compare children's scores to a nationally representative sample?

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Presentation Goals

- An understanding of Autism Spectrum Disorders (ASD)
- Symptoms of ASD
- Methods for assessment
- Importance of psychometric quality and a national standardization sample
- Autism Spectrum Rating Scale (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- Autism Spectrum Rating Scale Short Form (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- Conclusions

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Importance of a National Norm

- The way we calibrate a psychological test or rating scale score has a direct impact on the reliability and validity of the instrument
- The composition of the comparison and characteristics of the group is especially important whenever diagnostic decisions are being made.
- What is the current state of the art?

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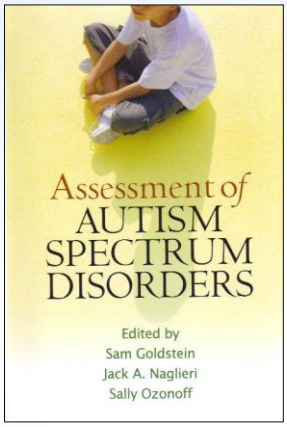
Importance of A National Norm

- Psychometric issues for Autism rating scales is provided in the chapter by Naglieri & Chambers in *Assessment of Autism Spectrum Disorders* (Goldstein, Naglieri, & Ozonoff, 2009)



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Importance of a National Norm

Psychometric Issues and Current Scales for Assessing Autism Spectrum Disorder

Jack A. Naglieri
Kimberly M. Chambers

The study of any psychological disorder is dependent upon the tools that are used, as these tools directly influence what is learned about the subject in research as well as clinical practice. As in all areas of science, what we discover depends upon the quality of the instruments we use and the information they provide. Better-made instruments yield more accurate and reliable information. Instruments that uncover more information relevant to the subject being examined will have better validity, and ultimately

Importance of a National Norm

TABLE 3.2. Comparison of Essential ASD Rating Scale Characteristics

Behavior rating scale	No. of items	Age range	Comparison sample size	Comparison sample	Representative standardization sample	Scores for total scale
Autism Diagnostic Interview—Revised (ADI-R)	93	2–*x* years	Exact *N* not given	Children with and without ASD, studies conducted by a[illegible]istered as[illegible] and	No	Raw score
Childhood Autism Rating Scale (CARS)	15	Exact ages not given	1,600	Ch[illegible] pr[illegible] H	No	Raw score
Social Communication Questionnaire (SCQ)	40	4–*x* years	200	A wide variety of individuals (persons with autism, atypical autism, Asperger syndrome, fragile X syndrome, Rett syndrome, conduct disorder, language delay, mental retardation, and other clinical diagnoses)	No	Raw score
Social Responsiveness Scale (SRS)	65	4–18 years	1,636	Cases from five studies, combined into one sample (74% white, 11% black, 11% Hispanic, 2% Asian, 2% other)	No	*T* score

We don't know the ***ages*** of those in the comparison group

Importance of a National Norm

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We sometimes don't know the ***size*** of the comparison group

Importance of a National Norm

TABLE 3.2. Comparison of Essential ASD Rating Scal

No nationally representative samples

Behavior rating scale	No. of items	Age range	Comparison sample size	Compa	Representative standardization sample	Scores for total scale
Autism Diagnostic Interview—Revised (ADI-R)	93	2–*x* years	Exact *N* not given	Children with and without ASD, studies conducted by authors where interviews were administered as part of routine initial clinical assessment and systematic research evaluations	No	Raw score
Childhood Autism Rating Scale (CARS)	15	Exact ages not given	1,600	Children who were referred to the TEACCH program (see text)	No	Raw score
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Importance of a National Norm

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Typically only raw scores are provided

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Importance of a National Norm

- What is the problem with not having a national norm?
  - You don't know how typical children perform
    - Typical means a wide variety of individuals who vary on important demographic variables
- What is the problem with not having a standard score like a T-score (mean of 50 and *SD* of 10)?
  - You don't know how similar a child's behavior is in relation to the norm
  - Let's look at some data …

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Diagnostic Reference Groups

- Naglieri, J. A. (2012). Psychological Assessment by School Psychologists: Opportunities and Challenges of A Changing Landscape. In K. Geisinger & B. A. Bracken (Eds.) *APA Handbook of Testing and Assessment in Psychology*. Washington, D.C.: American Psychological Association.

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Diagnostic Reference Groups

- I studied the differences between results when using a nationally representative sample versus a sample of children identified as having Autism as a reference group
- Raw score to standard score (T-scores) conversion table was constructed based on two different reference groups
  - Children with ASD
  - Nationally representative sample

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Diagnostic Reference Groups

- The **sample of children with ASD** (N = 243) were diagnosed with
  - Autism (*n* = 137), Asperger Syndrome (*n* = 80), or Pervasive Developmental Disorder-Not Otherwise Specified (*n* = 26).
  - comprised of individuals with a single primary diagnosis made by a qualified professional (e.g., psychiatrist, psychologist) according to the DSM-IV-TR (APA, 2000) or ICD-10 (WHO, 2007)) using appropriate methods (e.g., record review, rating scales, observation, and interview).

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Diagnostic Reference Groups

- The **sample, representative of the US** population, included males and females from each of the four geographic regions of the US and four racial-ethnic groups (Asian, Black, White-Not Hispanic and Hispanic Origin aged 6 – 18 years.
- The N = 1,828 (See Goldstein & Naglieri (2009) for more details about the normative sample of the ASRS and those identified with ASD.)

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Diagnostic Reference Groups

- Total **Raw Scores** on the ASRS for 6-18 Year olds rated by Teachers.

	Mean	SD	N
Total ASD Sample	129.1	46.9	243
Normative Sample	53.1	36.1	1,828

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Score Calibrations

A Raw Score of 130 is a T of 50 based on ASD sample

A Raw Score of 80 is a T of 40 based on the ASD sample

Raw Score	ASD Comparison	National Comparison
170	59	82
165	58	81
160	57	80
155	56	78
150	54	77
145	53	75
140	52	74
135	51	73
130	50	71
125	49	70
120	48	69
115	47	67
110	46	66
105	45	64
100	44	63
95	43	62
90	42	60
85	41	59
80	40	57
75	38	56
70	37	55
65	36	53

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Score Calibrations

A Raw Score of 130 is a T of 50 based on ASD sample

A Raw Score of 80 is a T of 40 based on the ASD sample

A Raw Score of 90 is a T of 42 based on ASD sample; but a T score of 60 (1 SD above the national reference group

Raw Score	ASD Comparison	National Comparison
170	59	82
165	58	81
160	57	80
155	56	78
150	54	77
145	53	75
140	52	74
135	51	73
130	50	71
125	49	70
120	48	69
115	47	67
110	46	66
105	45	64
100	44	63
95	43	62
90	42	60
85	41	59
80	40	57
75	38	56
70	37	55
65	36	53

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ASRS with GARS-2

	Rater	Age in Years	Obt *r*	Corr *r*	*N*	GARS-2 *M*	GARS-2 *SD*	ASRS *M*	ASRS *SD*
GARS Autism Index	Parent	2–5	.83	.61	78	100.9	25.7	74.5	11.4
	Teacher	2–5	.76	.41	53	100.1	30.5	75.3	12.7
	Parent	6–18	.80	.63	104	93.9	24.4	69.3	10.0
	Teacher	**6–18**	**.82**	**.68**	**116**	**88.6**	**23.3**	**69.8**	**10.0**

Note: GARS-2 standard scores are mean of 100, *SD* of 15; 80+ = concern.

Almost 1 SD below GARS mean = ASRS T of 70 (+2 SD)

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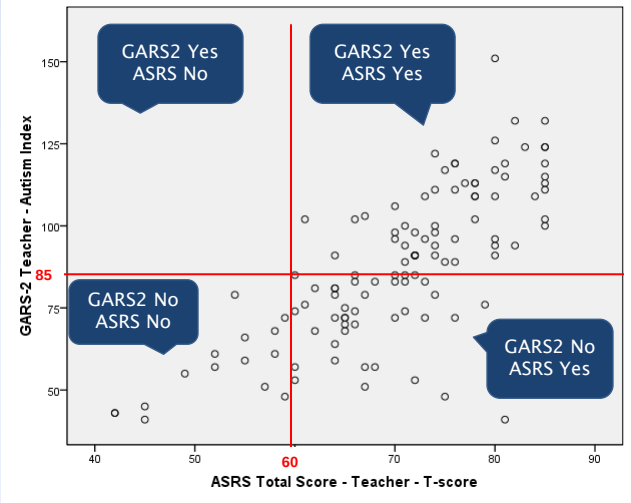
GARS-2 and ASRS

- N = 115 with clinical diagnosis: Autism (49%), PDD-nos (12%), Asperger (15%), LD (12%), ADHD (12%)
- GARS-2 mean = 87.4 (SD = 23.6)
- ASRS mean = 70.1 (SD = 9.9)



50

Importance of a National Norm

- Conclusions
  - The diagnostic conclusions we reach are greatly influenced by the tools we use
  - The composition of the reference group can make a substantial difference in the conclusions reached
  - Norms that represent a typical population are needed for all assessment tools
  - We have an obligation to use the highest quality tests

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Importance of a National Norm

- Only tests that yield standard scores based on a representative normal sample should be used in clinical practice.
- A comparison of ASD symptoms to a normative group is very helpful
- Comparisons to children with symptoms of Autism *only* can be misleading
- The use of raw scores should be avoided in all tests (especially achievement tests)

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ASRS Standardization Samples

Ages 2–5, 6–18 year groups

Importance of a National Norm

- Sample was stratified by
  - Sex, age, race/ethnicity, parental education level (PEL; for cases rated by parents), geographic region
  - Race/ethnicity of the child (Asian/Pacific Islander, Black/African American/African Canadian, Hispanic, White/Caucasian, Multiracial by the rater
  - Parents provided PEL of both parents
    - the higher of the two levels was used to classify the parental education level of the child
  - All raters completed the ASRS via the paper-and-pencil or online methods.

Importance of a National Norm

ASRS Standardization Samples by Age and Rater		
Age Groups	**Parent Raters**	**Teacher Raters**
2 - 5 Years	320	320
6 - 11 Years	480	480
12 - 18 Years	480	480
Sub Total n	1,280	1,280
TOTAL N	2,560	

Note: All norms are based on these age groups.

Note: at ages 2–16 years there were 80 subjects (40 girls and 40 boys) per one year age group. At ages 17–18 there were 80 subjects (40 girls and 40 boys) across this two year interval.

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Importance of a National Norm

- Validity samples were collected
  - a single primary diagnosis was indicated
  - a qualified professional (e.g., psychiatrist, psychologist) had made the diagnosis
  - Criteria were made using DSM–IV–TR or ICD–10
  - Clinical samples include
    - ASD (N = 580)
    - ADHD (N = 250)
    - Communication Delay (N = 180)
    - Developmental Delay (N = 140)
    - Anxiety / Depression (N = 100)

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Presentation Goals

- An understanding of Autism Spectrum Disorders (ASD)
- Symptoms of ASD
- Importance of psychometric quality and a national standardization sample
- Methods for assessment
- Autism Spectrum Rating Scale (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- Autism Spectrum Rating Scale Short Form (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- ASRS Interpretation with other measures
- Conclusions

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Components of an Evaluation

- History
- Questionnaires
- Observation
- Interaction
- Cognitive, neurodevelopmental and language data
- Adaptive functioning
- Emotional functioning
- Consideration of differential diagnosis and/or comorbidity

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Evaluation should include

- Topics to consider
  - Evaluation of age of onset
  - Social dysfunction including play
  - Communication dysfunction (pragmatics and semantics)
  - Unusual behaviors (e.g. need for sameness, odd interests, sterotypies)
- Instruments to assist in diagnosis
  - Tests (e.g., ADOS)
  - Rating scales

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Autism Rating Scales

- Gilliam Autism Scale
- Childhood Autism Rating Scale
- Autism Behavior Checklist
- Checklist for Autism in Toddlers
- Gilliam Asperger Rating Scale
- Autism Spectrum Rating Scale

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Presentation Goals

- An understanding of Autism Spectrum Disorders (ASD)
- Symptoms of ASD
- Methods for assessment
- Importance of psychometric quality and a national standardization sample
- Autism Spectrum Rating Scale (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- Autism Spectrum Rating Scale Short Form (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- ASRS Interpretation with other measures
- Conclusions

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ASRS Forms

- Produce a rating scale that includes behaviors associated with ASRS that meets the various needs of the clinician
  - Has different forms for early childhood and school aged populations
  - Uses the same set of questions for parents and teachers
  - Is easy to administer and score
  - Have reliability and validity
- Let's look at the forms and their use…

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Forms

- Instructions to the raters (parents and teachers) for ages 2 – 18 years

ASRS™

(6–18 Years)
TEACHER RATINGS
Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D.

Instructions for Raters: Read each statement that follows the phrase, "*During the past four weeks, how often did the student...,*" then circle

Instructions for Raters: Read each statement that follows the phrase, "***During the past four weeks, how often did the student...,***" then circle the number under the word that tells how often you saw the behavior. Read each question carefully, then mark how often you saw the behavior in the past four weeks. Answer every question without skipping any. If you want to change your answer, put an X through it and circle your new choice. Be sure to answer every question.

ASRS Forms

Figure 3.2. Sample Full-Length ASRS (6–18 Years) Parent Ratings

ASRS™

(6–18 Years)
PARENT RATINGS
Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D.

During the past four weeks, how often did the child...	Never	Rarely	Occasionally	Frequently	Very Frequently
1. appear disorganized?	0	1	2	(3)	4
2. become bothered by some fabrics or tags in clothes?	(0)	1	2	3	4
3. seek the company of other children?	0	1	2	(3)	4
4. show little emotion?	0	1	2	(3)	4
5. follow instructions that he/she understood?	0	(1)	2	3	4
6. argue and fight with other children?	0	1	(2)	3	4
7. have problems waiting his/her turn?	0	1	2	3	(4)
8. share fun activities with others?	0	1	(2)	3	4

ASRS Forms

- Underlying page contains item ratings and separation of items into scales.

Figure 3.3. Sample Full-Length ASRS (6–18 Years) Parent Ratings For

ASRS™ (6–18 Years) PARENT RATINGS

Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D.

INSTRUCTIONS: Transfer the circled numbers into the unshaded box(es) to the right of each item. Add the values in each column and write the sum in the Subtotal boxes at the bottom of each page. For each scale, sum Subtotals A and B to get the Raw Score. Transfer the Raw Scores to page 4 for ages 6–11 years and page 5 for ages 12–18 years.

During the past four weeks, how often did the child...	Never	Rarely	Occasionally	Frequently	Very Frequently	SC	UB	SR	DSM	PS	AS	SER	AL	ST	BR	SS
1. appear disorganized?	0	1	2	(3)	4			3								
2. become bothered by some fabrics or tags in clothes?	(0)	1	2	3	4		0									0
3. seek the company of other children?	4	3	2	(1)	0	1				1						
4. show little emotion?	0	1	2	(3)	4	3						3				
5. follow instructions that he/she understood?	4	(3)	2	1	0			3								
6. argue and fight with other children?	0	1	(2)	3	4			2								
7. have problems waiting his/her turn?	0	1	2	3	(4)			4								
8. share fun activities with others?	4	3	(2)	1	0	2			2			2				

Raw , T, Percentile, Classification

Child's Name/ID: Joey D Gender: (M) F (Circle One) Today's Date: 2009 / 07 / 02 (Year / Month / Day)

Parent's Name/ID: Mrs. D Grade: 5 Birth Date: 1999 / 01 / 02 (Year / Month / Day)

Did your child acquire language before age 3? (Delay of Communication 1) (Yes) No Don't Know

If Yes, did your child speak in 3 word sentences by age 3? (Delay of Communication 2) (Yes) No Don't Know

Age: 10 / 6 / 0 (Years / Months / Days)

Raw Score to *T*–Score and Percentile Rank Conversion Table for Ages 6–11 Years

Percentile Rank	*T*–Score	ASRS Scales			TOT	DSM	Treatment Scales								*T*–Score	Percentile Rank	Classification
		SC	UB	SR			PS	AS	SER	AL	ST	BR	SS	AT			
99	85	64–76			239–250	125–136	36	24	45–52				22–24	44	85	99	
99	84	62–63			236–238	122–124	35	23					21	43	84	99	
99	83	60–61	96		233–235	119–121	34	22	44				20	42	83	99	
99	82	58–59	94–95	67–68	230–232	116–118	33	21	43	24	20		19	41	82	99	
99	81	56–57	92–93	65–66	227–229	113–115	32		42	23		32	18	40	81	99	
99	80	54–55	90–91	64	224–226	110–112	31	20	40–41	22	19	31	17	39	80	99	
99	79	52–53	88–89	63	221–223	108–109	30		38–39			30	16		79	99	
99	78	50–51	86–87	61–62	218–220	105–107	29	19	37	21	18	29	15	38	78	99	Very Elevated
99	77	(48–49)	84–85	59–60	215–217	102–104	28		(36)				14		77	99	
99	76	46–47	81–83	57–58	213–214	98–101	27	18	35	20	17	28		37	76	99	
99	75	45	77–80	56	211–212	94–97	25–26		34	19		27	13		75	99	
99	74	44	72–76	55	209–210	90–93	24	17		18	16	26		36	74	99	
99	73	42–43	66–71	54	(207–208)	87–89	23		33	17		25	12		73	99	
99	72	41	61–65	53	205–206	84–86	22	16	32	16	15	(24)		(35)	72	99	
98	71	39–40	58–60	52	203–204	81–83	21		31	15		23	11	34	71	98	
98	70	38	55–57	(50–51)	201–202	78–80	(20)	15	30	14	14	22		33	70	98	
97	69	37	52–54	49	199–200	(75–77)	19		29	13		21	10	32	69	97	
96	68	35–36	48–51	47–48	198	72–74	18	14	28	12	13	20		31	68	96	
96	67	34	46–47	46	195–197	69–71	17		27			19	9	30	67	96	Elevated
95	66	33	44–45	45	192–194	66–68	16	13	26	11	12	18		29	66	95	
93	65	32	42–43	44	189–191	63–65	15		25			17		28	65	93	
92	64	31	40–41	41–43	187–188	60–62		12	24	10	11	16	8	27	64	92	
90	63	29–30	38–39	40	185–186	57–59	14		23					25–26	63	90	Slightly Elevated
88	62	28	36–37	37–39	182–184	53–56		11	22	9	10	15		24	62	88	
86	61	27	34–35	35–36	179–181	50–52	13		21			14	7	23	61	86	
84	60	26	(32–33)	33–34	175–178	47–49		10	20	8	9			22	60	84	

ASRS Forms

Scale Score Summary Table: Ages 6–11 Years

ASRS Scales

Scales	Raw Score	*T*-Score	Percentile Rank	Classification	90/95% *T*-score CI (circle one)
Social/Communication (SC)	49	77	99	Very Elevated	72 to 79
Unusual Behaviors (UB)	33	60	84	Slightly Elevated	56 to 63
Self-Regulation (SR)	50	70	98	Very Elevated	64 to 73

Total Score

SC *T*-Score		UB *T*-Score		SR *T*-Score		Sum of SC, UB, & SR *T*-Scores	*T*-Score	Percentile Rank	Classification	90/95% *T*-score CI (circle one)
77	+	60	+	70	=	207	73	99	Very Elevated	70 to 75

DSM-IV-TR Scale

Scale	Raw Score	*T*-Score	Percentile Rank	Classification	90/95% *T*-score CI (circle one)
DSM-IV-TR Scale (DSM)	77	69	97	Elevated	65 to 71

Treatment Scales

Scales	Raw Score	*T*-Score	Percentile Rank	Classification	90/95% *T*-score CI (circle one)
Peer Socialization (PS)	20	70	98	Very Elevated	62 to 73
Adult Socialization (AS)	9	58	79	Average	49 to 63
Social/Emotional Reciprocity (SER)	36	77	99	Very Elevated	69 to 79
Atypical Language (AL)	4	52	58	Average	46 to 58
Stereotypy (ST)	4	49	46	Average	43 to 56
Behavioral Rigidity (BR)	24	72	99	Very Elevated	65 to 75
Sensory Sensitivity (SS)	1	44	27	Average	39 to 51
Attention (AT)	35	72	99	Very Elevated	65 to 75

ASRS Forms in Spanish

ASRS™ (Edad 6–18 a
MAESTRO
Sam Goldstein, Ph.D. &

¿Durante las últimas cuatro semanas, con que frecuencia observó qué el estudiante...

	Nunca
1. pareció desorganizado(a)?	0
2. se sintió incómodo(a) con algunas telas o etiquetas en la ropa?	0
3. buscó la compañía de otros niños?	0
4. demostró poca emoción?	0
5. siguió instrucciones que entendió?	0
6. discutió y peleó con otros niños?	0
7. tuvo dificultad en esperar su turno?	0
8. compartió en actividades divertidas con otros?	0

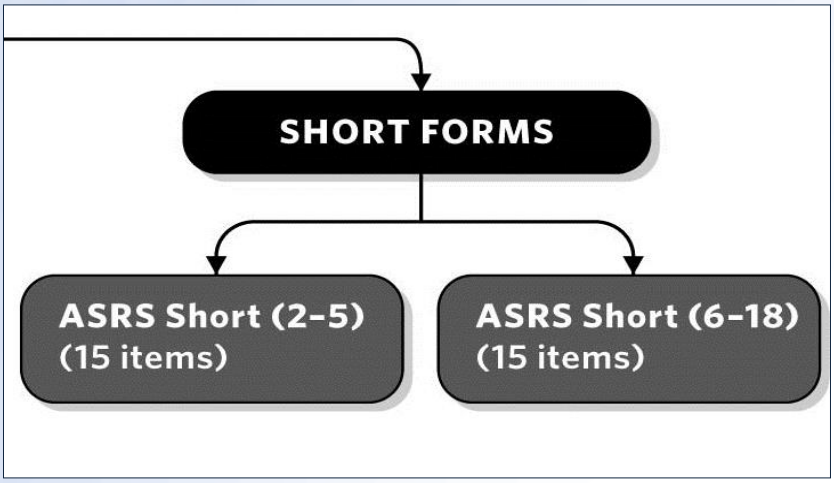
ASRS™

(Edad 6–18 años)
MAESTRO(A)
Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D.

Instrucciones: Lea cada frase después de la oración: **"Durante las últimas cuatro semanas, con qué frecuencia observó que el estudiante(a)..."**, luego marque su respuesta debajo de la palabra que indique la frecuencia con la que usted observó la conducta. Lea cada frase cuidadosamente, luego marque con qué frecuencia usted observó la conducta **durante las últimas cuatro semanas.** Conteste cada frase sin omitir ninguna. Si desea cambiar una respuesta, ponga una X a través de la respuesta incorrecta y marque su nueva respuesta. Por favor conteste cada frase.

MHS

Autism Rating Scales



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Short Form

AR5010

ASRS™ Short Form (6–18 Years)
Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D.

Child's Name/ID: _____ Gender: M F (Circle One) Grade: ____ Today's Date: ____/____/____ (Year/Month/Day)

Parent's/Teacher's Name/ID: _____ Rater Type: Parent Teacher (Circle One) Birth Date: ____/____/____ (Year/Month/Day)

For Teachers Only: Time Known Student: ____ ____ (Years Months) Class(es) Taught: _____ Age: ____/____/____ (Years/Months/Days)

Instructions: Read each statement that follows the phrase, "***During the past four weeks, how often did the child…,***" then circle the number under the word that tells how often you saw the behavior. Read each question carefully, then mark how often you saw the behavior **in the past four weeks.** Answer every question without skipping any. If you want to change your answer, put an X through it and circle your new choice. Be sure to answer every question.

During the past four weeks, how often did the child…	Never	Rarely	Occasionally	Frequently	Very Frequently
1. share fun activities with others?	0	1	2	3	4
2. use language that was immature for his/her age?	0	1	2	3	4
3. use an odd way of speaking?	0	1	2	3	4
4. become obsessed with details?	0	1	2	3	4
5. insist on doing things the same way each time?	0	1	2	3	4

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Short Form – Page 2

Profile — **ASRS Short (6–18)** by Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D

Instructions

1. Determine the rater type (Parent or Teacher) and choose the appropriate profile table for the child's age group (6–11, 12–18).
2. Circle the Raw Score and follow the row across to the right to determine the *T*-score, Confidence Interval (CI), and Percentile (%ile).

Child's Name/ID: _____ **Age:** ____ ____ (Years Months) **Gender:** M F (Circle One) **Grade:** ____ **Birth Date:** ____/____/____ (Month Day Year)

Parent's/Teacher's Name/ID: _____ **Rater Type:** Parent Teacher (Circle One) **Today's Date:** ____/____/____ (Month Day Year)

For Teachers Only: **Time Known Student:** ____ ____ (Years Months) **Classes Taught:** _____

Parent 6–11

Raw Score	T-score	90% CI	95% CI	%ile
53-60	85	81-89	80-90	99.9
52	84	80-88	79-89	99.9
51	83	79-87	78-88	99.9
50	82	78-86	77-87	99.9
49	81	77-85	76-86	99.9
48	80	76-84	75-85	99.9
47	79	75-83	74-84	99.8
46	78	74-82	73-83	99.7
44-45	77	73-81	72-82	99.7
43	76	72-80	71-81	99.5
42	75	71-79	70-80	99.4
41	74	70-78	69-79	99.2

Parent 12–18

Raw Score	T-score	90% CI	95% CI	%ile
53-60	85	81-89	80-90	99.9
51-52	84	80-88	79-89	99.9
49-50	83	79-87	78-88	99.9
47-48	82	78-86	77-87	99.9
45-46	81	77-85	76-86	99.9
43-44	80	76-84	75-85	99.9
41-42	79	75-83	74-84	99.8
39-40	78	74-82	73-83	99.7
38	77	73-81	72-82	99.7
37	76	72-80	71-81	99.5
36	75	71-79	70-80	99.4
35	74	70-78	69-79	99.2

Teacher 6–11

Raw Score	T-score	90% CI	95% CI	%ile
47-60	85	80-90	79-91	99.9
46	84	79-89	78-90	99.9
44-45	83	78-88	77-89	99.9
43	82	77-87	76-88	99.9
41-42	81	76-86	75-87	99.9
39-40	80	75-85	74-86	99.9
38	79	74-84	73-85	99.8
37	78	73-83	72-84	99.7
36	77	72-82	71-83	99.7
35	76	71-81	70-82	99.5
34	75	70-80	69-81	99.4
33	74	69-79	68-80	99.2

Teacher 12–18

Raw Score	T-score	90% CI	95% CI	%ile
53-60	85	81-89	80-90	99.9
52	84	80-88	79-89	99.9
50-51	83	79-87	78-88	99.9
49	82	78-86	77-87	99.9
47-48	81	77-85	76-86	99.9
45-46	80	76-84	75-85	99.9
44	79	75-83	74-84	99.8
43	78	74-82	73-83	99.7
42	77	73-81	72-82	99.7
41	76	72-80	71-81	99.5
40	75	71-79	70-80	99.4
39	74	70-78	69-79	99.2

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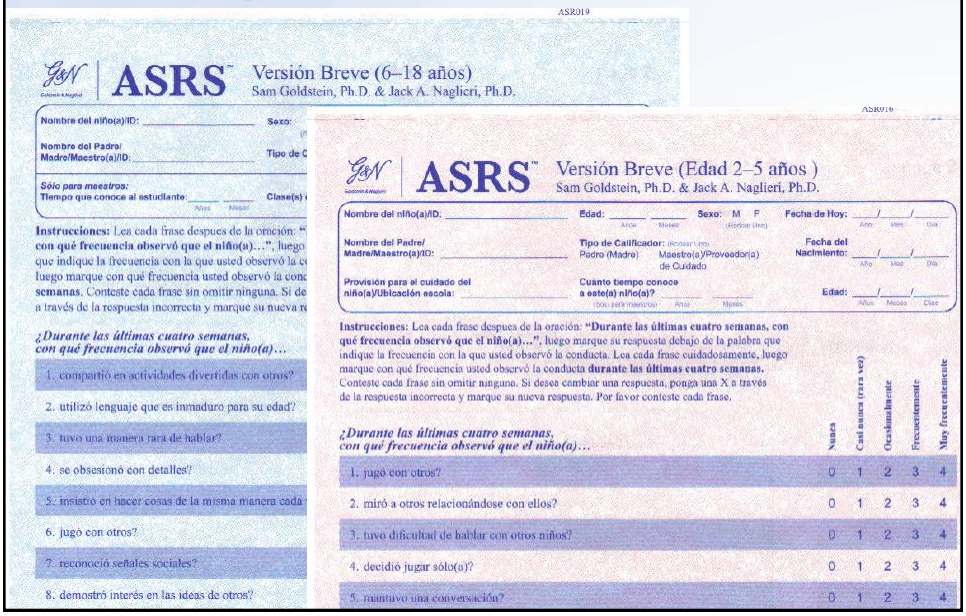
ASRS Spanish Short Forms



ASR019

ASRS Versión Breve (6–18 años)
Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D.

Nombre del niño(a)/ID: _____ Sexo:
Nombre del Padre/ Madre/Maestro(a)/ID: _____ Tipo de C
Sólo para maestros: Tiempo que conoce al estudiante: ____ ____ (Años Meses) Clase(s)

Instrucciones: Lea cada frase despues de la oración: "**con qué frecuencia observó que el niño(a)…**", luego que indique la frecuencia con la que usted observó la c luego marque con qué frecuencia usted observó la conc **semanas.** Conteste cada frase sin omitir ninguna. Si de a través de la respuesta incorrecta y marque su nueva re

¿Durante las últimas cuatro semanas, con qué frecuencia observó que el niño(a)…

1. compartió en actividades divertidas con otros?
2. utilizó lenguaje que es inmaduro para su edad?
3. tuvo una manera rara de hablar?
4. se obsesionó con detalles?
5. insistió en hacer cosas de la misma manera cada
6. jugó con otros?
7. reconoció señales sociales?
8. demostró interés en las ideas de otros?

ASR016

ASRS Versión Breve (Edad 2–5 años)
Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D.

Nombre del niño(a)/ID: _____ Edad: ____ ____ (Años Meses) Sexo: M F (Rodear Uno) Fecha de Hoy: ____/____/____ (Año Mes Día)

Nombre del Padre/ Madre/Maestro(a)/ID: _____ Tipo de Calificador: (Rodear Uno) Padre (Madre) Maestro(a)/Provoedor(a) de Cuidado Fecha del Nacimiento: ____/____/____ (Año Mes Día)

Provisión para el cuidado del niño(a)/Ubicación escola: _____ Cuanto tiempo conoce a este(a) niño(a)? ____ ____ (Solo para maestros) (Años Meses) Edad: ____/____/____ (Años Meses Días)

Instrucciones: Lea cada frase despues de la oración: **"Durante las últimas cuatro semanas, con qué frecuencia observó que el niño(a)…"**, luego marque su respuesta debajo de la palabra que indique la frecuencia con la que usted observó la conducta. Lea cada frase cuidadosamente, luego marque con qué frecuencia usted observó la conducta **durante las últimas cuatro semanas.** Conteste cada frase sin omitir ninguna. Si desea cambiar una respuesta, ponga una X a través de la respuesta incorrecta y marque su nueva respuesta. Por favor conteste cada frase.

¿Durante las últimas cuatro semanas, con qué frecuencia observó que el niño(a)…	Nunca	Casi nunca (rara vez)	Ocasionalmente	Frecuentemente	Muy frecuentemente
1. jugó con otros?	0	1	2	3	4
2. miró a otros relacionándose con ellos?	0	1	2	3	4
3. tuvo dificultad de hablar con otros niños?	0	1	2	3	4
4. decidió jugar sólo(a)?	0	1	2	3	4
5. mantuvo una conversación?	0	1	2	3	4

Reading Level of the ASRS

Table 3.1. ASRS Readability Levels by Form

Form		Readability Score		
		Overall	Instructions	Items
ASRS (2–5 Years)	Full-length	6.0	7.4	6.0
	Short	6.2	7.4	6.2
ASRS (6–18 Years)	Full-length	6.2	7.4	6.2
	Short	6.0	7.4	6.1

Note. Reading levels are identical for parent and teacher versions, as the item content is the same across both rater types.

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ASRS 'Nonverbal' Form

ASRS for those with limited or no language skills

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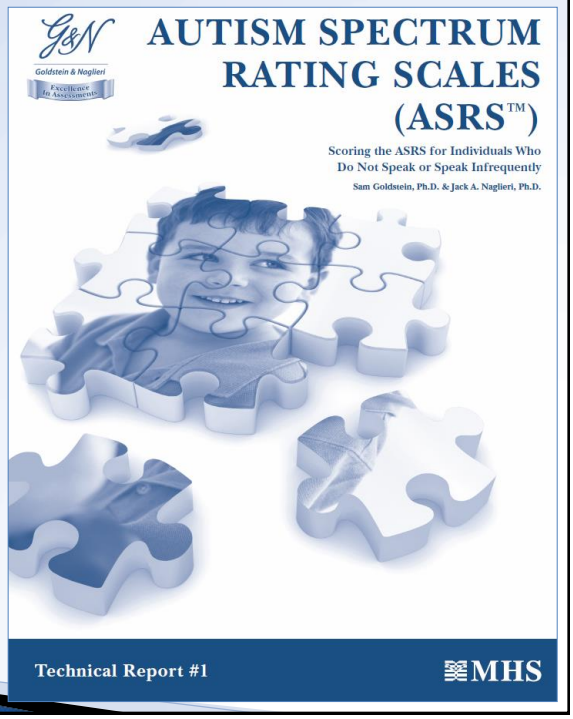
2013 Technical Report

- Scoring the ASRS for those who do not speak or speak infrequently



Items to Eliminate

Table 2. ASRS Items by Scale to Exclude When Using The Prorated Scoring Method with Individuals Who Do Not Speak or Speak Infrequently

Scale		Acronym	Item Number	
			ASRS (2–5 Years)	ASRS (6–18 Years)
ASRS Scales	Social/Communication	SC	5, 15, 22, 28, 29, 44	9, 23, 56
	Unusual Behaviors	UB	26, 41, 42, 53, 70	17, 20, 21, 26, 50, 68
	Self-Regulation (ASRS [6–18 Years])	SR	–	58
DSM-IV-TR Scale		DSM	5, 26, 28, 29, 41, 42, 53, 70	9, 20, 21, 23, 26, 37, 50, 56
Treatment Scales	Peer Socialization	PS	15	14, 50
	Adult Socialization	AS	44	37, 59
	Social/Emotional Reciprocity	SER	5	9
	Atypical Language	AL	6, 22, 42, 53, 59, 70	17, 20, 21, 26, 58, 68
	Stereotypy	ST	–	–
	Behavioral Rigidity	BR	–	–
	Sensory Sensitivity	SS	–	–
	Attention/Self-Regulation (ASRS [2–5 Years])	ASR	–	–
	Attention (ASRS [6–18 Years])	AT	–	–
Short Form			3, 5, 6, 8	2, 3

Prorating Table

Autism Spectrum Rating Scales™ (ASRS™)

Table 3. Prorated Score Conversion Table: ASRS (2–5 Years)

Raw Score	Prorated Score			Raw Score	Prorated Score				Raw Score
	ASRS Scales		DSM		Treatment Scales			Short Form	
	SC	UB			PS	AS	SER		
0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2				2	3	2	3	2
3	4				3	4	3	4	3
4	5				5	5	4	5	4
5	6				6	6	5	7	5
6	7				7	8	7	8	6
7	8				8	9	8	10	7
8	9				9	10	9	11	8
9	11				10	11	10	12	9
10	12				11	13	11	14	10
11	13		14	11	12	14	12	15	11
12	14		16	12	14	15	13	16	12
13	15		17	13					13
14	17	18	18	14					14
15	18	19	19	15					15
16		20	21	16					16
17	20	22	22	17					17
18	21	23	23	18					18
19	22	24							19
20	24								20
21	25	27	27	21					21
22	26	28	29	22	25	.	24	30	22
23	27	29	30	23	26	.	25	31	23

Raw Score (20) with verbal items omitted

Prorated Raw Score (24) used to obtain scale T-score

Reliabilities are still very high

Table 6. Cronbach's Alpha Values for Original and Prorated Scales: ASRS (6–18 Years) Parent Ratings

Scale		Original			Prorated		
		# of items	Age Group		# of items	Age Group	
			6–11	12–18		6–11	12–18
Total Score		60	.97	.97	50	.96	.95
ASRS Scales	Social/Communication	19	.95	.94	16	.93	.92
	Unusual Behaviors	24	.95	.94	18	.93	.93
	Self-Regulation	17	.92	.93	16	.92	.93
DSM-IV-TR Scale		34	.96	.95	26	.95	.94
Treatment Scales	Peer Socialization	9	.88	.88	7	.87	.84
	Adult Socialization	6	.77	.78	4	.69	.74
	Social/Emotional Reciprocity	13	.90	.90	12	.90	.87
Short Form		15	.92	.92	13	.91	.91
N		–	710	665	–	675	571

Note. All alpha values represent the weighted average of the normative and clinical samples.

Psychometrics

- Reliabilities are still high
- Factor structure is unchanged
- ASRS prorating method works well for those with limited or no language

Summary

A series of psychometric analyses were performed to examine the impact of prorating ASRS scores when certain items are omitted (i.e., those that cannot be accurately measured in individuals who do not speak or speak infrequently). Internal consistency values when these items were excluded were highly comparable to the original values. In addition, prorated means and standard deviations were similar to the original values. These results demonstrate that the original raw score to *T*-score conversion tables on the ASRS QuikScore Form can be used with the prorating system presented in this Technical Report. Factor analytic findings performed after removing the items shown in Table 2 were very similar to the original ASRS factor structure derived from all of the items (see *ASRS Technical Manual)*. Overall, these analyses indicate that excluding these items, and the subsequent prorating of scale scores, are psychometrically sound strategies for rating individuals who do not speak or speak infrequently.

ASRS Reliability

Naglieri & Goldstein (2012)

	Parent Raters				Teacher Raters			
	2-5	6-11	12-18	**Median**	2-5	6-11	12-18	**Median**
Total Scale	.95	.97	.97	**.97**	.94	.97	.97	**.97**
Social/Communication	.94	.91	.92	**.92**	.95	.93	.92	**.93**
Unusual Behaviors	.91	.94	.93	**.93**	.85	.93	.94	**.93**
Self-Regulation	-	.92	.93	**.93**	-	.94	.93	**.94**
Treatment Scales								
Peer Socialization	.77	.84	.84	**.84**	.85	.84	.83	**.84**
Adult Socialization	.67	.77	.79	**.77**	.78	.80	.77	**.78**
Social/Emotional Reciprocity	.83	.85	.88	**.85**	.88	.89	.89	**.89**
Atypical Language	.71	.81	.82	**.81**	.59	.75	.80	**.75**
Stereotypy	.75	.79	.77	**.77**	.67	.69	.72	**.69**
Behavioral Rigidity	.85	.89	.86	**.86**	.82	.90	.90	**.90**
Sensory Sensitivity	.71	.79	.77	**.77**	.59	.77	.84	**.77**
Attention/Self-Regulation (2-5) or Attention (6-18)	.83	.90	.89	**.89**	.83	.92	.91	**.91**

Note: The ASRS form for ages 2-5 has two empirically derived scales (Social/Communication and Unusual Behaviors).

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ASRS Validity

- And an updated view of ASD

Validity of the Factors

- Factor analysis is a valuable tool to understand how items group
- But we also need to know if the items have validity
- Discriminating children with ASD from the regular population is important
- Discriminating children with ASD from those who are not in the regular population but not ASD is very important
  - These data will be presented

Clinical Case Verification

- cases were used only if the following criteria were met:
  - a single primary diagnosis was indicated
  - a qualified professional (e.g., psychiatrist, psychologist) had made the diagnosis
  - the diagnosis made according to the DSM-IV-TR (APA, 2000) or ICD-10 (WHO, 2007)
  - appropriate methods (e.g., record review, rating scales, observation, interview) were used during diagnosis
- See ASRS Manual (pg. 49) for more details

ASRS Profiles

- A scale like the ASRS should differentiate children with ASD from the normal population.
- Comparison to regular children should show that those with ASDs have high scores.
- Comparisons to other clinical groups should also show differences from those with ASDs.
- Comparisons of the ASD to regular and other clinical samples gives an essential examination of validity .

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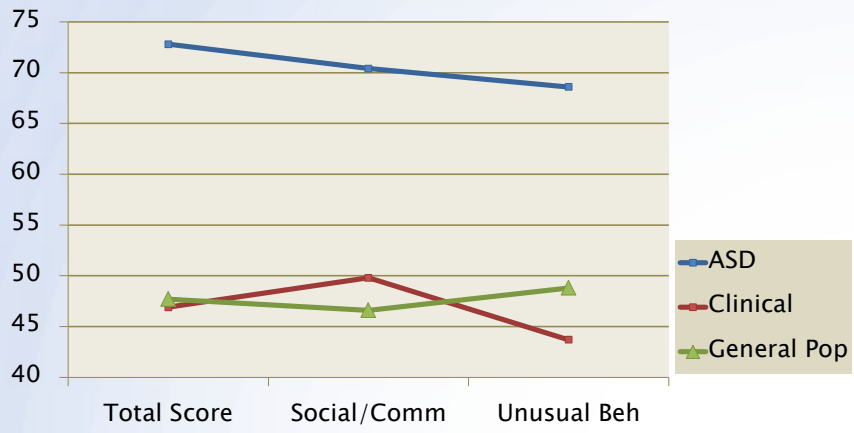
ASRS Validity: Parents 2-5



Note: Values from ASRS Manual (Goldstein & Naglieri, 2009) pages 66 – 67.

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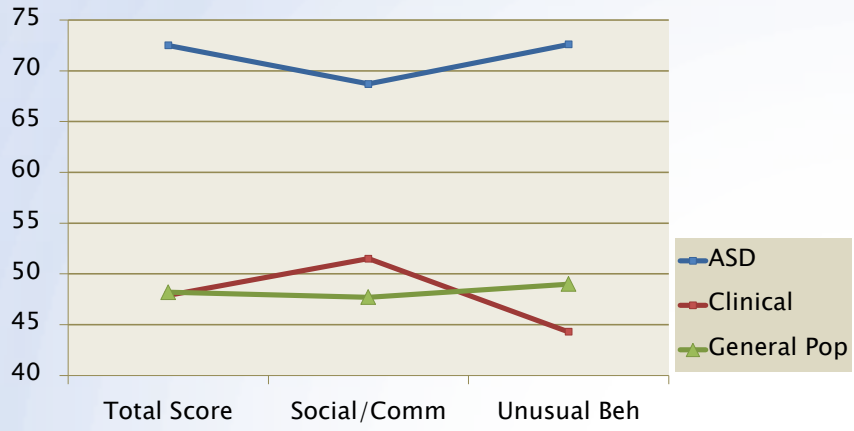
ASRS Validity: Teachers 2-5



Note: Values from ASRS Manual (Goldstein & Naglieri, 2009) pages 66 – 67.

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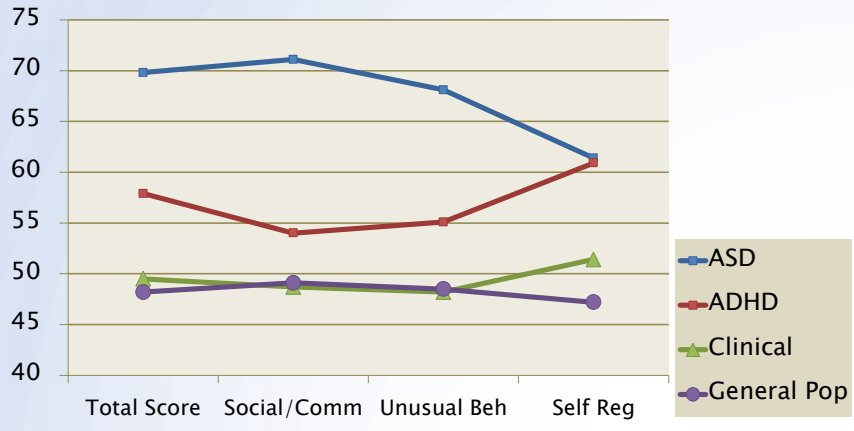
ASRS Validity: Parents 6-18



Note: Values from ASRS Manual (Goldstein & Naglieri, 2009) page 67.

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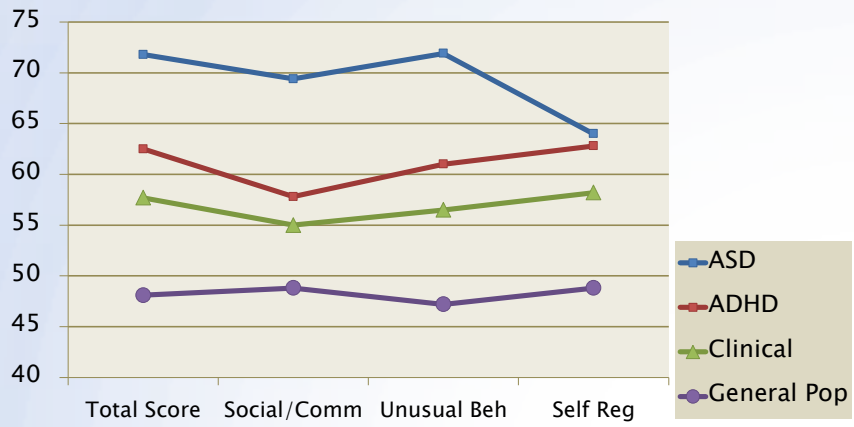
ASRS Validity: Teachers 6-18



Note: Values from ASRS Manual (Goldstein & Naglieri, 2009) page 67.

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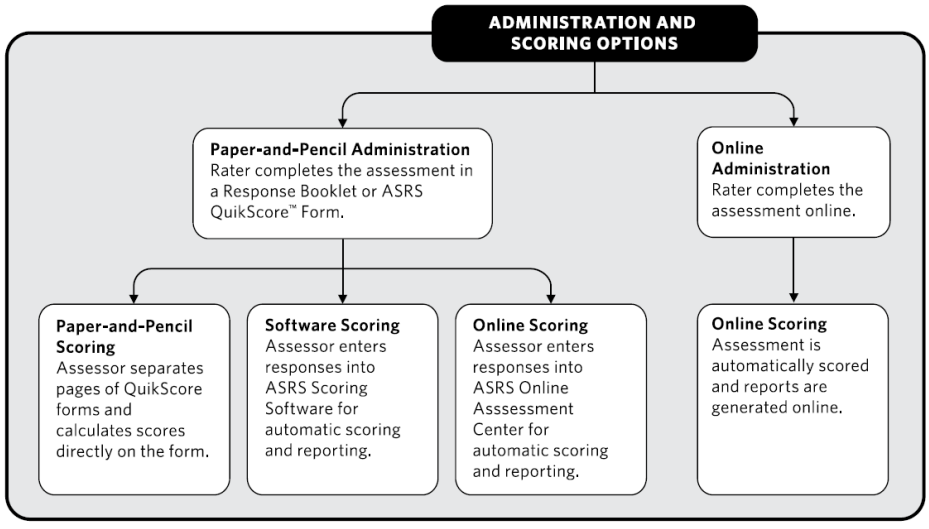
ASRS Scoring Options

Administration Scoring Options

Figure 3.1. Overview of Administration and Scoring Options



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Interpretation Options

Goldstein & Naglieri

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ASRS Interpretation

- For ages 2–5 years the ASRS **Total T-Score** (mean of 50 and SD of 10) is an equally weighted composite of
  - Social/Communication
  - Unusual Behaviors
- For ages 6–18 years the **Total T-score** is an equally weighted composite of
  - Social/Communication
  - Unusual Behaviors
  - Self-Regulation scales

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ASRS Interpretation

- The **DSM-IV-TR Scale** includes items that represent the symptoms used as part of the diagnostic criteria for ASD.
- Additional criteria (e.g., age of onset, differential diagnosis, and level of impairment) must be met before a DSM-IV-TR diagnosis can be assigned

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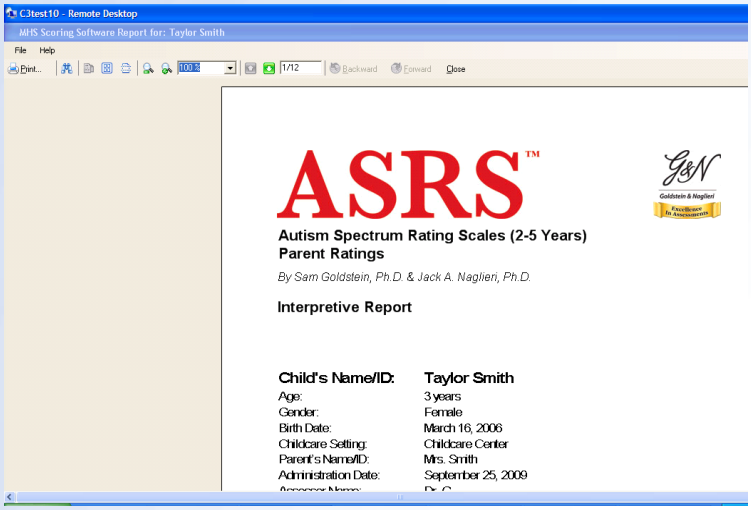
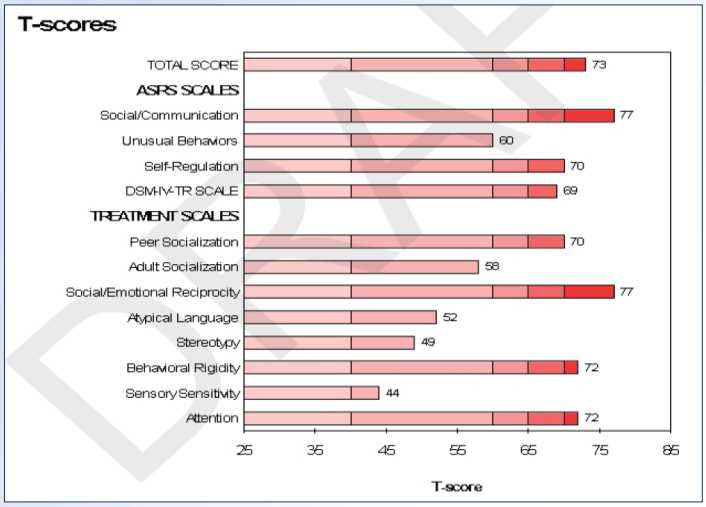
ASRS Interpretive Software

- There are three types of reports
  - Interpretive
  - Comparative
  - Progress

ASRS Interpretive Report



ASRS Interpretive Report



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ASRS Interpretive Report

ASRS (6-18 Years) Parent Interpretive Report for Joey D — Admin Date: 07/02/2009

Summary of Results

The following section summarizes the rater's observations of Joey D on the ASRS (6-18 Years) Parent form. Scores reported in this section include the obtained T-score, along with the 90% confidence interval (i.e., there is a 90% probability that the true T-score falls within this range), as well as the percentile ranking of the score. Higher T-scores indicate greater problems. **Note:** CI = Confidence Interval.

ASRS Scales

Ratings on the **Social/Communication** scale indicate the extent to which the youth uses verbal and non-verbal communication to initiate, engage in, and maintain social contact. Ratings on this scale yielded a T-score of 77 (90% CI = 72-79), which is ranked at the 99th percentile and falls in the Very Elevated Score range.

Ratings on the **Unusual Behaviors** scale indicate the youth's level of tolerance for changes in routine, engagement in apparently purposeless and stereotypical behaviors, and overreaction to certain sensory experiences. Ratings on this scale yielded a T-score of 60 (90% CI = 56-63), which is ranked at the 84th percentile and falls in the Slightly Elevated Score range.

Ratings on the **Self-Regulation** scale indicate how well the youth manages his behavior using a set of internalized rules to efficiently negotiate the environment. Ratings on this scale yielded a T-score of 70 (90% CI = 64-73), which is ranked at the 98th percentile and falls in the Very Elevated Score range.

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ASRS Interpretive Software

- There are three types of reports
  - Interpretive
  - Comparative
  - Progress

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ASRS Comparative Report

ASRS™

Autism Spectrum Rating Scales (6-18 Years)

By Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D.

Comparative Report

Youth's Name/ID: Joey D
Gender: Male
Birth Date: January 02, 1999

	Parent	Teacher
Youth's Name/ID:	Joey D	Joey D
Administration Date:	Jul 02, 2009	Jul 02, 2009
Age:	10 years	10 years
Grade:	5	5
Rater Name/ID:	Mrs. D	Mr. J
Assessor Name:	Dr. G	Dr. G
Data Entered By:	Maria	Maria

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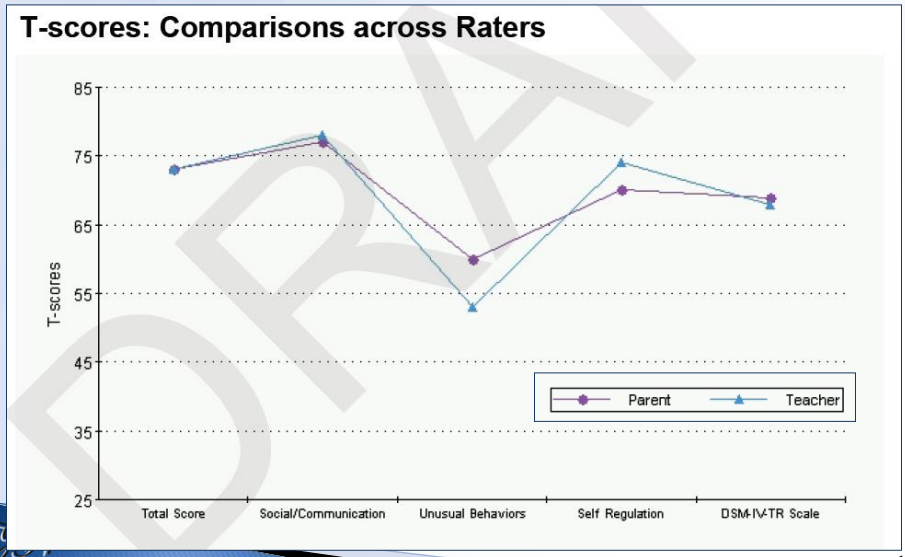
ASRS Comparative Report



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Inter-Rater Consistency: 6-18 Yrs

General Population Sample	Obt r	Cor r	N	Parent M	Parent SD	Teacher M	Teacher SD	d - ratio
Total Score	.51	.57	234	46.3	9.1	46.2	9.4	**.01**
Social/Communication	.60	.68	266	46.2	9.1	46.9	9.0	**.08**
Unusual Behaviors	.44	.50	252	48.0	9.2	46.2	9.2	**.20**
Self-Regulation	.57	.62	276	46.7	8.9	46.1	10.0	**.06**
DSM-IV-TR Scale	.55	.61	251	46.7	9.0	47.1	9.6	**.04**

Clinical Sample	Obt r	Cor r	N	Parent M	Parent SD	Teacher M	Teacher SD	d – ratio
Total Score	.84	.67	210	65.4	13.0	63.0	13.1	**.18**
Social/Communication	.84	.61	232	62.2	14.1	62.4	14.4	**.01**
Unusual Behaviors	.78	.63	238	64.9	12.4	60.4	12.5	**.36**
Self-Regulation	.80	.75	233	62.1	11.1	60.9	10.7	**.11**
DSM-IV-TR Scale	.83	.62	231	65.6	13.9	62.6	13.5	**.22**

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ASRS Interpretive Software

- There are three types of reports
  - Interpretive
  - Comparative
  - Progress

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Presentation Goals

- An understanding of Autism Spectrum Disorders (ASD)
- Symptoms of ASD
- Methods for assessment
- Importance of psychometric quality and a national standardization sample
- Autism Spectrum Rating Scale (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- Autism Spectrum Rating Scale Short Form (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- ASRS Interpretation with other measures
- Conclusions

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ASRS Short Forms

- Structure, Reliability, and Validity

Short Form

AR5010

ASRS™ Short Form (6–18 Years)
Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D.

Child's Name/ID: _____ Gender: M F (Circle One) Grade: ____ Today's Date: ____/____/____ (Year / Month / Day)

Parent's/Teacher's Name/ID: _____ Rater Type: Parent Teacher (Circle One) Birth Date: ____/____/____ (Year / Month / Day)

For Teachers Only: Time Known Student: ____ ____ (Years Months) Class(es) Taught: _____ Age: ____/____/____ (Years / Months / Days)

Instructions: Read each statement that follows the phrase, "***During the past four weeks, how often did the child…,***" then circle the number under the word that tells how often you saw the behavior. Read each question carefully, then mark how often you saw the behavior **in the past four weeks.** Answer every question without skipping any. If you want to change your answer, put an X through it and circle your new choice. Be sure to answer every question.

During the past four weeks, how often did the child…	Never	Rarely	Occasionally	Frequently	Very Frequently
1. share fun activities with others?	0	1	2	3	4
2. use language that was immature for his/her age?	0	1	2	3	4
3. use an odd way of speaking?	0	1	2	3	4
4. become obsessed with details?	0	1	2	3	4
5. insist on doing things the same way each time?	0	1	2	3	4

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Short Form – Page 2

Profile **ASRS Short (6–18)** by Sam Goldstein, Ph.D. & Jack A. Naglieri, Ph.D

Instructions

1. Determine the rater type (Parent or Teacher) and choose the appropriate profile table for the child's age group (6–11, 12–18).
2. Circle the Raw Score and follow the row across to the right to determine the *T*-score, Confidence Interval (CI), and Percentile (%ile).

Child's Name/ID: _____ **Age:** ____ ____ (Years Months) **Gender:** M F (Circle One) **Grade:** ____ **Birth Date:** _____/_____/_____ (Month Day Year)

Parent's/Teacher's Name/ID: _____ **Rater Type:** Parent Teacher (Circle One) **Today's Date:** _____/_____/_____ (Month Day Year)

For Teachers Only: **Time Known Student:** ____ ____ (Years Months) **Classes Taught:** _____

Parent 6–11

Raw Score	T-score	90% CI	95% CI	%ile
53-60	85	81-89	80-90	99.9
52	84	80-88	79-89	99.9
51	83	79-87	78-88	99.9
50	82	78-86	77-87	99.9
49	81	77-85	76-86	99.9
48	80	76-84	75-85	99.9
47	79	75-83	74-84	99.8
46	78	74-82	73-83	99.7
44-45	77	73-81	72-82	99.7
43	76	72-80	71-81	99.5
42	75	71-79	70-80	99.4
41	74	70-78	69-79	99.2

Parent 12–18

Raw Score	T-score	90% CI	95% CI	%ile
53-60	85	81-89	80-90	99.9
51-52	84	80-88	79-89	99.9
49-50	83	79-87	78-88	99.9
47-48	82	78-86	77-87	99.9
45-46	81	77-85	76-86	99.9
43-44	80	76-84	75-85	99.9
41-42	79	75-83	74-84	99.8
39-40	78	74-82	73-83	99.7
38	77	73-81	72-82	99.7
37	76	72-80	71-81	99.5
36	75	71-79	70-80	99.4
35	74	70-78	69-79	99.2

Teacher 6–11

Raw Score	T-score	90% CI	95% CI	%ile
47-60	85	80-90	79-91	99.9
46	84	79-89	78-90	99.9
44-45	83	78-88	77-89	99.9
43	82	77-87	76-88	99.9
41-42	81	76-86	75-87	99.9
39-40	80	75-85	74-86	99.9
38	79	74-84	73-85	99.8
37	78	73-83	72-84	99.7
36	77	72-82	71-83	99.7
35	76	71-81	70-82	99.5
34	75	70-80	69-81	99.4
33	74	69-79	68-80	99.2

Teacher 12–18

Raw Score	T-score	90% CI	95% CI	%ile
53-60	85	81-89	80-90	99.9
52	84	80-88	79-89	99.9
50-51	83	79-87	78-88	99.9
49	82	78-86	77-87	99.9
47-48	81	77-85	76-86	99.9
45-46	80	76-84	75-85	99.9
44	79	75-83	74-84	99.8
43	78	74-82	73-83	99.7
42	77	73-81	72-82	99.7
41	76	72-80	71-81	99.5
40	75	71-79	70-80	99.4
39	74	70-78	69-79	99.2

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ASRS Short Form – Reliability

Table 9.2. Internal Consistency

Age	Rater	Cronbach's Alpha		
		Norm	Clinical	Average
2–5 Years	Parent	.86	.96	.92
	Teacher/Childcare Provider	.89	.96	.93
6–11 Years	Parent	.90	.94	.92
	Teacher	.89	.92	.91
12–18 Years	Parent	.88	.95	.92
	Teacher	.90	.93	.92

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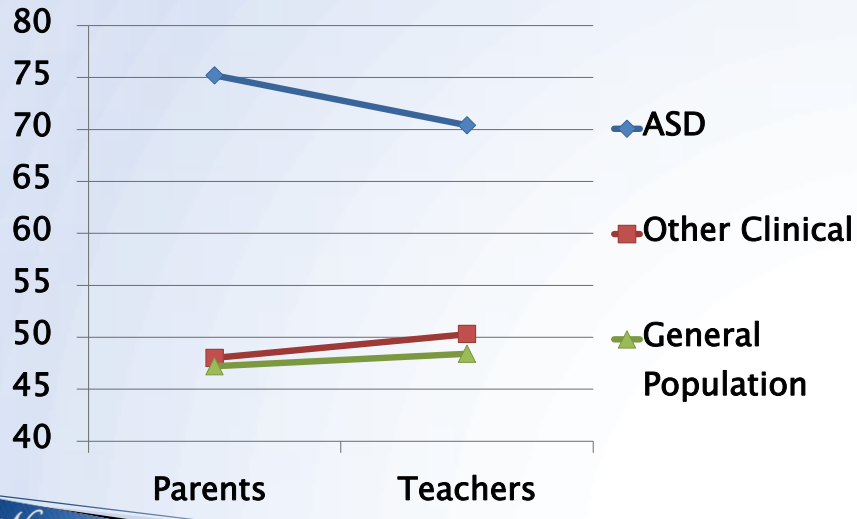
Short Form – Validity 2–5 Yrs



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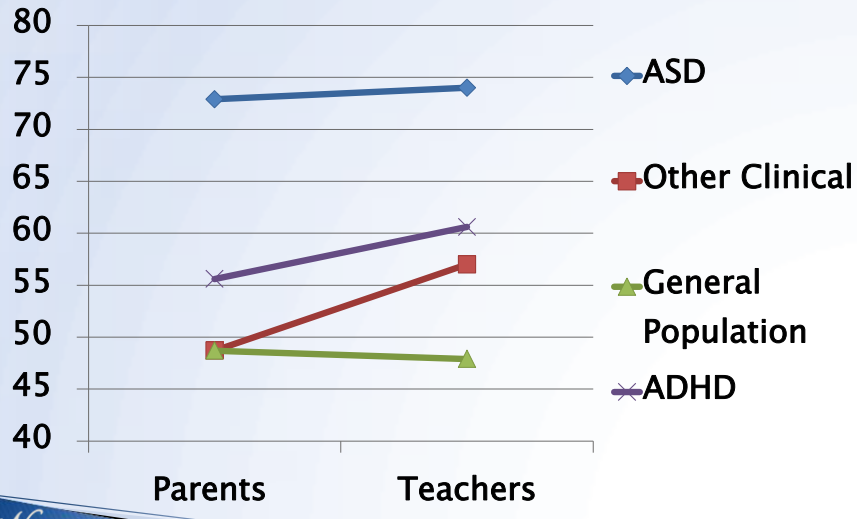
Short Form – Validity 6–18 Yrs



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Presentation Goals

- An understanding of Autism Spectrum Disorders (ASD)
- Symptoms of ASD
- Importance of psychometric quality and a national standardization sample
- Methods for assessment
- Autism Spectrum Rating Scale (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- Autism Spectrum Rating Scale Short Form (Goldstein & Naglieri, 2009)
  - Structure, Reliability, & Validity
- ASRS Interpretation with other measures
- Conclusions

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ASRS and other Rating Scales

- The differences in how rating scales are calibrated contribute to the differences between the scores that will be obtained

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ASRS with GARS–2

	Ages	Rater	Corr *r*	*N*	GARS-2 (X = 100; SD= 15) *M*	GARS-2 (X = 50; SD = 10) *M*	ASRS (X = 50, SD = 10) *M*
GARS Autism	2 - 5 Years	Parent	.61	78	100.9	50.6	74.5
		Teacher	.41	53	100.1	50.1	75.3
	6 - 18 Years	Parent	.63	104	93.9	45.9	69.3
		Teacher	.68	116	88.6	42.4	69.8

Note: GARS-2 standard scores are set to have a mean of 100, *SD* of 15; >85 = concern.

Almost 1 SD below GARS mean = ASRS score of 70 (+2 SD)

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ASRS with CARS

	Ages	Rater	Corr *r*	*N*	CARS *M*	ASRS *M*
CARS Total	2 - 5 Years	Parent	.66	34	36.8	76.7
		Teacher	.06	36	36.9	78.4
	6 - 18 Years	Parent	.40	109	35.3	69.5
		Teacher	.51	122	35.7	71.3

Note: CARS Manual: scores >29 may indicate Autism

CARS mean of 35.7 and ASRS mean of 71.3

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ADOS and ASRS

The importance of national norms

Goldstein & Naglieri

Sample Description

- University of Virginia *Autism Genetic Resource Exchange* (*AGRE*) project data
- Sample selection
  - If the child met criteria for ASD or Autism on the ADOS and met criteria for Autism on the ADI-R, they were considered to be on the autism spectrum – ASD or Autism – (whichever they met according to the ADOS).
  - In the AGRE dataset the ADOS is used in conjunction with the ADI to classify the child

Sample Description

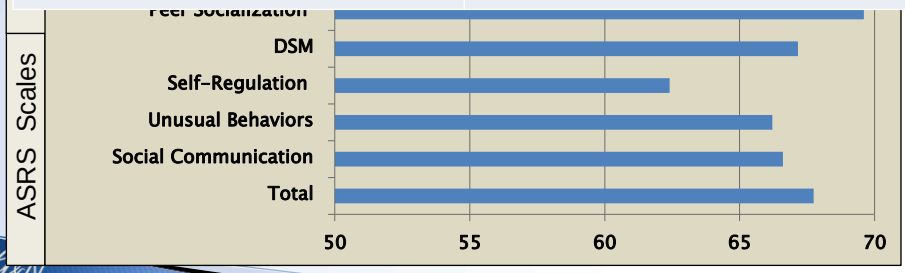
- Sample selection (continued)
  - The ADOS and ADI are used for designating the sample as ASD or Autism.
  - If the child did not meet criteria on either instrument there was a case conference to discuss the case in depth – taking into consideration multiple test results (in addition to ADOS and ADI) and reviewing video of the child. At that time the clinical psychologist and the clinician who administered the ADOS and ADI would come to a decision as to what to classify the child.

Sample Description

- Ages 6-18 (Mean = 10.3; SD = 3.1)
- N = 90
- 82% (N = 74) Males, 18% (N = 16) Females

ASRS Mean T-Scores ($N = 90$)

ASRS TOTAL T-Score	
Value	N
70+	35
65+	26
60+	19
<60	10

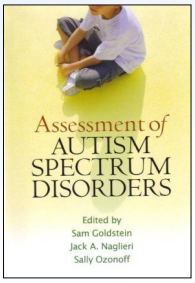


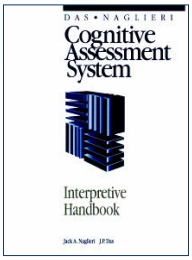
ADOS & ASRS Different Scales

	ADOS Diagnosis	ASRS Total (T > 59)
Autism or ASD	81	80
No Diagnosis	9	10

ASRS & Attention Difficulty

- Individuals with ASD have been described as having "***difficulties in disengaging and shifting attention***" (p. 214) (see Klinger, O'Kelley, & Mussey's chapter 8 in *Assessment of Autism Spectrum Disorders* (Goldstein, Naglieri, & Ozonoff, 2009)
- We tested this hypothesis using the Cognitive Assessment System (Naglieri & Das, 1997)





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ASRS & Attention Difficulty

- Sample Description

Table 8.16. Demographic Characteristics of the CAS Validity Sample

Demographic	Group	Parent		Teacher	
		N	%	*N*	%
Gender	Male	33	73.3	34	72.3
	Female	12	26.7	13	27.7
Race/Ethnicity	Asian	4	8.9	4	8.5
	African American	6	13.3	7	14.9
	Hispanic	11	24.4	11	23.4
	White	23	51.1	24	51.1
	Multiracial/Other	1	2.2	1	2.1
Parental Education Level	Less than high school	3	6.7	–	–
	High school or equivalent	7	15.6	–	–
	Some college	16	35.6	–	–
	College or higher	19	42.2	–	–
Total		**45**	**100.0**	**47**	**100.0**
Age *M* (*SD*)		**11.0 (2.4)**		**11.0 (2.4)**	

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ASRS & Attention Difficulty

- the ASRS (6-18 Years) and Cognitive Assessment System (CAS; Naglieri & Das, 1997) was administered to children diagnosed with an ASD who were rated by a parent (N = 45) or a teacher (N = 47)
- The CAS provides measures of
  - Planning, Attention, Simultaneous, and
  - Successive cognitive abilities
- PASS is based on A. R. Luria's (1973) view of major brain functions

ASRS & Attention Difficulty

28 **Cognitive Assessment System: Redefining Intelligence From a Neuropsychological Perspective**

Jack A. Naglieri and Tulio M. Otero

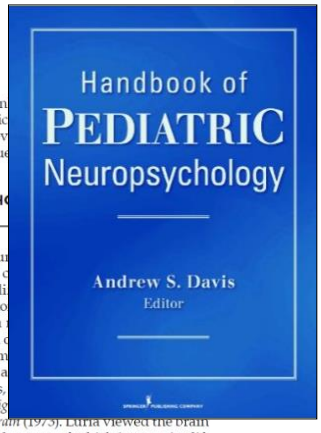
INTRODUCTION

Pediatric neuropsychology has become an important field for understanding and treating developmental, psychiatric, psychosocial, and learning disorders. By addressing both brain functions and environmental factors intrinsic in complex behaviors, such as thinking, reasoning, planning, and the variety of executive capacities, clinicians are able to offer needed services to children with a variety of learning, psychiatric, and developmental disorders. Brain–behavior relationships are investigated by neuropsychologists by interpreting several aspects of an individual's cognitive, language, emotional, social, and motor behavior. Standardized instruments are used by neuropsychologists to collect information and derive inferences about brain–behavior relationships. Technology, such as magnetic resonance imaging (MRI), functional MRI (FMRI), positron emission tomography, computerized tomography, and diffusion tensor imaging, has reduced the need for neuropsychological tests to localize and access brain damage. Neuropsychological tests, however,

Such tools should not on
cesses necessary for effic
also provide for the dev
tions and address the que

**FROM NEUROPSYCHO
TO ASSESSMENT**

Luria's theoretical accou
perhaps one of the most c
2008). Luria conceptuali
of brain–behavior relatio
orders that the clinician
the brain, the functional c
syndromes and impairm
and clinical methods of a
theoretical formulations,
lated in works such as *Hig*
1980) and *The Working Brain* (1973). Luria viewed the brain
as a functional mosaic, the parts of which interact in dif-



ASRS & Attention Difficulty

The Cognitive Assessment System

Jack A. Naglieri, Cara Conway

THEORY UNDERLYING THE CAS

The *Cognitive Assessment System (CAS)* (Naglieri & Das, 1997a) is a multidimensional measure of ability based on a cognitive and neuropsychological processing theory called *Planning, Attention, Simultaneous, and Successive (PASS)* (Naglieri, 1999a, 2005). The PASS theory described by Naglieri and Das (1997b, 2005) is a reconceptualization of intelligence largely, but not solely, based on the neuropsychological work of A. R. Luria (1966, 1973, 1980, 1982). The four processes that make up the PASS theory represent a blend of cognitive and neuropsychological constructs, such as executive functioning (Planning) and selective attention (Attention), including tests that in the past were often arguably described as nonverbal/visual-spatial (Simultaneous) and sequencing/memory (Successive) (Naglieri & Das, 2002).

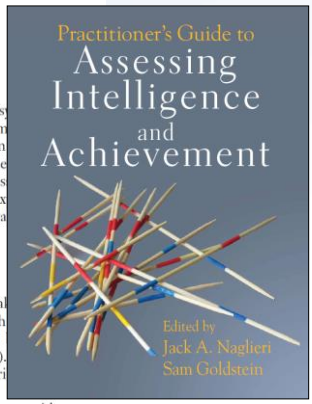
The PASS theory is a different approach to understanding intelligence that not only

the theory may have its roots in neuropsy
"its branches are spread over developm
educational psychology" (Varnhagen
1986, p. 130). Thus, with its conne
developmental and cognitive proces
PASS theory offers an advantage in ex
power over the notion of traditiona
intelligence (Naglieri & Das, 2002).

PASS Defined

The four cognitive processes that mak
PASS theory are each associated with
brain regions, cognitive abilities, and
(Naglieri, Conway, & Goldstein, 2007).
processes of the PASS theory are descri
fully below.

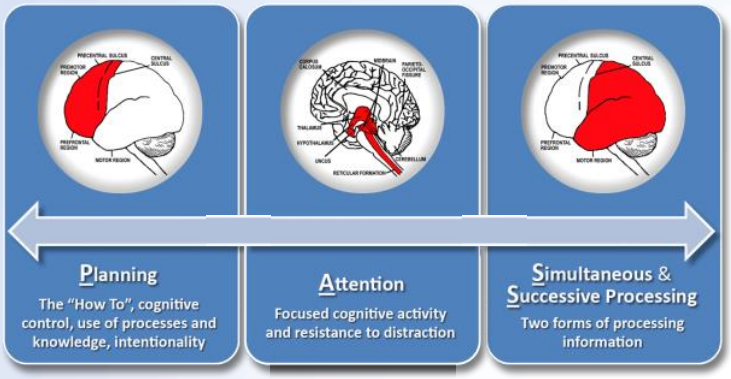
Planning is a mental activity that provides cognitive control, intentionality, organization, self-regulation and use of processes, knowledge, and skills. This includes self-monitoring and impulse control as well as generation, evaluation, and execution of a plan. This process may involve control over the other three processes, as well as



Do Children with ASD have Difficulty in Attention?

ASRS & Attention Difficulty

PASS: A neuropsychological approach to intelligence based on tThree Functional Units described by A. R. Luria (1972)



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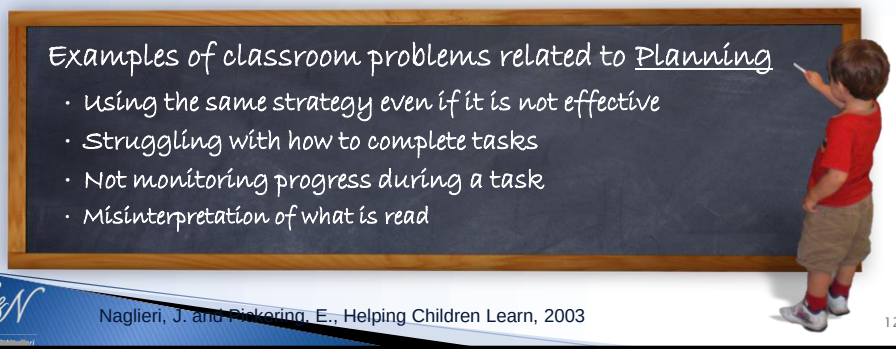
PASS Theory: Planning

Planning

- Evaluate a task
- Select or develop a strategy to approach a task
- Monitor progress during the task
- Develop new strategies when necessary



Naglieri, J. and Pickering, E., Helping Children Learn, 2003

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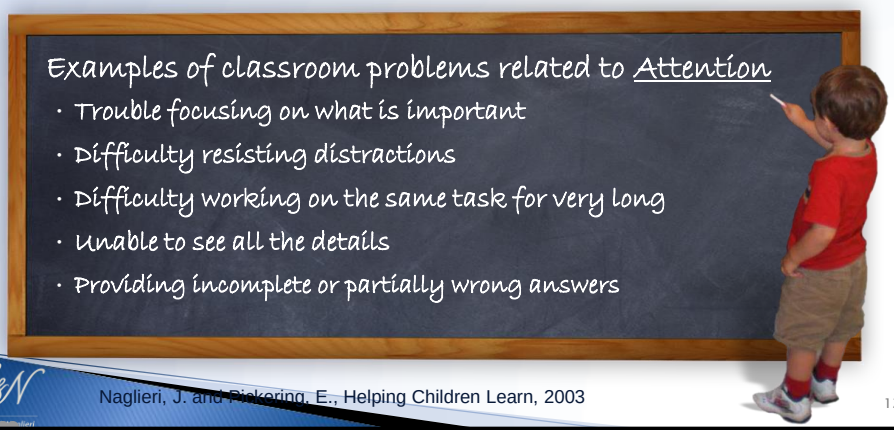
PASS Theory: Attention

Attention

- Focus on one thing and ignore others
- Resist distractions in the learning environment



Naglieri, J. and Pickering, E., Helping Children Learn, 2003

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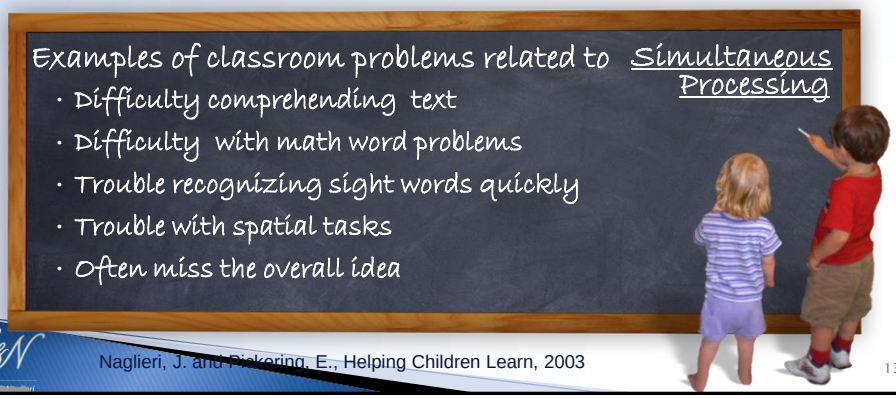
PASS Theory: Simultaneous

Simultaneous Processing

- Relate separate pieces of information into a group
- See how parts related to whole
- Recognize patterns



Naglieri, J. and Pickering, E., Helping Children Learn, 2003

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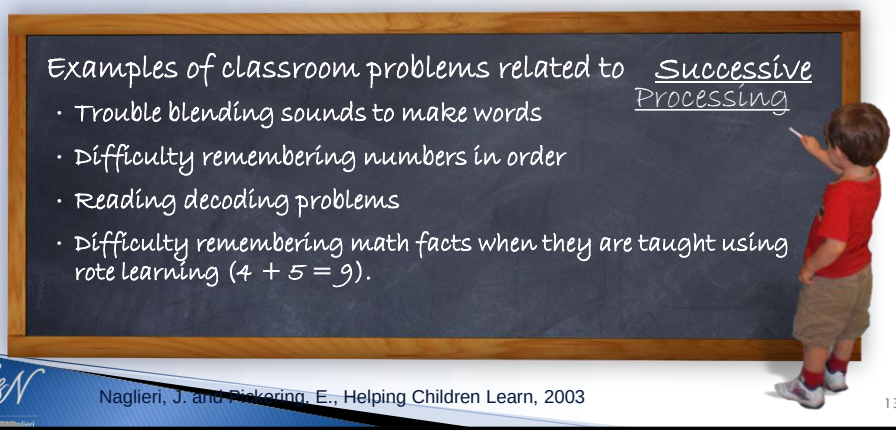
PASS Theory: Successive

Successive Processing

- Use information in a specific order
- Follow instructions presented in sequence



Naglieri, J. and Pickering, E., Helping Children Learn, 2003

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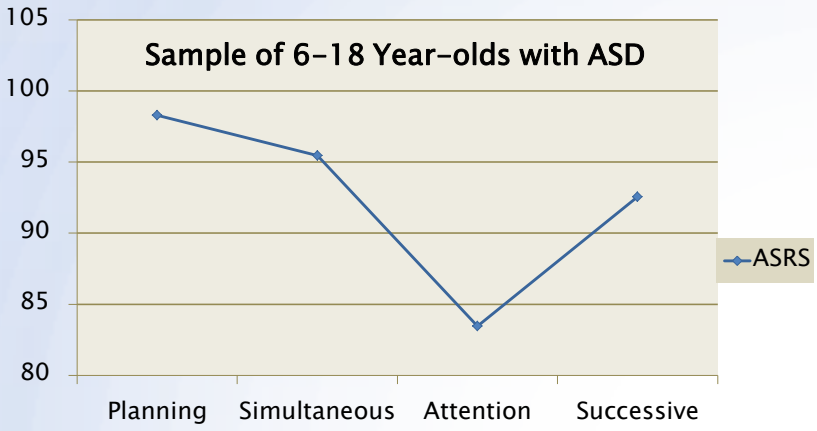
ASRS & Attention Difficulty



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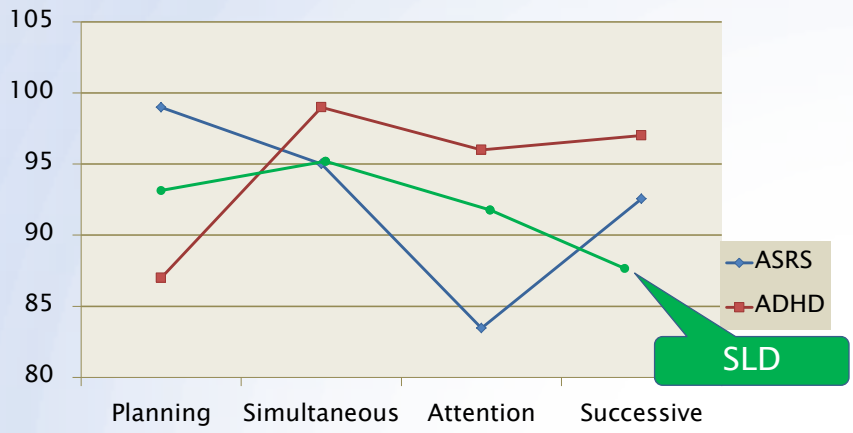
Differentiate ASD from ADHD and SLD

Goldstein & Naglieri

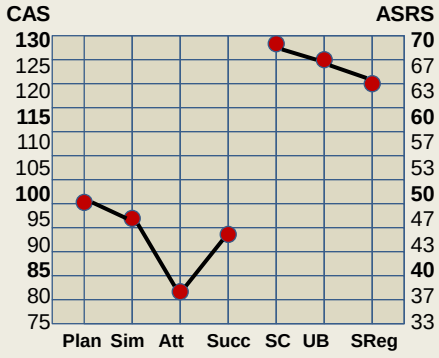
ASRS & Attention Difficulty



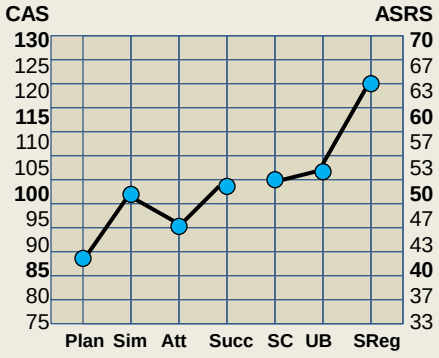
Note: Values for CAS for children with ADHD from Naglieri & Das (1997) CAS Interpretive Handbook

Differential Diagnosis: ADHD vs ASD

ASD Profile



ADHD Profile



Autism and Asperger Syndrome

ASRS preliminary findings

Autism & Asperger's

AUTISM SPECTRUM NEWS visit our website: www.mhnews-autism.org WINTER 2012

Autism and Asperger's: Two Distinct Disorders or One Disorder of Varying Symptom Severity

By Sam Goldstein, PhD, and Jack A. Naglieri, PhD

Autism has been conceptualized as a biologically determined set of behaviors occurring with varying presentation and severity that is likely as the result of varying cause (for review, see Goldstein, Naglieri, & Ozonoff, 2008). The disorder occurs significantly more often in boys (Smalley, Asernow, & Spence, 1988) and is found across all social classes (Gillberg & Schaumann, 1982). Recent surveys have suggested the incidence of autism in the general population may be as high as 1 per 113 (Center for Disease Control, 2007). Autism is a disorder in which individuals can present problems ranging from those that cause almost total impairment to others that allow the individual to function but not optimally. Children on the Autism Spectrum or continuum experience a wide range of developmental difficulties involving communication, socialization, thinking, cognitive skills, interests, activities and motor skills (Goldstein, Naglieri, & Ozonoff, 2008).

The Diagnostic and Statistical Manual IV – Text Revision (DSM-IV-TR) of the American Psychiatric Association (APA, 2000) criteria include a group of Pervasive Developmental Disorders under which Autism and Asperger's are considered two distinct conditions. The criteria for Autistic Disorder include three sets of behavioral descriptions to qualify for the diagnosis. A child must show evidence of symptoms from at least two of the first set of criteria and one from each of the second and third sets of criteria. The first set of criteria features qualitative impairment and social interaction manifested by problems preoccupation in certain patterns of behavior that would be considered abnormal in intensity or focus; compulsive adherence to specific non-functional routines or rituals, repetitive motor mannerisms (self-stimulatory behavior), or persistent preoccupation with parts of objects. The second two sets of criteria include delay prior to the age of three in social interaction, language as used for social communication or symbolic, imaginative play.

Though considered a distinct disorder in the DSM-IV-TR, Asperger's provides criteria identical to the Autism diagnosis for qualitative impairment in social interaction and restrictive, repetitive and stereotypic patterns of behavior. There is, however, no requirement for a qualitative impairment in communication. Specifically, this diagnosis requires an absence of clinically significant delay in language, acquiring single words by two years of age and communicative phrases used by three years of age. Because of the significant overlap in the diagnoses of these two conditions, most medical and mental health professions consider Asperger's as a milder form of autism or even "high functioning autism" despite the fact that it is not delineated this way in the DSM-IV-TR. In fact, proposals for the Pervasive Developmental Disorder categories for DSM-V have recommended the elimination of the distinction between these two conditions and instead propose to refer to the combined conditions as Autism Spectrum Disorder (American Psychiatric Association, in press).

The new proposed diagnostic criteria contain four parts focusing on (1) social communication and social interaction, (2) restricted, repetitive patterns of behavior, interests and activities; (3) symptoms present in early childhood; and (4) symptoms that limit and impair everyday life. This approach suggests

The results of our study summarized in Figure 1 (see the ASRS Manual for more details about the methods and results) allows for a comparison between a group of children diagnosed with Autism and a group diagnosed with Asperger's syndrome. The total ASRS score, three empirically derived scales, the DSM symptom score, and eight treatment scales containing behaviors specific to certain areas of functioning are shown. The ASRS T-scores are set to have a normative mean of 50 and a standard deviation of 10 based on a large representative sample of individuals in the US. Recall that a score of 60 falls at the 84th percentile and a score of 70 at the 98th percentile. As this instrument measures atypical or problematic behaviors, higher scores are indicative of greater number of symptoms.

Figure 1 provides a visual means of observing the differences between children with Autism and those with Asperger's. As can be seen, the individuals with Autism and Asperger's syndrome had nearly identical profiles which do differ on elevation. Figure 2 provides a comparison of each of the ASRS mean T-scores expressed as an effect size, that is, the difference between each mean expressed in standard deviation units. In addition to all of the differences being statistically significant ($p < .01$) the effect sizes ranged from a low of 0.43 (considered a small effect size) to 0.85 (considered a large effect size). The ASRS Total T-score effect size was 0.78. The largest difference was found for the ASRS Social/Communication scale. This is consistent with the current conceptualization of and diagnostic criteria for Asperger's as a condition characterized by normal early language development. These findings strongly suggest that the difference Autism and Asperger's syndrome is *based on severity* not a different composition

Sam Goldstein, PhD, is an Assistant Clinical Instructor in the University of Utah School of Medicine and Clinical Director of the Neurology at the Learning and Behavior Center. Jack A. Naglieri, PhD, is a Research Professor at the University of Virginia and Senior Research Scientist at the Devereux Center for Resilient Children. They are co-authors of the Autism Spectrum Rating Scale (2009), Assessment of Autism Spectrum Disorders (2008) and Interventions for Autism Spectrum Disorders (2012). Dr. Goldstein is also co-author of Raising Resilient Children With Autism Spectrum Disorders (2012).

References

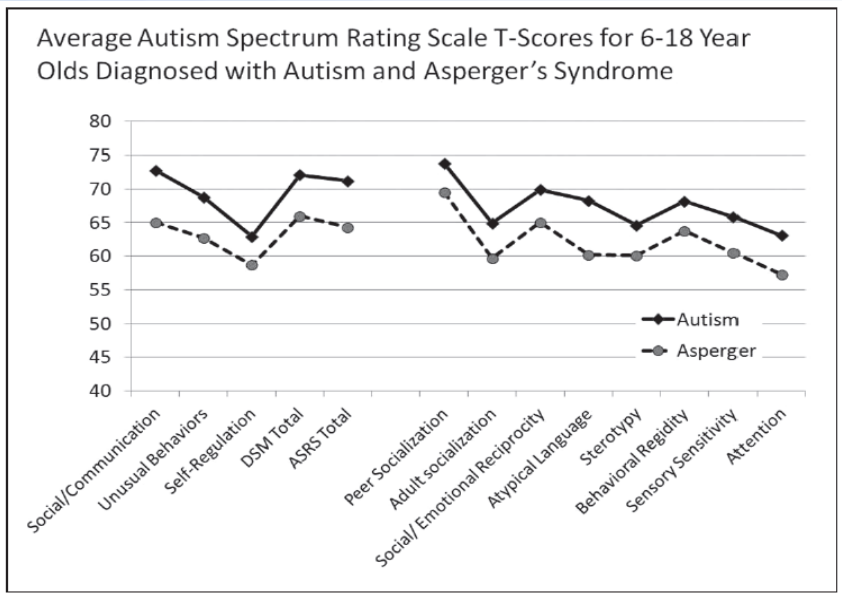
American Psychiatric Association (APA) (2000). *Diagnostic and statistical manual of mental disorders (4th ed. - text revision).* Washington, DC: Author.

American Psychiatric Association (APA) (in Press). *Diagnostic and statistical manual of mental disorders (5th Edition). Washington, DC: Author).*

Center for Disease Control and Prevention (2007). Prevalence of the autism spectrum disorders in multiple areas of the United States, Surveillance Years 2000 and 2002: A report from the Autism and Developmental Disabilities Monitoring (ADDM) Network (February 8, 2007). Atlanta, Georgia: Author.

Gillberg, C., & Schaumann, H. (1982). Social class and autism: Total population aspects. *Journal of Autism and Developmental Disorders, 12,* 223-228

Autism & Asperger's



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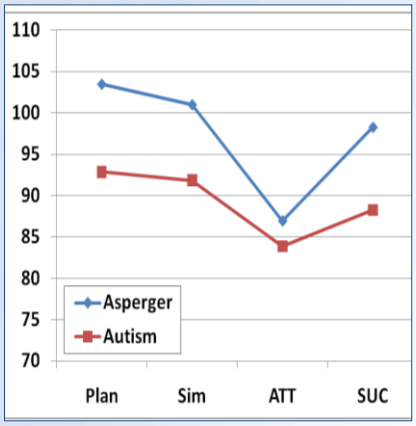
Autism vs Asperger 6–18



Descriptive Statistics and Comparisons Between Individuals with Autism (*n* = 20) and Asperger Syndrome (*n* = 23).

		Mn	*SD*	*F*	Sig	*d* -ratio
PLAN	Asperger	103.5	31.6	1.71	.20	0.40
	Autism	92.9	19.2			
SIM	Asperger	101.0	15.3	3.33	.08	0.54
	Autism	91.9	17.5			
ATT	Asperger	86.9	17.7	0.30	.59	0.17
	Autism	83.9	18.8			
SUC	Asperger	98.3	15.7	2.46	.12	0.47
	Autism	88.3	25.6			

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Presentation Goals

- An understanding of Autism Spectrum Disorders (ASD)
- Symptoms of ASD
- Importance of psychometric quality and a national standardization sample
- Methods for assessment
- Autism Spectrum Rating Scale (Goldstein [illegible] 2009)
  - Structure, Reliability, & Validity
- Autism Spectrum Rating Scale Short [illegible] & Naglieri, 2009)
  - Structure, Reliability, & Validity
- ASRS Interpretation with other measures
- Using ASRS for Treatment Planning, Ongoing Progress Monitoring and Treatment Evaluation
- Conclusions

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Treatment Effectiveness

Hidden dangers and test scores

Intervention – Kasari, et al – When Changes Over Time are Misleading

Journal of Consulting and Clinical Psychology
2008, Vol. 76, No. 1, 125–137

0022-006X/08/$12.00 DOI: 10.1037/0022-006X.76.1.125

Language Outcome in Autism: Randomized Comparison of Joint Attention and Play Interventions

Connie Kasari, Tanya Paparella, and Stephanny Freeman
University of California, Los Angeles

Laudan B. Jahromi
Arizona State University

This study reports results of a randomized controlled trial aimed at joint attention (JA) and symbolic play (SP) in preschool children with autism, with prediction to language outcome 12 months later. Participants were 58 children (46 boys) with autism between 3 and 4 years of age. Children were randomized to a JA intervention, an SP intervention, or control group. Interventions were conducted 30 min daily for 5–6 weeks. Assessments of JA skills, SP skills, mother–child interactions, and language development were collected at 4 time points: pre- and postintervention and 6 and 12 months postintervention by independent testers. Results indicate that expressive language gains were greater for both treatment groups compared with the control group, and results could not be explained by differences in other interventions in which children participated. For children beginning treatment with the lowest language levels, the JA intervention improved language outcome significantly more than did the SP or control interventions. These findings suggest clinically significant benefits of actively treating JA and SP skills in young children with autism.

Intervention – Kasari, et al

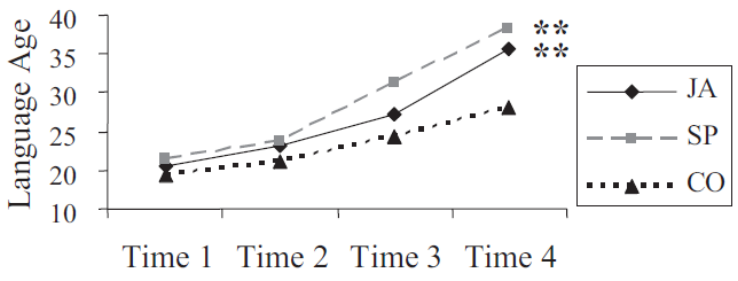
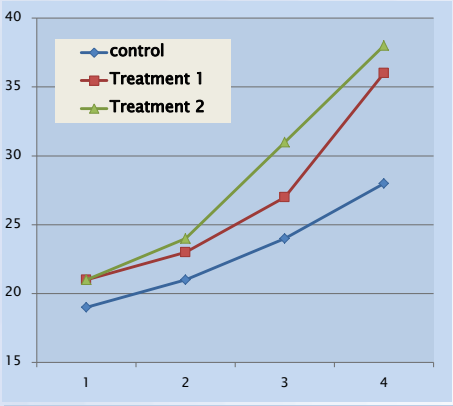
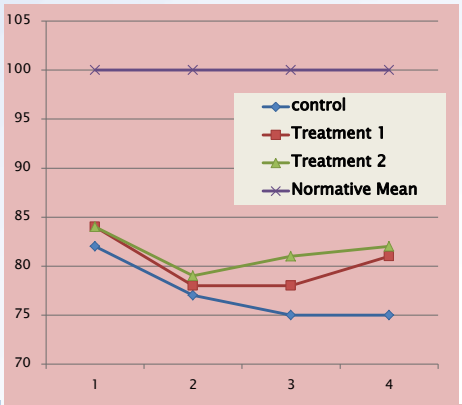


Figure 2. Growth in expressive language, measured in months. JA = joint attention; SP = symbolic play; CO = control group. **JA & SP > CO, $F(2, 164) = 6.84$, $p < .01$.

Kasari – Raw vs Standard Scores



Both treatment groups appear to have higher scores at Time 4. The interpretation of these data could lead to the conclusion that the treatments worked.



When the raw scores are converted to standard scores (Mn = 100, SD = 15) the results suggest that although the raw scores increased over the 12 month interval the standard scores associated with these raw scores actual showed no improvement.

Kasari, et al – Reinterpreted

- Even though the two treatment (as well as the control) groups' raw scores increased over time, the difference between those scores and the normative group remained large.
- Raw score improvement alone is insufficient to show treatment effectiveness.
- Standard score improvement provides an additional reference point that ***must*** be taken into consideration in order to determine if a treatment is sufficiently effective.

Treatment Evaluation with ASRS

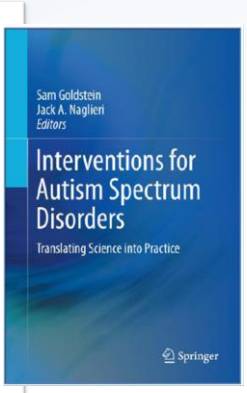
Chapter 3
Evaluation of Treatment Effectiveness in the Field of Autism

Psychometric Considerations and an Illustration

Jack A. Naglieri and Sam Goldstein

Introduction

Evidence-based treatment and the assessment of treatment effectiveness are dependent upon the collection of data during the evaluation process providing information about symptoms, impairment and abilities. Such an assessment allows for a seamless transition from assessment and diagnosis to effective treatment. Evaluating the effectiveness of a treatment strategy or program is important for interventions designed to address symptoms related to any psychological or developmental disorder. The



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Treatment Evaluation with ASRS

- Step 1: Identify specific area or areas of need based on ASRS T-scores of 60 or more
- Which indicates many characteristics similar to individuals diagnosed with an ASD.
  - Examine ASRS Total Score
- The Total Score is, however, insufficient for treatment planning because it is too general.
- Step 2: Look at the separate treatment scales

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Treatment Evaluation with ASRS

- Total Score of 73 by Parent & Teacher
- Social Communication scores are high for both raters
- Self-Regulation scores for both raters are also high

Table 3.3 Case of Donny: parent and teacher ASRS *T* values needed for significance

	Parent	Teacher
Total score	*73*	*73*
Social communication	*77*	*78*
Unusual behavior	*60*	53
Self-regulation	*70*	*74*
DSM-IV scale	*69*	*68*
Treatment scales		
Peer socialization	*70*	*73*
Adult socialization	58	*63*
Social/emotional reciprocity	*77*	*76*
Atypical language	52	44
Stereotypy	49	54
Behavioral rigidity	*72*	48
Sensory sensitivity	*44*	48
Attention	*71*	*73*

T-scores greater than 59 appear in italic text

[a]*Note* Differences needed for significance when comparing Table 4.5 of the ASRS Manual

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Treatment Evaluation with ASRS

- Consistently high scores on Peer Socialization, Social/Emotional Reciprocity and Attention

	Parent	Teacher	Difference	Difference needed[a]	
Total score	*73*	*73*	0	5	NS
Social communication	*77*	*78*	1	6	NS
Unusual behavior	*60*	53	−7	6	Sig
Self-regulation	*70*	*74*	4	7	NS
DSM-IV scale	*69*	*68*	−1	6	NS
Treatment scales					
Peer socialization	*70*	*73*	3	9	NS
Adult socialization	58	*63*	5	12	NS
Social/emotional reciprocity	*77*	*76*	−1	8	NS
Atypical language	52	44	−8	11	NS
Stereotypy	49	54	5	13	NS
Behavioral rigidity	*72*	48	−24	8	Sig
Sensory sensitivity	*44*	48	4	12	NS
Attention	*71*	*73*	2	7	NS

T-scores greater than 59 appear in italic text

[a]*Note* Differences needed for significance when comparing Parent and Teacher ratings are found in Table 4.5 of the ASRS Manual

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Treatment Evaluation with ASRS

- Item level analysis within Peer Socialization helps clarify the exact nature of the behaviors that led to the high score

3 Evaluation of Treatment Effectiveness in the Field of Autism 51

Fig. 3.7 Item level analysis from ASRS interpretive report (shaded items indicate scores that are more than 1 *SD* from the normative mean)

Peer Socialization	
Item	**Score**
3. seek the company of other children? (R)	1
14. have trouble talking with other children?	3
19. have social problems with children of the same age?	2
31. play with others? (R)	1
45. understand age-appropriate humor or jokes? (R)	1
50. talk too much about things that other children don't care about?	4
64. choose to play alone?	3
69. show good peer interactions? (R)	2
70. respond when spoken to by other children? (R)	1
Peer Socialization Raw Score =	**17**

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Treatment Evaluation with ASRS

Quick Solution Finder

Peer Socialization

Peer Socialization	
Item	Score
14. have trouble talking with other children?	3
50. talk too much about things that other children don't care about?	4
64. choose to play alone?	3
69. show good peer interactions? (R)	2

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Treatment Evaluation with ASRS

- The Quick Solution Guide provides the correspondence of behaviors associated with ASD and specific interventions provided by authors in the chapters that appear in the book.
- For example, Donny had a high ASRS T-score on the Social/Emotional Reciprocity scale and one of the items that addressed "looking at others when spoken to" was very high. Interventions for this behavior can be found on pages

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Treatment Evaluation with ASRS

Table 3.4 Parent *T*-scores for ASRS scales obtained over three time periods

	Time 1	Time 2	Time 3	Progress monitoring (Time 2 – 1)		Progress monitoring (Time 3 – 1)	
Total score	*73*	*70*	*63*	–3	NS	10	Sig
Social communication	*77*	*77*	*66*	0	NS	11	Sig
Unusual behavior	*60*	58	58	–2	NS	2	NS
Self-regulation	*70*	*67*	*62*	–3	NS	8	NS
DSM-IV scale	*69*	*68*	*63*	–1	NS	6	NS
Treatment scales							
Peer socialization	*70*	*69*	*68*	–1	NS	2	NS
Adult socialization	58	58	58	0	NS	0	NS
Social/emotional reciprocity	*77*	*77*	*63*	0	NS	14	Sig
Atypical language	52	52	52	0	NS	0	NS
Stereotypy	49	49	49	0	NS	0	NS
Behavioral rigidity	*72*	*67*	*67*	–5	NS	5	NS
Sensory sensitivity	44	44	44	0	NS	0	NS
Attention	*71*	*68*	58	–3	NS	13	Sig

T-scores greater than 59 appear in italic text

Note Differences needed for significance when comparing scores over time for Parent and Teacher ratings are found in Table 4.11 of the ASRS Manual ($p = 0.10$ with Bonferroni correction)

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Final Thoughts

- Accurate diagnosis requires well developed tools that
  - Are standardized on a typical sample that represents the US population
  - Represent current understanding of ASDs, especially the role of self-regulation
  - Have good reliability and validity
  - Have relevance to intervention
  - Are relatively easy to administer and score
- Our overall goal is greater understanding to help individuals with ASD and to ***help people like Devin…***

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Were They but There at Night

There is a bolder field where every stone

Is a glazed, glittering gem, like stars fallen from the sky

All except one, a plain grey rock alone in the center

Feeling excluded and shunned

People come, tourists, painters, photographers, collectors

To view each shining bolder, a pleasure to the beholder

Ooh! Ahh! Look at this one! Come quick!

Pockets bulge with fragments and paint cans run dry

But the grey rock remains ignored

An ugly blotch on a sweeping mural

The sun sets, everyone leaves

And they miss the centerpiece of the field

For when night falls, the grey rock in the center

It glows in the dark

Devin Teichert

Song of Myself

December 16, 2008

For more information…

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