NASP 2022 ANNUAL CONVENTION

FEBRUARY 15–18, 2022 | Hynes Convention Center | Boston, MA | www.nasponline.com/nasp2022

A Process Oriented Approach for Identifying and Remediating Specific Learning Disabilities

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Topical Outline

- Challenges of Assessment in Era of COVID
- The Problem with Traditional IQ Testing
- Intelligence Conceptualized by Brain Functioning: PASS Theory
- Subtypes of Reading, Writing and Math Disorders
- Using the Discrepancy-Consistency Model to Identify SLD
- CAS2 & FAR-FAM-FAW: Case Studies
  - Case study #1 (Reading)
  - Case study #2 (Math)
  - Case study #3 (Writing)

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For Future Reference

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The Challenge of Assessments During a Pandemic

- COVID-19 has caused the closure of nearly all schools in the United States in 2020, affecting more than 55 million students.

- According to NASP (2021): *"Schools should assume children have lost **about 25%** of the prior grade level's instruction. It is an estimate because districts varied in the use of in person, virtual, and hybrid models of schooling, as well as the nature and quality of instruction"*

- Are traditional achievement tests in still valid?

- Better question…..Are IQ tests still valid?

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Traditional Assessments for Math

- Applied Problems
- Calculation
- Math Facts Fluency
- Number Matrices

- Math Problem Solving
- Numeric Operations
- Math Fluency

- Math Concepts & Applications
- Math Computation
- Math Fluency

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Cognitive Deficits and COVID-19

- Adam Hampshire and colleagues (2020) examined over 84,000 patients suspected or biologically confirmed COVID patients using an on-line intelligence questionnaire called the Great British Intelligence Test (UK Dementia Research Institute).

- Tasks included 9 measures of processing including spatial span, mental rotation, semantic reasoning, vocabulary definitions, digit span, Tower of London, and block designs.

- Preliminary results were as follows:
  - .57 SD lower scores for patients on ventilator
  - .50 SD lower scores for patients hospitalized (no ventilator)
  - .25 SD lower scores for patients with respiratory problems.
  - .25 SD lower scores for patients with general symptoms.

  - ❖ Spatial working memory, attention, and semantic problem solving were lowest scores
  - ❖ Nets out to 8.5 point drop in IQ for most severe patients.

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Cognitive Related Deficits and COVID: Brain Fog?

- Executive functioning deficits and brain fog symptoms persisting months after recovery from COVID-19 (Goldberg et al., 2021)

- 33% of patients reported dysexecutive syndrome including inattention, disorganization, and disorientation. Bilateral frontotemporal hypo-fusion was common MRI finding. Helms, J. (2020). Neurological features in severe SARS-COV-2 Infection. New England Journal of Medicine.

- Large megakaryocytes- which are bone marrow cells responsible for blood clotting- crossing blood-brain barrier in COVID-19 patients. This may be leading to brain fog and cluttering neural connections. Nauen et al (2021). Assessing brain capillaries in COVID-19. JAMA Neurology.

EF Traits Particularly Impaired:
- Lexical Fluency
- Attention
- Processing Speed
- Working Memory

Beaud et al. (2020). Pattern of cognitive deficits in severe COVID-19. Journal of Neurology, Neurosurgery, Psychiatry.

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Paul 6th grade

Presenting Concerns: Academic Issues with Reading and Math

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 IV Reading	87	Below Average	19%
WIAT IV Math	**80**	Below Average	9%
WIAT IV Writing	94	Average	34%

Questions: #1 Does Jacob qualify for SPED or a Covid Casualty?
#2 Do IQ scores really explain learning?

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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
  - And more...
- I noticed that the Peabody Individual Achievement Test (1970) had a General Information and Arithmetic subtests JUST LIKE THE WISC!
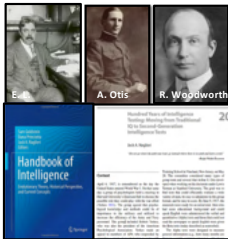- HOW DOES THAT MAKE SENSE?
- WHY DO WE HAVE THIS PROBLEM?

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Evolution of IQ http://www.jacknaglieri.com/cas2.html

- ➤ A group of psychologists met at Harvard in April of 1917 to construct an ability test to help the US military evaluate recruits (WWI)

- By July 1917 their research showed that the tests could "aid in segregating and eliminating the mentally incompetent, classify men according to their mental ability; and assist in selecting competent men for responsible positions" (p. 19, Yerkes, 1921).

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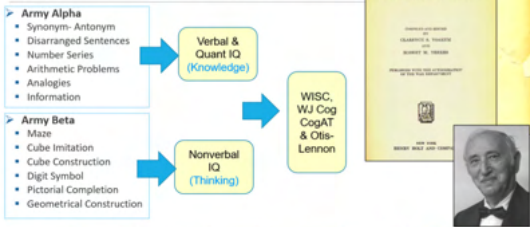## Evolution of IQ http://www.jacknaglieri.com/cas2.html

Alpha & Beta → Wechsler

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

  → Verbal & Quant IQ (Knowledge)

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

  → Nonverbal IQ (Thinking)

  → WISC, WJ Cog CogAT & Otis-Lennon

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ARMY IQ TEST: Alpha (Verbal)

1. tobacco
2. fruit
3. typewriter
4. Mogul
5. engineers
6. Superbas
7. fabric
8. corn
9. Mckinley
10. cigarette

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

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

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1920 Army Testing (Yoakum & Yerkes)

Army Testing (Yoakum & Yerkes, 1920) & Pintner (1923)

METHODS AND RESULTS   19

Why Beta?

Men who fail in alpha are sent to beta in order that injustice by reason of relative unfamiliarity with English may be avoided. Men who fail in beta are referred for individual examination by means of what may appear to be the most suitable and altogether appropriate procedure among the varied methods available. This reference for careful individual examination is yet another attempt to avoid injustice either by reason of linguistic handicap or accidents incident to group examining.

INTELLIGENCE TESTING
METHODS AND RESULTS

BY
RUDOLF PINTNER, Ph.D.

1. Tests must be relatively new. — A good intelligence test must avoid as much as possible anything that is commonly learned by the subjects tested. In a broad sense this rests upon a differentiation between knowledge and intelligence. To use as a test of intelligence

Note there is no mention of measuring verbal and nonverbal intelligences – **it was a social justice issue.**

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Views of General ability

- Wechsler "believed that his Verbal and Performance Scales represented different ways to access *g* (general ability)", but he never believed [in verbal and] nonverbal intelligence as being separate from 'g'. (Kaufman, 2008; in Wechsler Nonverbal Manual; Wechsler & Naglieri, 2006)

"The aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment (1939)"

"we did not start with a clear definition of general intelligence… [but] borrowed from every-day life a vague term implying all-round ability and… we [are] still attempting to define it more sharply and endow it with a stricter scientific connotation" (p. 53, Pintner, Intelligence Testing: Methods and Results, 1923)".

Tests that Demand Knowledge

Knowledge is Included in "Ability" Tests

Stanford-Binet-5	WISC-V	WJ-IV	KABC-II	OLSAT	CogAT
• Verbal • Knowledge • Quantitative Reasoning • Vocabulary • Verbal Analogies	• Verbal Comprehension Vocabulary, Similarities, Information & Comprehension • Fluid Reasoning Figure Weights, Arithmetic	• Comprehension Knowledge: Vocabulary & General Information • Fluid Reasoning: Number Series & Concept Formation • Auditory Processing: Phonological Processing	• Knowledge / GC • Riddles, • Expressive Vocabulary, • Verbal Knowledge	• Verbal • Following directions • Verbal Reasoning • Quantitative • Verbal Arithmetic Reasoning	• Verbal Scale • Analogies • Sentence Completion • Verbal Classification • Quantitative • 45 pages of oral instructions

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Differences in Mean Scores = Impact

According to the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014)

… **if a person has had limited opportunities to learn the content in a test of intelligence,** *that test may be considered unfair* (because it penalizes students for not knowing the answers) **even if the norming data do not demonstrate test bias.**
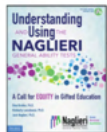
Equity
Bias

STANDARDS for Educational and Psychological Testing

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Verbal IQ Tests, Race & Ethnic Differences

Race and Ethnic Differences for Ability Tests that Demand Knowledge and those that require minimal Knowledge

Understanding and Using the NAGLIERI GENERAL ABILITY TESTS

A Call for EQUITY in Gifted Education

From: Brulles, D., Lansdowne, K. & Naglieri, J. A. (2022). Understanding and Using the Naglieri General Ability Tests: A Call to Equity in Gifted Education. Minneapolis, MN: Free Spirit Publishing.

Race and Ethnic Standard Score Differences Across Intelligence Tests	By Race	By Ethnicity
Tests that require knowledge	**Mn = 11.5**	**Mn = 9.2**
Otis-Lennon School Ability Test (district wide)	13.6	
Stanford-Binet IV (normative sample)	12.6	
WISC-V (normative sample)	11.6	
WJ- III (normative sample)	10.9	10.7
CogAT7 (Nonverbal scale)	11.8	7.6
WISC-V (statistical controls normative sample)	8.7	
Tests that require minimal knowledge	**Mn = 4.1**	**Mn = 2.6**
K-ABC (normative sample)	7.0	
K-ABC (matched samples)	6.1	
CAS-2 (normative sample)	6.3	4.5
CAS (statistical controls normative sample)	4.8	4.8
CAS-2 (statistical controls normative sample)	4.3	1.8
CAS-2 Brief (normative samples)	2.0	2.8
NNAT (matched samples)	4.2	2.8
Naglieri General Ability Test-Verbal	2.2	1.6
Naglieri General Ability Test-Nonverbal	1.0	1.1
Naglieri General Ability Test-Quantitative	3.2	1.3

We do the best we can with what we know, and when we know better, we do better.

— *Maya Angelou* —

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Intelligence in the 21st Century Conceptualized as brain function

Our Amazing Brains !

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Intelligence as Neurocognitive Abilities

- In Das and Naglieri's first meeting (February 11, 1984) they proposed that intelligence was better REinvented 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; and one defined as brain function

April 2018

PASS Neurocognitive Theory

- **P**lanning = THINKING ABOUT HOW YOU DO WHAT YOU DECIDE TO DO
- **A**ttention = BEING ALERT AND RESISTING DISTRACTIONS
- **S**imultaneous = UNDERSTANDING HOW THINGS FIT TOGETHER - PATTERNS
- **S**uccessive = MANAGING THINGS IN A SEQUENCE
- **PASS** = 'basic psychological processes'

Third Functional Unit: Planning Thinking About How to Solve Problems

Second Functional Unit: Simultaneous Working With Things or Ideas That Form a Whole

First Functional Unit: Attention Focusing With Resistance to Distraction

Second Functional Unit: Successive Working With Things or Ideas in Sequence
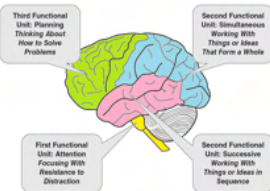
Figure 1.2 Three Functional Units and Associated Brain Structures
From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017

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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

I know that!

I need a plan!

Naglieri & Otero (2014)

- Neither the IQ/achievement discrepancy model nor RTI evaluates basic psychology processes
- CAS2 is ideal for meeting the IDEA definition of SLD "… 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."
- Evidence of a PASS weakness and its connection to academic weakness is the key to identifying SLD
- Establishing a disorder in the basic psychology processes is *essential* for determining SLD
- Use an equitable test explicitly developed to measure basic psychological processes
- The intelligence and achievement tests should explain learning

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PASS Comprehensive System
(Naglieri, Das, & Goldstein, 2014)

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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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SUBTYPES OF READING DISORDERS

(1) <u>Dysphonetic Dyslexia</u> – difficulty sounding out words in a phonological manner.

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

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

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

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SUBTYPES OF READING DISORDERS
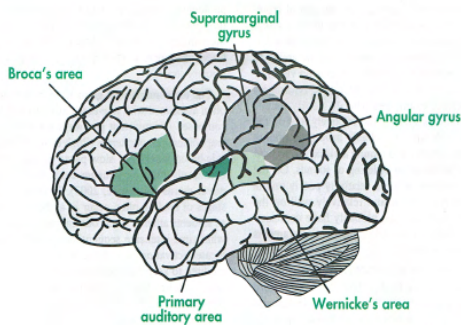
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Multiple Cueing Systems of Reading

➢ **Recognizes that both phonological** *(Successive Processing)***and orthographic** *(Simultaneous)* **and semantic cues** *(Planning)* **can facilitate word recognition.**

- **Phonics**
  - Phonemic Awareness
  - Decoding
- **Word Reading**
- **Ortho-graphy**
  - Orthographic Perception
  - Orthographic Memory
  - Alphabetic Knowledge
- **Semantic**
  - Vocabulary
  - Executive Functioning
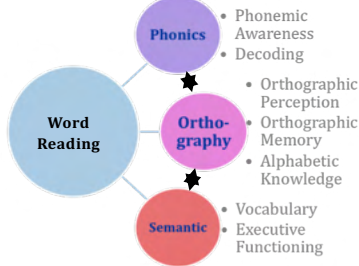
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USING PASS-FAR TO IDENTIFY READING DISORDERS

Reading Subtype	Description	PASS Process
Dysphonetic Dyslexia	Measures a student's ability to stitch together sequences of sounds to identify words in print. Dependent upon phonemic awareness and decoding skills.	Successive
Surface Dyslexia	Measures a student's ability to rapidly and automatically identify words in print. Dependent upon orthographic perception and orthographic memory skills.	Simultaneous and Successive
Mixed Dyslexia	Measures a student's ability to use both phonological and orthographical cues to accurately and fluently identify words in print.	Simultaneous and Successive
Reading Comprehension	Measures a student's ability to answer decipher meaning from print.	Planning Attention Simultaneous

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USING PASS-FAW TO IDENTIFY WRITING DISORDERS

(1) Graphomotor Dysgraphias - refers to a wide variety of motor skill deficits in which the voluntary execution of a skilled motor movement is impaired.

a) Premotor cortex plans the execution of a motor response.

b) Supplementary motor area - guides motor movement

c) Cerebellum - provides proprioceptive feedback.

d) Basal Ganglia - procedural memory and automaticity of handwriting.

PASS PROCESSES: PLANNING & SUCCESSIVE

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USING PASS-FAW TO IDENTIFY WRITING DISORDERS

(2) Dyslexic Dysgraphias- Spelling Miscues

a) Dysphonetic dysgraphia - the hallmark feature of this disorder is an inability to spell by *sound* due to poor *phonological* skills. There is often an over-reliance on the visual features of words when spelling.

b) Surface dysgraphia - a breakdown in the *orthographic* representation of words. Miscues made primarily on phonologically irregular words.

c) Mixed Dysgraphia - characterized by a combination of both *phonological* errors and *orthographical* errors depicting faulty arrangement of letters and words.

PASS PROCESSES: SUCCESSIVE & SIMULTANEOUS

USING PASS-FAW TO IDENTIFY WRITING DISORDERS

(3) Executive Dysgraphias - an inability to master the implicit rules for grammar which dictate how words and phrases can be combined. Deficits in *working memory* and *executive* functioning in frontal lobes hinders syntax!

- Word omissions
- Word ordering
- Incorrect verb usage
- Word ending errors
- Poor punctuation
- Lack of capitalization
- Oral vs. written language discrepancy

PASS PROCESSES: PLANNING, SUCCESSIVE, SIMULTANEOUS, ATTENTION

USING PASS-FAW TO IDENTIFY WRITING DISORDERS

Writing Subtype	Description	PASS Process
Graphomotor Dysgraphia	Measures a student's ability to plan, sequence, and execute the physical stroke of the writing process during timed conditions.	Planning and Successive
Dyslexic Dysgraphia	Measures the extent to which developmental dyslexia may be impacting writing by hindering the spelling process.	Simultaneous and Successive
Executive Dysgraphia	Refers to specific frontal lobe or executive functions in the writing process such as planning and sequencing, retrieval fluency, working memory, and saliency determination.	Planning, Attention Simultaneous Successive

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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USING PASS-FAM TO IDENTIFY MATH DISORDERS

Dyscalculia Subtypes

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

2. **Verbal** –Difficulties with rapid number identification skills, and retrieving *stored mathematical facts.* **(PASS: Simultaneous & Attention)**

3. **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)**

Learning vs. Skills in the Brain

- **Learning** depends on instruction & cognition (PASS)
- At first, PASS plays a major role in learning
- When a new task is learned and practiced it becomes a **skill** and execution requires less PASS

Role of PASS   **Role of Knowledge →Skills**

Maximum

Minimum

Over time and with experience

Novel Tasks   Well Learned Tasks

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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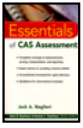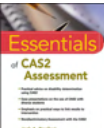
Discrepancy Consistency Method (DCM)

- 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

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

Support for 'g' but not Scales

Support for 'g'

- …The small portions of variance uniquely captured by [subtests]… render the group factors [scales] of questionable interpretive value independent of g (FSIQ general intelligence)
- Present CFA results confirm the EFA results (Canivez, Watkins, & Dombrowski, 2015); Dombrowski, Canivez, Watkins, & Beaujean (2015); and Canivez, Dombrowski, & Watkins (2015).

> The results of this study indicate that most **cognitive abilities specified in** John Carroll's **three-stratum theory have little-to-no interpretive relevance** above and beyond that of general intelligence.
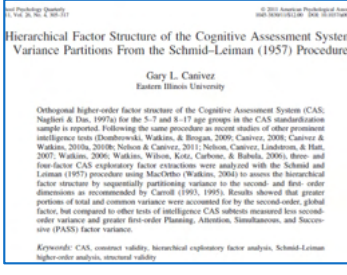
Support for PASS Scales has been found

Hierarchical Factor Structure of the Cognitive Assessment System: Variance Partitions From the Schmid–Leiman (1957) Procedure

Gary L. Canivez
Eastern Illinois University

- "…compared to the WISC–IV, WAIS–IV, SB–5, RIAS, WASI, and WRIT, the CAS had less variance apportioned to the higher-order general factor (g) and *greater proportions of variance apportioned to first-order Planning, Attention, Simultaneous and Successive factors.*
- This is consistent with the subtest selection and construction in an attempt to measure PASS dimensions linked to PASS theory … and neuropsychological theory (Luria)." (p. 311)
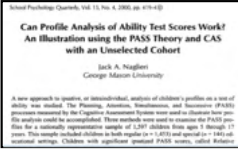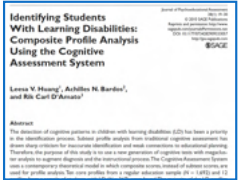
Research on PASS Profiles

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

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

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

Leesa V. Huang, Achilles N. Bardos, and Rik Carl D'Amato

"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.

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Research on PASS Profiles

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

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

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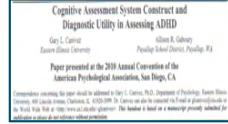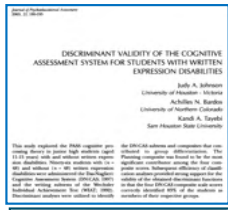
Patterns of Strengths & Weaknesses

Summaries of Research on Pattern of Strengths & Weaknesses of Scales from Several Intelligence Tests

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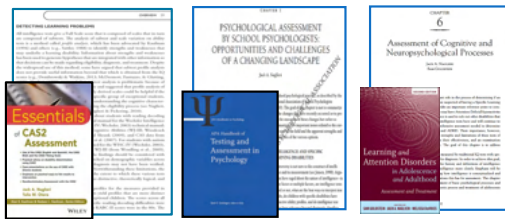
Patterns of Strengths & Weaknesses

These profiles across tests is very revealing - PASS works

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Slide 49: Correlations: We can do better!

Average correlations between IQ Scales with total achievement scores from *Essentials of CAS2 Assessment* Naglieri & Otero (2017)
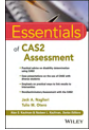
Correlations Between Ability and Achievement Test Scores			Average Correlation Scales without achievement
		All Scales	
WISC-V N = 201	Verbal Comprehension	.74	
	Visual Spatial	.46	
	Fluid Reasoning	.40	
	Working Memory	.63	
	Processing Speed	.34	.53 / .47
WJ-IV COG WJ-IV ACH N = 825	Comprehension Knowledge	.50	
	Fluid Reasoning	.71	
	Auditory Processing	.52	
	Short Term Working Memory	.43	
	Cognitive Processing Speed	.55	
	Long-Term Retrieval	.59	
	Visual Processing	.43	.54 / .50
KABC WJ-III ACH N = 167	Sequential/Gsm	.43	
	Simultaneous/Gv	.41	
	Learning/Glr	.50	
	Planning/Gf	.43	.48
	Knowledge/GC	.70	.53
CAS WJ-III ACH N=1,600	Planning	.57	
	Simultaneous	.67	
	Attention	.50	
	Successive	.60	.59

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

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Slide 50: Research on PASS & Achievement

PASS Research

➢ "The results clearly show that when CAS Full Scale is used it correlates **.60 with reading** and **.61 with mathematics**."

➢ "These correlations are significantly stronger ... than the correlations reported in previous meta-analysis for other measures of intelligence (e.g., Peng et al., 2019; Roth et al., 2015)...(e.g., WISC) that include tasks (e.g., Arithmetic, Vocabulary)..."

➢ "if we conceptualize intelligence as ... **cognitive processes that are linked to the functional organization of the brain**" it leads to significantly higher relations with academic achievement."

  ▪ "and these processes have direct implications for instruction and intervention..."

Georgiou, G., Guo, K., Naveenkumar, N., Vieira, A. P. A., & Das, J. P. (2019) PASS theory of intelligence and academic achievement: A meta-analytic review. *Intelligence, 79*.
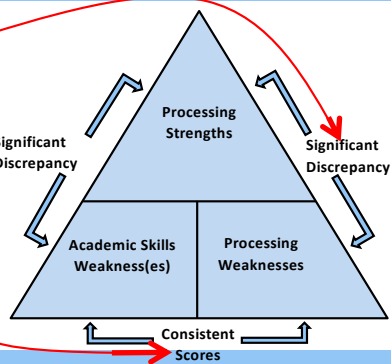
50

Slide 51: 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

Significant Discrepancy

Processing Strengths

Significant Discrepancy

Academic Skills Weakness(es)

Processing Weaknesses

Consistent Scores

How to Determine a Disorder

- Two sets of PASS scores were studied
  - Significant variation in relation to student's average has *instructional relevance*
  - Significant variation in relation to student's average AND a standard score less than 90 (< 25th %tile) *supports designation as SLD*

PASS Scales NOT Subtests

Significant Weaknesses

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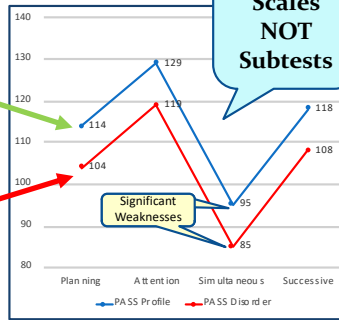
CAS2, FAR, FAM, FAW PSW Analyzers

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

CASE STUDY WORKBOOK
PASS SCORE ANALYZERS
10- MINUTE SOLUTIONS
SPEED/FLUENCY SCALE

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FREE CAS2, FAR, FAM, FAW PSW Analyzers

- Instructions tab Page 1

Discrepancy Consistency Method (DCM) for comparing PASS scores from the *Cognitive Assessment System* (CAS2; Extended & Core battery) with the *Feifer Assessment of Reading* (FAR) and *Feifer Assessment of Math* (FAM)
Jack A. Naglieri & Steve Feifer 9.18.18

Discrepancy Consistency Method (DCM)

HOW TO USE THIS WORKBOOK:
1. Click on tab for the CAS2 Extended (12-subtests) or Core (8-subtests) with the FAR or FAM.
2. Enter the PASS scores in the column labeled "Standard Scores" in BOX #1.
3. Enter the FAR and/or FAM standard scores in BOX #2.

Note: Once the PASS and FAR or FAM scores are entered the discrepancies and consistencies between neurocognitive and achievement scores will be noted. Follow the Flow-Chart (see Figure 3.2 included here which is from Essentials of CAS2 Assessment) for more guidance.

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CAS2, FAR, FAM, FAW PSW Analyzers

- Enter PASS and FAR standard scores in the yellow boxes

CAS2, FAR, FAM, FAW PSW Analyzers

- PASS scores are analyzed for Strengths and Weaknesses
- PASS and Achievement scores instantly compared

FREE – on www.jacknaglieri.com

CAS2, FAR, FAM, FAW PSW Analyzers

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

Note: This is a traditional Ability Achievement Discrepancy

Significant Discrepancy #2

Significant Discrepancy #1

The Consistency tells you WHY the student fails

CAS2, FAR, FAM, FAW PSW Analyzers

➢ Other free CAS2 Analyzers are available for the WIAT-3, WJ-4, and KTEA-3 on www.jacknaglieri.com

➢ But WHY do I suggest the combination of PASS scores from CAS2 with the FAR and FAM?

>   ➢ FAR, FAM and FAW are elegantly inter-related to the CAS2 because PASS processes underlie reading, math and writing skills

>   >   ➢ If a student is using a strategy when doing reading comprehension on the FAR - tie that to the CAS2 Planning score

>   >   ➢ When a student struggles with decoding words - connect that to the CAS2 Successive processing score

>   >   ➢ The connection between low scores on the FAR, FAM and FAW with PASS is so important because it explains WHY student struggles AND what to do about it AND it is consistent with IDEA SLD DEFINITION

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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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Topical Outline

- Challenges of Assessment in Era of COVID
- The Problem with Traditional IQ Testing
- Intelligence Conceptualized by Brain Functioning: PASS Theory
- Subtypes of Reading, Writing and Math Disorders
- Using the Discrepancy-Consistency Model to Identify SLD
- CAS2 & FAR-FAM-FAW: Case Studies
  - Case study #1 (Reading)
  - Case study #2 (Math)
  - Case study #3 (Writing)

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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 remember the **sequence of steps** when doing math and math facts
  - Some anxiety noted
  - Can't **sound out words**
  - Poor **spelling**
  - Poor reading comprehension

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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 IV Reading	87	Below Average	19%
WIAT IV Math	80	Below Average	9%
WIAT IV 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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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		

Differences Between PASS Scale Standard Scores and the Student's Average PASS Score Required for Significance for the CAS2 12-Subtest EXTENDED battery AGES 8-18 Years.

Cognitive Assessment System - 2		Difference from PASS Mean of: 92.3	Significantly Different (at p < .05) from	Strength or Weakness
PASS Scales	Standard Score			
Planning	92	-0.3	no	
Simultaneous	92	-0.3	no	
Attention	110	17.8	yes	Strength
Successive	75	-17.3	yes	Weakness

Ages 8-18 YEARS

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
Visual Spatial
Fluid Reasoning
Working Memory
Processing Speed

Planning
Attention
Simultaneous
Successive

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

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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

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CAS-2 Successive and Reading-Math

- **Successive Processing** – the ability to put information into a serial order or a particular sequence.

- **Successive & Reading** – underscores the ability to stitch together or sequence sounds to accurately identify words in print.
- **Successive & Math** – underscores the ability to solve problems that require multiple steps such as long division, working with fractions, and 2-3 digit multiplication.

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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)

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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.

Topical Outline

- What is a Learning Disability?
- The Problem with Traditional IQ Testing
- Intelligence Conceptualized by Brain Functioning: PASS Theory
- Subtypes of Reading, Writing and Math Disorders
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- CAS2 & FAR-FAM-FAW: Case Studies
  - Case study #1 (Reading)
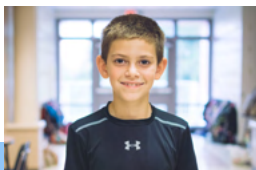 - Case study #2 (Math)
  - Case study #3 (Writing)

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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.

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

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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

Significant Discrepancy

Attention= 103
Successive= 94
Fam Procedure =90

Significant Discrepancy

Fam Semantic Index = 75
KTEAIII Math Concepts=80

Simultaneous= 74
Planning =79

Consistency

80
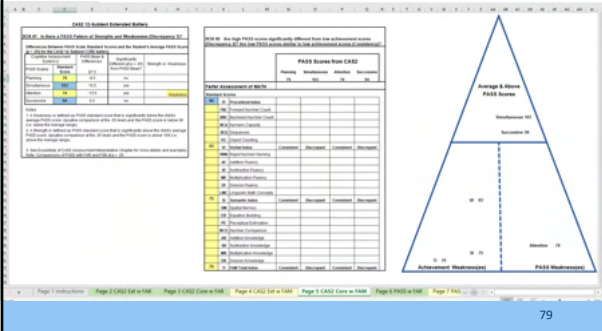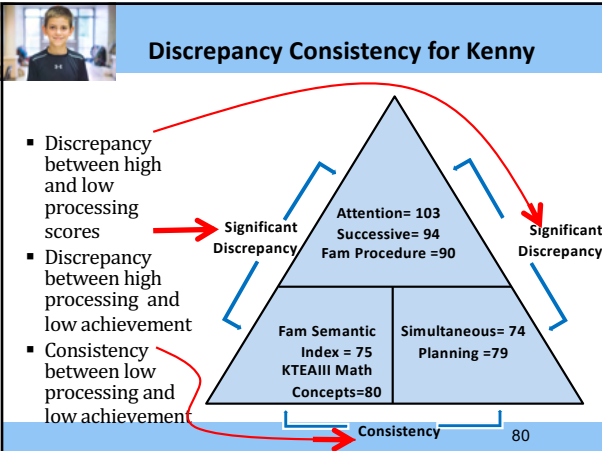
CAS-2 Simultaneous and Math

➢**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".
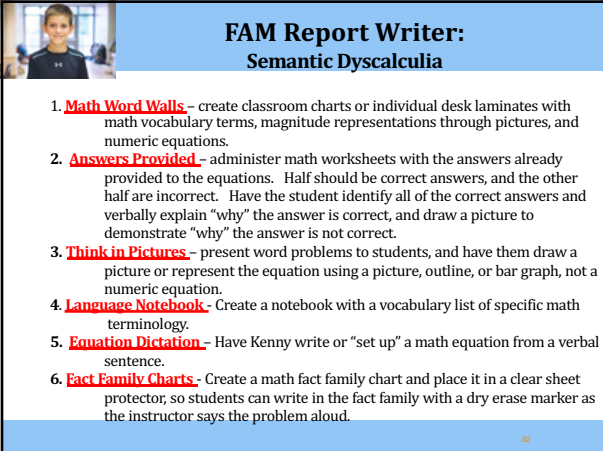
FAM Report Writer:
Semantic Dyscalculia

1. **Math Word Walls** – create classroom charts or individual desk laminates with math vocabulary terms, magnitude representations through pictures, and numeric equations.
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.
4. **Language Notebook** - Create a notebook with a vocabulary list of specific math terminology.
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, so students can write in the fact family with a dry erase marker as the instructor says the problem aloud.

Topical Outline
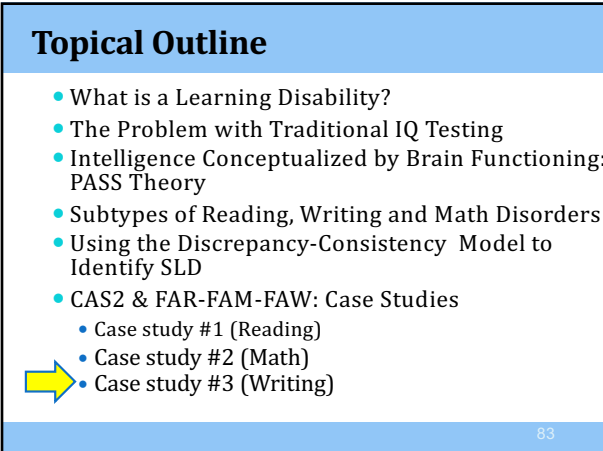
- What is a Learning Disability?
- The Problem with Traditional IQ Testing
- Intelligence Conceptualized by Brain Functioning: PASS Theory
- Subtypes of Reading, Writing and Math Disorders
- Using the Discrepancy-Consistency Model to Identify SLD
- CAS2 & FAR-FAM-FAW: Case Studies
  - Case study #1 (Reading)
  - Case study #2 (Math)
  - Case study #3 (Writing)

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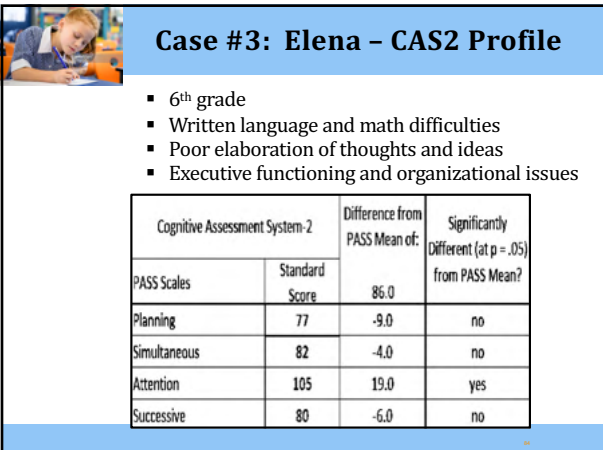## Case #3: Elena – CAS2 Profile

- 6th grade
- Written language and math difficulties
- Poor elaboration of thoughts and ideas
- Executive functioning and organizational issues

Cognitive Assessment System-2		Difference from PASS Mean of:	Significantly Different (at p = .05) from PASS Mean?
PASS Scales	Standard Score	86.0	
Planning	77	-9.0	no
Simultaneous	82	-4.0	no
Attention	105	19.0	yes
Successive	80	-6.0	no

Case #3: Elena – FAW Profile

- 6th grade
- Written language and math difficulties
- Poor elaboration of thoughts and ideas
- Executive functioning and organizational issues

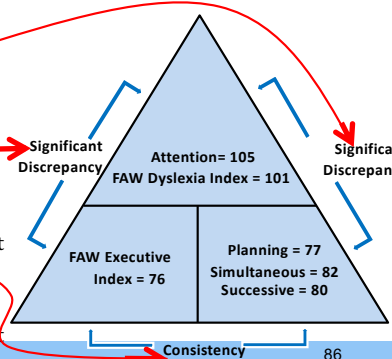| FAW Index	Standard Score (95% CI)	Percentile Rank	Qualitative Descriptor
Graphomotor Index	85 (+/-8)	16	Below Average
Dyslexia Index	101 (+/-8)	53	Average
Executive Index	76 (+/-5)	5	Moderately below average
FAW Total Index	87 (+/-8)	19	Below Average

Discrepancy Consistency for Elena

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

Significant Discrepancy

Significant Discrepancy

Attention = 105
FAW Dyslexia Index = 101

FAW Executive Index = 76

Planning = 77
Simultaneous = 82
Successive = 80

Consistency

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CAS-2 Planning and Written Language

➢ **Planning** – the ability to apply a strategy, and self-monitor and self- correct performance while working toward a solution.

➢ **Planning and Writing** – underscores the ability to deploy a particular idea or strategy to systemically arrange thoughts and ideas on paper. Simultaneous processing allows children to *"see the big picture"* as well.

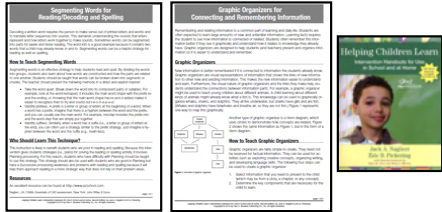**Interventions Related to PASS:** *Helping Children*
*Learn Intervention Handouts for Use in School and at Home, Second Edition* (Naglieri, & Pickering 2011)

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Intervention Protocol (Kryza & Naglieri, 2019)

- Be Intentional and Transparent
  - Explain his PASS scores to the students
  - Ask them if your results make sense
- Build on the Strengths
  - Help students use any PASS (and academic) strengths to support learning challenges

- Encourage the use of metacognitive strategies that can increase success
- Encourage a Growth Mindset and Self Efficacy
- Teach students about their AMAZING BRAIN
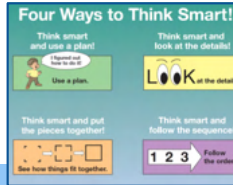
CAS2, FAR, FAM, FAW Summary

- 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!!!