SLD Identification Using a Pattern of Strengths and Weaknesses in Basic Psychological Processes (PASS) as measured by CAS2

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Introductions

- Introduce yourself to those at your table
- My interest in intelligence and instruction
- Initial degrees in psychology
- Experiences at UGA
- Need for evidence based interpretation
- My personal perspective on being a researcher and test developer
- Why this topic?

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Presentation Outline

- From achievement ability discrepancy to a pattern of strengths and weaknesses
- The Discrepancy/Consistency model
- Which tests to use to define a "basic psychological process"
- A neurocognitive theory will be suggested
  - complex decision making (frontal lobes – Planning)
  - focus and resistance to distractions (brain stem - Attention)
  - visual/verbal spatial ability (Occipital/Parietal - Simultaneous)
  - visual/verbal sequencing (Temporal area - Successive)
- Illustrative Case studies
  - How Discrepancy/Consistency yields more accurate eligibility determination
  - How Discrepancy/Consistency leads to intervention planning.

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IDEA and NASP Guidelines

What are some of the details of the Law?

One Hundred Eighth Congress
of the
United States of America

AT THE SECOND SESSIO

Begun and held at the City of Washington
the twentieth day of January, two thousa

An Act

To reauthorize the Individuals with Disabilities Education A
poses.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Individuals with Disabilities Education Improvement Act of 2004".

Individuals with Disabilities Education Improvement Act of 2004

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IDEA 2004

IQ achievement discrepancy no longer required

"(6) SPECIFIC LEARNING DISABILITIES.—

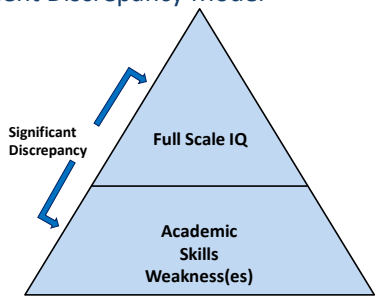
"(A) IN GENERAL.—Notwithstanding section 607(b), when determining whether a child has a specific learning disability as defined in section 602, a local educational agency shall not be required to take into consideration whether a child has a severe discrepancy between achievement and intellectual ability in oral expression, listening comprehension, written expression, basic reading skill, reading comprehension, mathematical calculation, or mathematical reasoning.

"(B) ADDITIONAL AUTHORITY.—In determining whether a child has a specific learning disability, a local educational agency may use a process that determines if the child responds to scientific, research-based intervention as a part of the evaluation procedures described in paragraphs (2) and (3).

IQ Achievement Discrepancy Model

Ability Achievement model is still permitted in IDEA

But it doesn't reveal the reason for the academic failure



IDEA 2004

"use a variety of assessment tools"

"(2) CONDUCT OF EVALUATION.—In conducting the evaluation, the local educational agency shall—

"(A) use a variety of assessment tools and strategies to gather relevant functional, developmental, and academic information, including information provided by the parent, that may assist in determining—

"(i) whether the child is a child with a disability; and

"not use any single measure as sole criterion"

"(B) not use any single measure or assessment as the sole criterion for determining whether a child is a child with a disability or determining an appropriate educational program for the child; and

"(C) use technically sound instruments that may assess the relative contribution of cognitive and behavioral factors, in addition to physical or developmental factors.

"assess cognitive factors"

IDEA 2004

"(3) ADDITIONAL REQUIREMENTS.—Each local educational agency shall ensure that—

"(A) assessments and other evaluation materials used to assess a child under this section—

non discriminatory assessments

"(i) are selected and administered so as not to be discriminatory on a racial or cultural basis;

"(ii) are provided and administered in the language and form most likely to yield accurate information on what the child knows and can do academically, developmentally, and functionally, unless it is not feasible to so provide or administer;

valid and reliable assessment

"(iii) are used for purposes for which the assessments or measures are valid and reliable;

"(iv) are administered by trained and knowledgeable personnel; and

"(v) are administered in accordance with any instructions provided by the producer of such assessments;

"(B) the child is assessed in all areas of suspected disability;

"(C) assessment tools and strategies that provide relevant information that directly assists persons in deter-

IDEA 2004

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"(A) IN GENERAL.—Notwithstanding section 607(b), when determining whether a child has a specific learning disability as defined in section 602, a local educational agency shall not be required to take into consideration whether a child has a severe discrepancy between achievement and intellectual ability in oral expression, listening comprehension, written expression, basic reading skill, reading comprehension, mathematical calculation, or mathematical reasoning.

"(B) ADDITIONAL AUTHORITY.—In determining whether a child has a specific learning disability, a local educational agency may use a process that determines if the child responds to scientific, research-based intervention as a part of the evaluation procedures described in paragraphs (2) and (3).

RTI may be used AS A PART of the evaluation… but not as sole method

IDEA 2004

Definition of SLD remains the same

"(30) SPECIFIC LEARNING DISABILITY.—

"(A) IN GENERAL.—The term 'specific learning disability' means a disorder in 1 or more of the basic psychological processes involved in understanding or in using [illegible], which disorder may manifest [illegible] to listen, think, speak, read, [illegible] mathematical calculations.

These statements describe a pattern of strengths and weaknesses in basic psychological processes; but not low in all processes

"(B) EXCLUDED.—Such term includes such [illegible] disabilities, brain injury, minimal [illegible] dyslexia, and developmental aphasia.

"(C) EXCLUDED.—Such term does not [illegible] is primarily the result of [illegible] motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage.

IDEA Law Summary

- Ability achievement discrepancy is no longer required (not disallowed)
- We must use a variety of assessment tools
- The use of any single measure or assessment as the sole criterion for determining SLD is *not permitted*
- RTI alone is not permitted
- Use assessments that are not discriminatory on racial or cultural basis
- Definition of SLD remains
  - 'a disorder in one or more of the basic psychological processes'
- For more information see: **http://idea.ed.gov/**

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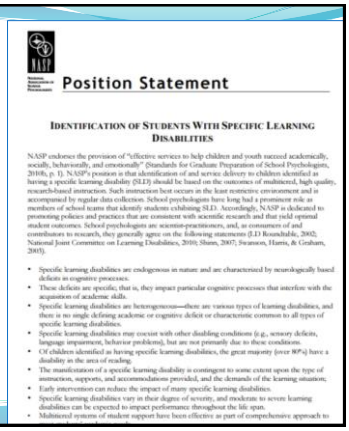
www.nasponline.org



Position Statement

IDENTIFICATION OF STUDENTS WITH SPECIFIC LEARNING DISABILITIES

NASP endorses the provision of "effective services to help children and youth succeed academically, socially, behaviorally, and emotionally" (Standards for Graduate Preparation of School Psychologists, 2010b, p. 1). NASP's position is that identification of and service delivery to children identified as having a specific learning disability (SLD) should be based on the outcomes of multitiered, high quality, research-based instruction. Such instruction best occurs in the least restrictive environment and is accompanied by regular data collection. School psychologists have long had a prominent role as members of school teams that identify students exhibiting SLD. Accordingly, NASP is dedicated to promoting policies and practices that are consistent with scientific research and that yield optimal student outcomes. School psychologists are scientist-practitioners, and, as consumers of and contributors to research, they generally agree on the following statements (LD Roundtable, 2002; National Joint Committee on Learning Disabilities, 2010; Shaw, 2007; Swanson, Harris, & Graham, 2003).

- Specific learning disabilities are endogenous in nature and are characterized by neurologically based deficits in cognitive processes.
- These deficits are specific; that is, they impact particular cognitive processes that interfere with the acquisition of academic skills.
- Specific learning disabilities are heterogeneous—there are various types of learning disabilities, and there is no single defining academic or cognitive deficit or characteristic common to all types of specific learning disabilities.
- Specific learning disabilities may coexist with other disabling conditions (e.g., sensory deficits, language impairment, behavior problems), but are not primarily due to these conditions.
- Of children identified as having specific learning disabilities, the great majority (over 80%) have a disability in the area of reading.
- The manifestation of a specific learning disability is contingent to some extent upon the type of instruction, supports, and accommodations provided, and the demands of the learning situation; Early intervention can reduce the impact of many specific learning disabilities.
- Specific learning disabilities vary in their degree of severity, and moderate to severe learning disabilities can be expected to impact performance throughout the life span.
- Multitiered systems of student support have been effective as part of comprehensive approach to

NASP 2011 SLD Position

- "NASP recommends that initial evaluation of a student with a suspected specific learning disability includes an individual comprehensive assessment...
- This evaluation may include measures of academic skills (norm-referenced and criterion-referenced), cognitive abilities and processes, and mental health status (social-emotional development); measures of academic and oral language proficiency as appropriate; classroom observations; and indirect sources of data (e.g., teacher and parent reports)."

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NASP 2011 SLD Position

- "Existing data from a problem-solving process that determines if the child responds to scientific evidence-based intervention may be considered at the time of referral, or new data of this type may be collected as part of the Tier 3 comprehensive evaluation.
- Eligibility determination should not be based on any single method, measure, or assessment."

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Hale, Naglieri, Kaufman, & Kavale (2004)

THE SCHOOL PSYCHOLOGIST

Policy Forum

Specific Learning Disability Classification in the New Individuals with Disabilities Education Act: The Danger of Good Ideas

James B. Hale
Children's Evaluation and Rehabilitation Center, Albert Einstein College of Medicine
Jack A. Naglieri
Center for Cognitive Development, George Mason University
Alan S. Kaufman
Yale Child Study Center, Yale University School of Medicine
Kenneth A. Kavale
College of Education, University of Iowa

Abstract

The recently revised IDEA guidelines indicate that a Specific Learning Disability (SLD) can be identified if a child has a disorder in the basic psychological processes. The criteria in the new guidelines for identifying SLD state that: a) a severe discrepancy between achievement and intellectual ability *shall not be required*; and b) a response to intervention (RTI) *may be considered*. These criteria are ambiguous regarding how the traditional ability-achievement discrepancy approach should be applied, and they are equally ambiguous about the recently adopted failure to RTI model. Absent from these criteria is any mention integrities. Identifying a child's unique pattern of performance on standardized measures not only assures compliance with the new IDEA guidelines, but also allows for recognition of individual cognitive strengths and needs, one of the prerequisites for intervention efficacy.

Specific Learning Disability Classification in the New Individuals With Disabilities Education Act: The Danger of Good Ideas

The National Assessment of Educational Progress (NAEP) recently released the nationwide results of reading and math scores for children in fourth and eighth grades. Averaging across all students, no gains were made in reading scores from

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Hale, Naglieri, Kaufman, & Kavale (2004)

- Because the definition of SLD is
  - "… a disorder in 1 or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations."
- "Establishing a disorder in the basic psychology processes is *essential* for determining SLD"
- So that the legal definition is aligned with the procedural methods used for eligibility
- But how, exactly, would measuring basic psychological processes be used for SLD eligibility determination?

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The key question is:

How can we operationalize the identification of a "disorder in one or more of the basic psychological processes" which manifests as "the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations"?

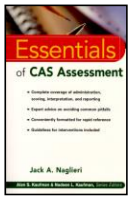
Presentation Outline

- From achievement ability discrepancy to a pattern of strengths and weaknesses
- The Discrepancy/Consistency Model (DCM)
- Which tests to use to define a "basic psychological process"
- A neurocognitive theory will be suggested
  - complex decision making (frontal lobes – Planning)
  - focus and resistance to distractions (brain stem - Attention)
  - visual/verbal spatial ability (Occipital/Parietal - Simultaneous)
  - visual/verbal sequencing (Temporal area - Successive)
- Illustrative Case studies
  - How Discrepancy/Consistency yields more accurate eligibility determination
  - How Discrepancy/Consistency leads to intervention planning.

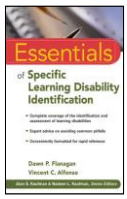
Discrepancy / Consistency Model

- The Discrepancy / Consistency model is a conceptual framework that was first introduced in 1999
- Similar models have been proposed by Hale and Flanagan

1999



2011



Discrepancy/Consistency Model (DCM)

- Naglieri (2011). The discrepancy/consistency approach to SLD identification using the PASS theory. In D. P. Flanagan & V. C. Alfonso (Eds.), *Essentials of Specific Learning Disability Identification* (145-172). Hoboken, NJ: Wiley.
- This chapter can be downloaded from www.jacknaglieri.com

THE DISCREPANCY/CONSISTENCY APPROACH TO SLD IDENTIFICATION USING THE PASS THEORY

Jack A. Naglieri

There are many reasons why children experience academic failure (e.g., poor instruction, lack of motivation, visual or auditory problems, lack of exposure to books and reading, instruction that does not meet a child's particular style of learning, overall limited intellectual ability, a specific intellectual ability deficit, etc.). This chapter focuses on those children who have a disorder in one or more of the basic psychological processes that underlie academic success and failure; that is, children with scores on a reliable and well-validated multidimensional test of cognitive processes that vary from the average to the well below-average ranges, with corresponding variability in standardized achievement test scores. These children can only be identified via a comprehensive assessment using nationally normed tests that uncover the processing deficit(s) and associated academic failure, despite adequate instruction and a consideration of other exclusionary factors. These types of children would meet the criteria for a specific learning disability (SLD) as defined by the 2004 reauthorization of the Individuals with Disabilities Education Improvement Act (IDEA; see Hale, Kaufman, Naglieri, & Kavale, 2006).

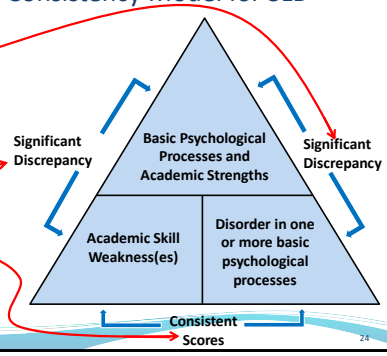
This chapter is about children who have a disorder in one or more of the basic psychological processes. These children's academic failure may be exacerbated by poor instruction, but inadequate teaching did not cause the problem. These children would likely benefit from frequent progress monitoring, but ongoing progress monitoring is not enough to ensure academic success. In order to understand the reasons for academic failure, these children need to be carefully

Discrepancy / Consistency Model

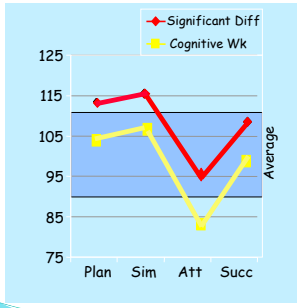
- The Discrepancy / Consistency Model is a method used to ensure that there is evidence of "a disorder in 1 or more of the basic psychological processes … which manifests itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations."
- The disorder in 1 or more basic psychological processes is found when a student shows a pattern of strengths and weaknesses in basic psychological processes, **and**…
- The imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations is found when a student shows a pattern of strengths and weaknesses in achievement
- The result is two discrepancies and a consistency

Discrepancy Consistency Model for SLD

- **Discrepancy #1** between high and low processing scores
- **Discrepancy #2** between high processing and low achievement
- **Consistency** between low processing and low achievement



Evidence of a 'disorder in processing'



- **Significant Difference**
  - *Is low relative* to the child's mean score
- **Cognitive Weakness**
  - Is a Significant weakness and the score falls below the Average range (<90)

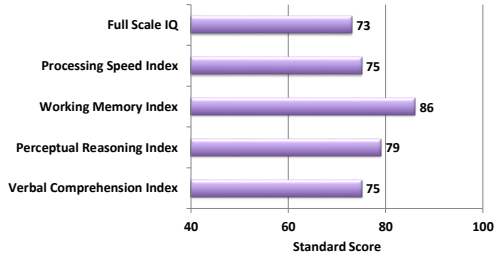
Case of Alejandro

CASE STUDY: ALEJANDRO (C.A. 7-0 GRADE 1)

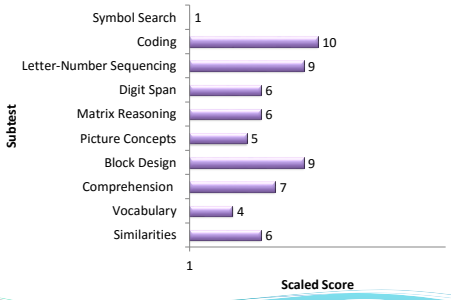
REASON FOR REFERRAL

- Academic:
  - Could not identify letters/sounds
  - October 2013: Could only count to 39
  - All ACCESS scores of 1
- Behavior:
  - Difficulty following directions
  - Attention concerns
  - Refusal/defiance

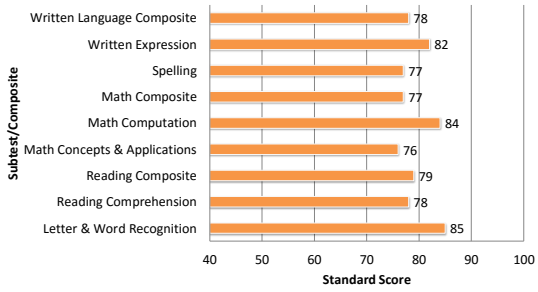
WISC-IV ASSESSMENT



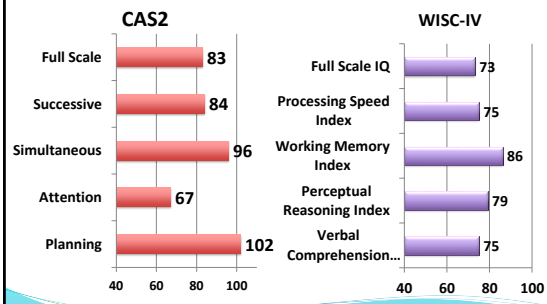
WISC-IV SUBTESTS



KTEA-II



PASS basic psychological processes



Thoughts about Alejandro

- We want to help our students, but how?
- What have tried to get information from the Wechsler Scales
  - Subtest analysis (doesn't work)
  - Interpretation of subtests according to other views (Working Memory, Speed, CHC, etc.) -doesn't work
- Cross Battery approach?
  - Reliability and Validity evidence is weak
- Which test/method should we use?
- All these questions will be answered…

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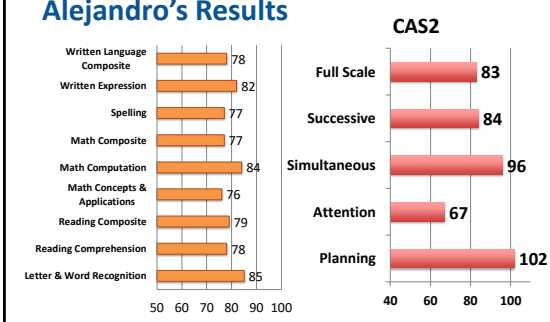
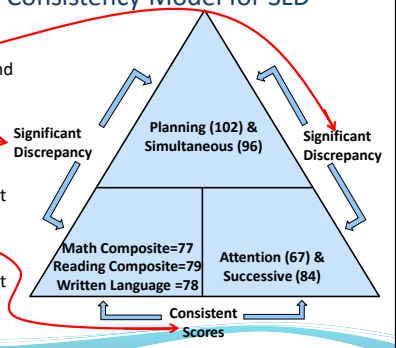
Alejandro's Results



Discrepancy Consistency Model for SLD

- Discrepancy between high and low processing scores
- Discrepancy between high processing and low achievement
- Consistency between low processing and low achievement



The case of Alejandro (by Dr. Otero)

- Alejandro has a "disorder in one or more of the basic psychological processes"
  - Attention = 67 and Successive = 84
- Good scores in basic psychological processes:
  - Simultaneous = 96 and Planning = 102
- He has documented academic failure
- Conclusions: He has intra-individual differences in basic psychological processes that underlie his academic problems

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Discrepancy / Consistency Model

- The Discrepancy / Consistency Model is a conceptual approach to ensure that there is evidence of…
  - a *discrepancy* between high and low (e.g., a significant weakness) scores in basic psychological processes
  - a *discrepancy* between high scores in basic psychological processes and low academic scores
  - a *consistency* between low scores in basic psychological processes and low academic scores
- The discrepancies ensure that the student has (1) within student variability in psychological processes and (2) a difference between processing and achievement
- The consistency helps us understand WHY the student has failed and WHAT to do about it

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How to Operationalize this Model

- IDEA – "each local educational agency shall ensure that assessments …used to assess a child" are:
  - "selected … so as not to be discriminatory on a racial or cultural basis"
  - "used for purposes for which the … measures are valid and reliable"
  - "technically sound [to assess] cognitive factors"
- Standardized norm based tests are the best way to evaluate and calibrate academic skills
  - Tests like the K-TEA, WIAT-III, WJ-IV, FAR, etc.
- Standardized norm based tests are the best way to evaluate and calibrate basic psychological processes

Time to Think and Talk

START

3 minutes left

- Reactions?
- Which test results make more sense?
- Was WISC-IV information Helpful?
- Did CAS2 Results change your mind?
- Can you determine if the student has a SLD using DCM?
- Your thoughts…

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Hale, Naglieri, Kaufman, & Kavale (2004)

- Tests that we specifically developed to measure basic psychological processes should be used
  - The K-ABC II (Kaufman & Kaufman, 2004)
  - Planning, Attention, Simultaneous, Successive (PASS) theory as measured by the CAS2 (Naglieri, Das & Goldstein, 2014)
- These and any other tests, will be evaluated based on two essential criteria included in IDEA:
  - Suitability for assessment of diverse populations
  - Validity for use in SLD eligibility determination

Non-discriminatory Tests

Do Students with SLD Have a Pattern of Cognitive Strengths and Weaknesses?

This is essential for intervention planning

IDEA 2004

"(3) ADDITIONAL REQUIREMENTS.—Each local educational agency shall ensure that—

"(A) assessments and other evaluation materials used to assess a child under this section—

non discriminatory assessments

"(i) are selected and administered so as not to be discriminatory on a racial or cultural basis;

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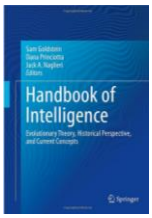
"(C) assessment tools and strategies that provide relevant information that directly assists persons in deter-

Evolution of IQ (Goldstein, Princiotta & Naglieri, 2015)



Hundred Years of Intelligence Testing: Moving from Traditional IQ to Second-Generation Intelligence Tests

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Jack A. Naglieri

"Do not go where the path may lead, go instead where there is no path and leave a trail."
–Ralph Waldo Emerson

Context

April 6, 1917, is remembered as the day the United States entered World War I. On that same day a group of psychologists held a meeting in Harvard University's Emerson Hall to discuss the possible role they could play with the war effort (Yerkes 1921). The group agreed that psychological knowledge and methods could be of importance to the military and utilized to increase the efficiency of the Army and Navy personnel. The group included Robert Yerkes, who was also the president of the American Psychological Association. Yerkes made an appeal to members of APA who responded by

Training School in Vineland, New Jersey, on May 28. The committee considered many types of group tests and several that Arthur S. Otis developed when working on his doctorate under Lewis Terman at Stanford University. The goal was to find tests that could efficiently evaluate a wide variety of men, be easy to administer in the group format, and be easy to score. By June 9, 1917, the materials were ready for an initial trial. Men who had some educational background and could speak English were administered the verbal and quantitative (Alpha) tests and those that could not read the newspaper or speak English were given the Beta tests (today described as nonverbal).

The Alpha tests were designed to measure general information (e.g., how many months are

Race by test (Naglieri, 2015)

psychological processes measured by KABC and CAS are the more fair than traditional tests

Table 20.1 Mean score differences in standard scores by race on traditional IQ and second-generation intelligence tests

Test	Difference
Traditional	
SB-IV (matched)	12.6
WISC-IV (normative sample)	11.5
WJ-III (normative sample)	10.9
WISC-IV (matched)	10.0
Second generation	
KABC (normative sample)	7.0
KABC (matched)	6.1
KABC-2 (matched)	5.0
CAS2 (normative sample)	6.3
CAS (demographic controls)	4.8
CAS2 (demographic controls)	4.3

Naglieri, Rojahn, Matto (2007)

Hispanic White difference on CAS Full Scale of 4.8 standard score points (matched)

Available online at www.sciencedirect.com
ScienceDirect
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INTELLIGENCE
Intelligence 35 (2007) 568–579

Hispanic and non-Hispanic children's performance on PASS cognitive processes and achievement☆

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[b] Virginia Commonwealth, United States

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Available online 8 January 2007

Abstract

Hispanics have become the largest minority group in the United States. Hispanic children typically come from working class homes with parents who have limited English language skills and educational training. This presents challenges to psychologists who assess these children using traditional IQ tests because of the considerable verbal and academic (e.g., quantitative) content. Some researchers have suggested that intelligence conceptualized on the basis of psychological processes may have utility for assessment of children from culturally and linguistically diverse populations because verbal and quantitative skills are not included. This study examined Hispanic children's performance on the Cognitive Assessment System (CAS; Naglieri, J.A., and Das, J.P. (1997). Cognitive Assessment System. Itasca, IL: Riverside.]) which is based on the Planning, Attention, Simultaneous, and Successive (PASS) theory of intelligence. The scores of Hispanic (N=244) and White (N=1956) children on the four PASS processes were obtained and the respective correlations between PASS and achievement compared. Three complementary sampling methodologies and data analysis strategies were chosen to compare the Ethnic groups. Sample size was maximized using nationally representative groups and demographic group differences were minimized using smaller matched samples. Small differences between Hispanic and non-Hispanic children were found when ability was measured with tests of basic PASS processes. In addition, the correlation between the PASS constructs and achievement were substantial for both Hispanic and non-Hispanic children and were not significantly different between the groups.
Published by Elsevier Inc.

Bilingual Hispanic Children's Performance on the English and Spanish Versions of the Cognitive Assessment System

Jack A. Naglieri
George Mason University
Tulio Otero
Columbia College, Elgin Campus
Brianna DeLauder
George Mason University
Holly Matto
Virginia Commonwealth University

School Psychology Quarterly
2007, Vol. 22, No. 3, 432–448

This study compared the performance of referred bilingual Hispanic children on the Planning, Attention, Simultaneous, Successive (PASS) theory as measured by English and Spanish versions of the Cognitive Assessment System (CAS; Naglieri & Das, 1997a). The results suggest that students scored similarly on both English and Spanish versions of the CAS. Within each version of the CAS, the bilingual children earned their lowest scores in Successive processing regardless of the language used during test administration. Small mean differences were noted between the means of the English and Spanish versions for the Simultaneous and Successive processing scales; however, mean Full Scale scores were similar. Specific subtests within the Simultaneous and Successive scales were found to contribute to the differences between the English and Spanish versions of the CAS. Comparisons of the children's profiles of cognitive weakness on both versions of the CAS showed that these children performed consistently despite the language difference.

English Spanish CAS

Means, *SDs*, *d*-ratios, Obtained and Correction Correlations Between the English a

Spanish Version of the CAS (*N* = 55).

	CAS English		CAS Spanish		*d*-ratio	Correlations	
	Mean	*SD*	Mean	*SD*	*d*	Obtained	Corrected
Planning	92.6	13.1	92.6	13.4	.00	.96	.97
Simultaneous	89.0	12.8	93.0	13.7	-.30	.90	.93
Attention	94.8	13.9	95.1	13.9	-.02	.98	.98
Successive	78.0	13.1	83.1	12.6	-.40	.82	.89
Full Scale	84.6	13.6	87.6	13.8	-.22	.96	.97

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Otero, Gonzales, Naglieri (2012)

- SLD and PASS scores

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Psychology Press

The Neurocognitive Assessment of Hispanic English-Language Learners With Reading Failure

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Lauren Gonzales
George Mason University, Fairfax, Virginia
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This study examined the performance of referred Hispanic English-language learners ($N = 40$) on the English and Spanish versions of the *Cognitive Assessment System* (CAS; Naglieri & Das, 1997). The CAS measures basic neuropsychological processes based on the Planning, Attention, Simultaneous, and Successive (PASS) theory (Naglieri & Das, 1997; Naglieri & Otero, 2011a). Full Scale (FS) scores as well as PASS processing scale scores were compared, and no significant differences were found in FS scores or in any of the PASS processes. The CAS FS scores on the English ($M = 86.4$, $SD = 8.73$) and Spanish ($M = 87.1$, $SD = 7.94$) versions correlated .94 (uncorrected) and .99 (corrected for range restriction). Students earned their lowest scores in Successive processing regardless of the language in which the test was administered. PASS cognitive profiles were similar on English and Spanish versions of the PASS scales. These findings suggest that students scored similarly on both versions of the CAS and that the CAS may be a useful measure of these four abilities for Hispanic children with underdeveloped English-language proficiency.

Otero, Gonzales, Naglieri (2012)

- "Fagan (2000) as well as Suzuki and Valencia (1997) suggested that a cognitive processing approach like that used in the CAS would avoid the knowledge base required to answer verbal and quantitative questions found on most traditional IQ tests and would be more appropriate for culturally and linguistically diverse populations. The results of this study support the assertion (p. 8)."

TABLE 2
Means, Standard Deviations, *d* Ratios, and Correlations Between the English and Spanish Versions of the Cognitive Assessment System (*N* = 40)

	CAS English		CAS Spanish			Correlations	
CAS Subtests and Scales	*M*	*SD*	*M*	*SD*	*d ratio*	*Obtained*	*Corrected*
Scales							
Planning	94.60	8.78	94.98	8.59	-0.04	.978	.997
Simultaneous	92.58	11.34	93.63	12.06	-0.09	.886	.953
Attention	94.08	8.48	94.78	8.23	-0.08	.973	.997
Successive	78.65	10.29	78.25	10.08	0.04	.943	.987
Full Scale	86.40	8.73	87.10	7.94	-0.08	.936	.993

WJ-III and ELL Hispanic Students

(Sotelo-Dynega, Ortiz, Flanagan & Chaplin, 2013)

11 point mean score difference in GAI

As English skills go down so does the GAI

Table 1
WJ III GIA and Test Performance Differences Between LEPs and the WJ III Standardization Sample Mean

	Sample		WJ III Sample				
WJ III Test	*M*	*SD*	*M*	*SD*	Difference	*t*	*d*
General Intellectual Ability	89.34	11.78	100	15	−10.64	−7.05***	−.90
Verbal Comprehension	80.38	14.09	100	15	−19.62	−10.87***	−1.40
Concept Formation	87.16	12.20	100	15	−12.84	−8.22***	−1.05
Numbers Reversed	95.23	12.46	100	15	−4.77	−2.96*	−0.38
Visual–Auditory Learning	95.62	14.56	100	15	−4.38	−2.25*	−0.30
Sound Blending	97.82	11.57	100	15	−2.18	−1.47	−0.19
Visual Matching	98.93	9.80	100	15	−1.07	−0.85	−0.11
Spatial Relations	99.18	8.45	100	15	−0.82	−0.758	−0.10

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 2
Differences Among the NYSESLAT Proficiency Group's WJ III, GIA Mean Score, and the WJ III Standardization Sample Mean

	Sample		WJ III Sample				
NYSESLAT Proficiency Group	*M*	*SD*	*M*	*SD*	Difference	*t*	*d*
Beginner	71.75	3.95	100	15	−28.25	−14.31*	−7.15
Intermediate	82.29	8.66	100	15	−17.71	−7.65*	−2.05
Advanced	89.55	9.17	100	15	−10.45	−10.45*	−1.14
Proficient	101	9.23	100	15	1.00	.405	0.11

*$p < .001$.

The First IQ TEST: Alpha

1. Bull Durham is the name of tobacco
2. The Mackintosh Red is a kind of fruit
3. The Oliver is a typewriter
4. A passenger locomotive type is the Mogul
5. Stone & Webster are well know engineers
6. The Brooklyn Nationals are called Superbas
7. Pongee is a fabric
8. Country Gentleman is a kind of corn
9. President during the Spanish War Mckinley
10. Fatima is a make of cigarette

From: Psychological Examining the United States Army (Yerkes, 1921, p. 213)

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CAS in Italy

Psychological Assessment

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Multigroup Confirmatory Factor Analysis of U.S. and Italian Children's Performance on the PASS Theory of Intelligence as Measured by the Cognitive Assessment System

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University of Virginia and Devereux Center for Resilient Children

Stefano Taddei
University of Florence

Kevin Williams
Multi-Health Services, Toronto, Ontario, Canada

This study examined Italian and U.S. children's performance on the English and Italian versions, respectively, of the Cognitive Assessment System (CAS; Naglieri & Conway, 2009; Naglieri & Das, 1997), a test based on a neurocognitive theory of intelligence entitled PASS (Planning, Attention, Simultaneous, and Successive; Naglieri & Das, 1997; Naglieri & Otero, 2011). CAS subtest, PASS scales, and Full Scale scores for Italian (N = 809) and U.S. (N = 1,174) samples, matched by age and gender, were examined. Multigroup confirmatory factor analysis results supported the configural invariance of the CAS factor structure between Italians and Americans for the 5- to 7-year-old (root-mean-square error of approximation [RMSEA] = .038; 90% confidence interval [CI] = .033, .043; comparative fit index [CFI] = .96) and 8- to 18-year-old (RMSEA = .036; 90% CI = .028, .043; CFI = .97) age groups. The Full Scale standard scores (using the U.S. norms) for the Italian (100.9) and U.S. (100.5) samples were nearly identical. The scores between the samples for the PASS scales were very similar, except for the Attention Scale (d = 0.26), where the Italian sample's mean score was slightly higher. Negligible mean differences were found for 9 of the 13 subtest scores, 3 showed small d-ratios (2 in favor of the Italian sample), and 1 was large (in favor of the U.S. sample), but some differences in subtest variances were found. These findings suggest that the PASS theory, as measured by CAS, yields similar mean scores and showed factorial invariance for these samples of Italian and American children, who differ on cultural and linguistic characteristics.

US and Italian Samples– Mean Scores

Table 5
Means and SDs for Italian Children (N = 809) on the CAS Subtests and PASS and Full Scales Using U.S. Norms and Comparisons to U.S. Sample (N = 1,174), Matched by Age

	Italian			U.S.					
Subtests and scales	*M*	*SD*	*n*	*M*	*SD*	*n*	*F*	*p*	*d*-ratio
CAS composite scales									
Planning	97.7	13.4	809	100.5	15.4	1,174	18.1	<.01	−0.19
Simultaneous	103.0	13.9	809	101.1	14.1	1,174	9.3	<.01	0.14
Attention	104.2	13.7	809	100.6	14.4	1,174	32.2	<.01	0.26
Successive	99.0	12.5	809	100.5	14.5	1,174	5.1	.02	−0.11
Full Scale	100.9	12.9	809	100.5	14.8	1,174	2.3	.13	0.03

Note. CAS = Cognitive Assessment Syste[m]; PASS = Planning, Attention, Simultaneous, and Successive. U.S. sample *N*s vary due Designations for *d*-ratios are as follows: T = [t]; .2), S = small (.2), M = medium (.5), and L = large (.8). For all *F* values the *df*s a for Speech Rate (1, 1219) and Sentence [C]; 52).

Italian mean = 100.9 &US mean = 100.5

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Why Measure Basic Psych Processes?

- Measures of basic psychological processes in these measures assess abilities without requiring knowledge
  - Vocabulary
  - Arithmetic
  - Similarities
  - Comprehension
  - Information
- The knowledge requirement in traditional IQ tests distorts the measurement of ability

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IDEA 2004

"(3) ADDITIONAL REQUIREMENTS.—Each local educational agency shall ensure that—

"(A) assessments and other evaluation materials used to assess a child under this section—

"(i) are selected and administered so as not to be discriminatory on a racial or cultural basis;

"(ii) are provided and administered in the language and form most likely to yield accurate information on what the child knows and can do academically, developmentally, and functionally, unless it is not feasible to so provide or administer;

valid and reliable assessment

"(iii) are used for purposes for which the assessments or measures are valid and reliable;

"(iv) are administered by trained and knowledgeable personnel; and

"(v) are administered in accordance with any instructions provided by the producer of such assessments;

"(B) the child is assessed in all areas of suspected disability;

"(C) assessment tools and strategies that provide relevant information that directly assists persons in deter-

SLD vs ADHD Profiles and correlation with achievement

Do Students with SLD Have a Pattern of Cognitive Strengths and Weaknesses?

This is essential for intervention planning

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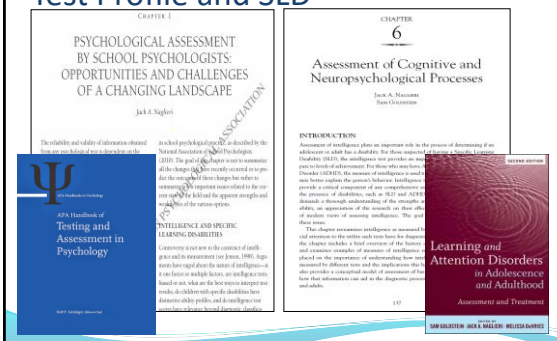
Test Profile and SLD



Naglieri & Goldstein (2011)

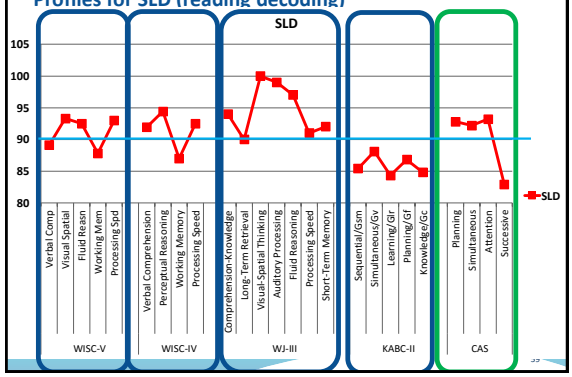
GROUP PROFILES BY ABILITY TEST

Because ability tests play such an important role in the diagnostic process, it is crucial to understand the sensitivity each test may have to any unique characteristics of those with an SLD or attention deficit. Clinicians need to know if an adolescent or adult has a specific deficit in ability that is related to a specific academic learning problem. There has been considerable research on, for example, Wechsler subtest profile analysis, and most researchers conclude that no profile has diagnostic utility for individuals with SLD or ADHD (Kavale & Forness, 1995). The failure of subtest profiles has led some to argue (e.g., Naglieri, 1999) that scale, rather than subtest, variability should

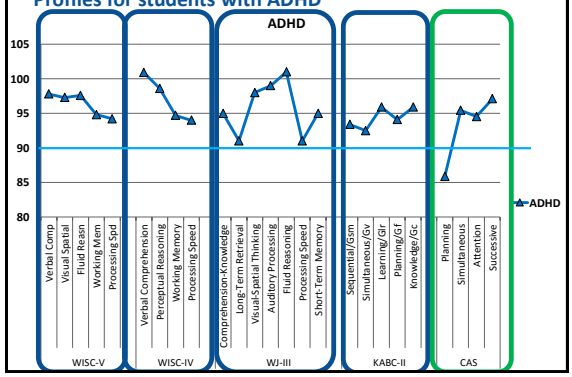
1. We need to know if intelligence tests yield distinctive profiles

2. Subtest profile analysis is UNSUPPORTED so use scale profiles instead

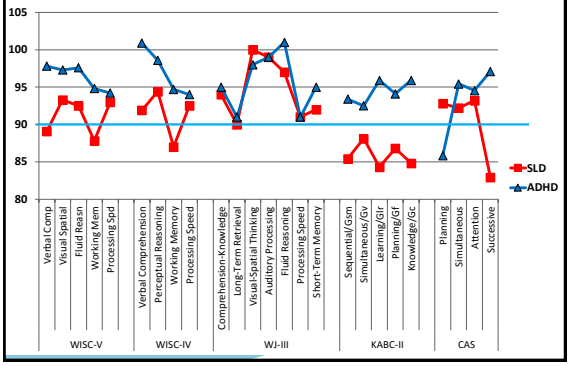
Profiles for SLD (reading decoding)



Profiles for students with ADHD

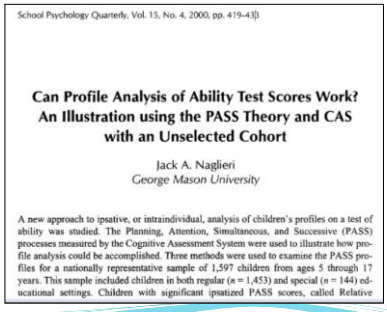


Profiles for SLD (reading decoding) & ADHD



PASS Profiles and Educational Placement

Students receiving special education were more than four times as likely to have at least one PASS weakness and a comparable academic weakness than those in regular education


School Psychology Quarterly, Vol. 15, No. 4, 2000, pp. 419–43[]

Can Profile Analysis of Ability Test Scores Work? An Illustration using the PASS Theory and CAS with an Unselected Cohort

Jack A. Naglieri
George Mason University

A new approach to ipsative, or intraindividual, analysis of children's profiles on a test of ability was studied. The Planning, Attention, Simultaneous, and Successive (PASS) processes measured by the Cognitive Assessment System were used to illustrate how profile analysis could be accomplished. Three methods were used to examine the PASS profiles for a nationally representative sample of 1,597 children from ages 5 through 17 years. This sample included children in both regular (n = 1,453) and special (n = 144) educational settings. Children with significant ipsatized PASS scores, called Relative

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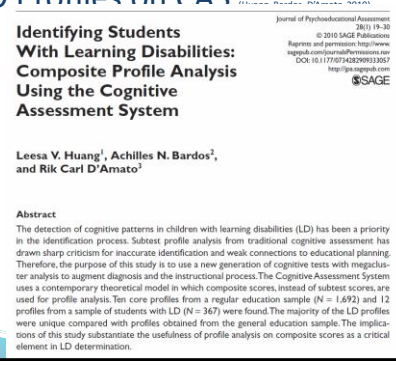
SLD Profiles on CAS


Identifying Students With Learning Disabilities: Composite Profile Analysis Using the Cognitive Assessment System

Journal of Psychoeducational Assessment
28(1) 19–30
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DOI: 10.1177/0734282909333057
http://jpa.sagepub.com
SAGE

Leesa V. Huang[1], Achilles N. Bardos[2], and Rik Carl D'Amato[3]

Abstract

The detection of cognitive patterns in children with learning disabilities (LD) has been a priority in the identification process. Subtest profile analysis from traditional cognitive assessment has drawn sharp criticism for inaccurate identification and weak connections to educational planning. Therefore, the purpose of this study is to use a new generation of cognitive tests with megaculster analysis to augment diagnosis and the instructional process. The Cognitive Assessment System uses a contemporary theoretical model in which composite scores, instead of subtest scores, are used for profile analysis. Ten core profiles from a regular education sample (N = 1,692) and 12 profiles from a sample of students with LD (N = 367) were found. The majority of the LD profiles were unique compared with profiles obtained from the general education sample. The implications of this study substantiate the usefulness of profile analysis on composite scores as a critical element in LD determination.

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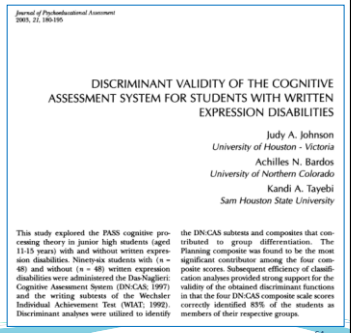
Johnson, Bardos & Tayebi, 2003

- "this study suggests that the CAS…yields information that contributes to the differential diagnosis of students suspected of having a learning disability in writing"


Journal of Psychoeducational Assessment
2003, 21, 180-195

DISCRIMINANT VALIDITY OF THE COGNITIVE ASSESSMENT SYSTEM FOR STUDENTS WITH WRITTEN EXPRESSION DISABILITIES

Judy A. Johnson
University of Houston - Victoria
Achilles N. Bardos
University of Northern Colorado
Kandi A. Tayebi
Sam Houston State University

This study explored the PASS cognitive processing theory in junior high students (aged 13-15 years) with and without written expression disabilities. Ninety-six students with (n = 48) and without (n = 48) written expression disabilities were administered the Das-Naglieri: Cognitive Assessment System (DN:CAS; 1997) and the writing subtests of the Wechsler Individual Achievement Test (WIAT; 1992). Discriminant analyses were utilized to identify the DN:CAS subtests and composites that contributed to group differentiation. The Planning composite was found to be the most significant contributor among the four composite scores. Subsequent efficiency of classification analyses provided strong support for the validity of the obtained discriminant functions in that the four DN:CAS composite scale scores correctly identified 85% of the students as members of their respective groups.

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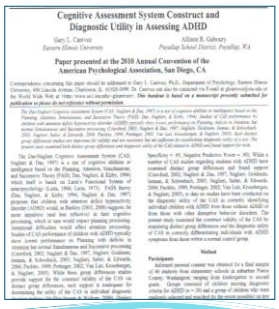
Canivez & Gaboury (2010)

- "the present study demonstrated the potential of the CAS to correctly identify students who demonstrated behaviors consistent with ADHD diagnosis." glcanivez@eiu.edu


Cognitive Assessment System Construct and Diagnostic Utility in Assessing ADHD

Gary L. Canivez
Eastern Illinois University
Alison R. Gaboury
Pewaukee School District, Pewaukee, WI

Paper presented at the 2010 Annual Convention of the American Psychological Association, San Diego, CA

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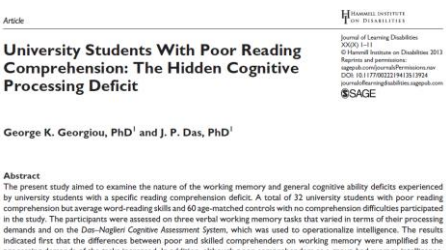
Georgiou & Das (2013)


Article

University Students With Poor Reading Comprehension: The Hidden Cognitive Processing Deficit

Journal of Learning Disabilities
XX(X) 1–11
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DOI: 10.1177/0022219413513914
journaloflearningdisabilities.sagepub.com
SAGE

George K. Georgiou, PhD[1] and J. P. Das, PhD[1]

Abstract

The present study aimed to examine the nature of the working memory and general cognitive ability deficits experienced by university students with a specific reading comprehension deficit. A total of 32 university students with poor reading comprehension but average word-reading skills and 60 age-matched controls with no comprehension difficulties participated in the study. The participants were assessed on three verbal working memory tasks that varied in terms of their processing demands and on the *Das–Naglieri Cognitive Assessment System*, which was used to operationalize intelligence. The results indicated first that the differences between poor and skilled comprehenders on working memory were amplified as the processing demands of the tasks increased. In addition, although poor comprehenders as a group had average intelligence, they experienced significant difficulties in simultaneous and successive processing. Considering that working memory and general cognitive ability are highly correlated processes, these findings suggest that the observed differences between poor and skilled comprehenders are likely a result of a deficient information processing system.

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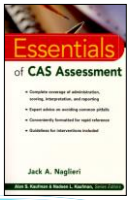
SLD vs ADHD Profiles

- There needs to be evidence that intelligence tests which are widely used in school psychology yield specific profiles at the scale (theoretical) level.
  - Without such evidence their utility to identify a 'disorder in one or more of the basic psychological processes' is limited
  - Subtest profile analysis is not advised
- The next important validity issue is correlation to achievement –
  - Do scores on the cognitive measure relate to academic achievement test scores?

IQ Correlations with Achievement?

- IQ scores correlate about **.5 to .55** with achievement Intelligence (Brody, 1992)
- But traditional tests have achievement in them
- Naglieri (1999) summarized the correlations between several tests and achievement
  - The median correlation between each test's overall score and all achievement variables was obtained



Ability & Achievement (Naglieri, 1999)

	Tests with knowledge			Tests with Little knowledge	
	WISC-III FSIQ	DAS GCA	WJ-R Cog	K-ABC MPC	CAS FS
Median r	.590	.600	.625	.630	.700
N	1,284	2,400	888	2,636	1,600

WISC-3: WIAT Manual Table C.1 ages 6-16; WJ-R Technical Manual; CAS Interpretive Handbook; K-ABC Interpretative Manual; DAS Handbook. Increase = $(r^2_1 - r^2_2)/ r^2_1$ where r^2_1 = WISC-3 WIAT correlation

Conclusion: YOU DON'T need Verbal and Quantitative to correlate with achievement

Correlations with Achievement

- Next, a summary of ability test correlations with achievement EXCLUDING the scales that clearly require knowledge
- The average correlations of the SCALES with achievement and those without achievement were obtained to avoid ***criterion contamination***…

Correlations with Achievement

- Average correlations between IQ Scales with total achievement scores
- The strength of measuring *basic psychological processes* as PASS is clear

Note: All correlations are reported in the ability tests' manuals. Values per scale were averaged within each ability test using Fisher z transformations.

Correlations Between Ability and Achievement Test Scores			Average Correlation All Scales	Average Correlation Scales without achievement
WISC-V	Verbal Comprehension	.74		
WIAT-III	Visual Spatial	.46		
N = 201	Fluid Reasoning	.40		
	Working Memory	.63		
	Processing Speed	.34	.53	.47
WJ-IV COG	Comprehension Knowledge	.50		
WJ-IV ACH	Fluid Reasoning	.71		
N = 825	Auditory Processing	.52		
	Short Term Working Memory	.55		
	Cognitive Processing Speed	.55		
	Long-Term Retrieval	.43		
	Visual Processing	.45	.54	.50
KABC	Sequential/Gsm	.43		
WJ-III ACH	Simultaneous/Gv	.41		
N = 167	Learning/Glr	.50		
	Planning/Gf	.59		.48
	Knowledge/GC	.70	.53	
CAS	Planning	.57		
WJ-III ACH	Simultaneous	.67		
N=1,600	Attention	.50		
	Successive	.60		.59

Note: WJ-IV Scales Comp-Know= Vocabulary and General Information; Fluid Reasoning = Number Series and Concept Formation; Auditory Processing = Phonological processing.

Implications

- Non-discriminatory data suggest that traditional IQ tests yield larger race and ethnic differences than tests of basic psychological processing.
  - Conclusion: KABC2 and CAS2
- Validity data suggests show not all tests yield profiles that differentiate SLD and ADHD, evidence needed for determining strengths and weaknesses suggests.
  - Conclusion: CAS2 yields different profiles
  - And CAS correlates the highest with achievement.

Time to Think and Talk

START

3 minutes left

- Reactions?
- Which results were most surprising?
- Do the results match your experiences in the field?
- Do you still think vocabulary is a good way to measure IQ?
- Your thoughts…

Presentation Outline

- From achievement ability discrepancy to a pattern of strengths and weaknesses
- The Discrepancy/Consistency model
- Which tests to use to define a "basic psychological process"
- A neurocognitive theory will be suggested
  - complex decision making (frontal lobes – Planning)
  - focus and resistance to distractions (brain stem - Attention)
  - visual/verbal spatial ability (Occipital/Parietal - Simultaneous)
  - visual/verbal sequencing (Temporal area - Successive)
- Illustrative Case studies
  - How Discrepancy/Consistency yields more accurate eligibility determination
  - How Discrepancy/Consistency leads to intervention planning.

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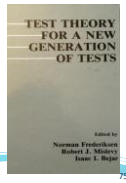
Defining basic psychological process

- How did we identify 'basic psychological processes'?
  - We should use knowledge from cognitive and neuropsychology to construct a model to test
  - A well tested model can evolve into a THEORY of 'basic psychological processes'
  - We should not assign new labels to traditional IQ subtests
  - We should recognize the limitations of developing a theory from factor analysis – "*a research program dominated by factor analyses of test intercorrelations is incapable of producing an explanatory theory of human intelligence"* (Lohman & Ippel, 1993, p. 41)



Defining basic psychological process

- The term 'basic psychological processes' is a modern term for ability (or intelligence) when traditional verbal tests that are confounded by knowledge (e.g., Information, Similarities, Arithmetic, Vocabulary) are excluded
- 'basic psychological processes' provide us the means to function and acquire knowledge and skills
  - Skills, like reading decoding, phonological coding, or math calculation, are *not* examples of a cognitive process
    - Skill = knowledge that is well learned and therefore can be performed with little thinking

Cognition or Knowledge?

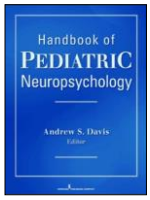
- What does the student have to **know** to complete a task?
  - This is dependent on *instruction*
- How does the student have to **think** to complete a task?
  - This is dependent on the *brain* – ***'basic psychological processes'***
- We must assess ability and achievement separately

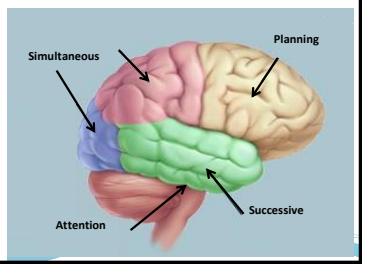
Basic Psychological Processes

Connecting IDEA with practice

Brain, Cognition, & Intelligence

- The brain is the seat of abilities called PASS
- These basic psychological processes are the foundation of learning (Naglieri & Otero, 2011)





See Naglieri, J. A. & Otero, T. (2011). Cognitive Assessment System: Redefining Intelligence from A Neuropsychological Perspective. In A. Davis (Ed.). *Handbook of Pediatric Neuropsychology (320-333)*. New York: Springer Publishing.

PASS & Basic Psychological Processes

- **P**lanning = THINKING ABOUT HOW YOU DO WHAT YOU DECIDE TO DO
- **A**ttention = BEING ALERT AND RESIST DISTRACTIONS
- **S**imultaneous = GETTING THE BIG PICTURE
- **S**uccessive = FOLLOWING A SEQUENCE
- **PASS theory** is a modern way to measure neurocognitive abilities related to brain function

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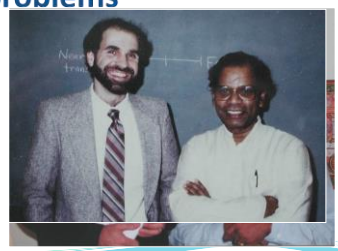
What is a Basic Psychological Process?

- A specific cognitive process provides a unique kind of function
- A variety of cognitive processes is needed to meet the many demands of our complex environment
- A variety of cognitive processes gives us away of achieving the same goal using different types of or different combinations of processes (this is important for intervention planning).

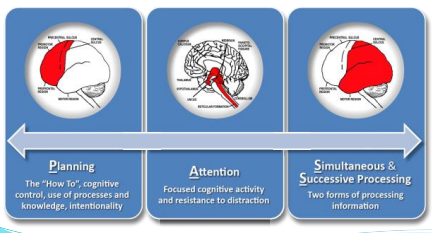
81

A Neurocognitve approach to understanding learning and learning problems



PASS: A neurocognitive approach

Three Functional Units described by A. R. Luria



83

PASS Theory

- **Planning** is a basic psychological process we use to determine, select, and apply efficient solutions to problems
  - problem solving
  - developing plans and using strategies
  - impulse control and self-control
  - control of processing
  - retrieval of knowledge

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CAS2: Rating Scale Planning

Directions for Items 1–10. These questions ask how well the child or adolescent decides how to do things to achieve a goal. They also ask how well a child or adolescent thinks before acting and avoids impulsivity. Please rate how well the child or adolescent creates plans and strategies to solve problems.

During the past month, how often did the child or adolescent . . .	Never	Rarely	Sometimes	Frequently	Always
1. produce a well-written sentence or a story?	0	1	2	3	4
2. evaluate his or her own actions?	0	1	2	3	4
3. produce several ways to solve a problem?	0	1	2	3	4
4. have many ideas about how to do things?	0	1	2	3	4
5. have a good idea about how to complete a task?	0	1	2	3	4
6. solve a problem with a new solution when the old one did not work?	0	1	2	3	4
7. use information from many sources when doing work?	0	1	2	3	4
8. effectively solve new problems?	0	1	2	3	4
9. have well-described goals?	0	1	2	3	4
10. consider new ways to finish a task?	0	1	2	3	4

___ + ___ + ___ + ___ + ___ = ___ Planning Raw Score

Planned Codes

- Child fills in the codes in the empty boxes
- Children are encouraged to think of a good way to complete the page

A	B	C	D	A
X O	O O	X X	O X	

A	B	C	D	A
X O	O O	X X		
X O	O O			
X O	O O			
X O	O O			

Planned Codes

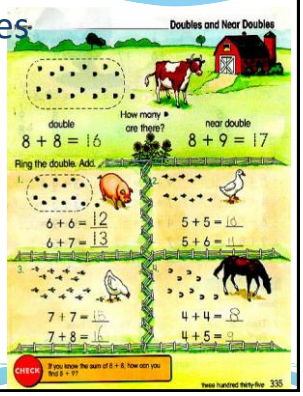
- Page 2
- What is a good plan to complete this page?
- Note orientation

A	B	C	D
X O	O O	X X	O X

A	B	C	D	A
X O	O O	X X		
D	A	B	C	D
O X	X O			
C	D	A	B	C
X X	O X			
B	C	D	A	B
O O	X X			

Math Strategies

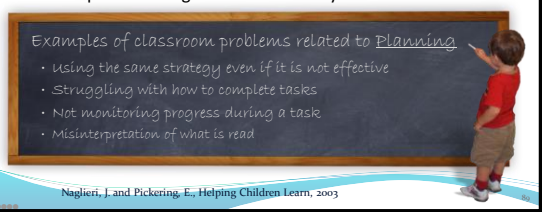
Note to the Teacher: When we teach children skills by helping them use strategies and plans for learning, we are teaching both knowledge and processing. Both are important.



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

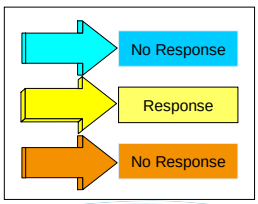


Naglieri, J. and Pickering, E., Helping Children Learn, 2003

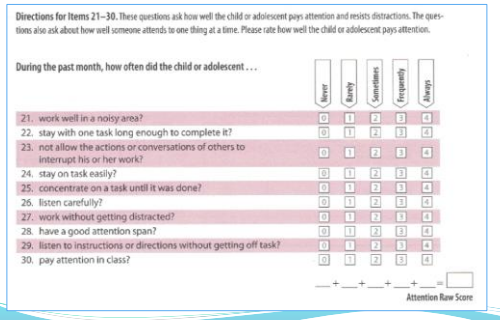
PASS Theory

- **Attention** is a basic psychological process we use to selectively attend to some stimuli and ignores others
  - focused cognitive activity
  - selective attention
  - resistance to distraction

RED
BLUE



CAS2: Rating Scale Attention



Directions for Items 21–30. These questions ask how well the child or adolescent pays attention and resists distractions. The questions also ask about how well someone attends to one thing at a time. Please rate how well the child or adolescent pays attention.

During the past month, how often did the child or adolescent . . .

	Never	Rarely	Sometimes	Frequently	Always
21. work well in a noisy area?	0	1	2	3	4
22. stay with one task long enough to complete it?	0	1	2	3	4
23. not allow the actions or conversations of others to interrupt his or her work?	0	1	2	3	4
24. stay on task easily?	0	1	2	3	4
25. concentrate on a task until it was done?	0	1	2	3	4
26. listen carefully?	0	1	2	3	4
27. work without getting distracted?	0	1	2	3	4
28. have a good attention span?	0	1	2	3	4
29. listen to instructions or directions without getting off task?	0	1	2	3	4
30. pay attention in class?	0	1	2	3	4

___+___+___+___+___=___

Attention Raw Score

Jack A. Naglieri, Ph.D. jnaglier@gmu.edu 91

CAS2 Expressive Attention

- The child says the color not the word
- Score is time and number correct

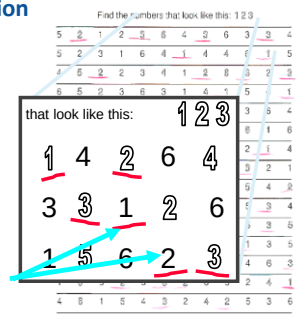
RED	BLUE	GREEN	YELLOW
YELLOW	GREEN	RED	BLUE
RED	YELLOW	YELLOW	GREEN
BLUE	GREEN	RED	BLUE
GREEN	YELLOW	RED	YELLOW

92

Number Detection

- Items 1 - 4 have 180 numbers on each page
- Each child is given two pages
- Targets appear at the top of the page
- Score for targets found and

false detections



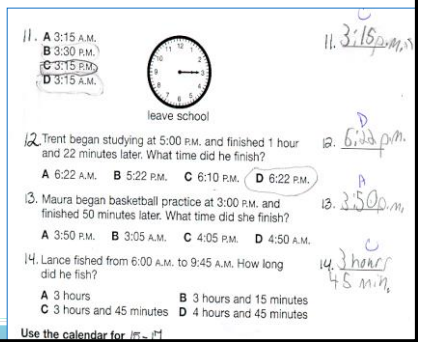
Find the numbers that look like this: 1 2 3

that look like this: 1 2 3

93

Attention

This sheet has a strong Attention demands because of the similarity of the options



11. A 3:15 A.M. B 3:30 P.M. C 3:15 P.M. D 3:15 A.M.

leave school

12. Trent began studying at 5:00 P.M. and finished 1 hour and 22 minutes later. What time did he finish?
A 6:22 A.M. B 5:22 P.M. C 6:10 P.M. D 6:22 P.M.

13. Maura began basketball practice at 3:00 P.M. and finished 50 minutes later. What time did she finish?
A 3:50 P.M. B 3:05 A.M. C 4:05 P.M. D 4:50 A.M.

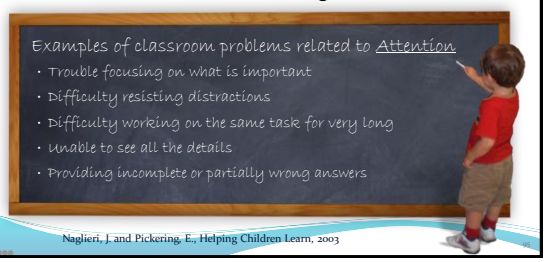
14. Lance fished from 6:00 A.M. to 9:45 A.M. How long did he fish?
A 3 hours B 3 hours and 15 minutes C 3 hours and 45 minutes D 4 hours and 45 minutes

Use the calendar for

PASS Theory: Attention

Attention

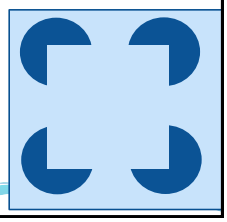
- Focus on one thing and ignore others
- Resist distractions in the learning environment



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

PASS Theory

- **Simultaneous** is a basic psychological process which we use to integrate stimuli into groups
  - Stimuli are seen as a whole
  - Each piece must be related to the others
  - Content is not relevant



CAS2: Rating Scale Simultaneous

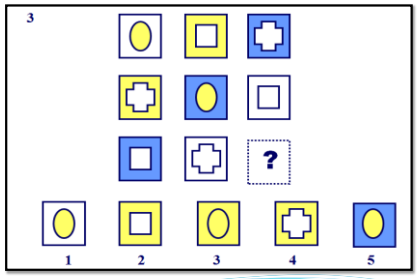
Directions for Items 11–20. These questions ask how well the child or adolescent sees how things go together. They also ask about working with diagrams and understanding how ideas fit together. The questions involve seeing the whole without getting lost in the parts. Please rate how well the child or adolescent visualizes things as a whole.

During the past month, how often did the child or adolescent . . .	Never	Rarely	Sometimes	Frequently	Always
11. like to draw designs?	0	1	2	3	4
12. figure out how parts of a design go together?	0	1	2	3	4
13. classify things into groups correctly?	0	1	2	3	4
14. work well with patterns and designs?	0	1	2	3	4
15. see how objects and ideas are alike?	0	1	2	3	4
16. work well with physical objects?	0	1	2	3	4
17. like to use visual materials?	0	1	2	3	4
18. see the links among several things?	0	1	2	3	4
19. show interest in complex shapes and patterns?	0	1	2	3	4
20. recognize faces easily?	0	1	2	3	4

__ + __ + __ + __ + __ = ☐ Simultaneous Raw Score

Jack A. Naglieri, Ph.D. jnaglier@gmu.edu 97

CAS2 Matrices



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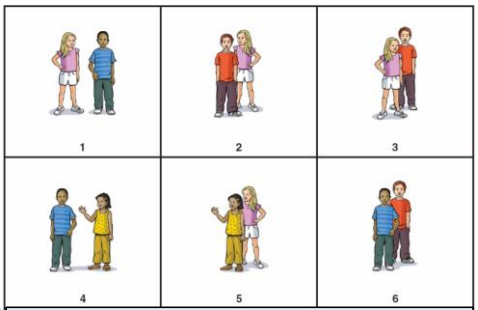
CAS2 Verbal-Spatial Relations

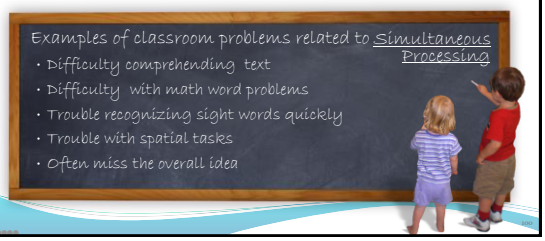


Which picture shows a boy behind a girl?

PASS Theory: Simultaneous

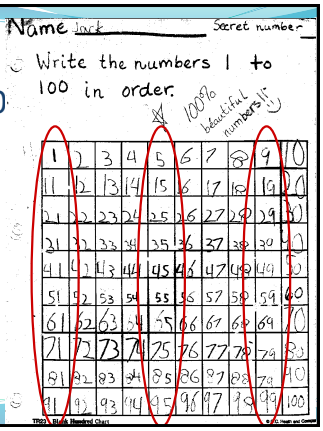
Simultaneous Processing

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



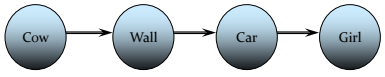
Numbers from 1 to 100

Simultaneous processing is used in this work sheet because it helps the child see the patterns in the math



Modern Theory: Successive

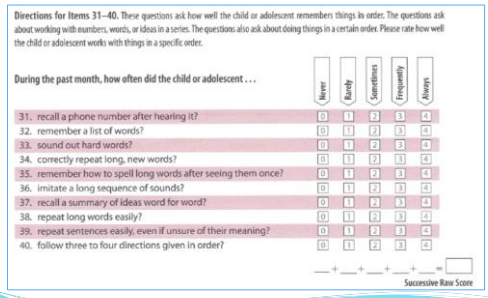
- **Successive** processing is a basic psychological process we use to manage stimuli in a specific serial order
  - Stimuli form a chain-like progression
  - Stimuli are not inter-related



The child answers a question about a statement read by the examiner such as:
The red greened the blue with a yellow.
Who got greened?

102

CAS2: Rating Scale Successive



Directions for Items 31–40. These questions ask how well the child or adolescent remembers things in order. The questions ask about working with numbers, words, or ideas in a series. The questions also ask about doing things in a certain order. Please rate how well the child or adolescent works with things in a specific order.

During the past month, how often did the child or adolescent . . .	Never	Rarely	Sometimes	Frequently	Always
31. recall a phone number after hearing it?	0	1	2	3	4
32. remember a list of words?	0	1	2	3	4
33. sound out hard words?	0	1	2	3	4
34. correctly repeat long, new words?	0	1	2	3	4
35. remember how to spell long words after seeing them once?	0	1	2	3	4
36. imitate a long sequence of sounds?	0	1	2	3	4
37. recall a summary of ideas word for word?	0	1	2	3	4
38. repeat long words easily?	0	1	2	3	4
39. repeat sentences easily, even if unsure of their meaning?	0	1	2	3	4
40. follow three to four directions given in order?	0	1	2	3	4

___ + ___ + ___ + ___ + ___ = ☐

Successive Raw Score

Word Series, Sentence Repetition (Ages 5-7) or Sentence Questions (Ages 8-17)

- Word Series
  - Child repeats high imagery single syllable words presented at 1 per second
- Sentence Repetition
  - Child repeats sentences exactly as stated by the examiner such as:
  - The red greened the blue with a yellow.
- Sentence Questions
  - Child answers a question about a statement made by the examiner such as:
  - The red greened the blue with a yellow. Who got greened?

CAS2

- Visual Digit Span subtest allows for a Visual Auditory comparison

5 3 7

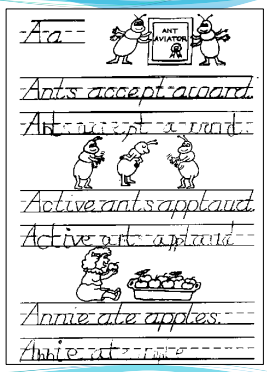
4 3 8 6 1

Visual–Auditory Comparison

	Scaled Score
Word Series	_____
Visual Digit Span	_____
Difference (ignore sign)	_____
Circle one: .05 .10 NS	

Successive

The sequence of the sounds is emphasized in this work sheet - this requires successive processing

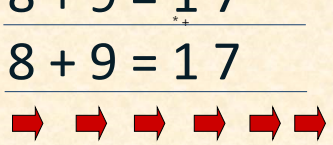


Learning Math Facts

8 + 9 = 1 7

8 + 9 = 1 7

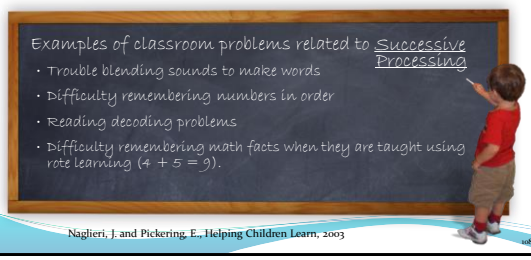
8 + 9 = 1 7



PASS Theory: Successive

Successive Processing

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

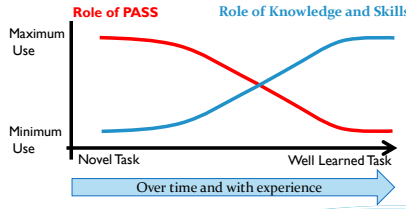


Naglieri, J. and Pickering, E., Helping Children Learn, 2003

Relationships between PASS, knowledge and skills

Knowledge and Planning Learning Curves

- At first, basic psychological processes play a major role in learning
- When a new task is learned and practiced it becomes a skill and execution requires retrieval and application of knowledge (Goldberg, 2009).



Time to Think and Talk

START

3 minutes left

- Reactions?
- Does PASS make sense?
- Have you seen the four PASS neurocognitive abilities in the behavior of children?
- Your thoughts…

Presentation Outline

- From achievement ability discrepancy to a pattern of strengths and weaknesses
- The Discrepancy/Consistency model
- Which tests to use to define a "basic psychological process"
- A neurocognitive theory will be suggested
  - complex decision making (frontal lobes – Planning)
  - focus and resistance to distractions (brain stem - Attention)
  - visual/verbal spatial ability (Occipital/Parietal - Simultaneous)
  - visual/verbal sequencing (Temporal area - Successive)
- Illustrative Case studies
  - How Discrepancy/Consistency yields more accurate eligibility determination
  - How Discrepancy/Consistency leads to intervention planning.

The Case of Rocky – Discrepancy Consistency Model example

From assessment to intervention

The case of Rocky

- Rocky[1] is a real child with a real problem
- He lives in a large middle class school district
  - a wide variety of services are available
- In first grade Rocky was performing significantly below grade benchmarks in reading, math, and writing.
  - He received group reading instruction weekly and six months of individual reading instruction from a reading specialist
  - He made little progress and was retained

Note: This child's name and other potentially revealing data have been changed to protect his identity.

The case of Rocky

- By the middle of his second year in first grade Rocky was having difficulty with
  - decoding, phonics, and sight word vocabulary; math problems, addition, fact families, and problem solving activities;
  - and focusing and paying attention."
- After two years of special team meetings and special reading instruction he is now working two grade levels below his peers and is having difficulty in reading, writing, and math
- A comprehensive evaluation was conducted
- Here is a look at just the evidence of a 'disorder in basic psychological processes'

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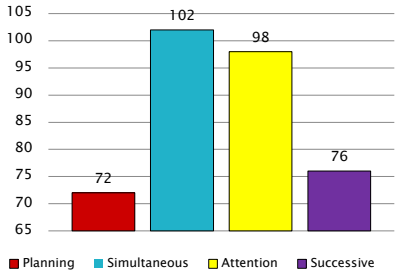
Basic Psychological Processing Scores



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The case of Rocky

- He has intra-individual differences in cognitive processes that underlie his academic problems
- Rocky has a "disorder in one or more of the basic psychological processes"

	Score	Diff	Significant	S/W
Planning	**72**	**-15.0**	**yes**	**Weakness**
Simultaneous	**102**	**15.0**	**yes**	
Attention	**98**	**11.0**	**yes**	
Successive	**76**	**-11.0**	**yes**	**Weakness**
PASS mean	**87.0**			

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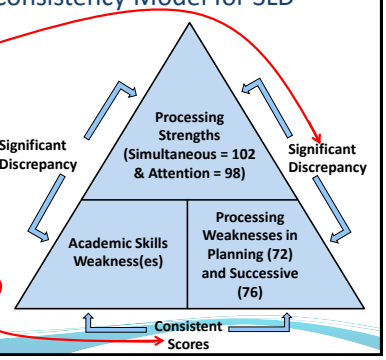
Discrepancy Consistency Model for SLD

- Discrepancy between high and low processing scores
- Discrepancy between high processing and low achievement
- Consistency between low processing and low achievement



The case of Rocky

- Rocky meets the definition of SLD in IDEA
  - He requires specialized intervention that takes into account his learning needs
  - Intervention should emphasize the use of strategies and plans in all content areas
  - Intervention should include ways to better work with serial information
  - Rote memory and phonics instruction are ill-advised

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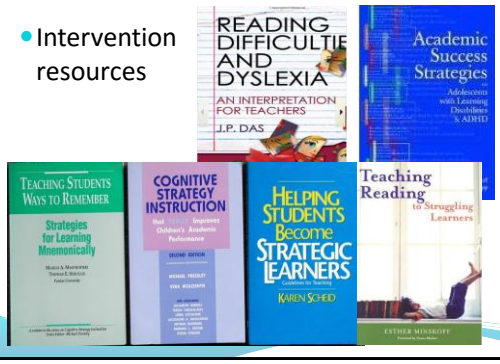
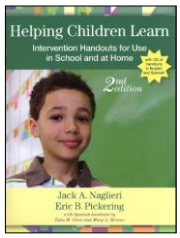
Intervention Resources

- Intervention resources

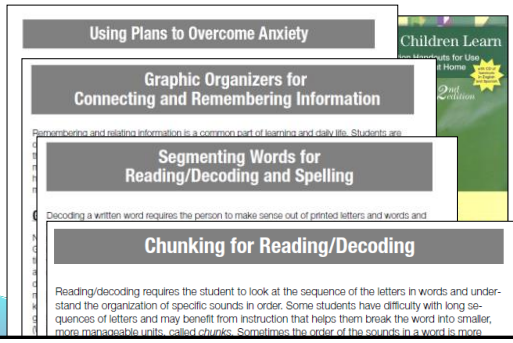


Interventions

- Helping Children Learn Intervention Handouts for Use in School and at Home, *Second Edition*
  By Jack A. Naglieri, Ph.D., & Eric B. Pickering, Ph.D.,
- Spanish handouts by Tulio Otero, Ph.D., & Mary Moreno, Ph.D.



Interventions for Rocky



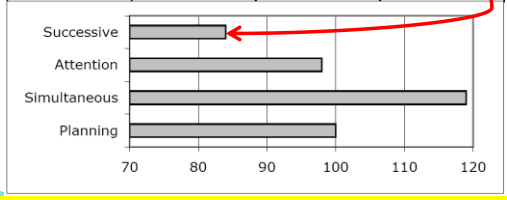
The Case of Larry

Linda M. Einhorn-Marcoux, M.A.,
Examiner & Intervention Instructor

Naglieri, J. A. (2006). Best Practices in Linking Cognitive Assessment of Students with Learning Disabilities to Interventions in A. Thomas and J. Grimes (Eds.) *Best Practices in School Psychology* (Fifth Edition). Bethesda: NASP.

Larry's PASS scores

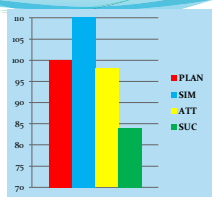
	Standard Score	Difference from Mean	
Planning	100	-0.25	-
Simultaneous	119	18.75	Strength
Attention	98	-2.25	-
Successive	84	-16.25	Weakness
Mean	100.25		



Note: A 'disorder in basic psychological process' = Score is different from student's average AND below 90

Larry

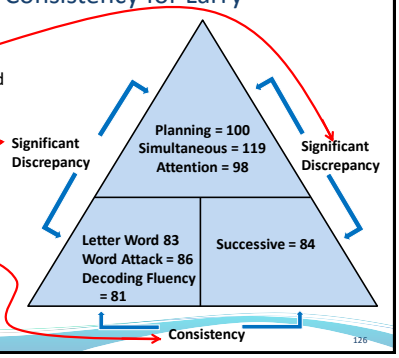
- Low achievement test scores
  - Letter Word Recognition 83
  - Written Expression 81
  - Word Attack 86
  - Decoding Fluency 81



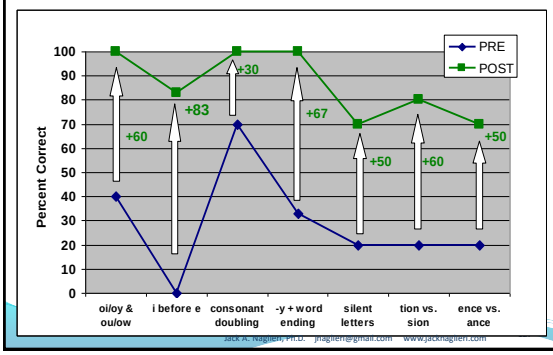
- Meets the definition of SLD
  - "… a disorder in 1 or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations."

Discrepancy Consistency for Larry

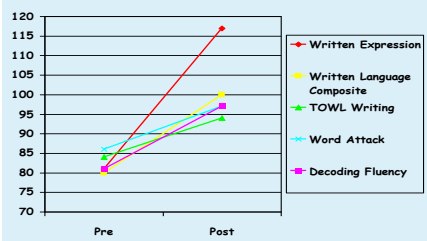
- Discrepancy between high and low processing scores
- Discrepancy between high processing and low achievement
- Consistency between low processing and low achievement



Larry's Pre-Post skills scores



Larry's Pre-Post skills scores



Basic Psychological Processes and Intervention

The first time a test of ability has been shown to be relevant to instruction/intervention

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DOI: 10.1177/0022219410391190
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SAGE

A Cognitive Strategy Instruction to Improve Math Calculation for Children With ADHD and LD: A Randomized Controlled Study

Jackie S. Iseman[1] and Jack A. Naglieri[1]

Abstract

The authors examined the effectiveness of cognitive strategy instruction
Successive) given by special education teachers to students with ADHD
experimental group were exposed to a brief cognitive strategy instructi
development and application of effective planning for mathematical comp
standard math instruction. Standardized tests of cognitive processes a
students completed math worksheets throughout the experimental pe
Johnson Tests of Achievement, Third Edition, Math Fluency and Wechsl
Numerical Operations) were administered pre- and postintervention, a
follow-up. Large pre-post effect sizes were found for students in the exp
math worksheets (0.85 and 0.26), Math Fluency (1.17 and 0.09), and Nu
At 1 year follow-up, the experimental group continued to outperform t
students with ADHD evidenced greater improvement in math worksh
(which measured the skill of generalizing learned strategies to other sit
when provided the PASS-based cognitive strategy instruction.

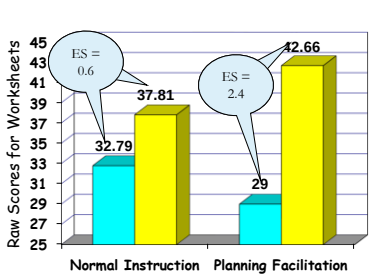
Design of the Study

Experimental and Comparison Groups

7 worksheets with Normal Instruction

Experimental Group	Comparison Group
19 worksheets with Planning Facilitation	19 worksheets with Normal Instruction

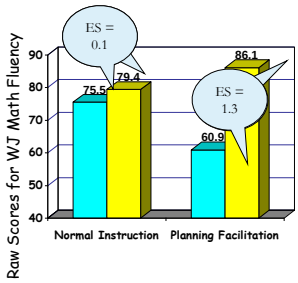
Classroom Worksheets Pre-Post



Cognition (Planning scores) predicted response to intervention

Reminder
< .2 = no effect
.2 - .5 = small
.6 - .8 = medium
> .8 = large

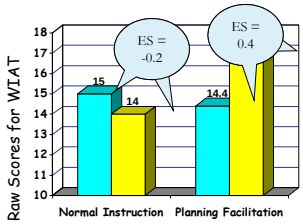
WJ Math Fluency



Cognition (Planning scores) predicted response to intervention

Reminder
< .2 = no effect
.2 - .5 = small
.6 - .8 = medium
> .8 = large

WIAT Numerical Operations



Cognition (Planning scores) predicted response to intervention

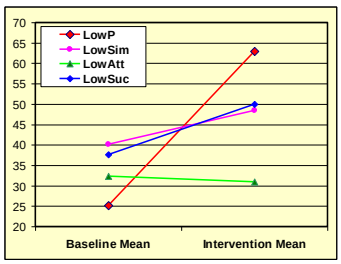
Reminder
< .2 = no effect
.2 - .5 = small
.6 - .8 = medium
> .8 = large

One Year Follow-up

At 1-year follow-up, 27 of the students were retested on the WJ-III ACH Math Fluency subtest as part of the school's typical yearly evaluation of students. This group included 14 students from the comparison group and 13 students from the experimental group. The results indicated that the improvement of students in the experimental group ($M = 16.08$, $SD = 19$, $d = 0.85$) was significantly greater than the improvement of students in the comparison group ($M = 3.21$, $SD = 18.21$, $d = 0.09$).

Iseman (2005)

- Baseline Intervention means by PASS profile
- Different response to the same intervention



Cognition (Planning scores) predicted response to intervention

PASS Comprehensive System

GOAL: Create a set of tools to measures PASS Theory for use across multiple settings and multiple tiers

PASS Comprehensive System

CAS2 (12 subtests)	CAS2: Brief (4 subtests)	CAS2: Rating Scale

PASS Comprehensive System

(Naglieri, Das, & Goldstein, 2014)

CAS2 Rating Scale (4 subtests)	CAS2 Brief (4 subtests)	CAS2 Core (8 subtests)	CAS2 Extended (12 subtests)
Total Score Planning Simultaneous Attention Successive	Total Score Planning Simultaneous Attention Successive	Full Scale Planning Simultaneous Attention Successive	Full Scale Planning Simultaneous Attention Successive Supplemental Scales Executive Function Working Memory Verbal / Nonverbal Visual / Auditory

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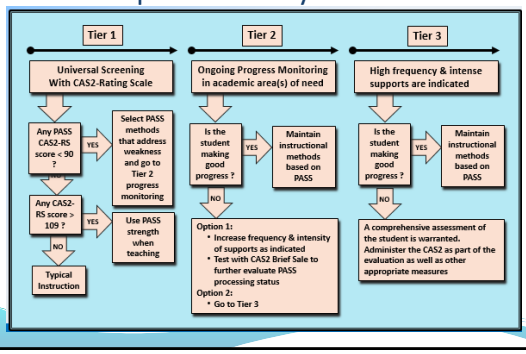
PASS Comprehensive System

- At Tier 1 CAS2: Rating Scale can be completed by a teacher and depending upon those results…
- At Tier 2 the CAS2: Brief scale could be given to inform instruction and for screening
- At Tier 3 the CAS2: Extended Battery could be given for full evaluation of his neurocognitive abilities
- This PASS Comprehensive System provides three ways to learn about a student's learning strengths and weaknesses

140

PASS Comprehensive System



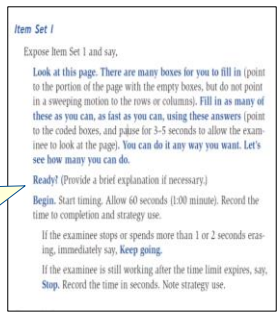
CAS2 (Ages 5-18 yrs.)

CAS2 Development Goals

- **CAS2**
  - New norms
  - Strengthen reliability of the scales by modifying subtest formats
  - Improve factor structure
  - Add/delete items
  - Add a visual Successive subtest
  - Add new scales beyond PASS
  - Retain Administration format of
    - Examiner demonstrates,
    - Child does a sample
    - Directions for remaining items is given
    - And opportunity to Provide Help is given

Provide Help

The examiner can explain the demands of the task in any manner deemed appropriate and in any language



Item Set 1

Expose Item Set 1 and say,

Look at this page. There are many boxes for you to fill in (point to the portion of the page with the empty boxes, but do not point in a sweeping motion to the rows or columns). **Fill in as many of these as you can, as fast as you can, using these answers** (point to the coded boxes, and pause for 3–5 seconds to allow the examinee to look at the page). **You can do it any way you want. Let's see how many you can do.**

Ready? (Provide a brief explanation if necessary.)

Begin. Start timing. Allow 60 seconds (1:00 minute). Record the time to completion and strategy use.

If the examinee stops or spends more than 1 or 2 seconds erasing, immediately say, **Keep going.**

If the examinee is still working after the time limit expires, say, **Stop.** Record the time in seconds. Note strategy use.

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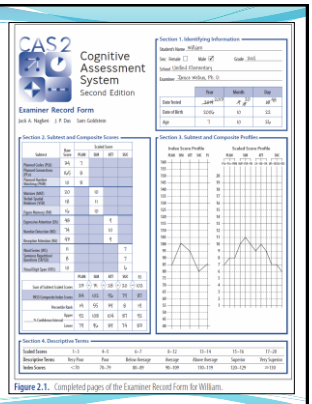
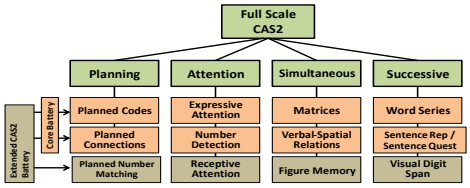
CAS2

- Same 8 (40 minutes) or 12 (60 minutes) subtest versions
- PASS and Full Scales provided (100 & 15) subtests (10 and 3)

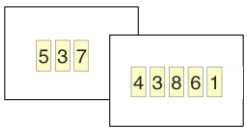

CAS2 Cognitive Assessment System Second Edition
Examiner Record Form
Figure 2.1. Completed pages of the Examiner Record Form for William.
145

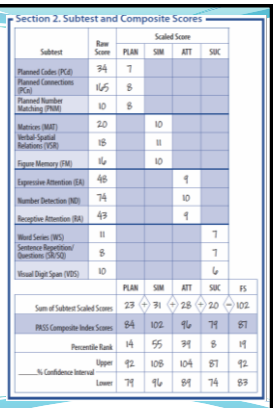
CAS2 Scale and Subtest Structure



CAS2

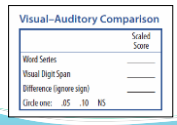
- All subtests modified
- Planning subtests have more items
- Speech Rate deleted
- New: Visual Digit Span subtest

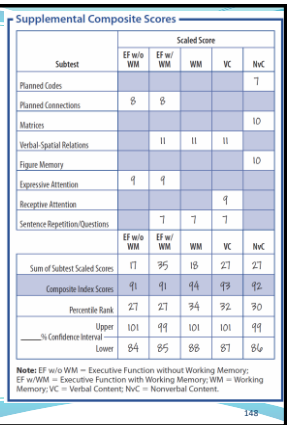



Section 2. Subtest and Composite Scores
147

CAS2

- Supplementary Scales: Executive Function, Working Memory, Verbal, Nonverbal
- Added: A Visual and Auditory comparison


Visual–Auditory Comparison
Scaled Score
Word Series
Visual Digit Span
Difference (ignore sign)
Circle one: .05 .10 NS


Supplemental Composite Scores
148

CAS2 Planning & Simultaneous

- Planned Number Matching
  - Variation on the original version
- Planned Codes
  - Variation on the original version
- Planned Connections
  - Additional items
- Matrices
  - More items added
- Verbal-Spatial Relations
  - More items added
- Figure Memory
  - More items added

CAS2 Attention & Successive

- Expressive Attention
  - No in color
- Number Detection
  - New format
- Receptive Attention
  - New format
- Word Series
- Sentence Repetition
  - Ages 5-7
- Sentence Questions
  - Ages 8-18
- Visual Digit Span
  - New subtest

CAS2 Online Scoring and Report Writing

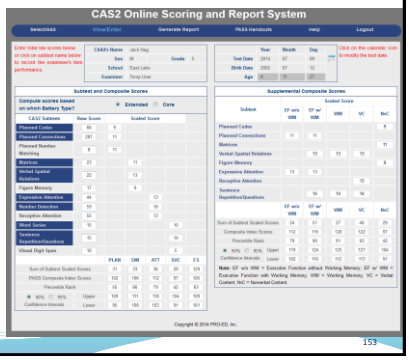
CAS2 Online Score & Report

http://www.proedinc.com/customer/ProductView.aspx?ID=7277

- Enter data at the subtest level or enter subtest raw scores
- Online program converts raw scores to standard scores, percentiles, etc. for all scales.
- A narrative report with graphs and scores is provided

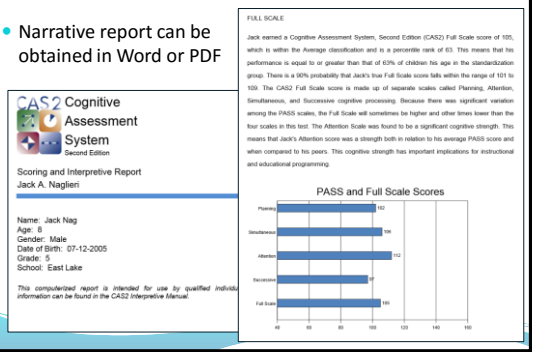
CAS2 Online Score & Report

- As values are entered the program completes the record form
- Supplemental scales are automatically computed
  - Executive Function
  - Working Memory
  - Verbal
  - Nonverbal



CAS2 Online Score & Report

- Narrative report can be obtained in Word or PDF



CAS2 Online Report Text

FULL SCALE

Jack earned a Cognitive Assessment System, Second Edition (CAS2) Full Scale score of 105, which is within the Average classification and is a percentile rank of 63. This means that his performance is equal to or greater than that of 63% of children his age in the standardization group. There is a 90% probability that Jack's true Full Scale score falls within the range of 101 to 109. The CAS2 Full Scale score is made up of separate scales called Planning, Attention, Simultaneous, and Successive cognitive processing. Because there was significant variation among the PASS scales, the Full Scale will sometimes be higher and other times lower than the four scales in this test. The Attention Scale was found to be a significant cognitive strength. This means that Jack's Attention score was a strength both in relation to his average PASS score and when compared to his peers. This cognitive strength has important implications for instructional and educational programming.

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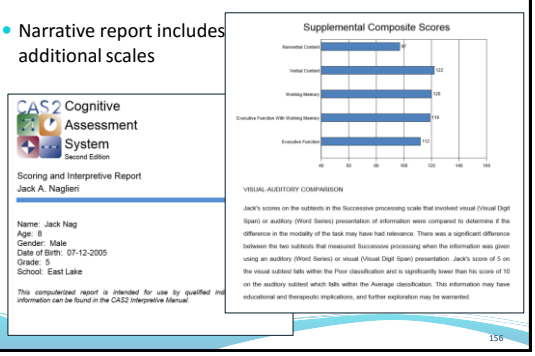
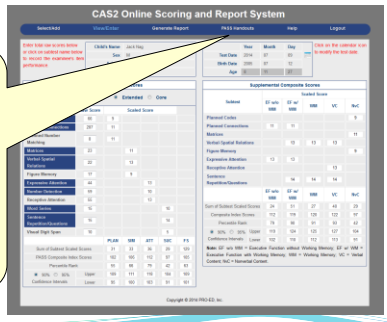
CAS2 Online Score & Report

- Narrative report includes additional scales



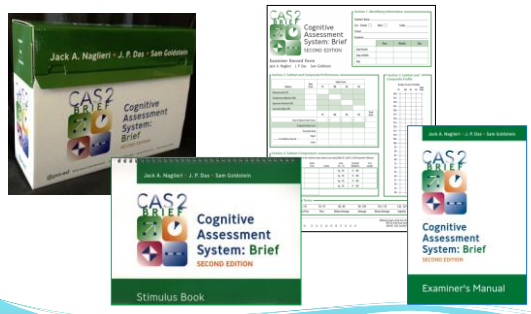
CAS2 Online Score & Report

Online program includes PASS handouts from Helping Children Learn (2nd Edition) in English and Spanish



157

CAS2: Brief for ages 4-18 years



CAS2: Brief

- Give in 20 minutes
- **Good for reevaluations**
- Yields PASS and Total standard scores (Mn 100, SD 15)
- All items are different from CAS2
  - Planned Codes
  - Simultaneous Matrices
  - Expressive Attention
- New Subtest
  - Successive Digits (forward only)

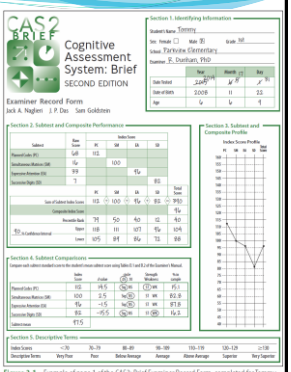
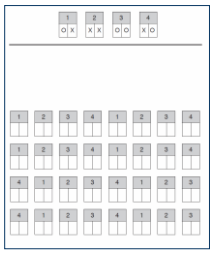


Figure 3.1. Example of page 1 of the CAS2: Brief Examiner Record Form, completed for Tommy.

159

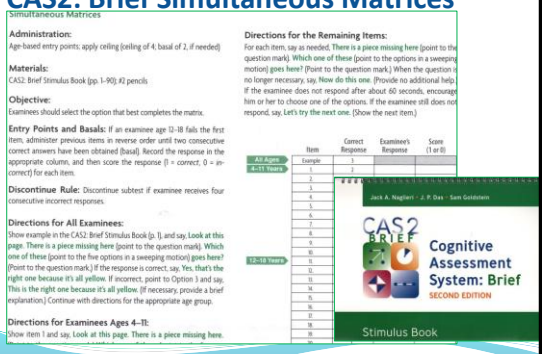
CAS2: Brief Scale

- Planned Codes is used for Planning ability
- Eight items using numbers not letters as in CAS2 and different orientation of the pages



160

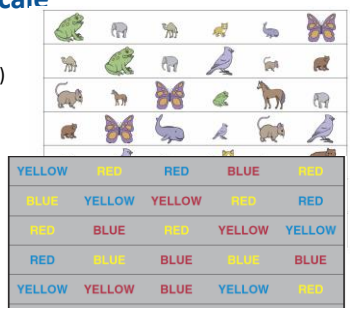
CAS2: Brief Simultaneous Matrices



161

CAS2: Brief Scale

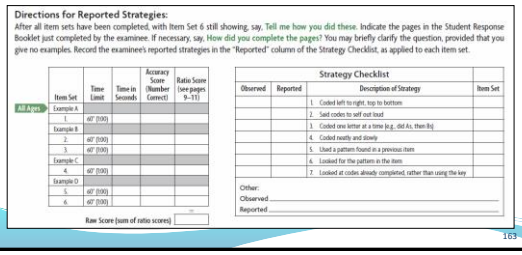
- Expressive Attention (Stroop) used
- Big/Little animals (ages 4-7 years)
- Color Words (ages 8-18)



162

CAS2: Brief Planned Codes & Successive Digits

- Planned Codes has 8 items using numbers not letters and has different patterns
- Successive Digits uses numbers (not words)



Directions for Reported Strategies:
After all item sets have been completed, with Item Set 6 still showing, say, Tell me how you did these. Indicate the pages in the Student Response Booklet just completed by the examinee. If necessary, say, How did you complete the pages? You may briefly clarify the question, provided that you give no examples. Record the examinee's reported strategies in the "Reported" column of the Strategy Checklist, as applied to each item set.

	Item Set	Time Limit	Time in Seconds	Accuracy Score (Number Correct)	Ratio Score (see pages 9–11)
All Ages	Example A				
	1.	60" (100)			
	Example B				
	2.	60" (100)			
	3.	60" (100)			
	Example C				
	4.	60" (100)			
	Example D				
	5.	60" (100)			
	6.	60" (100)			
	Raw Score (sum of ratio scores)				

Strategy Checklist			
Observed	Reported	Description of Strategy	Item Set
		1. Coded left to right, top to bottom	
		2. Said codes to self out loud	
		3. Coded one letter at a time (e.g., did As, then Bs)	
		4. Coded neatly and slowly	
		5. Used a pattern found in a previous item	
		6. Looked for the pattern in the item	
		7. Looked at codes already completed, rather than using the key	

Other:
Observed
Reported

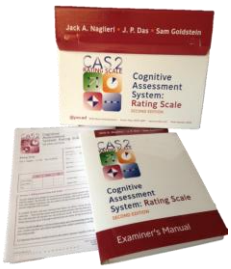
163

CAS2: Rating Scale

- Structure and features

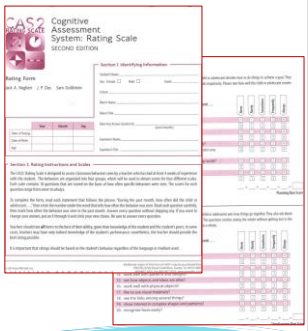
CAS2 Rating Scales (Ages 4-18 yrs.)

- The CAS2: Rating measures behaviors associated with PASS constructs
- Normed on a nationally representative sample of 1,383 students rated by teachers



CAS2 Rating Scales

- The CAS2: Rating form contains 40 items
- 10 items for each PASS scale
- PASS and Total scales are set to have a mean of 100 and standard deviation of 15



CAS2 Rating Scales

- The rater is given a description of what each scale is intended to measure.
- This informs teachers about PASS

Directions for Items 1–10. These questions ask how well the child or adolescent decides how to do things to achieve a goal. They also ask how well a child or adolescent thinks before acting and avoids impulsivity. Please rate how well the child or adolescent creates plans and strategies to solve problems.

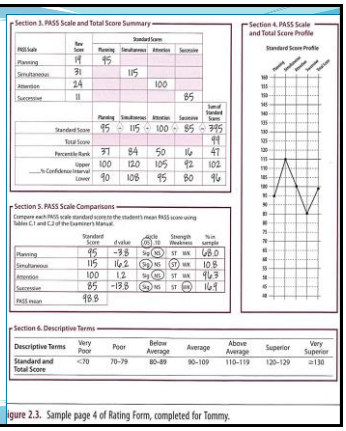
Directions for Items 11–20. These questions ask how well the child or adolescent sees how things go together. They also ask about working with diagrams and understanding how ideas fit together. The questions involve seeing the whole without getting lost in the parts. Please rate how well the child or adolescent visualizes things as a whole.

Directions for Items 21–30. These questions ask how well the child or adolescent pays attention and resists distractions. The questions also ask about how well someone attends to one thing at a time. Please rate how well the child or adolescent pays attention.

Directions for Items 31–40. These questions ask how well the child or adolescent remembers things in order. The questions ask about working with numbers, words, or ideas in a series. The questions also ask about doing things in a certain order. Please rate how well the child or adolescent works with things in a specific order.

CAS2 Rating Scales

- The CAS2: Rating Scale scores can be used as part of a larger comprehensive evaluation or for instructional planning



igure 2.3. Sample page 4 of Rating Form, completed for Tommy.

PASS: Across the Three Measures

	CAS2 Rating Scale Items ask how well the child...	CAS2	CAS2 Brief
Planning	thinks before acting, creates plans, uses strategies to achieve a goal.	Planned Codes Planned Connections Planned Number Matching	Planned Codes
Attention	can focus attention to one thing at at time and resists distractions.	Expressive Attention Number Detection Receptive Attention	Expressive Attention
Simultaneous	understands how parts combine to make a whole and see the big picture.	Matrices Verbal-Spatial Relations Figure Memory	Simultaneous Matrices
Successive	works with numbers, words or ideas that are arranged in a specific series.	Word series Sentence Repetition/Questions Visual Digit Span	Successive Digits

169

SLD and Basic Psychological Processes

- The IDEA definition of SLD is
  - "… a disorder in 1 or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations."
- **Measuring basic psychological processes is essential** to address the SLD definition
- School psychologists should choose wisely when selecting a measure of basic psychological processes

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