A Neuropsychological Approach for Identifying and Remediating Specific Learning Disabilities

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Topical Outline

- Introduction
- A "basic psychological process" approach to SLD eligibility determination
- Measure PASS and reading skills (FAR)
  - Case study #1
- Measure PASS and math skills (FAM)
  - Case study #2
  - Case study #3

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Jacob 6th grade

Presenting Concerns: Reading, Math Word Problems, Text Anxiety

WISCV Scales	COMPOSITE SCORE	RANGE	PERCENTILE RANK
Verbal Comprehension Index	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%
FULL SCALE SCORE	**81**	**Below Average**	**10%**
WIAT III Reading	87	Below Average	19%
WIAT III Math	90	Average	25%
WIAT III Writing	94	Average	34%

Questions: **#1 Does Jacob qualify for SPED?**
#2 Can you write an IEP based upon this data?

3

www.nasponline.org

NASP
National Association of School Psychologists

2011

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; Shinn, 2007; Swanson, Harris, & Graham, 2003).

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NASP 2011 LD POSITION STATEMENT

- Specific learning disabilities …
  - are characterized by **neurologically** based deficits in cognitive processes.
  - impact a specific cognitive process and
  - result in a specific academic skill weakness
  - Are best identified using *multiple sources of data*
- The great majority **(over 80%)** of children with SLD have a disability in reading.

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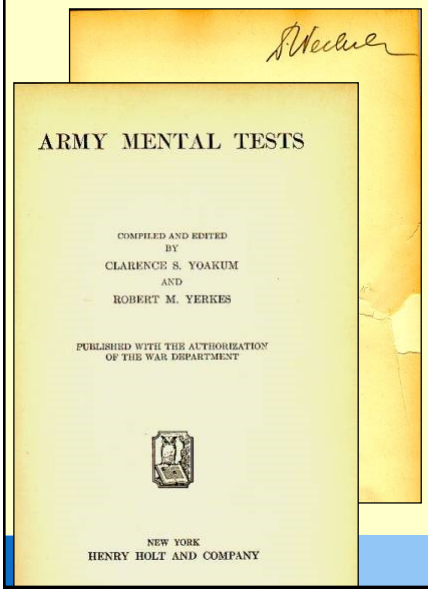
Traditional IQ and Achievement Tests

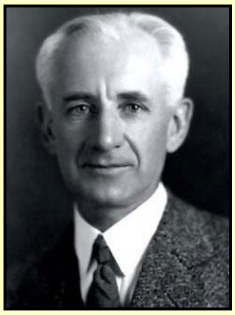
- 1975 Charles Champagne Elementary, Bethpage, NY
- Typical assessment
  - Draw A Person
  - Bender-Gestalt
  - WISC
  - Peabody Individual Achievement Test
  - Sentence Completion Test
  - Developmental history
  - other measures as needed

Traditional IQ and Achievement Tests

- When I started working as a school psychologist in 1975…I noticed that parts of the WISC were VERY similar to parts of the achievement test I was giving
  - In fact the Peabody Individual Achievement Test (1970) had a General Information and Arithmetic subtests JUST LIKE THE WISC!
- HOW DOES THAT MAKE SENSE?
- WHY DO WE HAVE THIS PROBLEM?

From Alpha/Beta to Wechsler IQ





- Yoakum & Yerkes (1920) summarized the methods used by the military to

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From Alpha/Beta to Wechsler IQ

- Army Alpha
  - Synonym- Antonym
  - Disarranged Sentences
  - Number Series
  - Arithmetic Problems
  - Analogies
  - Information

Verbal & Quantitative

- Army Beta
  - Maze
  - Cube Imitation
  - Cube Construction
  - Digit Symbol
  - Pictorial Completion
  - Geometrical Construction

Nonverbal

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Thinking vs Knowing

- Scales on IQ tests that are confounded by knowledge
  - WISC-V
    - Verbal Comprehension: Vocabulary, Similarities, Information & Comprehension
    - Fluid Reasoning: Figure Weights, Picture Concepts, Arithmetic
  - WJ-IV
    - Comprehension Knowledge: Vocabulary & General Information
    - Fluid Reasoning: Number Series & Concept Formation
    - Auditory Processing: Phonological Processing
  - K-ABC
    - Knowledge / GC: Riddles, Expressive Vocabulary, Verbal Knowledge

[redacted]

Our Amazing Brains !

Intelligence as Neurocognitive Abilities

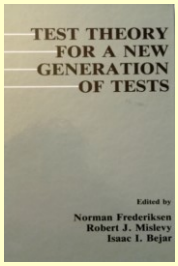
- Sternberg (2015) has stated that "the field of intelligence [has been] lost in a theoretical swamp. Researchers were falling over each other to compete either in determining which of various psychometric theories (e.g., Spearman, Thurstone, Cattell, Guilford, Guttman) had the most support; or later they were trying to synthesize these theories (e.g., John Carroll)"
  - Sternberg (2015) in *Cognition, Intelligence and Achievement* (Eds. Papadopoulos, Parrila & Kirby)

Intelligence as Neurocognitive Abilities

- In Das and Naglieri's first meeting (February 11, 1984) they proposed that intelligence was better defined as PASS processes and began development of the **C**ognitive **A**ssessment **S**ystem (Naglieri & Das, 1997).
- The CAS was the first intelligence *test* to be built on a specific *theory* of intelligence.

Defining Neurocognitive Abilities

- How did we identify 'basic psychological processes'?
  - We recognized 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)
  - We used research from cognitive and neuropsychology to construct a way to measure basic psychological processes



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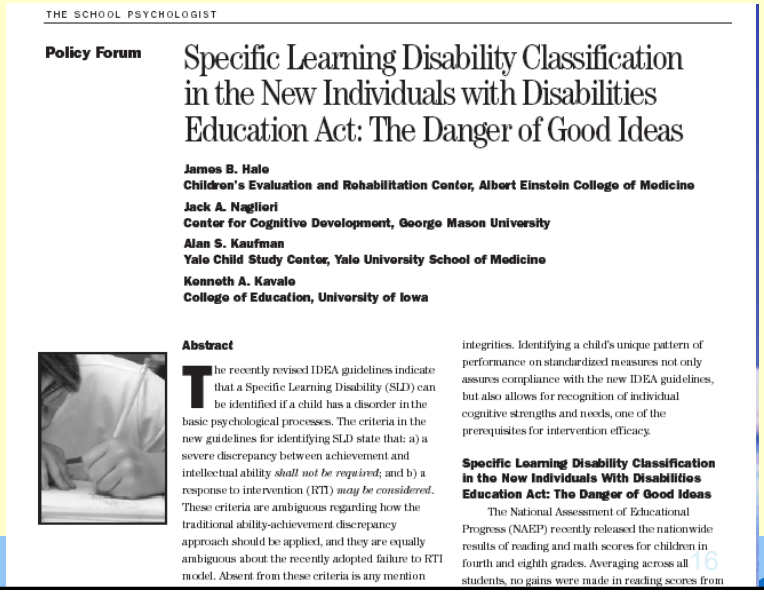
Hale, Naglieri, Kaufman, & Kavale (2004)



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
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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)

- The IDEA definition of SLD is
  - "… a disorder in 1 or more of the basic psychological processes ... [that results] in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations."
- Neither the IQ/achievement discrepancy model nor RTI evaluates basic psychology processes
- "Establishing a disorder in the basic psychology processes is *essential* for determining SLD"
- But first we have to define **"basic psychology processes"**

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What is a Cognitive Process?

- The term cognitive process is a modern term for concepts like ability or intelligence
- Cognitive processes lead to the acquisition of knowledge and skills
- Skills, like reading decoding or math calculation, are *not* examples of cognitive process
  - these are sets of specific knowledge and skills acquired and/or performed by the application of cognitive processes

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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* – ***PASS***
- We must assess ability and achievement separately

PASS Neurocognitive Theory

- **P**lanning = THINKING ABOUT HOW YOU DO WHAT YOU DECIDE TO DO
- **A**ttention = BEING ALERT AND RESISTING DISTRACTIONS
- **S**imultaneous = GETTING THE BIG PICTURE
- **S**uccessive = FOLLOWING A SEQUENCE

PASS = 'basic psychological processes'

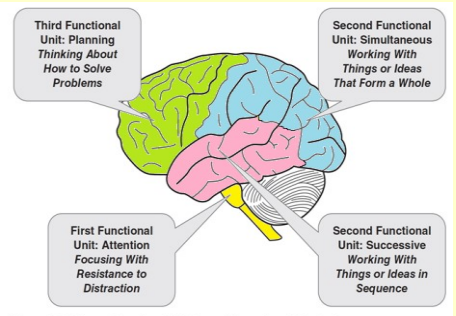

Figure 1.2 Three Functional Units and Associated Brain Structures

From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017

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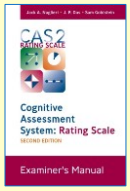
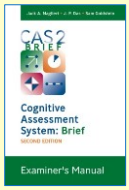
PASS Comprehensive System

(Naglieri, Das, & Goldstein, 2014)

For eligibility determination

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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Defining Dyslexia

- *"Dyslexia is characterized by difficulties with **accurate** and / or **fluent** word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge."*

- International Dyslexia Association

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Problems with "Phonological Deficit" Model

1. **Assumes dyslexia is a homogenous condition.**
2. **Does not account for the developmental trajectory of phonological awareness being more significant with younger than older readers (Araujo et al., 2010; Frijters et al., 2011).**
3. **The model fails to account why numerous phonological skills are preserved for disabled readers (Shany & Share, 2011).**
4. **The model suggests that phonological training is the only course of intervention.**
5. **Inconsistent with IDA definition and neuroscience.**

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FAR SUBTYPES OF READING DISORDERS

(1) Dysphonetic Dyslexia – difficulty sounding out words in a phonological manner.

(2) Surface Dyslexia – difficulty with the rapid and automatic recognition of words in print.

(3) Mixed Dyslexia – multiple reading deficits characterized by impaired phonological and orthographic processing skills. Most severe form of dyslexia.

(4) Comprehension Deficits – mechanical side of reading is fine but difficulty persists deriving meaning from print.

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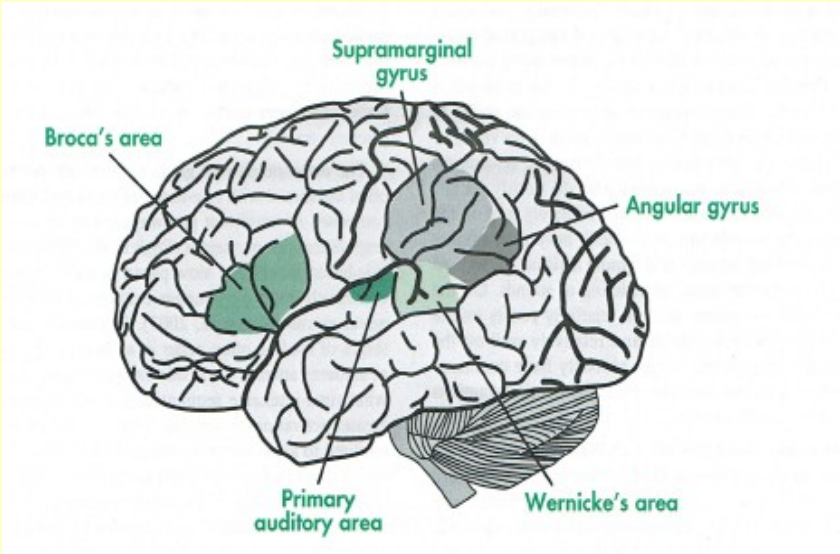
FAR SUBTYPES OF READING DISORDERS



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FAR SUBTEST STRUCTURE

Index	Subtest	Grade range	Approximate administration time in minutes
Phonological Index (PI)	Phonemic Awareness (PA)	PK to college	5 to 10
	Nonsense Word Decoding (NWD)	Grade 2 to college	2
	Isolated Word Reading Fluency (ISO)	K to college	1
	Oral Reading Fluency (ORF)	K to college	2 to 3
	Positioning Sounds (PS)	PK to college	3 to 4
Fluency Index (FI)	Rapid Automatic Naming (RAN)	PK to college	2
	Verbal Fluency (VF)	PK to college	2
	Visual Perception (VP)	PK to college	1
	Orthographical Processing (OP)	K to college	8
	Irregular Word Reading Fluency (IRR)	Grade 2 to college	1
Comprehension Index (CI)	Semantic Concepts (SC)	PK to college	5 to 8
	Word Recall (WR)	PK to college	4
	Print Knowledge (PK)	PK to Grade 1	4
	Morphological Processing (MP)	Grade 2 to college	7
	Silent Reading Fluency (SRF)	Grade 2 to college	8

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The Purpose of an Assessment

- The purpose of testing should be to assist school teams with eligibility qualification decisions, but more importantly, to generate interventions.

- **WJIV Prediction for Reading**: *(Scholastic Aptitude Scores)*
  1. **Oral Vocabulary**
  2. **Phonological Processing**
  3. **Concept Formation**
  4. **Number-Pattern Matching**
- **Not:**
  1. **Letter-Pattern Matching**
  2. **Story Recall or Memory for Words**
  3. **Visual-Auditory Learning**
  4. **Verbal Attention**

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SLD Eligibility: We can do better

- Average correlations between IQ Scales with total achievement scores from *Essentials of CAS2 Assessment* Naglieri & Otero (2017)

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

Table 1.5 Average Correlations Between Ability Tests and Achievement Including and Excluding Scales That Require Knowledge

			Average Correlation	
			All Scales	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.

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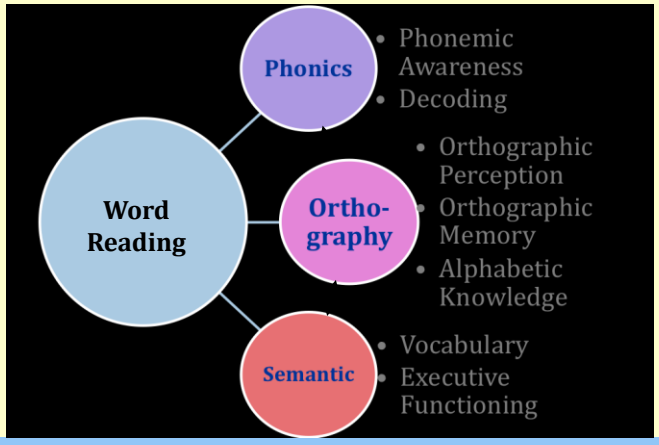
Multiple Cueing Systems of Reading

- **Recognizes that both phonological and orthographic and semantic cues can facilitate word recognition.**



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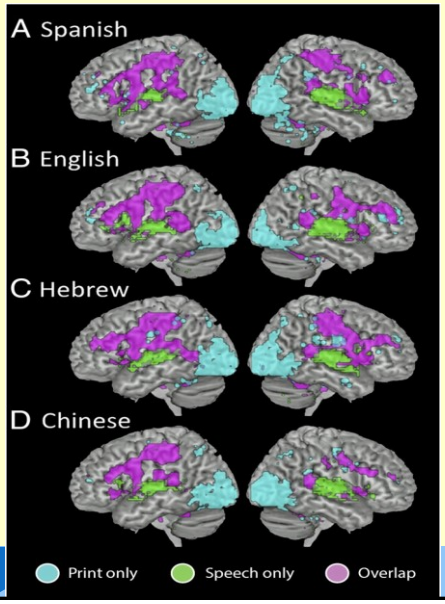
A Universal Reading Brain

Rueckl et al., (2015). Universal brain signature of proficient reading: Evidence from four contrasting languages. **Proceedings of the National Academy of Sciences**; 112(50): 15510–15515



- Proficient reading entails the convergence of phonological and orthographic processing systems onto a common network of neural structures dominated by the left perisylvian regions of the brain.
- Dyslexics in transparent orthographic systems, such as Spanish, German, Italian, Greek have difficulty in acquiring reading speed as a hallmark deficit of dyslexia (Ziegler et al., 2003; Davies et al., 2007; Constantinidou & Stainthorp, 2009; Wimmer et al., 2010).

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From IQ to Brain Function (PASS)

Learning is based on BRAIN function.

- Wechsler (traditional IQ) was not based on the brain
- We can now redefine intelligence as neurocognitive processes based on brain function (A. R. Luria)

Reinvent understanding of intelligence based on the brain.

- Measure brain function, not IQ
- Do not include achievement test questions
- Measure ***thinking*** not ***knowledge (less cultural bias)***
- Remember, **CHC** is not the same as **neuropsychology.**

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PASS and DCM for Eligibility and Intervention

From a practitioner perspective:

- DCM provides clarity for SLD eligibility
- PASS shines light on strengths that would go unnoticed via knowledge-based cognitive assessment
- Better understanding for using strengths to mitigate weaknesses
- Simple explanations for parents, teachers *AND* students
- Process approach to developing strategies and interventions for learning challenged students

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Using the CAS2, FAR and FAM to Detect a Pattern of Strengths and Weaknesses using the Discrepancy Consistency Method (DCM)

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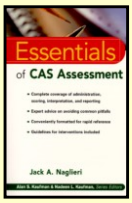
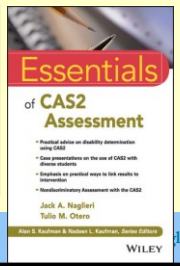
Discrepancy Consistency Method (DCM)

- The Discrepancy Consistency Method (DCM) was first introduced in 1999 (most recently in 2017)





Pattern of Strengths and Weaknesses Using the Discrepancy/Consistency Method for SLD Determination

Three methods for detecting a pattern of strengths and weaknesses (PSW) that can be used as part of the process of identifying a student with a specific learning disability (SLD) have been suggested by Naglieri in 1999, Hale and Fiorello in 2004, and by Flanagan, Ortiz, and Alfonso in 2007. These authors share the same goal: to present a procedure to detect a PSW in scores that can be used to identify an SLD (sometimes referred to as a third option; Zirkel & Thomas, 2010). Despite differences in the composition of the scores used and the definitions of what constitutes a basic psychological process, these methods all rely on finding a combination of differences as well as similarities in scores across academic and cognitive tests. Our approach to operationalizing a PSW is called the Discrepancy/Consistency Method (DCM) for the identification of SLD. Determining SLD is essentially based on the combination of PASS and achievement test scores. The method involves a systematic examination of variability of PASS and academic achievement test scores which has

DON'T FORGET 3.5

The essence of the Discrepancy/Consistency Method is two discrepancies and one consistency.

Discrepancy 1:
Significant variability among the PASS scores indicating a weakness in one or more of the basic psychological processes

Discrepancy 2:
Significant difference between high PASS scores and low achievement test scores

Consistency:
No significant difference between low PASS scores and low achievement

Discrepancy Consistency Method

- The Discrepancy Consistency Method is used to determine if 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

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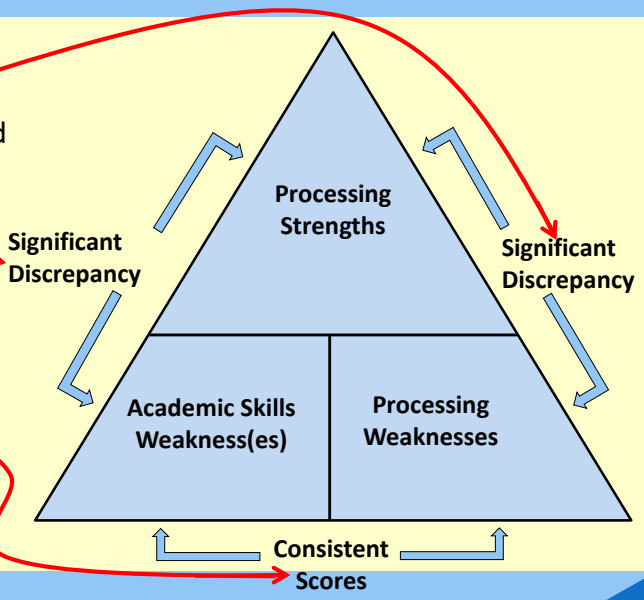
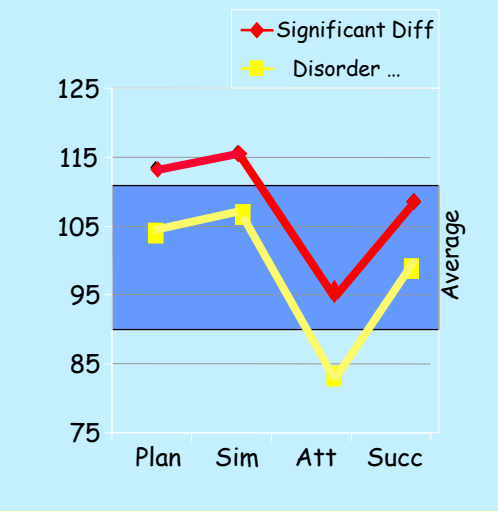
Discrepancy Consistency Model for SLD

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



Evidence of a 'disorder in processing'



- **Two Rules**
  - **A low PASS score** *relative* to the child's mean score
  - **AND, the low PASS score is at least** below the Average range (<90)
    - The lower the PASS weakness the stronger the evidence of a disorder in a basic psychological process

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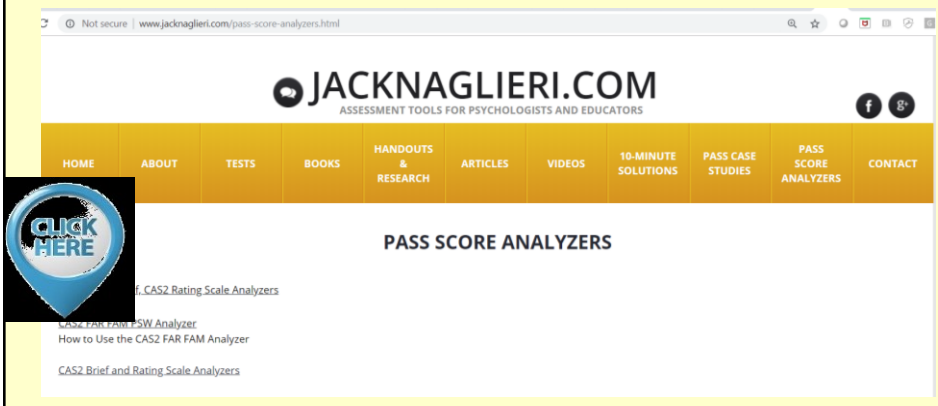
CAS2, FAR & FAM PSW Analyzer

- Naglieri and Feifer have developed a ***free*** excel worksheet that analyzes the relationships between the CAS2, FAR and FAM – available from www.jacknaglieri.com

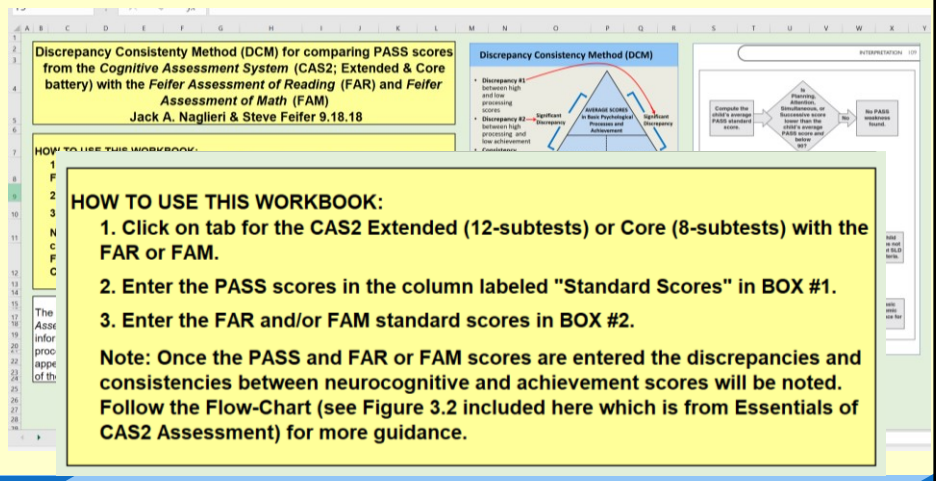
CAS2, FAR & FAM PSW Analyzer

- Download the ***free*** excel worksheet by selecting the title "CAS2 FAR FAM PSW Analyzer"



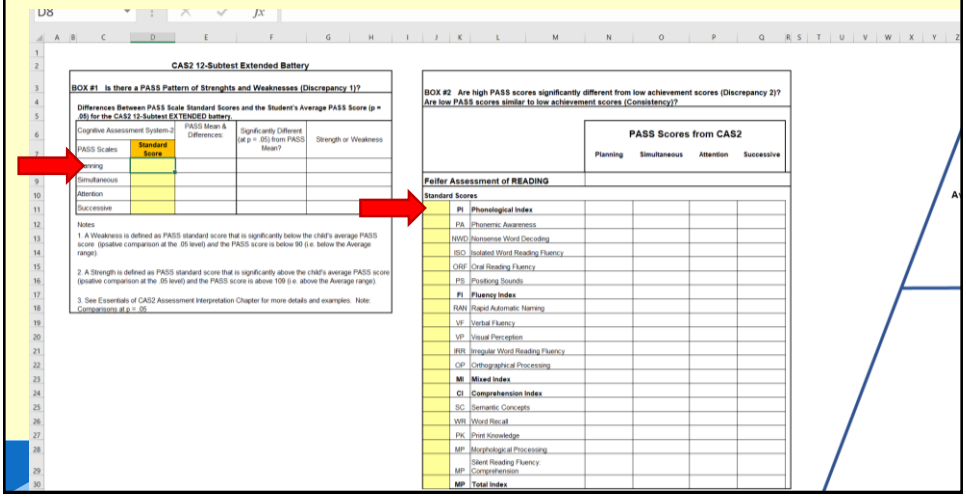
CAS2, FAR & FAM PSW Analyzer

- Instructions tab Page 1



CAS2, FAR & FAM PSW Analyzer

- CAS2 Extended and FAR analysis on Page 2
  - Enter PASS and FAR standard scores in the yellow boxes



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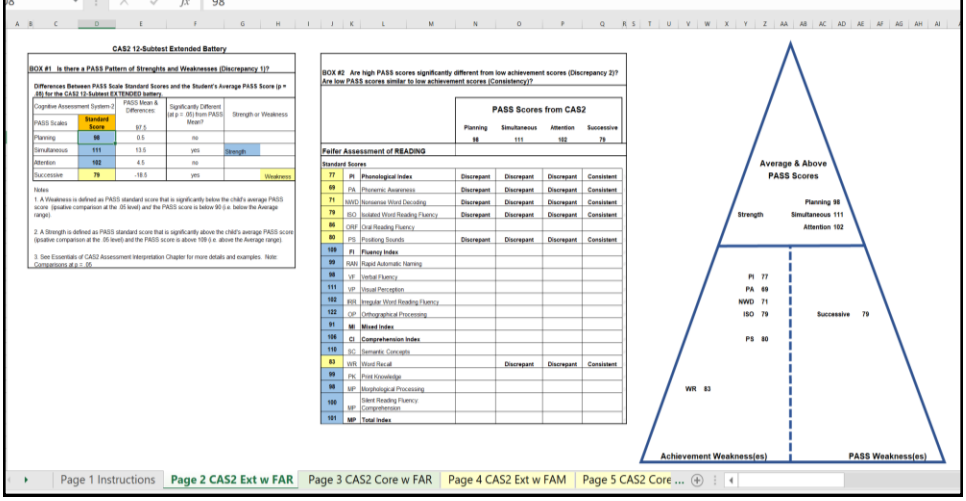
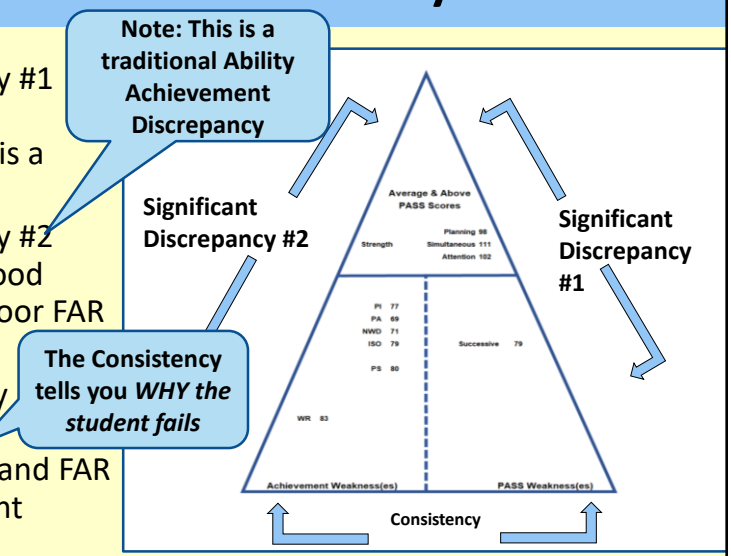


CAS2, FAR & FAM PSW Analyzer

- Discrepancy #1 Successive processing is a weakness
- Discrepancy #2 between good PASS and poor FAR scores
- Consistency between Successive and FAR achievement scores

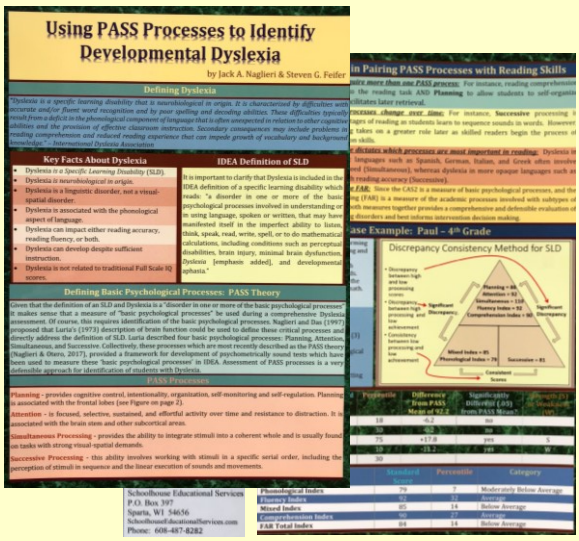


CAS2 Illustrative Case Studies

- A ***free*** CAS2 Case Workbook with illustrative examples of how to identify different PASS processing disorders and academic weakness, with interventions, is available

Using CAS2 and Far for Dyslexia

- Naglieri & Feifer provide an 8-page summary of how to use CAS2 and FAR to identify four subtypes of Dyslexia using the Discrepancy Consistency Method



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Case of Paul: 4th grade referral

- **Case of Paul** -A 9 year old in 4th grade
  - Problems in reading (and math)
  - Can't sound out words
  - Poor spelling
  - Poor reading comprehension
  - Good memory for details
  - Can't remember the sequence of steps when doing math and math facts

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Paul – age 9 years

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

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Paul – age 9 years

FAR index	Standard score (95% CI)	Percentile	Qualitative descriptor
Phonological Index	75	5%	Moderately Below Average
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
Nonsense Word Decoding – requires the student to decode a series of nonsense words presented in order of increasing difficulty .	71	3%	Moderately Below Average
Irregular Word Reading Fluency – the student reads a list of phonologically irregular words arranged in order of increasing difficulty in 60 seconds.	95	37%	Average

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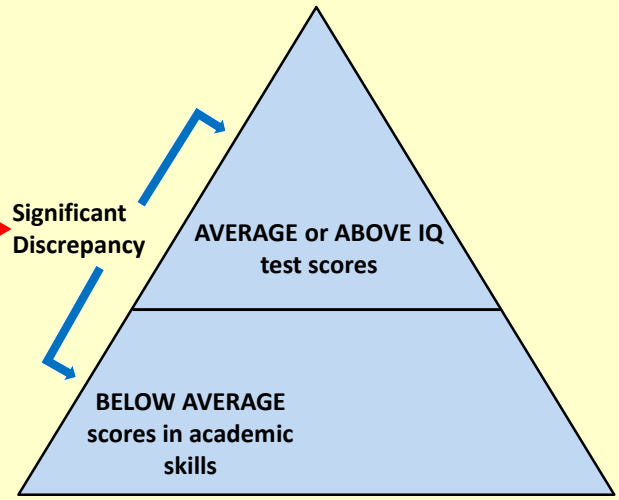
Traditional Discrepancy Approach

- **Discrepancy** between high IQ and low achievement test scores



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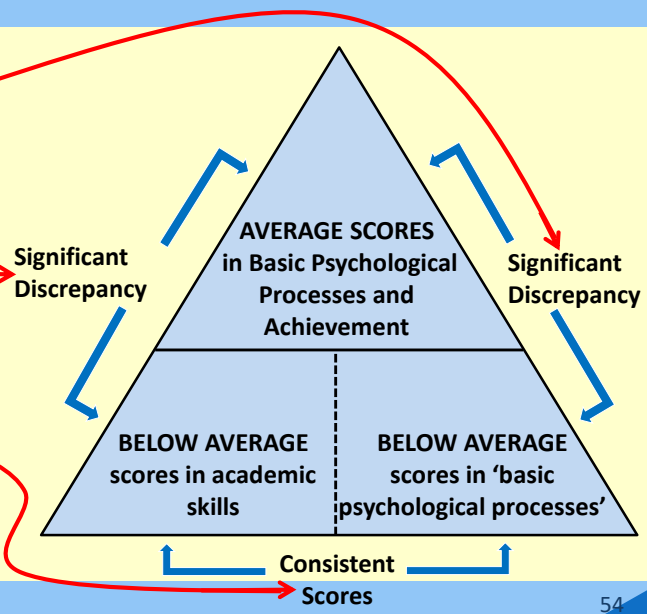
SLD Eligibility: We can do better

- Identify Specific Learning Disabilities (SLD) using the **Discrepancy/Consistency Method** (*Essentials of CAS2 Assessment* by Naglieri & Otero, 2017)
  - based on theoretically defined measures of neurocognitive processes rather than traditional IQ achievement discrepancy
  - The Pattern of Strengths and Weaknesses (PSW) will based on basic psychological processing scores combined with academic test scores

Discrepancy Consistency Method (DCM)

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

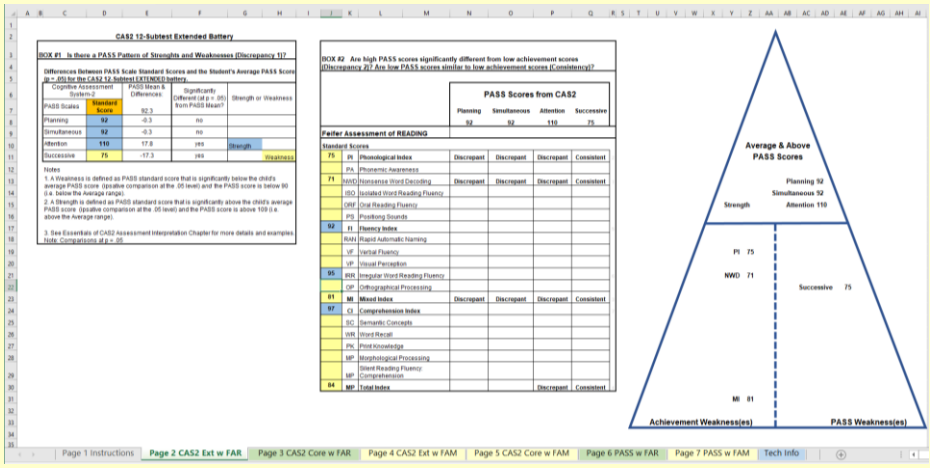


Paul – age 9 years

CAS-2	STANDARD SCORE	Classification	
Planning	**92**	**Average**	
Simultaneous	**92**	**Average**	
Attention	**110**	**Average**	
Successive	**75**	**Very Low**	
Full Scale is not reported			

CAS2 FAR Analyzer Results for Paul

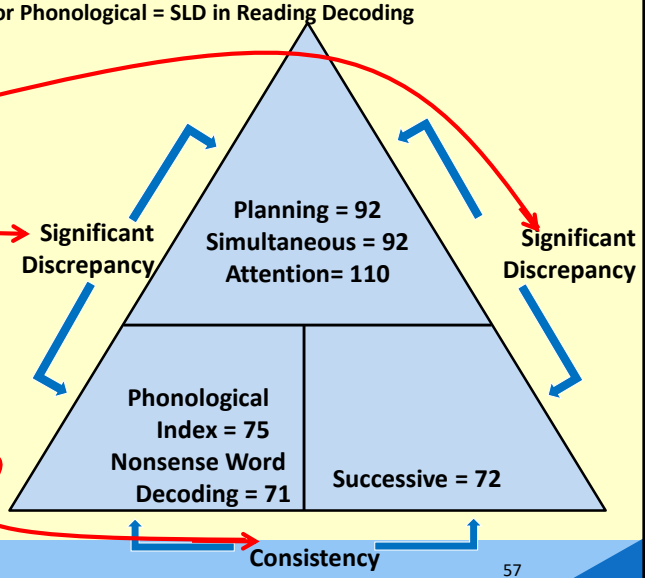
- Discrepancy Consistency Results show a PSW



Discrepancy Consistency Method - Paul

Poor Successive + Poor Phonological = SLD in Reading Decoding

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



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WISC-V and CAS2

- **Why are the WISC-V and CAS2 scores so different?**
- **Because the two test measure VERY different things**
- **The only similarity is:**

Verbal Comprehension	Planning
Visual Spatial	Attention
Fluid Reasoning	Simultaneous
Working Memory	Successive
Processing Speed	

- But note, Working Memory on WISC-V includes Digit span Backwards which is Successive and Planning (Schofield & Ashman)

Intervention Plan for Paul

- Explain his PASS scores to engage the student in the solutions and build confidence
- Build on His Strengths
  - Help him use his Planning, Attention, Simultaneous and Strengths to support challenges with Successive processing
- Encourage the use of metacognitive strategies (P) that can him perform better when tasks demand Successive processing
  - See Naglieri and Pickering's book

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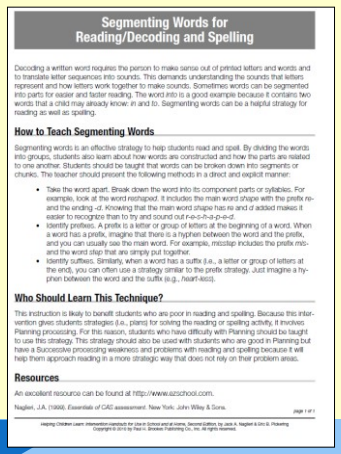
Interventions related to PASS

- *Helping Children Learn Intervention Handouts for Use in School and at Home*, *Second Edition* (Naglieri, & Pickering 2011)



Segmenting Words for Reading/Decoding and Spelling

Decoding a written word requires the person to make sense out of printed letters and words and to translate letter sequences into sounds. This demands understanding the sounds that letters represent and how letters work together to make sounds. Sometimes words can be segmented into parts for easier and faster reading. The word *into* is a good example because it contains two words that a child may already know: *in* and *to*. Segmenting words can be a helpful strategy for reading as well as spelling.

How to Teach Segmenting Words

Segmenting words is an effective strategy to help students read and spell. By dividing the words into groups, students also learn about how words are constructed and how the parts are related to one another. Students should be taught that words can be broken down into segments or chunks. The teacher should present the following methods in a direct and explicit manner:

- Take the word apart. Break down the word into its component parts or syllables. For example, look at the word *reshaped*. It includes the main word *shape* with the prefix *re-* and the ending *-d*. Knowing that the main word *shape* has *re* and *d* added makes it easier to recognize than to try and sound out *r-e-s-h-a-p-e-d*.
- Identify prefixes. A prefix is a letter or group of letters at the beginning of a word. When a word has a prefix, imagine that there is a hyphen between the word and the prefix, and you can usually see the main word. For example, *mis*clap includes the prefix *mis-* and the word *step* that are simply put together.
- Identify suffixes. Similarly, when a word has a suffix (i.e., a letter or group of letters at the end), you can often use a strategy similar to the prefix strategy. Just imagine a hyphen between the word and the suffix (e.g., *heart-less*).

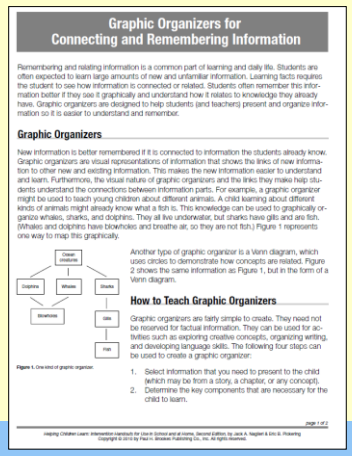
Who Should Learn This Technique?

This instruction is likely to benefit students who are poor in reading and spelling. Because this intervention gives students strategies (i.e., plans) for solving the reading or spelling activity, it involves Planning processing. For this reason, students who have difficulty with Planning should be taught to use this strategy. This strategy should also be used with students who are good in Planning but have a Successive processing weakness and problems with reading and spelling because it will help them approach reading in a more strategic way that does not rely on their problem areas.

Resources

An excellent resource can be found at http://www.azschool.com.

Naglieri, J.A. (1999). *Essentials of CAS assessment*. New York: John Wiley & Sons.



Graphic Organizers for Connecting and Remembering Information

Remembering and relating information is a common part of learning and daily life. Students are often expected to learn large amounts of new and unfamiliar information. Learning facts requires the student to see how information is connected or related. Students often remember this information better if they see it graphically and understand how it relates to knowledge they already have. Graphic organizers are designed to help students (and teachers) present and organize information so it is easier to understand and remember.

Graphic Organizers

New information is better remembered if it is connected to information the students already know. Graphic organizers are visual representations of information that shows the links of new information to other new and existing information. This makes the new information easier to understand and learn. Furthermore, the visual nature of graphic organizers and the links they make help students understand the connections between information parts. For example, a graphic organizer might be used to teach young children about different animals. A child learning about different kinds of animals might already know what a fish is. This knowledge can be used to graphically organize whales, sharks, and dolphins. They all live underwater, but sharks have gills and are fish. (Whales and dolphins have blowholes and breathe air, so they are not fish.) Figure 1 represents one way to map this graphically.

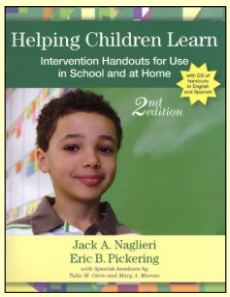
Figure 1. One kind of graphic organizer.

Another type of graphic organizer is a Venn diagram, which uses circles to demonstrate how concepts are related. Figure 2 shows the same information as Figure 1, but in the form of a Venn diagram.

How to Teach Graphic Organizers

Graphic organizers are fairly simple to create. They need not be reserved for factual information. They can be used for activities such as exploring creative concepts, organizing writing, and developing language skills. The following four steps can be used to create a graphic organizer:

1. Select information that you need to present to the child (which may be from a story, a chapter, or any concept).
2. Determine the key components that are necessary for the child to learn.



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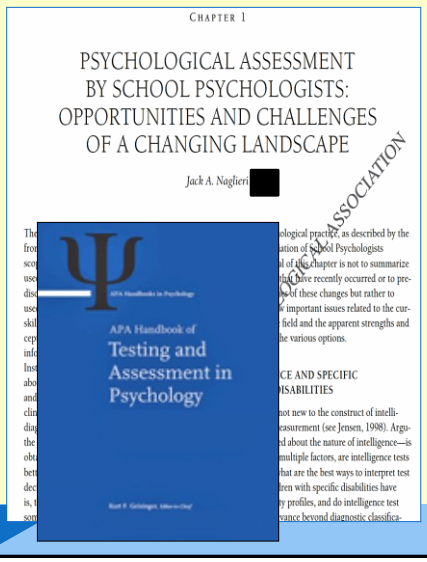
FAR INTERPRETIVE REPORT WRITER

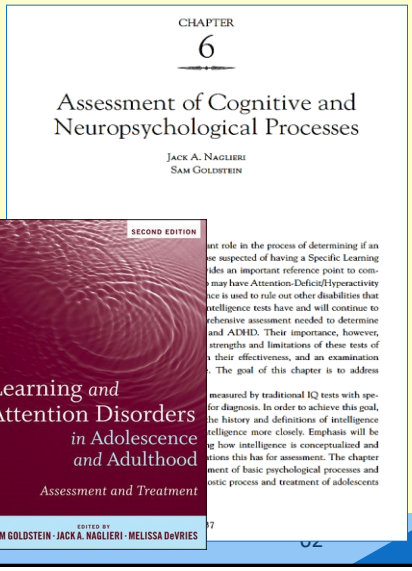
Fundations	FAR INTERPRETIVE REPORT WRITER: Targeted Reading Programs
Alphabetic Phonics	A multisensory phonological approach to reading that is an extension of the traditional Orton-Gillingham model. There are 11 fast-paced activities embedded within each lesson to develop automaticity with phonics skills.
Read Well	A top-down reading and language arts solution that emphasizes a mixture of instruction to the class as a whole, smaller groups, and individual student practice.
Lexia Primary Reading	A self-paced computer-based program that helps students develop reading skills. The program identifies when students would benefit from additional support, and automatically notifies the teacher with individualized feedback and recommendations.
Fast Forword Language to Reading	A scientifically-based 8-12 week reading intervention that boosts students' reading levels by one or two grades. Focuses on phonemic awareness, phonics, fluency, comprehension, and vocabulary.
Voyager Time Warp Plus	A summer reading intervention that encompasses 80 hours-worth of material. Phonemic awareness, phonics and word analysis, fluency, vocabulary, and comprehension are covered thoroughly through daily practice.
System 44	Teaches foundational reading skills to students Grades 3+. This computer-based platform encourages students to think critically and interact with the text as they learn phonics and comprehension.
Academy of Reading	An intervention program that helps students with phonemic awareness, phonics, fluency, vocabulary, and comprehension. This online program Includes real-time reading assessments and progress monitoring.
Words Their Way	A developmental spelling, phonics, and vocabulary program with numerous activities geared toward developing orthographic knowledge. Sorting, constructing a word wall, and creating a word study notebook are essential components of the program.

Ability Test Profile Studies


CHAPTER 1

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

Jack A. Naglieri


CHAPTER 6

Assessment of Cognitive and Neuropsychological Processes

Jack A. Naglieri
Sam Goldstein

Naglieri & Goldstein (2011)

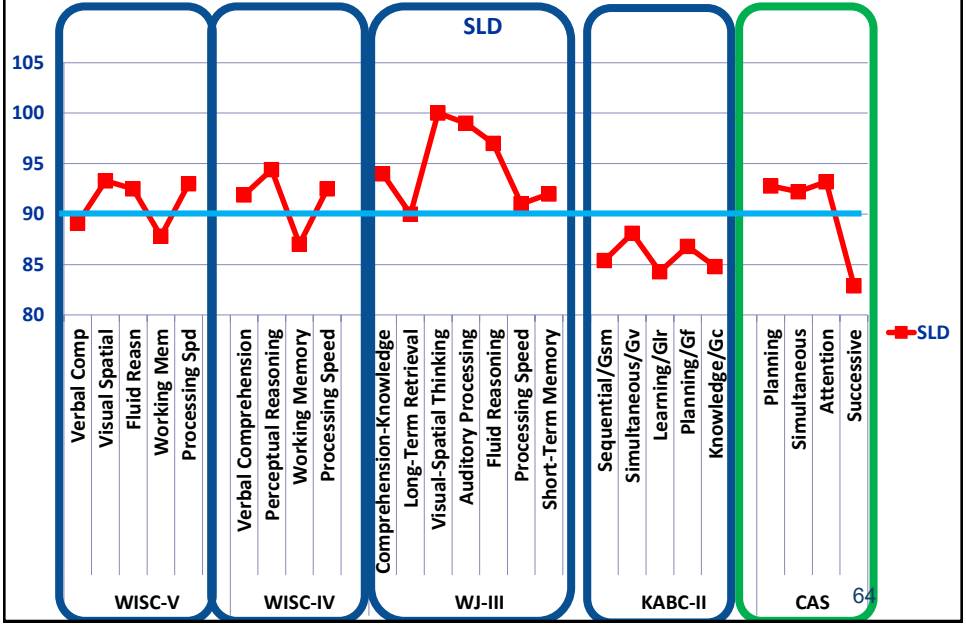
GROUP PROFILES BY ABILITY TEST

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)



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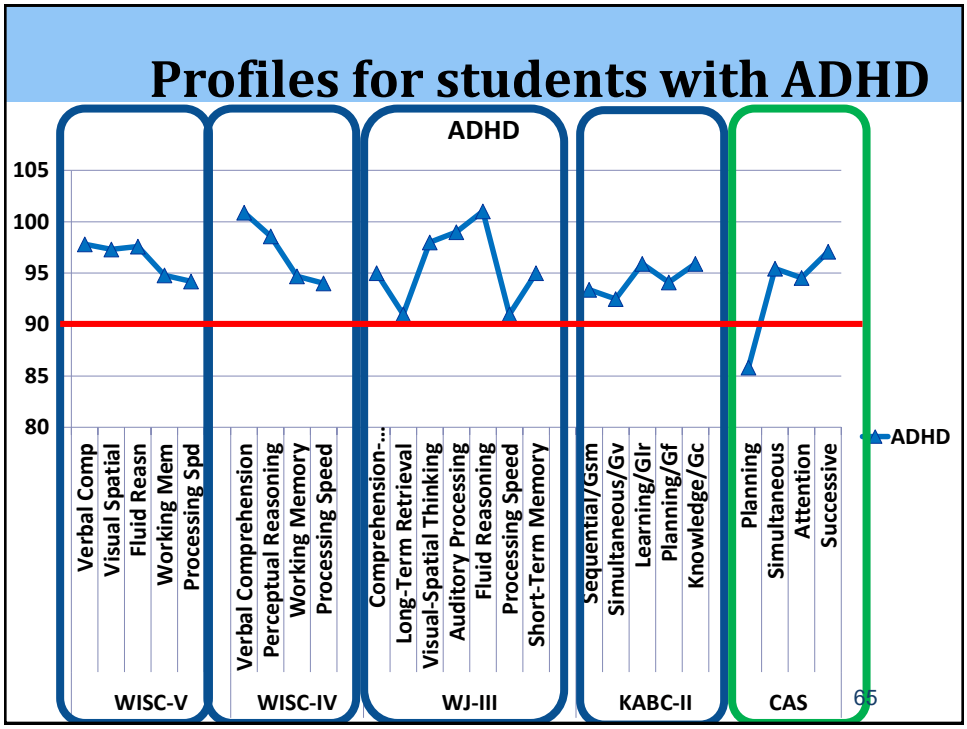
Profiles for students with ADHD
ADHD
105
100
95
90
85
80
Verbal Comp
Visual Spatial
Fluid Reasn
Working Mem
Processing Spd
Verbal Comprehension
Perceptual Reasoning
Working Memory
Processing Speed
Comprehension-...
Long-Term Retrieval
Visual-Spatial Thinking
Auditory Processing
Fluid Reasoning
Processing Speed
Short-Term Memory
Sequential/Gsm
Simultaneous/Gv
Learning/Glr
Planning/Gf
Knowledge/Gc
Planning
Simultaneous
Attention
Successive
ADHD
WISC-V
WISC-IV
WJ-III
KABC-II
CAS
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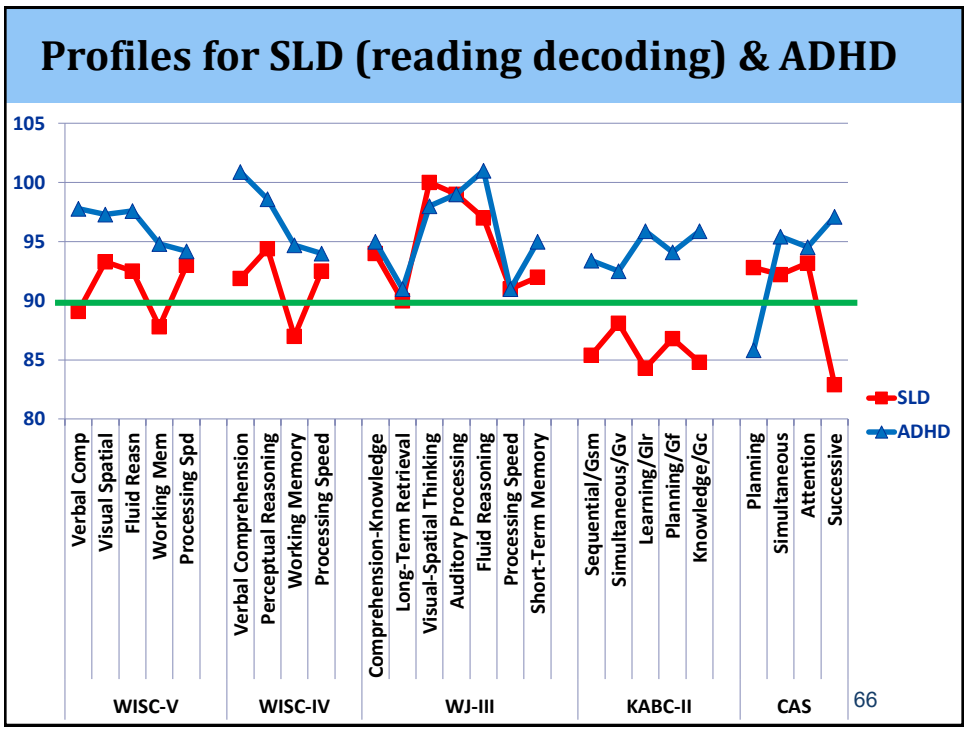

Profiles for SLD (reading decoding) & ADHD
105
100
95
90
85
80
Verbal Comp
Visual Spatial
Fluid Reasn
Working Mem
Processing Spd
Verbal Comprehension
Perceptual Reasoning
Working Memory
Processing Speed
Comprehension-Knowledge
Long-Term Retrieval
Visual-Spatial Thinking
Auditory Processing
Fluid Reasoning
Processing Speed
Short-Term Memory
Sequential/Gsm
Simultaneous/Gv
Learning/Glr
Planning/Gf
Knowledge/Gc
Planning
Simultaneous
Attention
Successive
SLD
ADHD
WISC-V
WISC-IV
WJ-III
KABC-II
CAS
66

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[illegible]

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

SLD Profiles on CAS (Huang, Bardos, D'Amato, 2010)

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

Journal of Psychoeducational Assessment
28(1) 19–30

DOI: 10.1177/0734282909333057
http://jpa.sagepub.com
SAGE

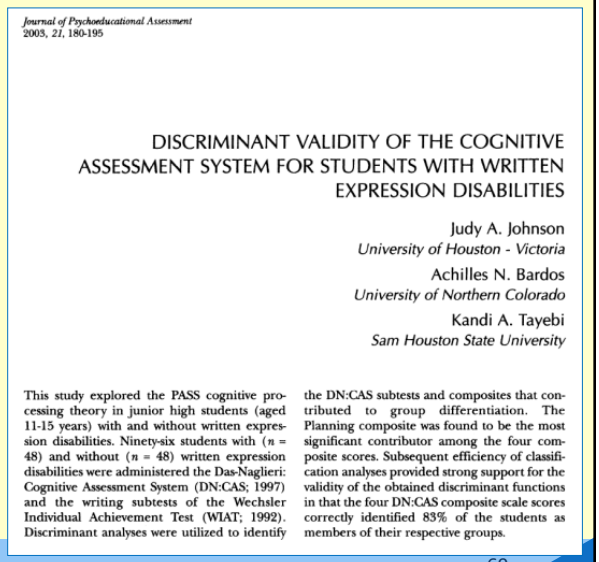
Leesa V. Huang[1], Achilles N. Bardos[2], and Rik Carl D'Amato[3]

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 megacluster 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.

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 11-15 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 83% of the students as members of their respective groups.

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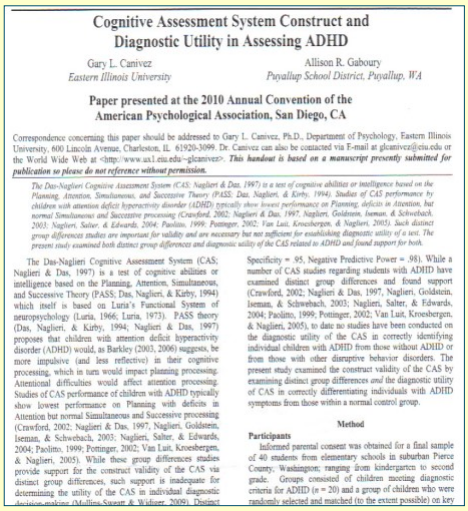
Canivez & Gaboury (2010)

- "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
Allison R. Gaboury
Puyallup School District, Puyallup, WA

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

Correspondence concerning this paper should be addressed to Gary L. Canivez, Ph.D., Department of Psychology, Eastern Illinois University, 600 Lincoln Avenue, Charleston, IL 61920-3099. Dr. Canivez can also be contacted via E-mail at glcanivez@eiu.edu or the World Wide Web at <http://www.ux1.eiu.edu/~glcanivez>. ***This handout is based on a manuscript presently submitted for publication so please do not reference without permission.***

The Das-Naglieri Cognitive Assessment System (CAS; Naglieri & Das, 1997) is a test of cognitive abilities or intelligence based on the Planning, Attention, Simultaneous, and Successive Theory (PASS; Das, Naglieri, & Kirby, 1994). Studies of CAS performance by children with attention deficit hyperactivity disorder (ADHD) typically show lowest performance on Planning; deficits in Attention, but normal Simultaneous and Successive processing (Crawford, 2002; Naglieri & Das, 1997; Naglieri, Goldstein, Iseman, & Schwebach, 2003; Naglieri, Salter, & Edwards, 2004; Paolito, 1999; Pottinger, 2002; Van Luit, Kroesbergen, & Naglieri, 2005). Such distinct group differences studies are important for validity and are necessary but not sufficient for establishing diagnostic utility of a test. The present study examined both distinct group differences and diagnostic utility of the CAS related to ADHD and found support for both.

The Das-Naglieri Cognitive Assessment System (CAS; Naglieri & Das, 1997) is a test of cognitive abilities or intelligence based on the Planning, Attention, Simultaneous, and Successive Theory (PASS; Das, Naglieri, & Kirby, 1994) which itself is based on Luria's Functional System of neuropsychology (Luria, 1966; Luria, 1973). PASS theory (Das, Naglieri, & Kirby, 1994; Naglieri & Das, 1997) proposes that children with attention deficit hyperactivity disorder (ADHD) would, as Barkley (2003, 2006) suggests, be more impulsive (and less reflective) in their cognitive processing, which in turn would impact planning processing. Attentional difficulties would affect attention processing. Studies of CAS performance of children with ADHD typically show lowest performance on Planning with deficits in Attention but normal Simultaneous and Successive processing (Crawford, 2002; Naglieri & Das, 1997; Naglieri, Goldstein, Iseman, & Schwebach, 2003; Naglieri, Salter, & Edwards, 2004; Paolino, 1999; Pottinger, 2002; Van Luit, Kroesbergen, & Naglieri, 2005). While these group differences studies provide support for the construct validity of the CAS via distinct group differences, such support is inadequate for determining the utility of the CAS in individual diagnostic decision-making (Mullins-Sweatt & Widiger, 2009). Distinct Specificity = .95, Negative Predictive Power = .98). While a number of CAS studies regarding students with ADHD have examined distinct group differences and found support (Crawford, 2002; Naglieri & Das, 1997, Naglieri, Goldstein, Iseman, & Schwebach, 2003; Naglieri, Salter, & Edwards, 2004; Paolito, 1999; Pottinger, 2002; Van Luit, Kroesbergen, & Naglieri, 2005), to date no studies have been conducted on the diagnostic utility of the CAS in correctly identifying individual children with ADHD from those without ADHD or from those with other disruptive behavior disorders. The present study examined the construct validity of the CAS by examining distinct group differences *and* the diagnostic utility of CAS in correctly differentiating individuals with ADHD symptoms from those within a normal control group.

Method

Participants

Informed parental consent was obtained for a final sample of 40 students from elementary schools in suburban Pierce County, Washington; ranging from kindergarten to second grade. Groups consisted of children meeting diagnostic criteria for ADHD (n = 20) and a group of children who were randomly selected and matched (to the extent possible) on key

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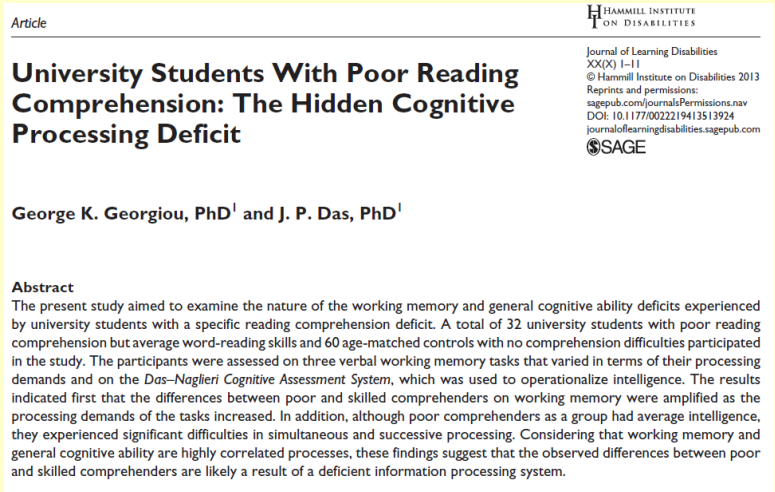
Georgiou & Das (2013)



Article

HAMMILL INSTITUTE ON DISABILITIES

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XX(X) 1–11

DOI: 10.1177/0022219413513924
journaloflearningdisabilities.sagepub.com
SAGE

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

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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Topical Outline

- Introduction
- A "basic psychological process" approach to SLD eligibility determination
- Measure PASS and reading skills (FAR)
  - Case study #1

Measure PASS and math skills (FAM)

  - Case study #2
  - Case study #3

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What is a Math Disability?

***Dyscalculia** – children with specific math-related deficits, including : a) Learning and retrieving mathematical facts

(Language Retrieval)

b) Executing math calculation procedures

(Working Memory)

c) Basic number sense and concept development

(Executive Functioning)

Math Learning Disability (MLD) - a generic term referring to children whose math performance in the classroom is substantially below age- and grade-level expectations. Often used when there is unexpected underachievement.

* Up to **20%** of school age children have MLD or persistent difficulty with math (Iuculano et al., 2015)

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fam™
feiferassessmentofmathematics™
Steven G. Feifer, DEd

- A neurodevelopmental assessment of mathematics
- Pre-K to College (Ages 4-21)
- Normative sample included 1,061 students
- 19 subtests in complete battery
- Diagnoses **3** subtypes of math disorders
- Includes the FAM-S dyscalculia screening battery
- Total Fam index score and **3** math index scores:
  - a) Procedural subtype
  - b) Verbal subtype
  - c) Semantic subtype
- **Qualification Level:** S or B

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Steven G. Feifer, DEd

Dyscalculia Subtypes

- **Procedural** – a deficit in the ability to count, order, or sequence numbers or mathematical procedures. Often, there are limitations with symbolic working memory and pattern recognition. **(PASS: Successive)**

- **Verbal** – an inability to use language-based procedures to assist in arithmetic skills. Difficulties with rapid number identification skills, and retrieving stored mathematical facts. **(PASS: Attention)**

- **Semantic** – a core deficit in both visual-spatial and conceptual components of mathematics . Deficits include poor estimation skills, difficulty aligning numbers in columns, poor magnitude representations, and difficulty selecting a particular mathematical strategy to solve real world problems. **(Planning & Simultaneous)**

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Structure of the FAM

Index	Subtest	Grade range	Approximate administration time
Procedural Index (PI)	Forward Number Count (FNC)	PK to college	5 minutes
	Backward Number Count (BNC)	K to college	5 minutes
	Numeric Capacity (NCA)	PK to college	3 minutes
	Sequences (SEQ)	PK to college	5 minutes
	Object Counting (OC)	PK to Grade 2	5 minutes
Verbal Index (VI)	Rapid Number Naming (RNN)	PK to college	1 minute
	Addition Fluency (AF)	K to college	1 minute
	Subtraction Fluency (SF)	K to college	1 minute
	Multiplication Fluency (MF)	Grade 3 to college	1 minute
	Division Fluency (DF)	Grade 3 to college	1 minute
	Linguistic Math Concepts (LMC)	PK to college	6 minutes
Semantic Index (SI)	Spatial Memory (SM)	PK to college	5 minutes
	Equation Building (EB)	Grade 3 to college	4 to 6 minutes
	Perceptual Estimation (PE)	PK to college	5 minutes
	Number Comparison (NCO)	PK to college	2 minutes
	Addition Knowledge (AK)	K to college	2 minutes
	Subtraction Knowledge (SK)	K to college	2 minutes
	Multiplication Knowledge (MK)	Grade 3 to college	2 minutes
	Division Knowledge (DK)	Grade 3 to college	2 minutes

Topical Outline

- Introduction
- A "basic psychological process" approach to SLD eligibility determination
- Measure PASS and reading skills (FAR)
  - Case study #1
- Measure PASS and math skills (FAM)
  - Case study #2
  - Case study #3

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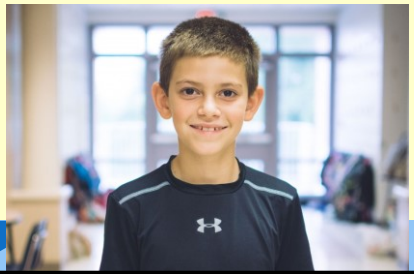
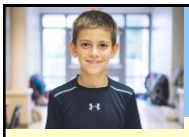
Kenny – 8 years old

- 3rd grade and struggles retaining basic math facts.
- Often fails most tests and quizzes.
- Limited conceptual understanding of math.
- Tends to count on his fingers when working.
- Reading and writing skills commensurate with age and grade level.



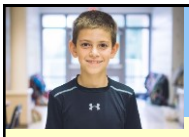
* No behavior or attention concerns.

78



Kenny 8 years-old

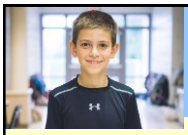
CAS-2	COMPOSITE SCORE	RANGE	PERCENTILE RANK
Planning: the ability to apply a strategy, and self-monitor and self- correct performance while working toward a solution.	**79**	**Poor**	**8%**
Attention: the ability to selectively focus on a stimulus while inhibiting responses from competing stimuli.	**103**	**Average**	**58%**
Simultaneous Processing- 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**	**Poor**	**5%**
Successive Processing- is the ability to put information into a serial order or particular sequence.	**94**	**Average**	**34%**
CAS-2 COMPOSITE SCORE	**88**	**Below Average**	**21%**



Kenny 8 Years-old

KTEA III Math Subtests	Standard Score	Percentile	Range
Math Concepts & Applications – the student responds orally to applied math problems involving number concepts, time, and measurement.	80	9%	Below Average
Math Computation – an untimed test requiring student to solve math equations including addition, subtraction, multiplication and division.	88	21%	Below Average
Math Fluency – the student solves as many basic problems as possible in one minute	85	16%	Below Average
KTEA III Math Composite	82	12%	Below Average

80



Kenny 8 Years-old

FAM Index	Standard Score	Percentile	Range
Procedural Index – measures the ability to count, order, and/or sequence numbers.	90	25%	Average
Verbal Index – measures the ability to automatically identify numbers, retrieve facts, and understand math terminology.	83	13%	Below Average
Semantic Index – measures the ability to determine magnitude representations, estimation, pattern recognition, and quantitative reasoning.	75	5%	Moderately Below Average
FAM TOTAL INDEX	79	8%	Moderately Below Average

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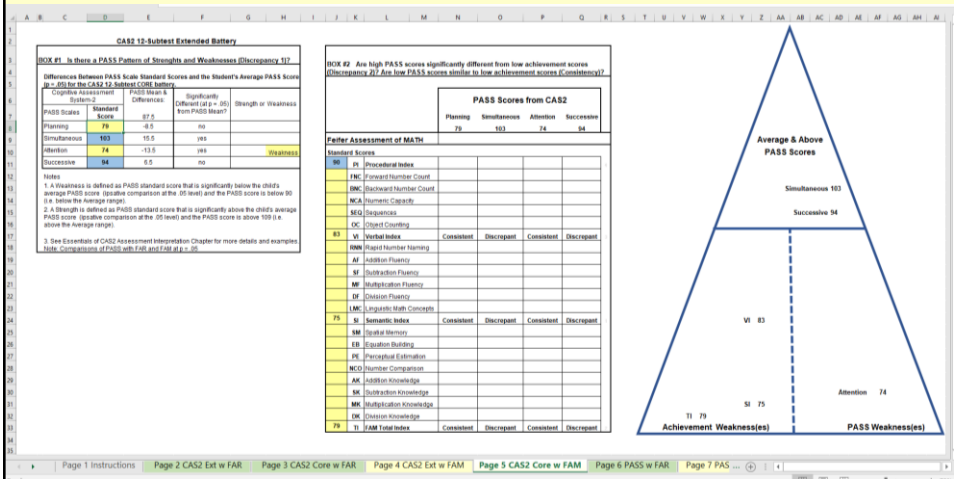
CAS2 & FAM Analyzer Results for Kenny

- Discrepancy Consistency Method shows a PSW



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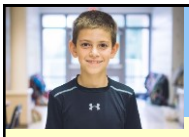
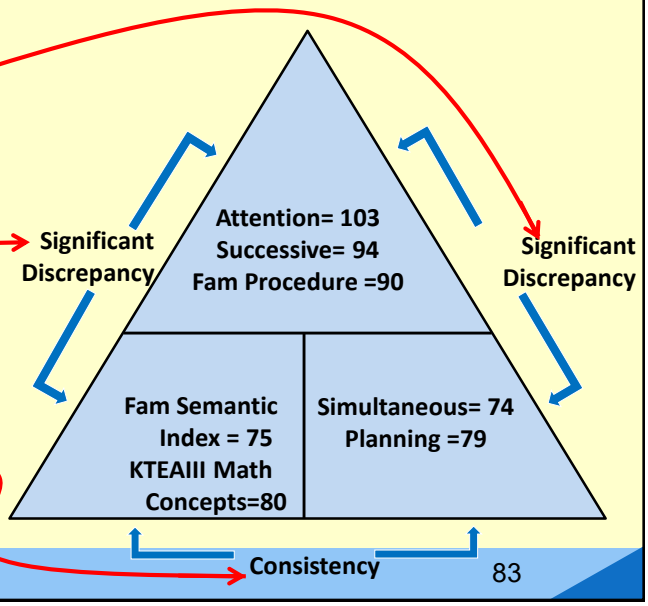


Discrepancy Consistency for Kenny

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



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CAS-2 Simultaneous and Math

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

➢**Simultaneous & Math** – underscores the ability to subitize, estimate, align columns of numbers, and develop a visual-spatial representation (nonsymbolic) of magnitudes and amounts. Essential in the core development of "number sense".

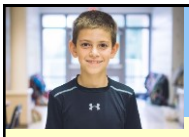
How to Pair CAS2 & FAM

➢**CAS2** - determine if there is a cognitive processing weakness (i.e. Planning & Simultaneous) and whether that particular weakness directly impacts mathematics.

➢**FAM**: The Semantic Index on the FAM is heavily dependent upon both Planning and Simultaneous processing.

Poor **Planning** (CAS-2) ✚ Poor **Semantic Index** (FAM) 〓
SLD in Mathematical Problem Solving
(Semantic Dyscalculia)

85



FAM Report Writer:
Semantic Dyscalculia

1. **Math Word Walls – create classroom charts or individual desk laminates with math vocabulary terms, magnitude representations through pictures, and numeric equations and facts as a reference guide.**

2. **Answers Provided – administer math worksheets with the answers already provided to the equations. Half should be correct answers, and the other half are incorrect. Have the student identify all of the correct answers and verbally explain "why" the answer is correct, and draw a picture to demonstrate "why" the answer is not correct.**

3. **Think in Pictures – present word problems to students, and have them draw a picture or represent the equation using a picture, outline, or bar graph, not a numeric equation. This will develop greater conceptual understanding and heighten magnitude representational skills. The Singapore math curriculum is based upon a bar graph representation to assist students.**

4. **Language Notebook - Create a notebook with a vocabulary list of specific math terminology. Have Kenny define math terms and write their meanings by giving specific examples.**

5. **Equation Dictation – Have Kenny write or "set up" a math equation from a verbal sentence.**

6. **Fact Family Charts - Create a math fact family chart and place it in a clear sheet protector. The sheet protector works as a dry erase board, so students can write in the fact family with a dry erase marker as the instructor says the problem aloud.**

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Topical Outline

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87

Jackson: 13 yrs old

- 7th grader who makes careless mistakes in math.
- Needs excessive time to complete homework.
- Good conceptual understanding of math, though often misses important details.
- Tends to forget steps when problem solving.
- Declining grades in math.

* Seems to lack confidence in mathematics.

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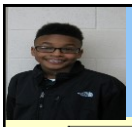

Jackson 13 years-old

CAS-2	COMPOSITE SCORE	RANGE	PERCENTILE RANK
Planning: the ability to apply a strategy, and self-monitor and self- correct performance while working toward a solution.	**101**	**Average**	**53%**
Attention: the ability to selectively focus on a stimulus while inhibiting responses from competing stimuli.	**81**	**Below Average**	**10%**
Simultaneous Processing- 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.	**104**	**Average**	**61%**
Successive Processing- is the ability to put information into a serial order or particular sequence.	**83**	**Below Average**	**13%**
CAS-2 COMPOSITE SCORE	**92**	**Average**	**30%**

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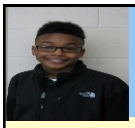
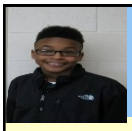


Jackson 13 years-old

KTEA III Math Subtests	Standard Score	Percentile	Range
Math Concepts & Applications – the student responds orally to applied math problems involving number concepts, time, and measurement.	94	34%	Average
Math Computation – an untimed test requiring student to solve math equations including addition, subtraction, multiplication and division.	82	12%	Below Average
Math Fluency – the student solves as many basic problems as possible in one minute	90	25%	Average
KTEA III Math Composite	86	18%	Below Average

90



Jackson 13 years-old

FAM Index	Standard Score	Percentile	Range
Procedural Index – measures the ability to count, order, and/or sequence numbers.	74	4%	Moderately Below Average
Verbal Index – measures the ability to automatically identify numbers, retrieve facts, and understand math terminology.	90	25%	Average
Semantic Index – measures the ability to determine magnitude representations, estimation, pattern recognition, and quantitative reasoning.	94	34%	Average
FAM TOTAL INDEX	85	16%	Below Average

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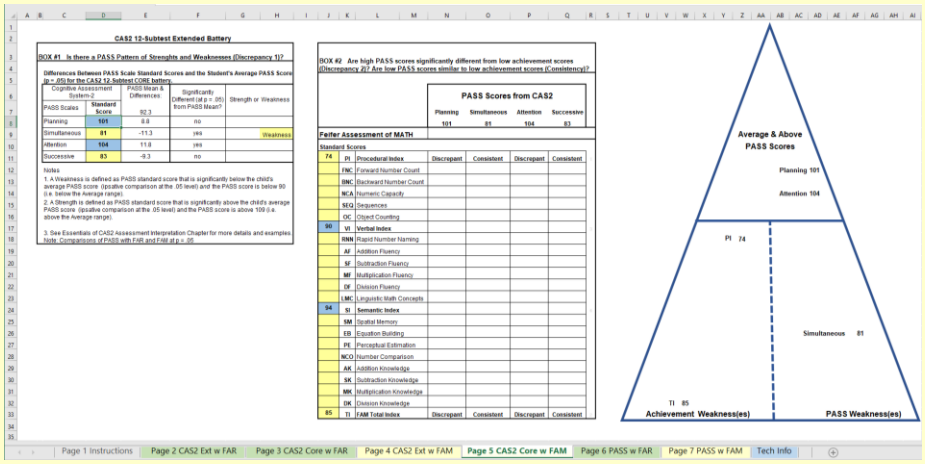
CAS2 & FAM Analyzer Results for Jackson

- Discrepancy Consistency Method shows a PSW



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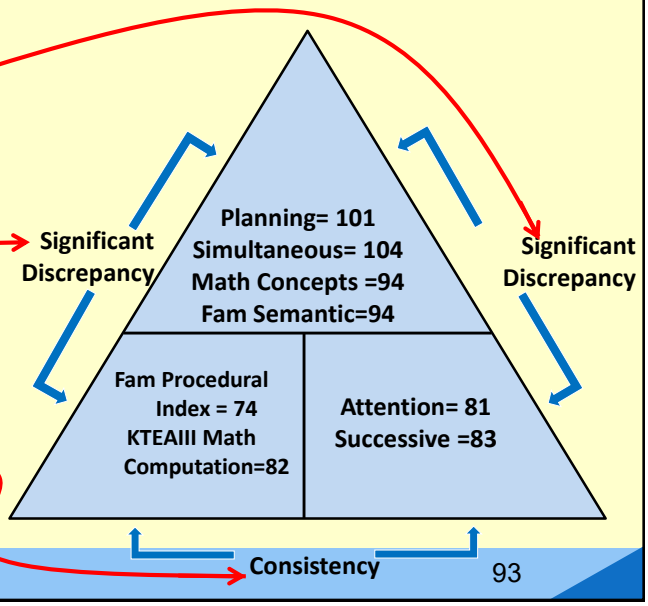
Discrepancy Consistency for Jackson

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



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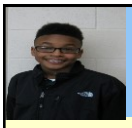


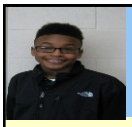
How to Pair CAS2 & FAM

➢**CAS2** - determine if there is a cognitive processing weakness (i.e. Successive) and whether that particular weakness directly impacts mathematics.

➢**FAM**: The Procedural Index on the FAM is heavily dependent upon Successive processing.

Poor Successive (CAS2) ✚ Poor Procedural (FAM) 〓
SLD in Mathematical Problem Solving
(Procedural Dyscalculia)

94



FAM Report Writer:
Procedural Dyscalculia

1. **FNWS/BNWS – place emphasis on developing a Forward Number Word Sequence and Backward Number Word Sequence by skip counting out loud from various increments. Begin with whole numbers *(i.e. "Count backwards by 6's from the number 136" and then incorporate fractions and decimals "Count forwards from 3's by 1/3rd")***

2. **Hundreds Chart - A hundreds chart will assist students in developing a greater sense of number patterns and relationships. Place a chip on the chart, and ask students to move the chip by various increments on the chart.**
3. **Abacus Training – Using a color-coded abacus helps to reinforce magnitude representations of numbers and develop more automatic counting skills. The beads should be color-coded and divided into two groups of five for each row.**
4. **Sequence Sense – practice developing an understanding of basic number patterns and how numerals sequentially relate to one another. For instance, present a number pattern such as 3 -6 – 9 - __ - 15. First, allow Jackson to use manipulatives and/or paper and pencil to solve, and eventually try solving without any manipulatives.**
5. **Vertical number lines – attach a number line that runs vertically beside Jackson's desk. This will aid in developing a better feel for spatial relationships between numbers.**

6. **Domino Patterns – practice developing an understanding of basic number patterns using dominoes. For instance, present dominoes in an array and have students find the missing domino that best completes the pattern.**
7. **Student directed algorithms. Instead of memorizing a singular method for problem solving, students should be taught multiple methods and select their own, rather than be forced to abide by the teacher's method.**

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CAS2, FAR and FAM Summary

- These instruments are based upon a neurocognitive theory of brain functioning.
- Using these measures is a time-efficient way to measure basic psychological processes and their influence of academic skill acquisition and execution
- Detect a pattern of cognitive and academic strengths and weaknesses using the Discrepancy Consistency Method (DCM) to diagnose SLD
- DCM explains *WHY* a student is having math difficulty, by showing HOW a student thinks about reading or math
- Directly informs intervention decision making
- This approach puts the "I" back into IEP's!!!