

# **SLD Identification Using a Pattern of Strengths and Weaknesses in Basic Psychological Processes**

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# Presentation Outline



From achievement ability discrepancy to a pattern of strengths and weaknesses

- The Discrepancy/Consistency Method (DCM)
- Which tests to use to define and measure “basic psychological process”
- A neurocognitive theory will be suggested - **PASS**
- Illustrative Case study
  - How DCM yields more accurate eligibility determination
  - How DCM leads to intervention planning.

One Hundred Eighth Congress  
of the  
United States of America

AT THE SECOND SESSION

*Begun and held at the City of Washington on  
the twentieth day of January, two thousand*

An Act

To reauthorize the Individuals with Disabilities Education Act  
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”.

**SEC. 2. ORGANIZATION OF THE ACT.**

Individuals with  
Disabilities  
Education  
Improvement Act  
of 2004

IQ achievement discrepancy no longer required

# IDEA 2004

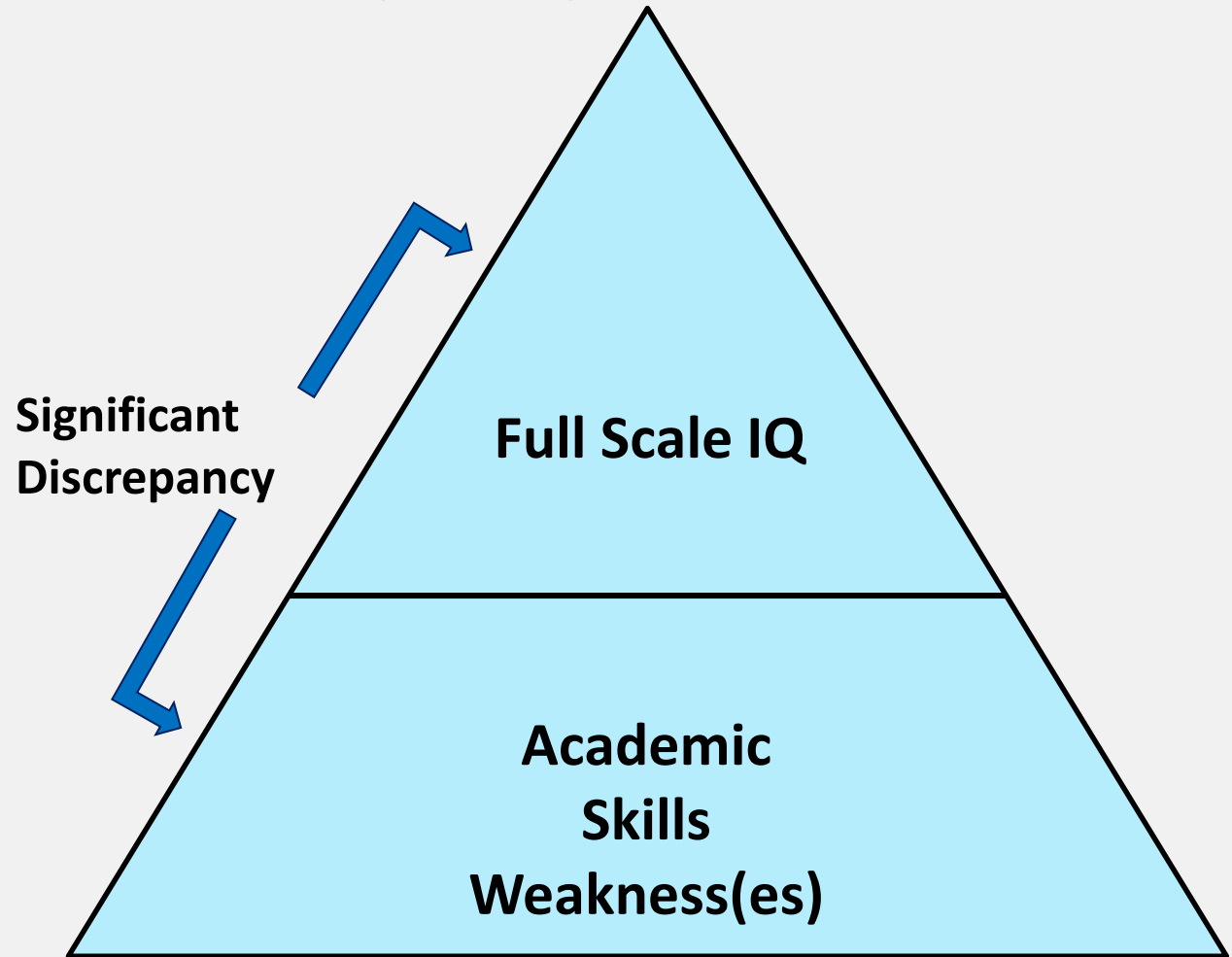
## “(6) SPECIFIC LEARNING DISABILITIES

“(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;

“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 and 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—

“(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;

“(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 determining the educational needs of the child.

non  
discriminatory  
assessments

valid and  
reliable  
assessment

# IDEA 2004

“(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).

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 language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations.

“(B) DISORDERS INCLUDED.—Such term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia.

“(C) DISORDERS NOT INCLUDED.—Such term does not include a learning problem that is primarily the result of visual, hearing, or 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
- We must 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/>**

# 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?

# Presentation Outline

- From achievement ability discrepancy to a pattern of strengths and weaknesses



## The Discrepancy/Consistency Method (DCM)

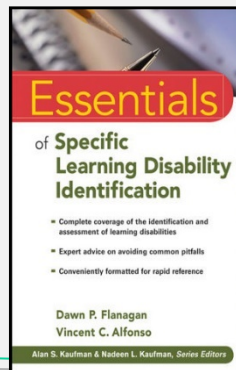
- Which tests to use to define and measure “basic psychological process”
- A neurocognitive theory will be suggested - **PASS**
- Illustrative Case study
  - How DCM yields more accurate eligibility determination
  - How DCM leads to intervention planning.

# Discrepancy / Consistency Method (DCM)

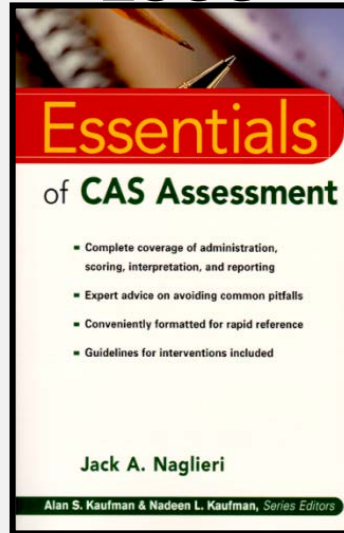
- The Discrepancy / Consistency Method is a conceptual framework that was first introduced in 1999 (and now 2017)

- Similar models have been proposed

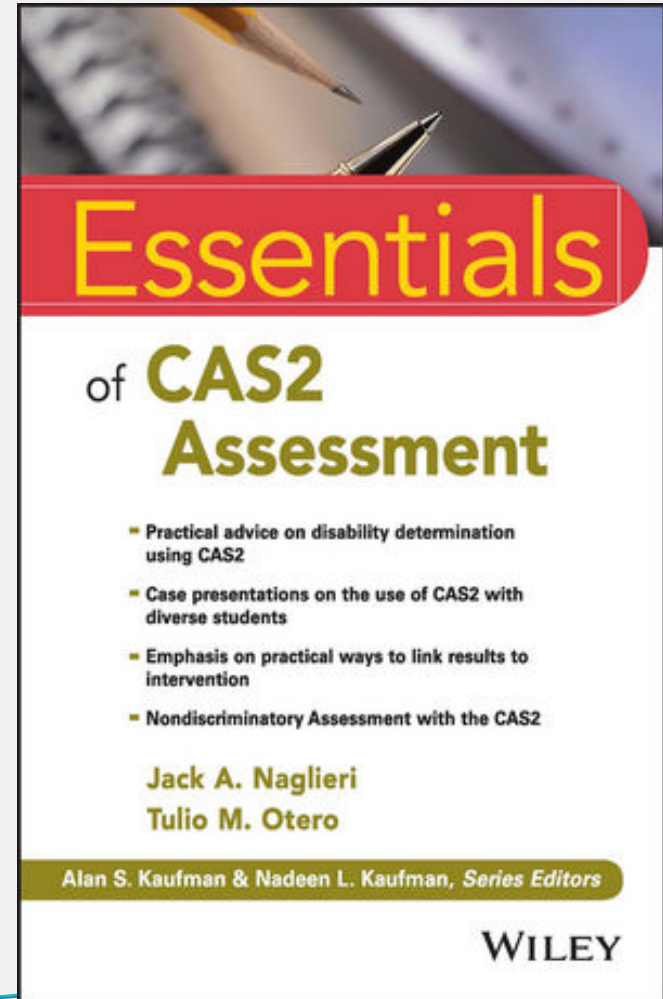
2011



1999



2017

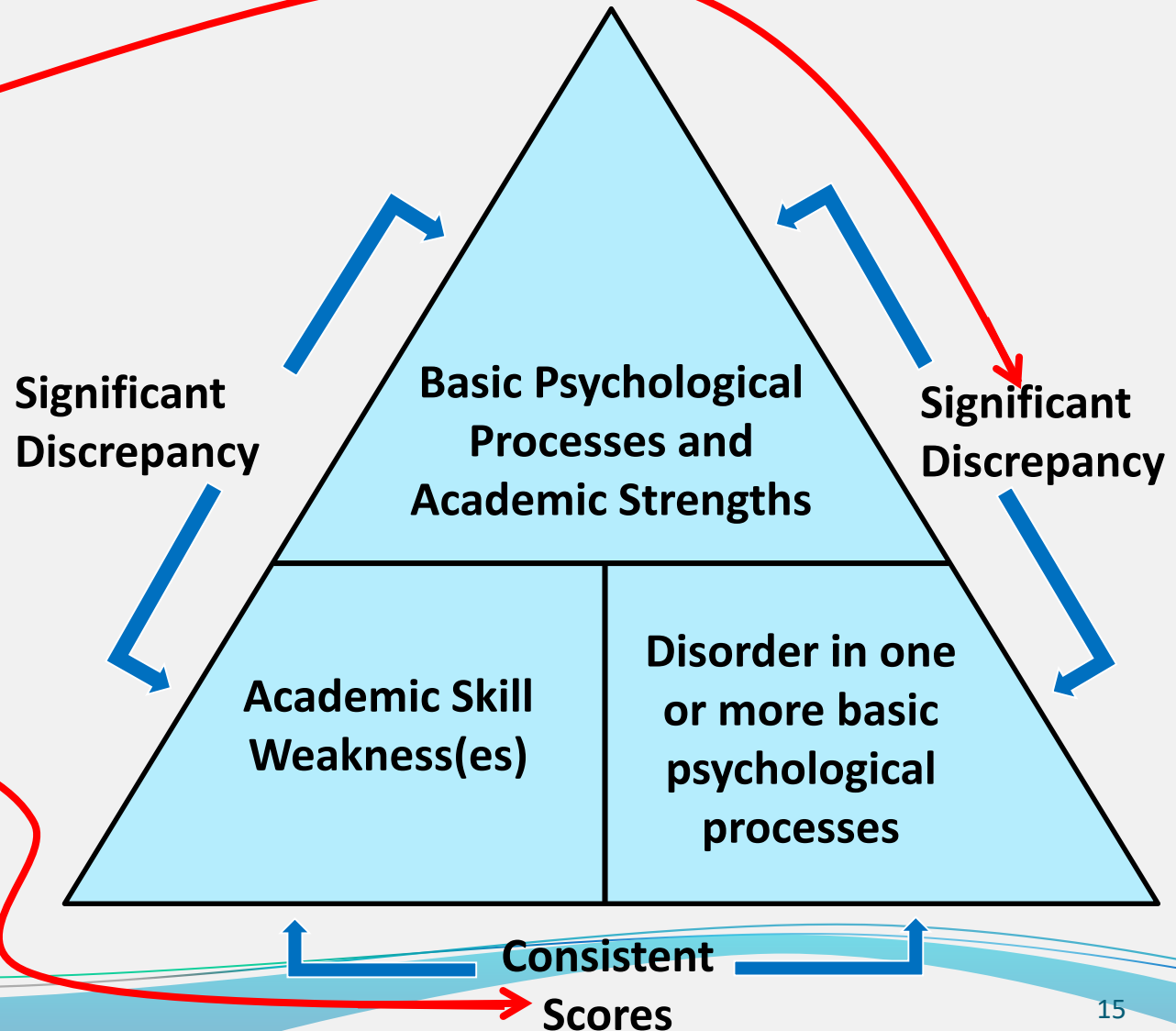


# Discrepancy / Consistency Method

- The Discrepancy / Consistency Method is 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
- 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

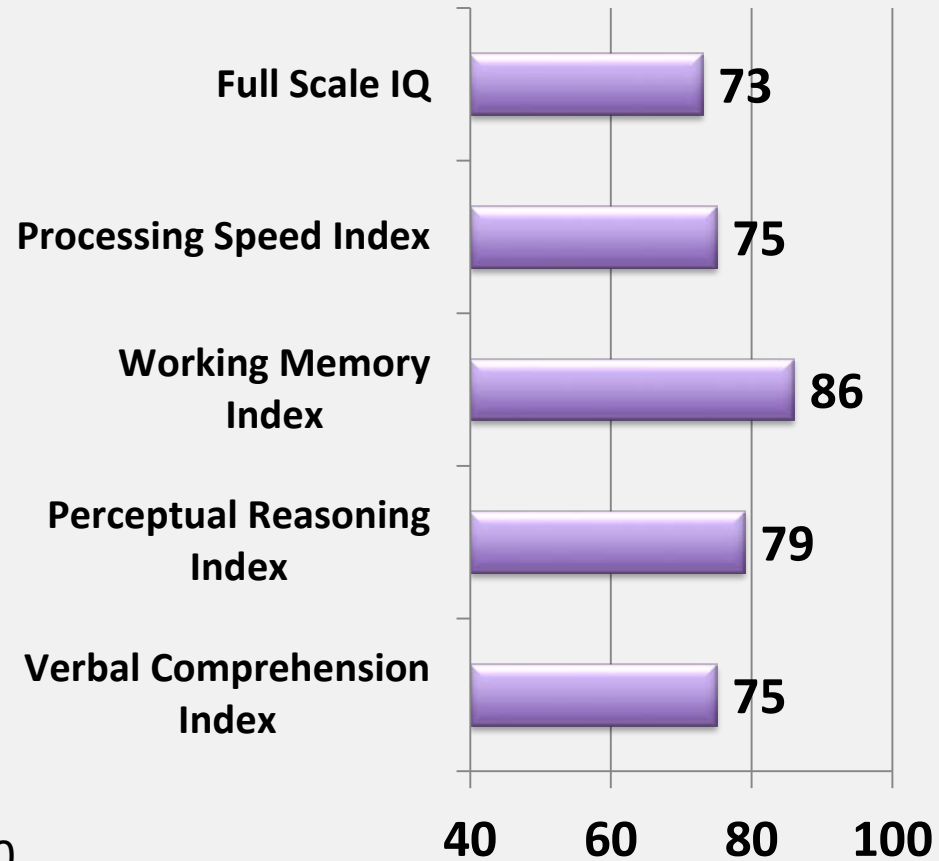
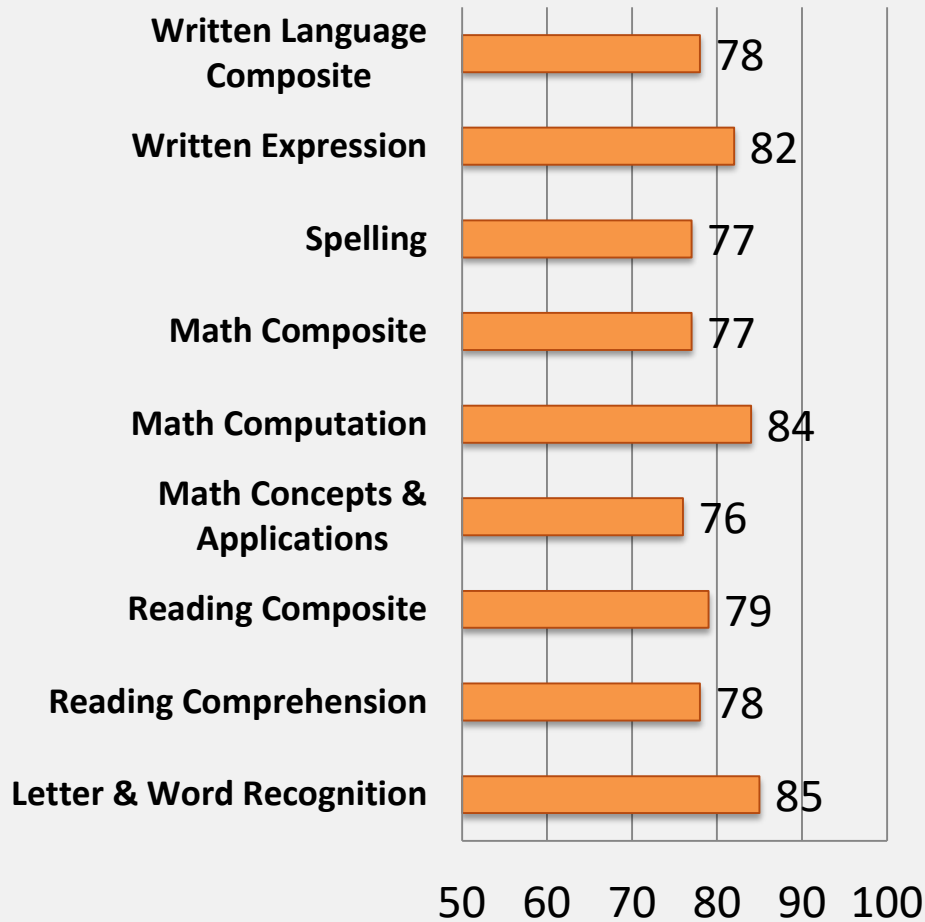


# CASE STUDY: ALEJANDRO Age 7-0 Gr 1

- Evaluated by Dr. Tulio Otero due to academic and behavioral issues:
- 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

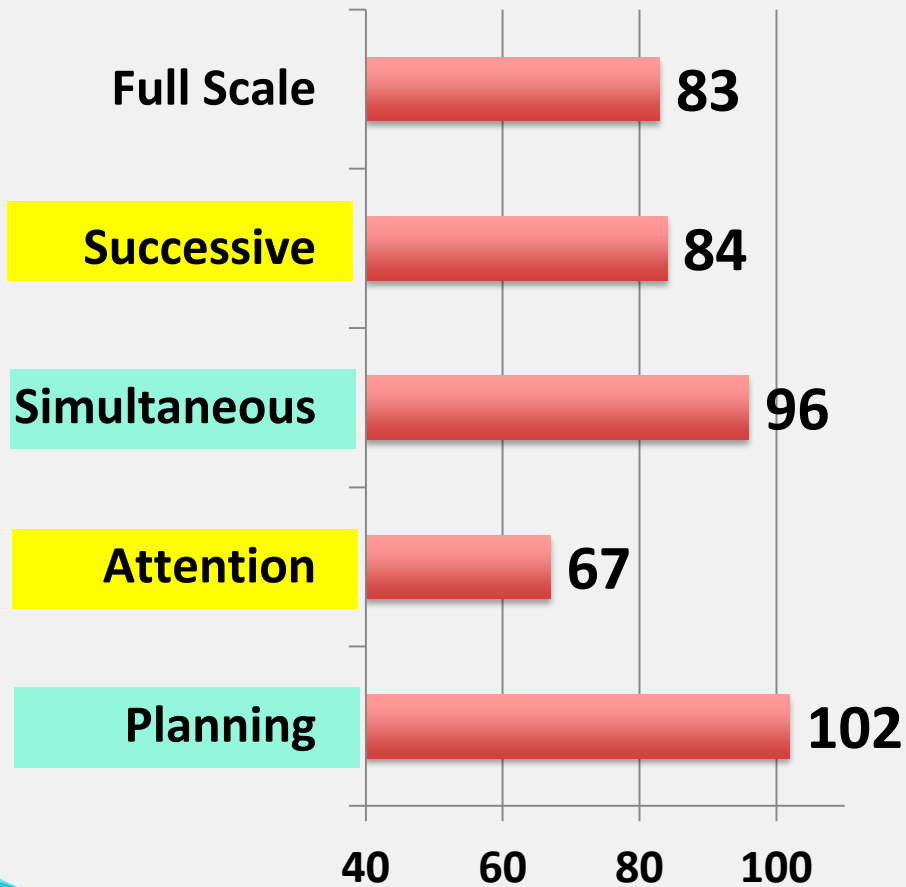


# Alejandro's Results

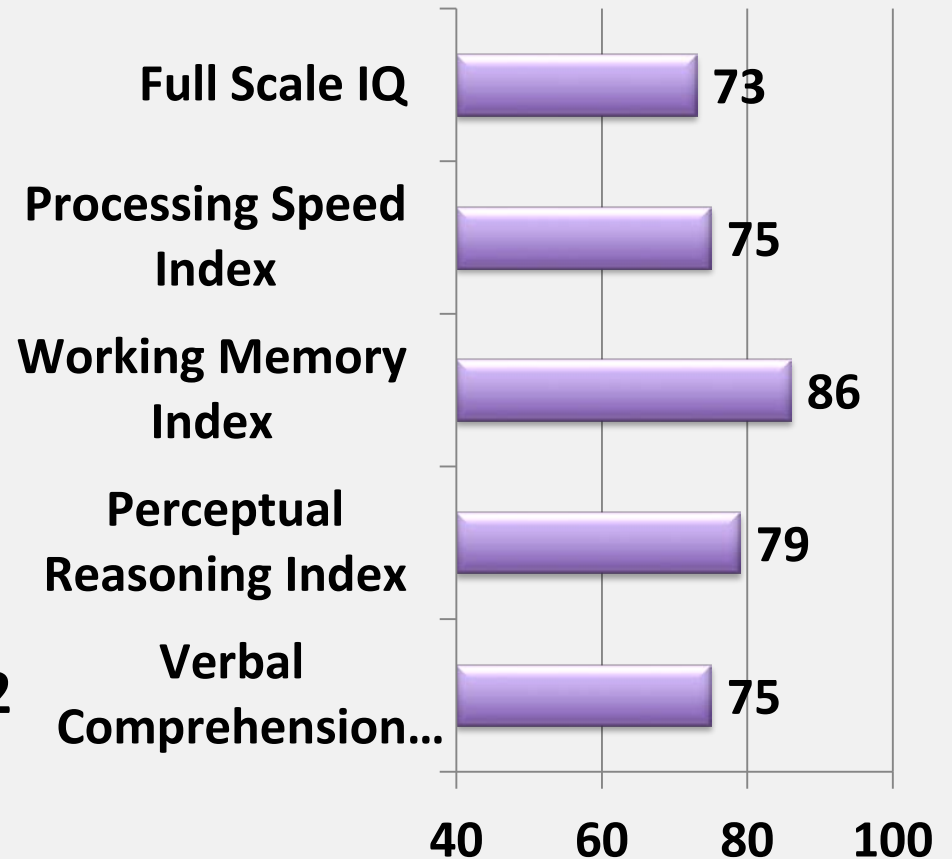


# PASS basic psychological processes

## CAS2

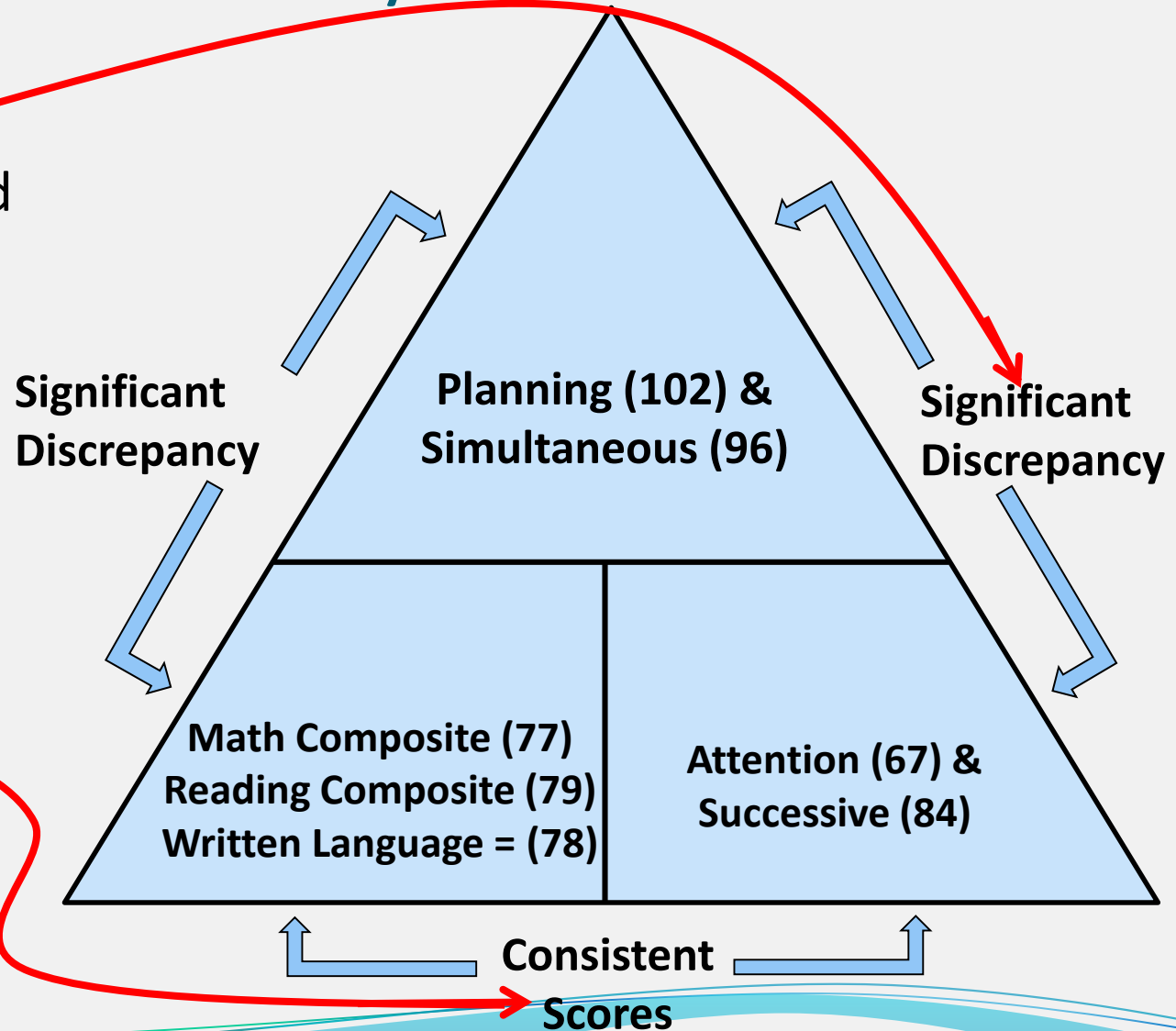


## WISC-IV



# 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



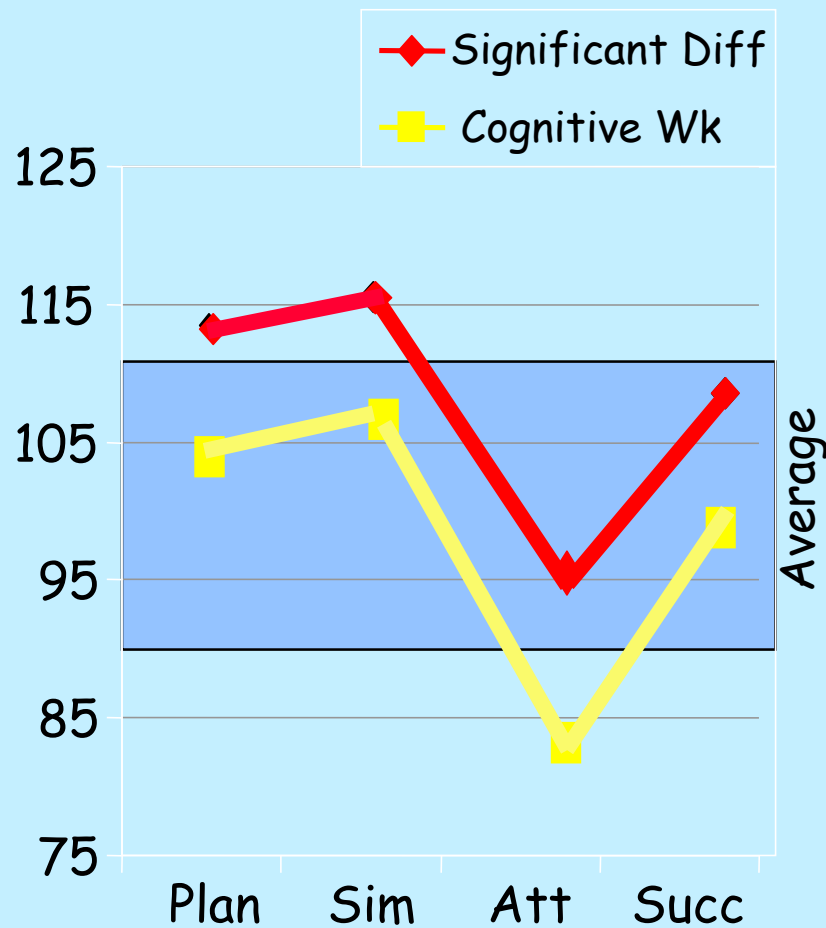
# CAS2 Hand or Online Scoring & Reporting

## PASS Scale Comparisons

Compare each PASS scale index score to the child's mean PASS score using Tables A.1 and A.2 (Extended Battery) or A.3 and A.4 (Core Battery) of the Interpretive Manual.

	Index Score	<i>d</i> value	circle .05 .10	Strength Weakness	% in sample
Planning	84	-6.3	Sig (NS)	ST WK	50.7
Simultaneous	102	11.7	(Sig) NS	(ST) WK	22.3
Attention	96	5.7	Sig (NS)	ST WK	53.1
Successive	79	-11.3	(Sig) NS	ST (WK)	28.0
PASS mean	90.3				

# 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)

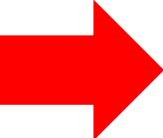
# The case of Alejandro (by Dr. Otero)

- ▶ Alejandro has
  - ▶ a “disorder in one or more of the basic psychological processes” Attention = 67 and Successive = 84 and academic failure
    - Good scores in Simultaneous = 96 and Planning = 102
- The discrepancies ensure that the student has (1) within student variability in basic psychological processes and (2) a difference between processing and achievement
- The consistency helps us understand **WHY** the student has failed

# Advantages of DCM

- There are four basic psychological processes
- There is considerable evidence that these four are
  - sufficient to detect a disorder in basic psychological processes
  - most appropriate for evaluation of African-American and Hispanic students
  - There won't be over-identification of SLD
- This is a powerfully elegant and straightforward way to evaluate students with a specific learning disability
- The SCIENCE behind these conclusions will be presented next

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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)
  - The CAS2 (Naglieri, Das & Goldstein, 2014)
- These and other tests, will be evaluated based on two essential criteria included in IDEA:
  - Non-discriminatory assessment
  - Correlation with achievement test scores
  - Validity for SLD eligibility determination

# IDEA 2004

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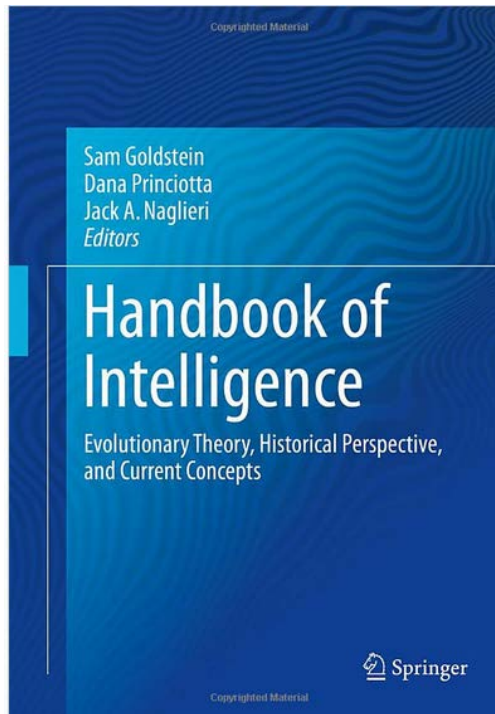
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“(B) the child is assessed in all areas of suspected disability;

“(C) assessment tools and strategies that provide relevant information that directly assists persons in determining the educational needs of the child;

**non  
discriminatory  
assessments**

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



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

20

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
<i>Traditional</i>	
SB-IV (matched)	12.6
WISC-IV (normative sample)	11.5
WJ-III (normative sample)	10.9
WISC-IV (matched)	10.0
<i>Second generation</i>	
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)



ELSEVIER

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)



Intelligence 35 (2007) 568 – 579



## Hispanic and non-Hispanic children's performance on PASS cognitive processes and achievement<sup>☆</sup>

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Received 16 May 2006; received in revised form 6 November 2006; accepted 6 November 2006

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.

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

# PASS Score by Language

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

**Jack A. Naglieri**  
*George Mason University*

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*Columbia College, Elgin Campus*

**Brianna DeLauder**  
*George Mason University*

**Holly Matto**  
*Virginia Commonwealth University*

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

CAS Full Scale = 84.6  
in English and 87.6 in  
Spanish

*This study compared the performance on the Planning, Attention, Simultaneous, and Successive (PASS) theory (Naglieri & Das, 1997a). The on both English and Spanish versions of the CAS, the bilingual children earned similar scores regardless of the language used during the assessment. No significant differences were noted between the means for the Simultaneous and Successive processes. Specific subtests with differences were found to contribute to the differences between the two versions of the CAS. Comparisons of performance on both versions of the CAS consistently despite the language difference.*

CAS Full Scale = 86.4  
in English and 87.1 in  
Spanish

APPLIED NEUROPSYCHOLOGY: CHILD, 0: 1–9, 2012  
Copyright © Taylor & Francis Group, LLC  
ISSN: 2162-2965 print/2162-2973 online  
DOI: 10.1080/21622965.2012.670547

Psychology Press  
Taylor & Francis Group

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

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*George Mason University, Fairfax, Virginia*

Jack A. Naglieri

*University of Virginia, Fairfax, Virginia*

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, 2011c). 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.

# CAS in Italy

Psychological Assessment

© 2012 American Psychological Association  
1040-3590/12/\$12.00 DOI: 10.1037/a0029828

## 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

Jack A. Naglieri

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Stefano Taddei

University of Florence

Kevin Williams

Multi-Health Services, Toronto, Ontario, Canada

**Italian mean = 100.9  
& US mean = 100.5  
using US norms**

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.

# WJ-III and ELL Hispanic Students

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

11 point  
mean score  
difference in  
GAI

Table 1

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

WJ III Test	Sample		WJ III Sample		Difference	<i>t</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
General Intellectual Ability	89.34	11.78	100	15	-10.64	-7.07**	-0.90
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	-2.35*	-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*

NYSESLAT Proficiency Group	Sample		WJ III Sample		Difference	<i>t</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
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.

As English  
skills go  
down so does  
the GAI



# Illinois School District U-46

IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF ILLINOIS  
EASTERN DIVISION

DANIEL, DINAH and DEANNA MCFADDEN, )  
minors, by their parent and next friend, Tracy )  
McFadden; KAREN, RODOLFO and KIARA )  
TAPIA, minors, by their parent and next friend, )  
Mariela Montoya; JOCELYN BURCIAGA, minor, )  
by her parent and next friend, Griselda Burciaga; )  
and KASHMIR IVY, minors, by their parent )  
and next friend, Beverly Ivy; KRISTIANNE )  
SIFUENTES, minors, by her parent and next )  
friend, Irma Sifuentes, )

Plaintiffs, )

v. )

BOARD OF EDUCATION FOR ILLINOIS )  
SCHOOL DISTRICT U-46, )

Defendant. )

No. 05 C 0760

Judge Robert W. Gettleman

# Illinois School District U-46

- Main question:
  - Does the District's gifted program unlawfully discriminate against Hispanic Students?

On July 11, 2013, Judge Robert Gettleman issued a decision holding that District U-46 *intentionally* discriminated against Hispanic students specific in their gifted programming (placement), and found problems with policies and instruments

- The district relied too much on verbal and achievement tests for identification of gifted students.
- 42% of district's students are Hispanic but only 2% in GT

# Correlations with Achievement

- Can you take achievement out of a cognitive test?

➤ The average correlations between ability and academic scores with and without *critierion contamination*...

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

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Jack A. Naglieri

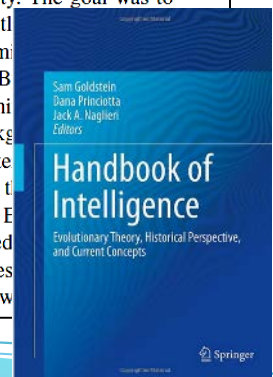
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### Context

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 measure a variety of men, be easy to administer, be in a simple format, and be easy to score. By June 1917, the test materials were ready for an initial trial. The test had some educational background and those who did not speak English were administered quantitative (Alpha) tests and those who could read the newspaper or speak English were administered the Beta tests (today described as the Wechsler Adult Intelligence Scale). The Alpha tests were designed to provide general information (e.g., how



# Correlations with Achievement

- Correlations between ability & achievement tests show the strength of measuring basic psychological processes

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	Scales without achievement
WISC-V WIAT-III N = 201	Verbal Comprehension	.74	.53	.47
	Visual Spatial	.46		
	Fluid Reasoning	.40		
	Working Memory	.63		
	Processing Speed	.34		
WJ-IV COG WJ-IV ACH N = 825	Comprehension Knowledge	.50	.54	.50
	Fluid Reasoning	.71		
	Auditory Processing	.52		
	Short Term Working Memory	.55		
	Cognitive Processing Speed	.55		
	Long-Term Retrieval	.43		
	Visual Processing	.45		
KABC-2 WJ-III ACH N = 167	Sequential/Gsm	.43	.53	.48
	Simultaneous/Gv	.41		
	Learning/Glr	.50		
	Planning/Gf	.59		
	Knowledge/GC	.70		
CAS WJ-III ACH N=1,600	Planning	.57	.59	
	Simultaneous	.67		
	Attention	.50		
	Successive	.60		

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

# Test Profile and SLD

CHAPTER 1

## PSYCHOLOGICAL ASSESSMENT BY SCHOOL PSYCHOLOGISTS: OPPORTUNITIES AND CHALLENGES OF A CHANGING LANDSCAPE

Jack A. Naglieri

The reliability and validity of information obtained from any psychological test is dependent on the

in school psychological practice, as described by the National Association of School Psychologists (2010). The goal of this chapter is not to summarize all the changes that have recently occurred or to predict the outcomes of these changes but rather to summarize a few important issues related to the current state of the field and the apparent strengths and weaknesses of the various options.

### INTELLIGENCE AND SPECIFIC LEARNING DISABILITIES

Controversy is not new to the construct of intelligence and its measurement (see Jensen, 1998). Arguments have raged about the nature of intelligence—is it one factor or multiple factors, are intelligence tests biased or not, what are the best ways to interpret test results, do children with specific disabilities have distinctive ability profiles, and do intelligence test scores have relevance beyond diagnostic classifica-

CHAPTER

6

## Assessment of Cognitive and Neuropsychological Processes

JACK A. NAGLIERI  
SAM GOLDSTEIN

### INTRODUCTION

Assessment of intelligence plays an important role in the process of determining if an adolescent or adult has a disability. For those suspected of having a Specific Learning Disability (SLD), the intelligence test provides an important comparison to levels of achievement. For those who may have a Disorder (ADHD), the measure of intelligence is used to provide a critical component of any comprehensive assessment. The presence of disabilities, such as SLD and ADHD demands a thorough understanding of the strengths and weaknesses of the individual, an appreciation of the research on their effectiveness, and an understanding of modern views of assessing intelligence. The goal of this chapter is to examine these issues.

This chapter reexamines intelligence as measured by standardized tests. Special attention to the utility such tests have for diagnosis and treatment. The chapter includes a brief overview of the history and development of intelligence testing and examines examples of measures of intelligence and their use. It places on the importance of understanding how intelligence is measured by different tests and the implications this has for diagnosis. It also provides a conceptual model of assessment of basic cognitive functions and how that information can aid in the diagnostic process for children and adults.

137



APA Handbooks in Psychology

APA Handbook of  
Testing and  
Assessment in  
Psychology

Kurt F. Geisinger, Editor-in-Chief

SECOND EDITION

Learning and  
Attention Disorders  
in Adolescence  
and Adulthood

Assessment and Treatment

EDITED BY  
SAM GOLDSTEIN · JACK A. NAGLIERI · MELISSA DeVRIES

# Naglieri & Goldstein (2011)

## GROUP PROFILES BY ABILITY TEST

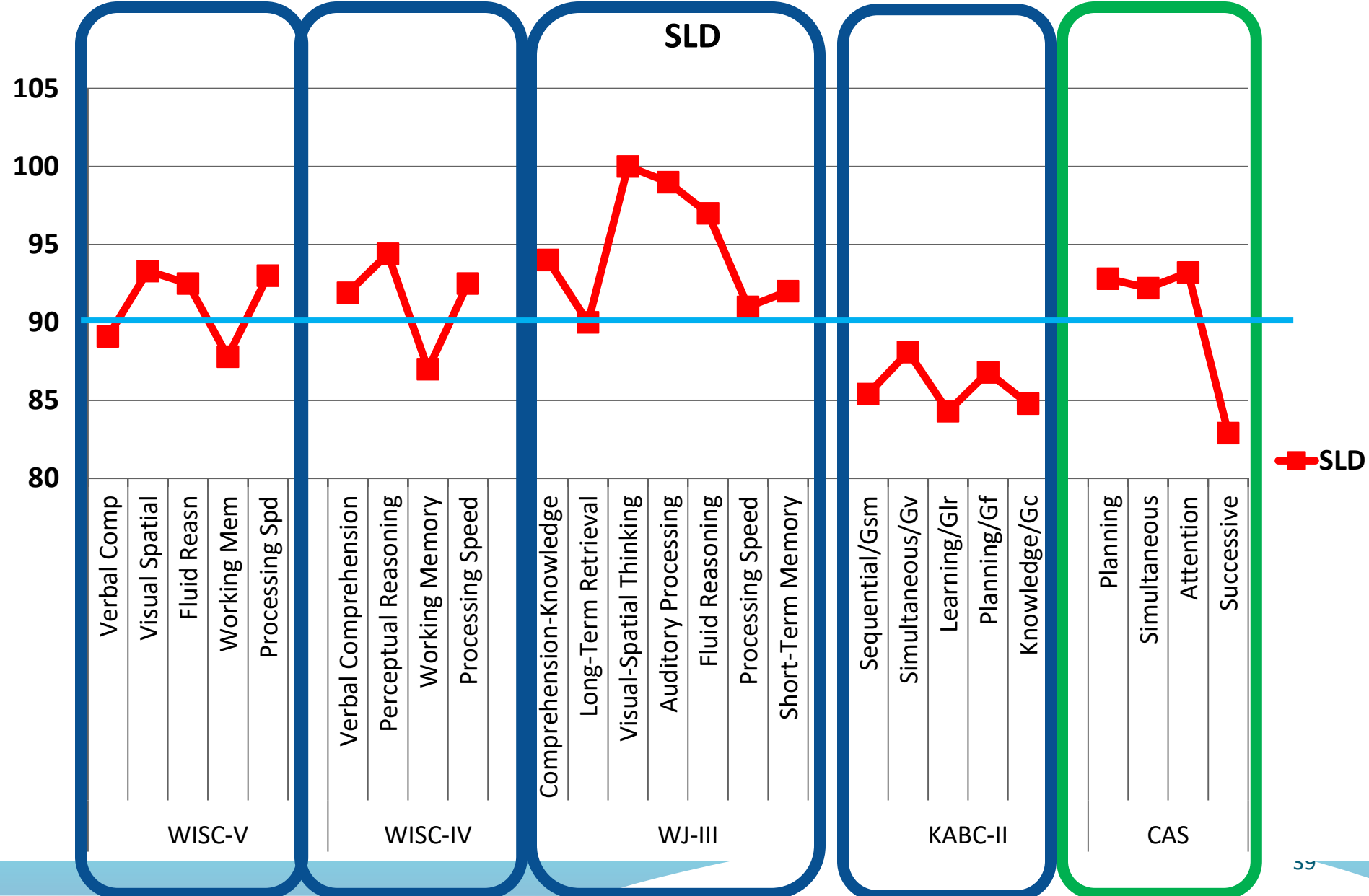
Because ability tests play such an important role in the diagnostic process, it is crucial to understand the sensitivity each test may have to any unique characteristics of those with an SLD or attention deficit. Clinicians need to know if an adolescent or adult has a specific deficit in ability that 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

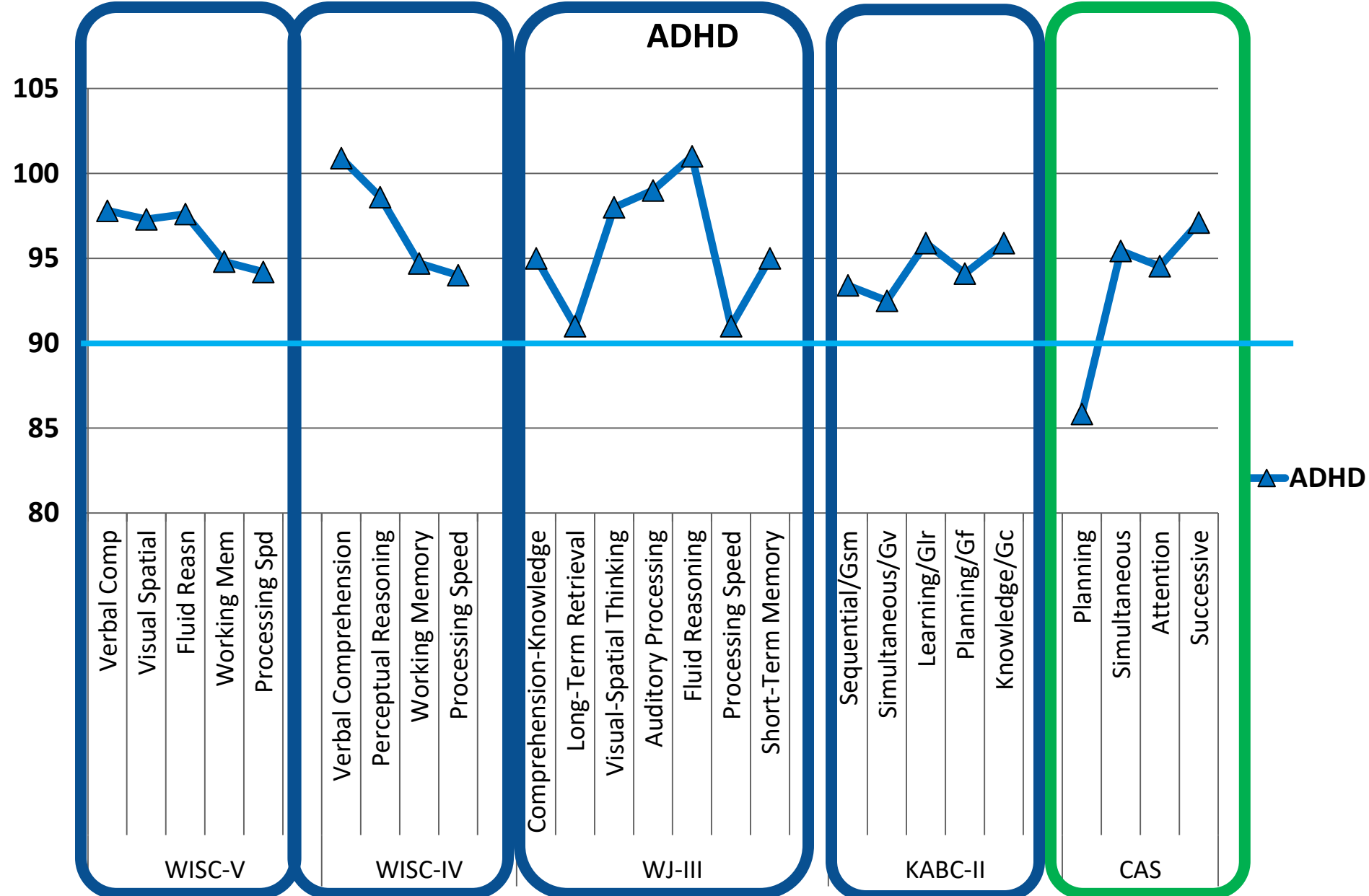
# Profiles for SLD (reading decoding)

SLD



# Profiles for students with ADHD

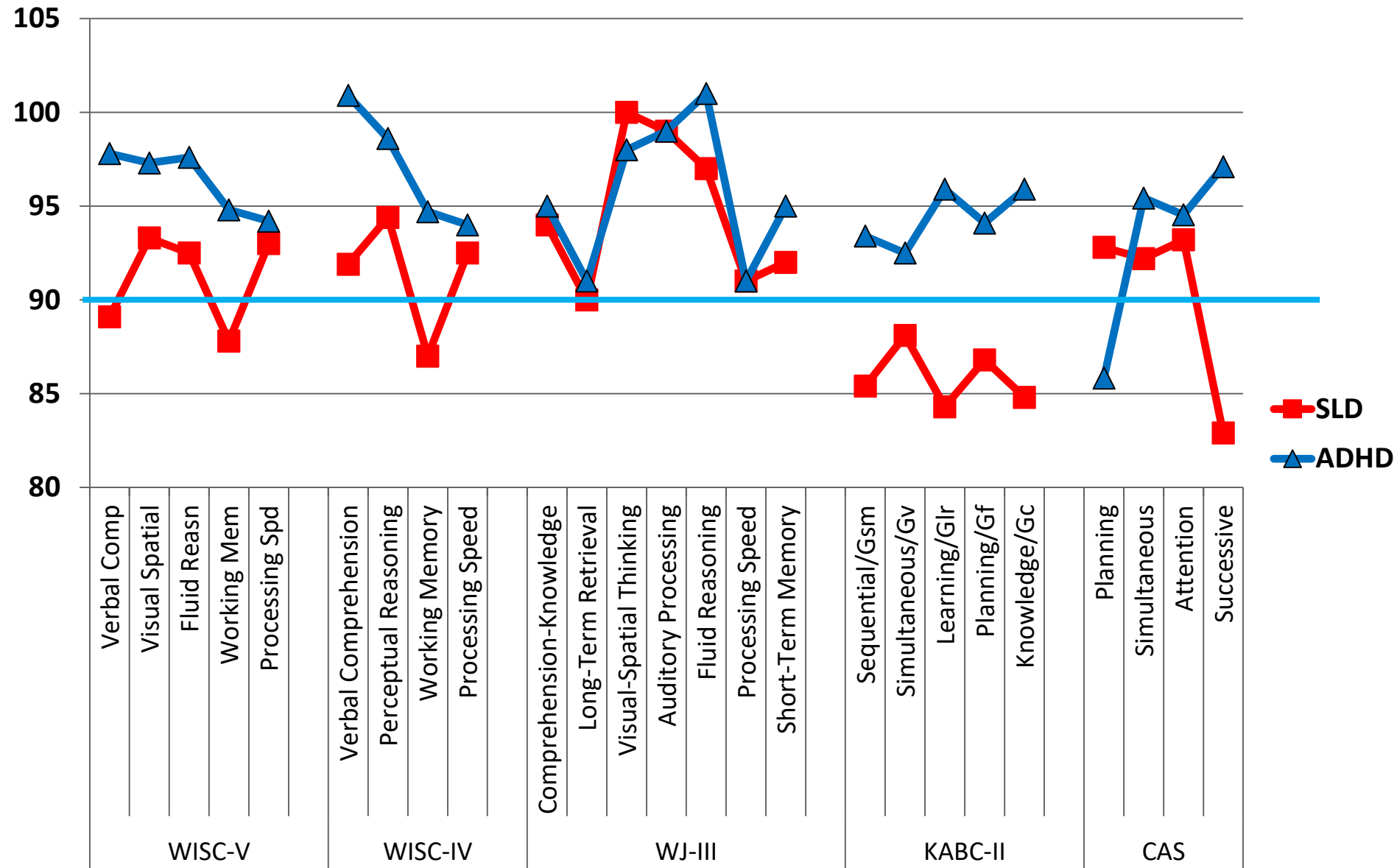
ADHD



ADHD



# Profiles for SLD (reading decoding) & ADHD



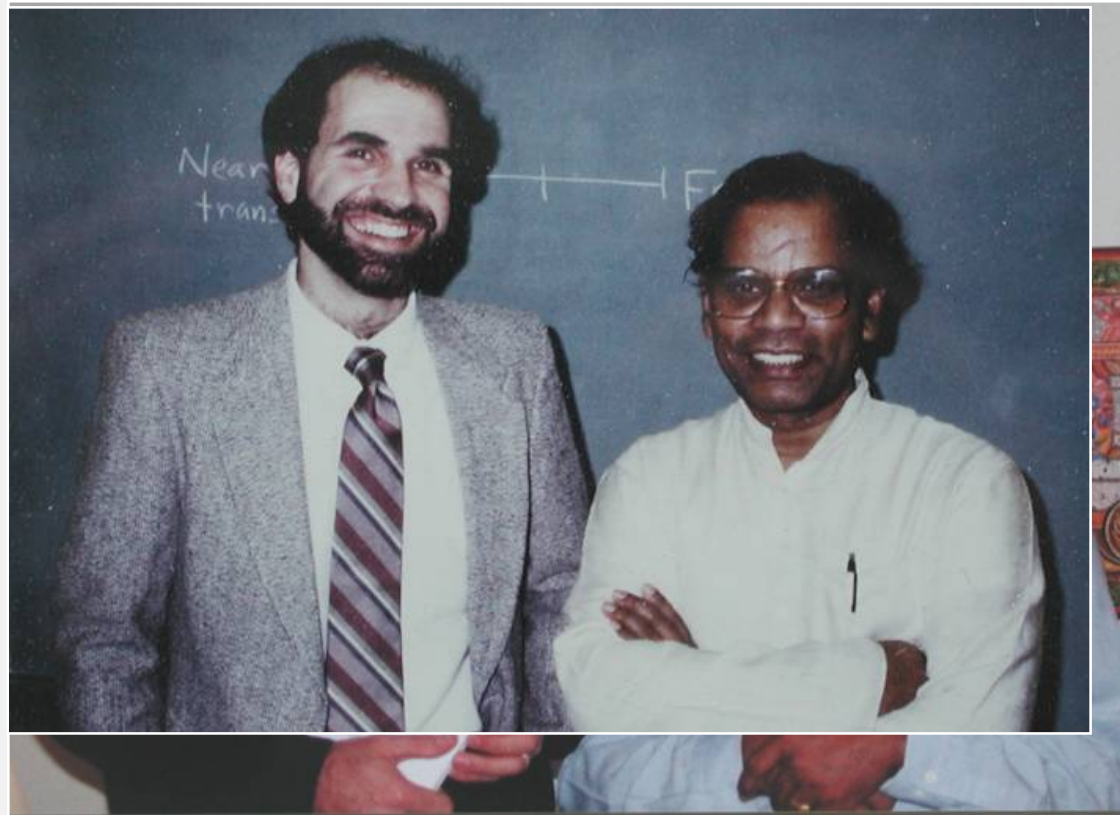
# Implications

- Non-discriminatory data suggest that traditional IQ tests yield larger race and ethnic differences than tests of basic psychological processing.
  - Conclusion: CAS2 yields the smallest differences
- 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
- *WHAT MAKES the PASS basic psychological processes as measured by CAS2 so effective?*

# Presentation Outline

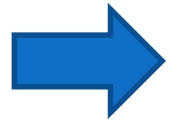
- From achievement ability discrepancy to a pattern of strengths and weaknesses
- The Discrepancy/Consistency Method (DCM)
- Which tests to use to define and measure “basic psychological process”
- ➔ A neurocognitive theory will be suggested - **PASS**
- Illustrative Case study
  - How DCM yields more accurate eligibility determination
  - How DCM leads to intervention planning.

# A Neurocognitive approach to understanding learning and learning problems



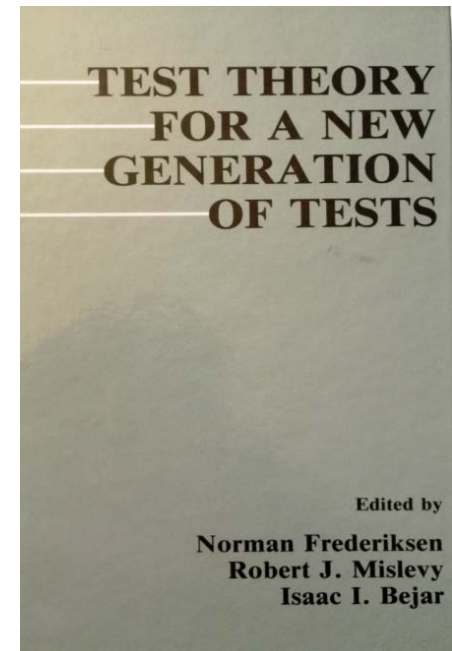
# Defining basic psychological process

- ▶ How did we identify ‘basic psychological processes’?



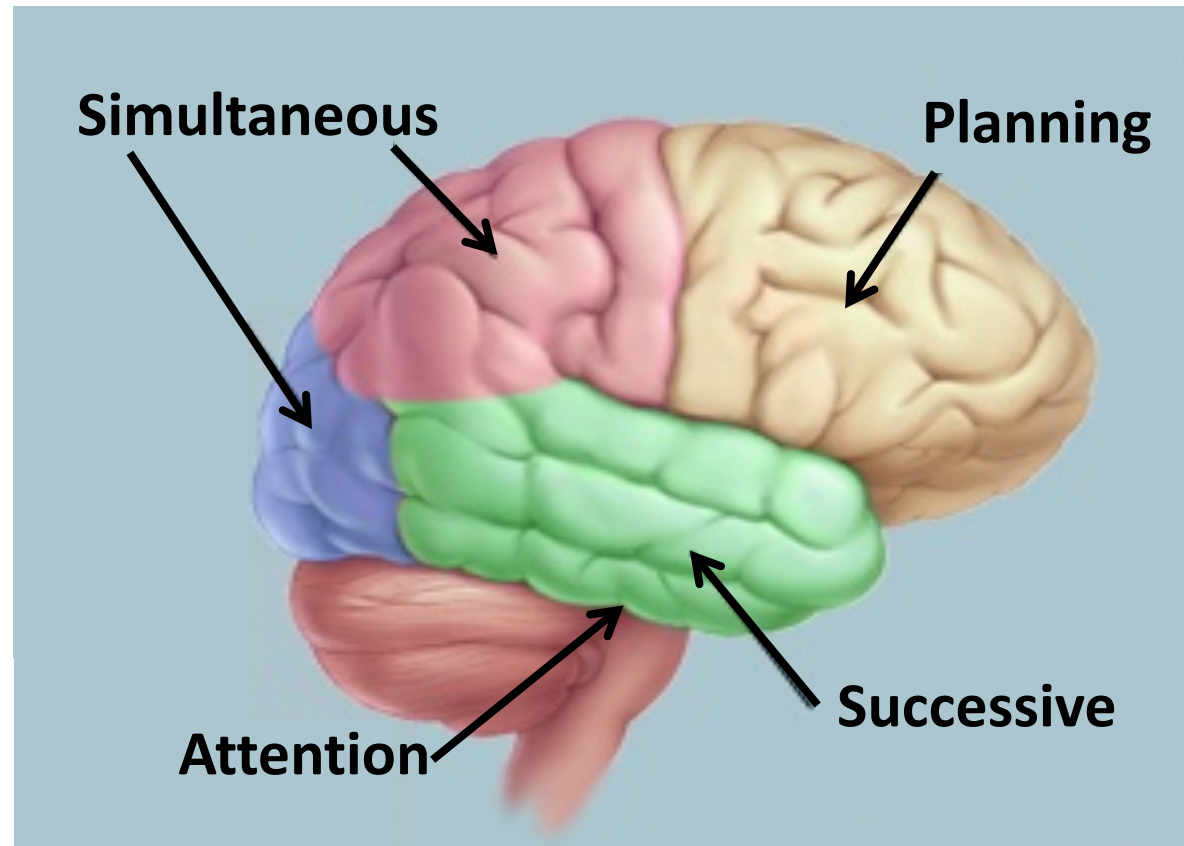
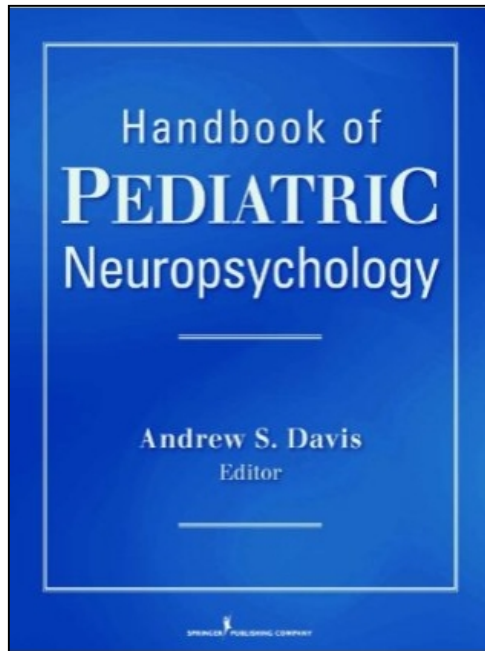
We agreed that – “*a research program dominated by factor analyses of test intercorrelations is incapable of producing an explanatory theory of human intelligence*” (Lohman & Ippel, 1993, p. 41)

- Use knowledge from cognitive and neuropsychology to identify basic psychological processes



# Brain & Basic Psychological Processes

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

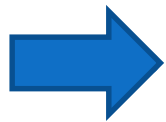


See Naglieri, J. A. & Otero, T. (2011). Cognitive Assessment System: Redefining Intelligence from A Neuropsychological Perspective. In A. Davis (Ed.). *Handbook of Pediatric Neuropsychology* (320-333). New York: Springer Publishing.

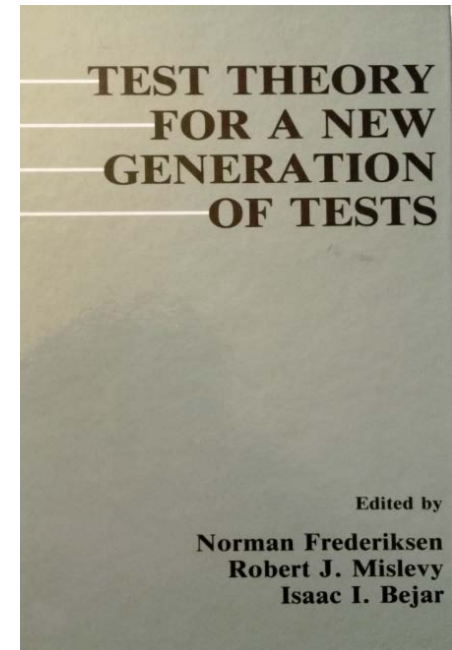
# Defining basic psychological process

## ▶ How did we identify ‘basic psychological processes’?

- We agreed that – *“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)
- Use knowledge from cognitive and neuropsychology to identify basic psychological processes

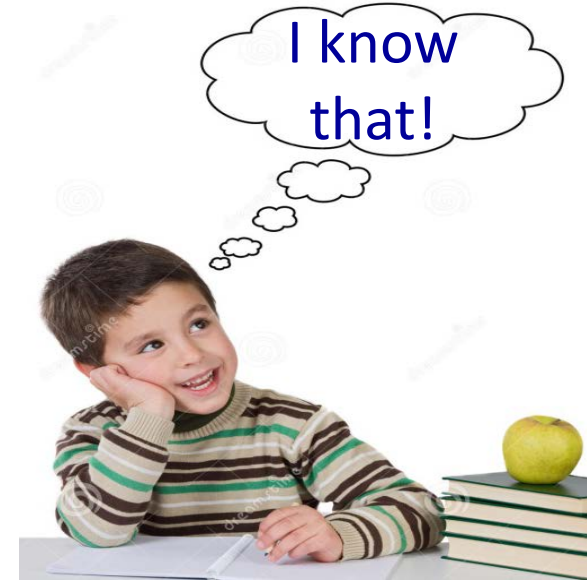


We were very careful in our test development process to measure **thinking** not **knowing**



# 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 THINKING and KNOWLEDGE separately





# 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 learning

# CAS2 (Ages 5-18 yrs.)



Cognitive Assessment System  
Second Edition

## Examiner Record Form

Jack A. Naglieri J. P. Das Sam Goldstein

**Section 1. Identifying Information**

Student's Name \_\_\_\_\_

Sex: Female  Male  Grade \_\_\_\_\_

School \_\_\_\_\_

Examiner \_\_\_\_\_

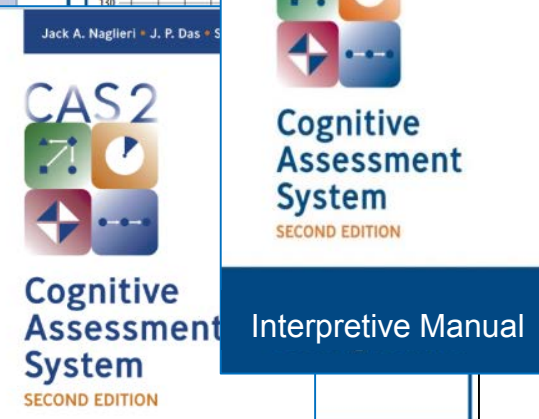
Date Tested	Year	Month	Day
Date of Birth			
Age			

**Section 2. Subtest and Composite Scores**

Subtest	Raw Score	Scaled Score			
		PLAN	SIM	ATT	SUC
Planned Codes (PGd)					
Planned Connections (PCn)					
Planned Number Matching (PNM)					
Matrices (MAT)					
Verbal-Spatial Relations (VSR)					
Figure Memory (FM)					
Expressive Attention (EA)					
Number Detection (ND)					
Receptive Attention (RA)					
Word Series (WS)					
Sentence Repetition/Questions (SR/SQ)					
Visual Digit Span (VDS)					
		PLAN	SIM	ATT	
Sum of Subtest Scaled Scores		+	+		
PKSS Composite Index Scores					
Percentile Rank					
Upper % Confidence Interval					
Lower					

**Section 3. Subtest and Composite Profiles**

Index Score Profile	Scaled Score Profile			
	PLAN	SIM	ATT	SUC
160				
155				
150				
145				
140				
135				
130				



Cognitive Assessment System 2  
Español

## Hoja de registro del evaluador

Jack A. Naglieri Mary A. Moreno Tulio M. Otero

**Sección 1. Información de Identificación**

Nombre del estudiante \_\_\_\_\_

Género: Femenino  Masculino  Grado \_\_\_\_\_

Escuela \_\_\_\_\_

Evaluador \_\_\_\_\_

	Año	Mes	Día
Fecha evaluación			
Fecha nacimiento			
Edad			

**Sección 2. Puntuaciones de subpruebas y puntuaciones compuestas**

Subprueba	Puntuación cruda	Puntuación escala			
		PLAN	SIM	ATEN	SUC
Códigos planificados (CPd)					
Conexiones planificadas (CPn)					
Planificación de números pareados (PNP)					
Matrices (MAT)					
Relaciones verbales-espaciales (RVE)					
Memoria de figuras (MF)					
Atención expresiva (AE)					
Detección de números (DN)					
Atención receptiva (AR)					
Serie de palabras (SP)					
Repetición/Preguntas oraciones (RP/RQ)					
Retención visual de dígitos (RVD)					
Suma de puntuaciones escala de las subpruebas		+	+	+	=
Puntuaciones de índices compuestos PKSS					
Rango percentil					
Intervalos de confianza					
Superior					
Inferior					

**Sección 3. Perfiles de subpruebas y puntuaciones compuestas**

Perfil de puntuación por índice	Perfil de puntuaciones por escala			
	PLAN	SIM	ATEN	SUC
160				
155				
150				
145				
140				
135				
130				
125				
120				
115				
110				
105				
100				
95				
90				
85				
80				
75				
70				
65				
60				
55				
50				
45				
40				

# PASS Theory

▶ **Planning** is a basic psychological process we use to determine, select, and apply efficient solutions to problems

- problem solving
- developing plans
- using strategies
- impulse control
- self-control
- retrieval of knowledge

A	B	C	D	
X	O	O	O	

---

A	B	C	D	A
X	O	X		

---

A	B	C	D	A
X	O			

---

A	B	C	D	A
X	O			

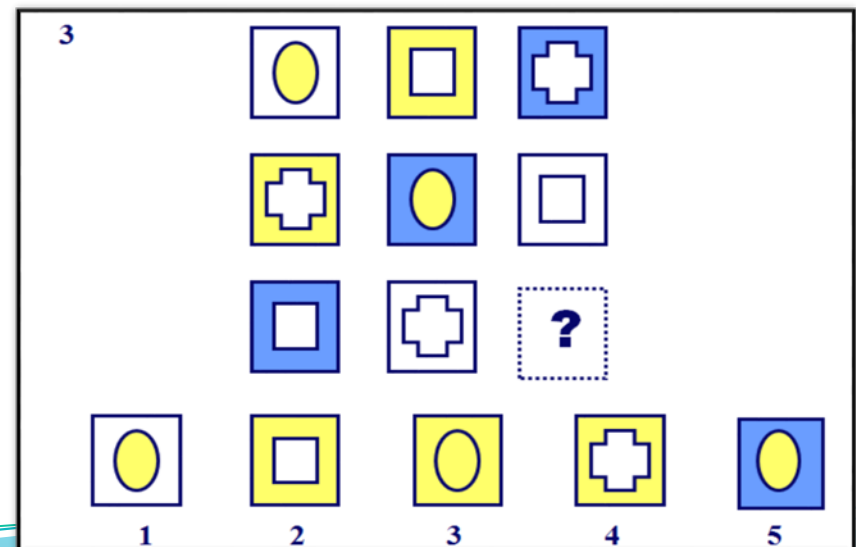
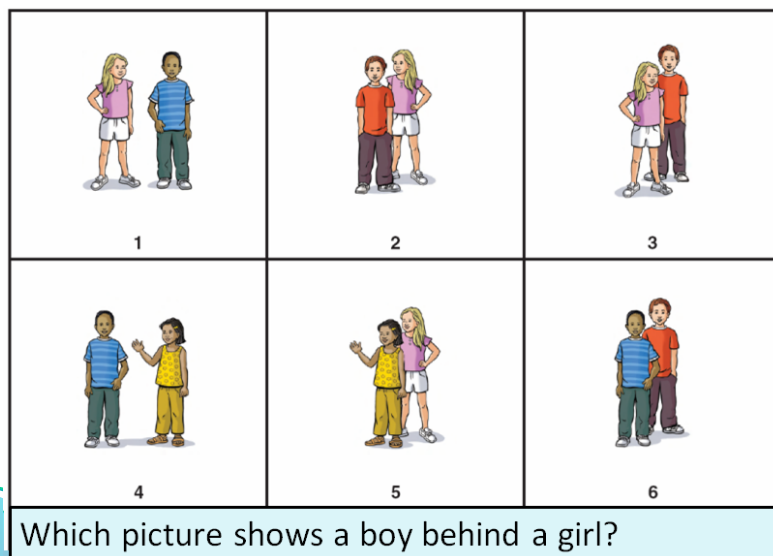
# PASS Theory

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



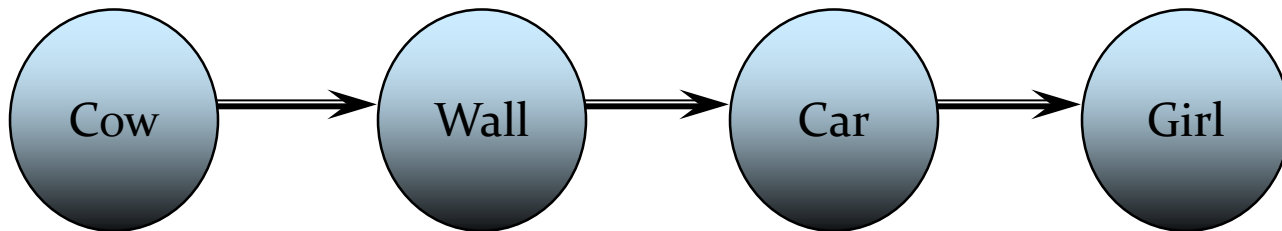
# PASS Theory

- **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 secondary to process



# 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

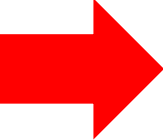


The child answers a question about a statement read by the examiner such as:

**The red greened the blue with a yellow.**

**Who got greened?**

# Presentation Outline

- From achievement ability discrepancy to a pattern of strengths and weaknesses
  - The Discrepancy/Consistency Method (DCM)
  - Which tests to use to define and measure “basic psychological process”
  - A neurocognitive theory will be suggested - **PASS**
-  Illustrative Case study
- How DCM yields more accurate eligibility determination
  - How DCM leads to intervention planning.

# Jacob - 6<sup>th</sup> grade

## Presenting Concerns: Reading, Math Word Problems, Text Anxiety

WISC V	SCORE	RANGE	PERCENTILE RANK
Verbal Comprehension	89	Below Average	23%
Visual Spatial Index	84	Below Average	14%
Fluid Reasoning Index	82	Below Average	12%
Working Memory Index	72	Very Low	3%
Processing Speed Index	76	Very Low	6%
<b>FULL SCALE SCORE</b>	<b>81</b>	<b>Below Average</b>	<b>10%</b>
WIAT III Reading	87	Below Average	19%
WIAT III Math	90	Average	25%
WIAT III Writing	94	Average	34%



# Jacob 6<sup>th</sup> grade

CAS-2	COMPOSITE SCORE	RANGE	PERCENTILE RANK
<b>Planning:</b> the ability to apply a strategy, and self-monitor and self- correct performance while working toward a solution.	92	Average	30%
<b>Attention:</b> the ability to selectively focus on a stimulus while inhibiting responses from competing stimuli.	98	Average	45%
<b>Simultaneous Processing-</b> is the ability to reason and problem solve by integrating separate elements into a conceptual whole, and often requires strong visual-spatial problem solving skills.	90	Average	25%
<b>Successive Processing-</b> is the ability to put information into a serial order or particular sequence.	72	Very Low	3%
<b>CAS-2 COMPOSITE SCORE</b>	86	Below Average	18%

# Jacob 6<sup>th</sup> grade


FAR index	Standard score	%tile	Category
Phonological Index	75	5%	<b>Moderately Below Average</b>
Fluency Index	92	30%	Average
Mixed Index	81	10%	Below Average
Comprehension Index	97	42%	Average
FAR Total Index	84	14%	Below Average

KEY INTERPRETATION	Score	Percentile	Descriptor
<b>Nonsense Word Decoding</b> - requires the student to decode a series of nonsense words presented in order of increasing difficulty .	71	3%	Moderately Below Average
<b>Irregular Word Reading Fluency</b> - the student reads a list of phonologically irregular words arranged in order of increasing difficulty in 60 seconds.	95	37%	Average

# How to Pair the Far with CAS2

➤ **FAR**: The **Phonological Index** is a measure of decoding skills and word reading based upon phonological processing tests (*i.e. Phonemic Awareness or Positioning Sounds*).

Item	Correct response
ad : van : tage	advantage

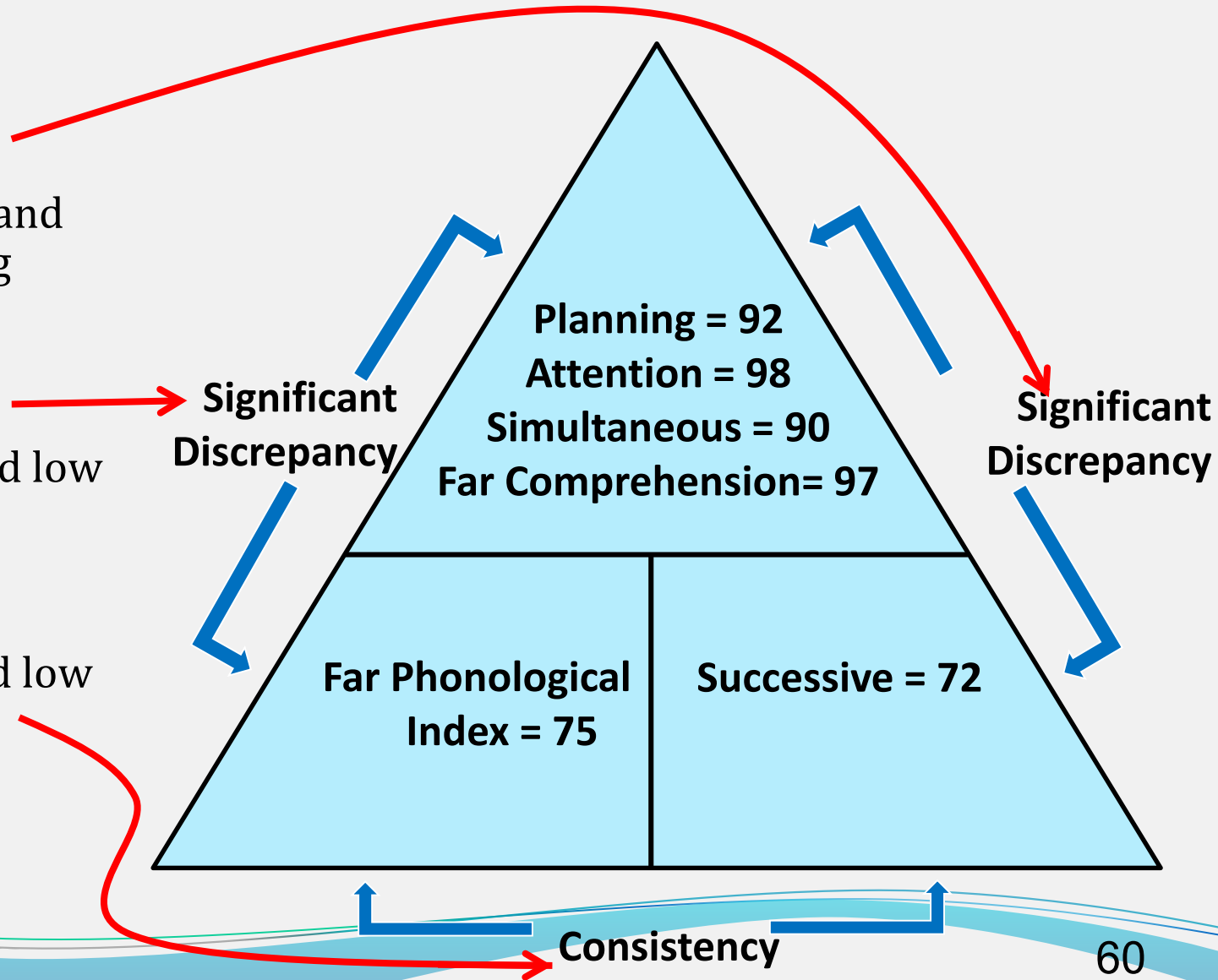


d      ||

**Poor Successive (CAS-2) + Poor Phonological Index (FAR) = SLD in Reading Decoding**

# Discrepancy Consistency for Jacob

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

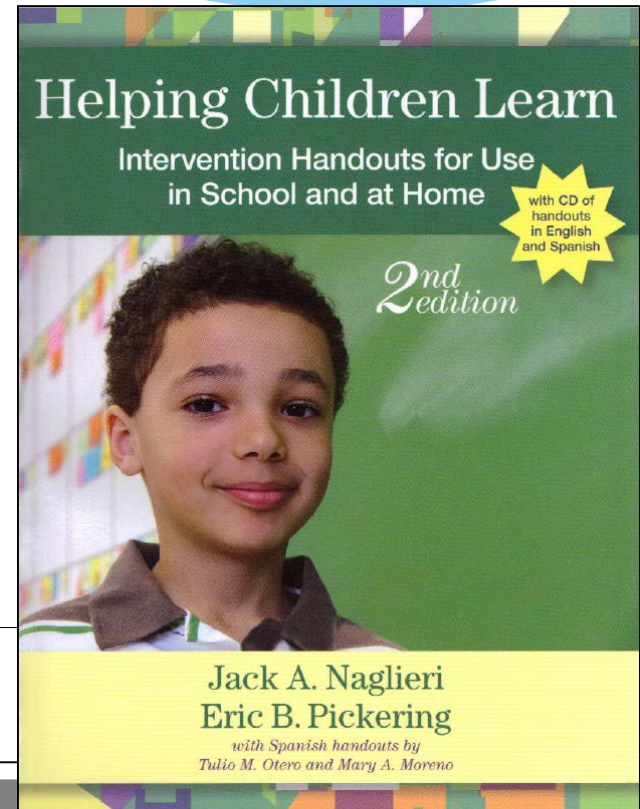


# Successive Processing Interventions

- Alphabetic Phonics (Orton-Gillingham)
- Recipe for Reading
- SRA Corrective Reading
- Earobics II
- SIPPS
- Lindamood Seeing Stars Program
- LEXIA
- Horizons
- Read Well
- DISTAR (*Reading Mastery*)
- Fast Forward II(Tallal)
- Earobics I
- Phono-Graphix
- Saxon Phonics Program
- Success for All
- Ladders to Literacy
- Foundations
- Road to the Code
- Scott Foresman Early Intervention Reading

# Interventions

- Helping Children Learn Intervention Handouts for Use in School and at Home, *Second Edition* (Naglieri & Pickering, 2011)
- Spanish handouts by Tulio Otero, Ph.D., & Mary Moreno, Ph.D.



## Using Plans to Overcome Anxiety

Some children  
to do. Anxiety  
strong if a child  
not have a clear  
may actually  
situation is  
make children  
new situations  
recognized

### How to Use

Follow these

1.

## Graphic Organizers for Connecting and Remembering Information

Remembering  
often expect  
the student to  
information better  
have. Graphi  
information so it

### Graphic O

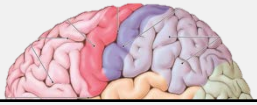
New informa  
Graphic orga  
tion to other

## Segmenting Words for Reading/Decoding and Spelling

Decoding a  
to translate  
represent a  
into parts f  
words that  
reading as

## Chunking for Reading/Decoding

Reading/decoding requires the student to look at the sequence of the letters in words and understand the organization of specific sounds in order. Some students have difficulty with long



# Structure of the Far

Index	Subtest	PASS Process
<b>Phonological Index (PI)</b>	Phonemic Awareness (PA)	Successive
	Nonsense Word Decoding (NWD)	Successive
	Isolated Word Reading Fluency (ISO)	Successive/Simultaneous
	Oral Reading Fluency (ORF)	Successive/Simultaneous
	Positioning Sounds (PS)	Successive
<b>Fluency Index (FI)</b>	Rapid Automatic Naming (RAN)	Simultaneous
	Verbal Fluency (VF)	Planning
	Visual Perception (VP)	Attention
	Orthographical Processing (OP)	Simultaneous/Attention
	Irregular Word Reading Fluency (IRR)	Simultaneous
<b>Comprehension Index (CI)</b>	Semantic Concepts (SC)	Simultaneous/Planning
	Word Recall (WR)	Attention/Planning
	Print Knowledge (PK)	Attention
	Morphological Processing (MP)	Successive
	Silent Reading Fluency (SRF-C)	Simultaneous/Planning/Attention

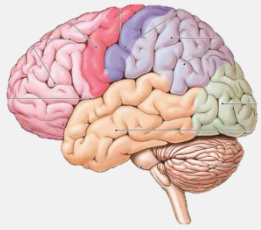
# CAS-2 Simultaneous Processing & Reading Fluency

**Simultaneous Processing**– the ability to integrate separate elements into a conceptual whole, and often requires visual-spatial problem solving skills.

**Simultaneous & Reading** -the ability to automatically and instantaneously recognize words in print without sounding out each individual phoneme. An extremely important skill in developing reading fluency.



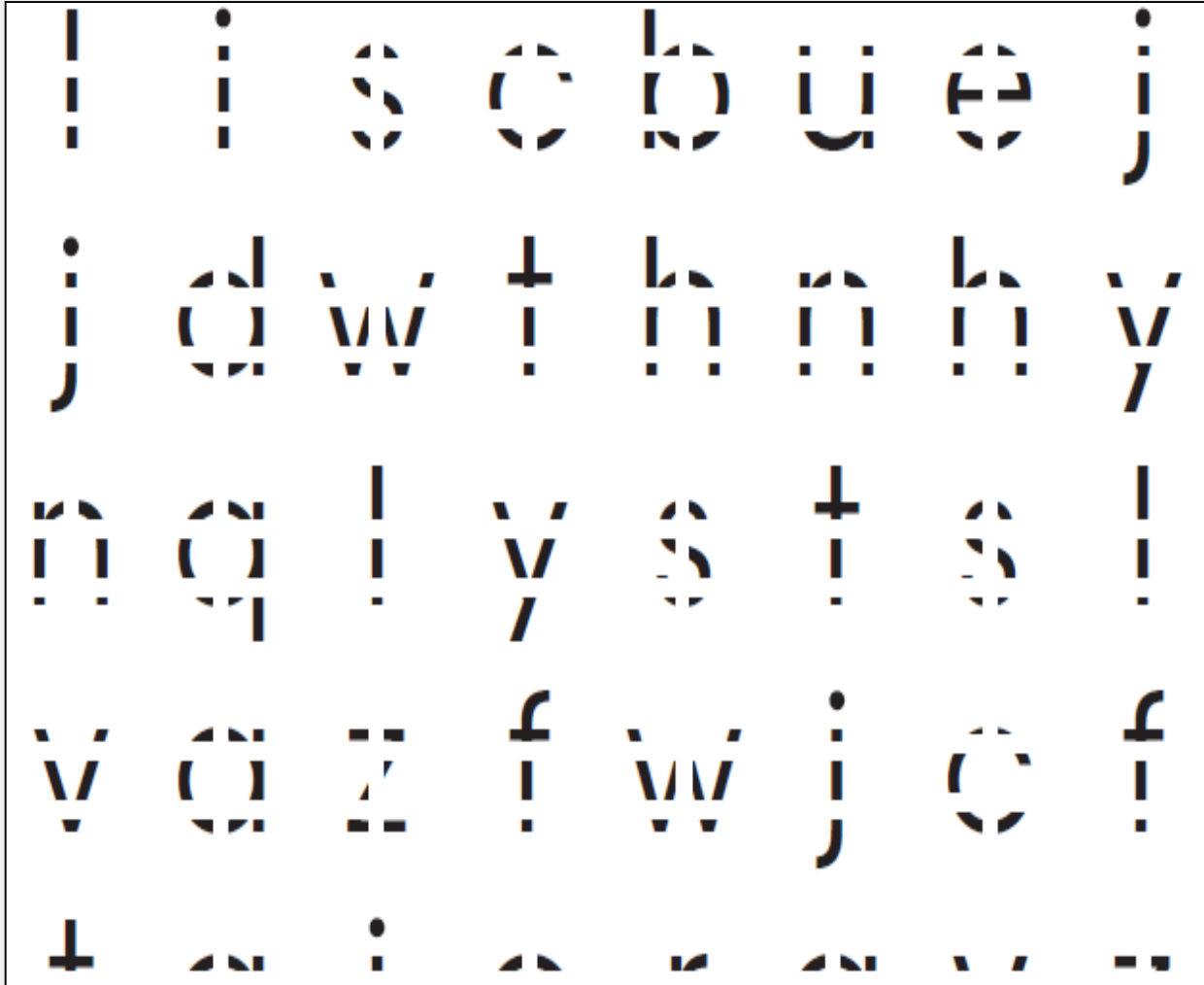


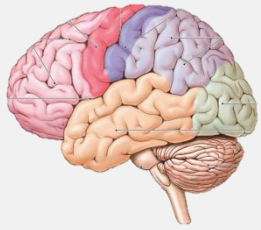


# Rapid Automatic Naming: Simultaneous Perception

---

## Far Rapid Naming of Stencils





# **Irregular Word Fluency: Simultaneous Processing**

---

## **Far Irregular Word Reading Fluency:**

**(60 seconds)**

**yacht**

**debt**

**answer**

**seizure**

**gnome**

**malign**

**conscience**

**plaque**

# Nelson 4<sup>th</sup> grade

## Presenting Concerns: Reading, Writing, Math Fluency

<b>WISCV Domains</b>	<b>COMPOSITE SCORE</b>	<b>RANGE</b>	<b>PERCENTILE RANK</b>
<b>Verbal Comprehension Index</b>	<b>103</b>	<b>Average</b>	<b>58%</b>
<b>Visual Spatial Index</b>	<b>84</b>	<b>Below Average</b>	<b>14%</b>
<b>Fluid Reasoning Index</b>	<b>79</b>	<b>Very Low</b>	<b>8%</b>
<b>Working Memory Index</b>	<b>91</b>	<b>Average</b>	<b>27%</b>
<b>Processing Speed Index</b>	<b>82</b>	<b>Below Average</b>	<b>12%</b>
<b>FULL SCALE SCORE</b>	<b>81</b>	<b>Below Average</b>	<b>10%</b>
<b>WIAT III Reading</b>	<b>80</b>	<b>Below Average</b>	<b>9%</b>
<b>WIAT III Math</b>	<b>90</b>	<b>Average</b>	<b>25%</b>
<b>WIAT III Writing</b>	<b>86</b>	<b>Below Average</b>	<b>18%</b>

# Nelson 4<sup>th</sup> grade

CAS-2	SCORE	RANGE	PERCENTILE RANK
<b>Planning:</b> the ability to apply a strategy, and self-monitor and self- correct performance while working toward a solution.	94	Average	35%
<b>Attention:</b> the ability to selectively focus on a stimulus while inhibiting responses from competing stimuli.	98	Average	45%
<b>Simultaneous Processing-</b> is the ability to reason and problem solve by integrating separate elements into a conceptual whole, and often requires strong visual-spatial problem solving skills.	74	Very Low	4%
<b>Successive Processing-</b> is the ability to put information into a serial order or particular sequence.	90	Average	25%
<b>CAS-2 COMPOSITE SCORE</b>	89	Below Average	23%

# Nelson 4<sup>th</sup> grade

**FAR index**

**Standard score  
(95% CI)**

**Percentile**

**Qualitative descriptor**

Phonological Index

90(+/-5)

25%

Average

Fluency Index

73 (+/-7)

3%

Moderately Below Average

Mixed Index

81 (+/-5)

10%

Below Average

Comprehension Index

97 ( $\pm$ 8)

42%

Average

**FAR Total Index**

**84 ( $\pm$ 5)**

**14%**

**Below Average**

# Nelson 4<sup>th</sup> grade

KEY INTERPRETATION	Score	Percentile	Descriptor
<b>Isolated Word Reading Fluency</b> – the student reads a list of phonologically regular words arranged in order of increasing difficulty in 60 seconds.	86	18%	Below Average
<b>Irregular Word Reading Fluency</b> – the student reads a list of phonologically irregular words arranged in order of increasing difficulty in 60 seconds.	71	3%	Moderately Below Average

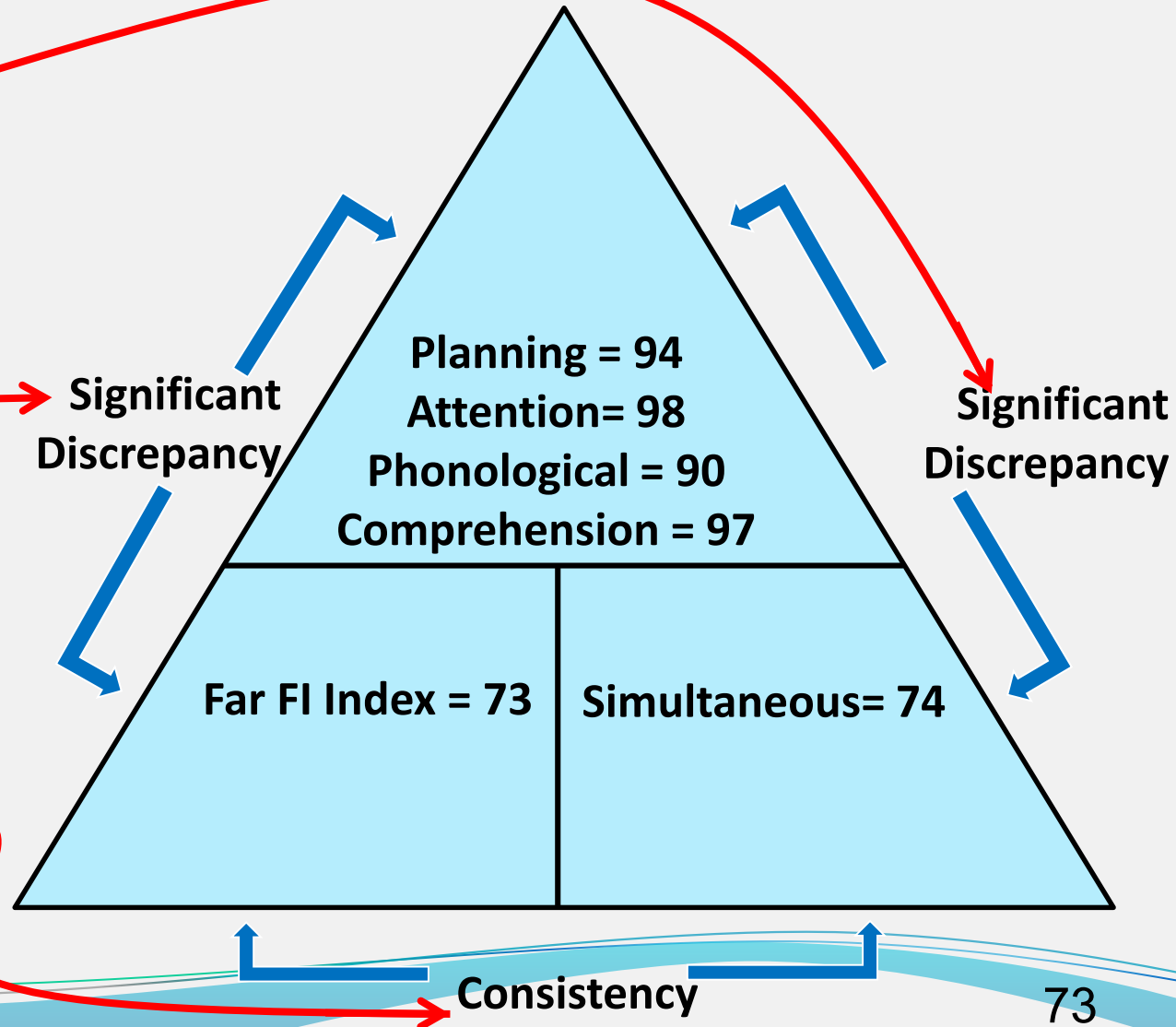
➤ Nelson can apply decoding skills to familiar words, but lacks an effective strategy when reading phonologically irregular words.

KEY INTERPRETATION	Score	Percentile	Descriptor
<b>Visual Perception</b> – requires the student to identify letters printed backwards that are embedded within an array of words. A timed measure of text perception.	75	5%	Moderately Below Average
<b>Orthographic Processing</b> – the student must recall a group of letters in the correct order that are embedded within a target word presented for 1 second. A measure of orthographic working memory skills.	72	4%	Moderately Below Average

➤ Nelson struggles with both text perception, as well as orthographic processing, both of which are hindering his reading pace and fluency. 72

# Discrepancy Consistency for Nelson

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



# Fluency Intervention: Read Naturally

- A fluency based program designed to develop speed, accuracy, and proper expression.
- Designed to be used 3 times per week...30 minutes, mainly for students between 2<sup>nd</sup> (51wpm) though 8<sup>th</sup> (133 wpm) grades.
- Each level of the program has 24 non-fiction stories.
  - a) Student placed in level and goal is set.
  - b) Cold read for one minute graphing wpm and identifying difficult words.
  - c) Read with tape three times consecutively.
  - d) Hot read is attempted.
  - e) Comprehension questions involve main idea, details, vocabulary, inferences, & short answers.



# Discrepancy/Consistency Method

- ▶ Measuring basic psychological processes is essential to address SLD as described in IDEA and state standards
- ▶ CAS2 provides a way to operationalize the measurement “basic psychological processes” -- PASS
- ▶ PASS is a neurocognitive theory of learning
- ▶ There is strong evidence that PASS scores are non-discriminatory, strongly related to academic performance, can be used to detect SLD and intervention design

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