Application of CHC Theory and Cross-Battery Assessment to SLD Identification

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Spokane, WA
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Today's Agenda

- Overview of the Field of Ability Assessment
  - The Wechsler Scales in Perspective
  - Progress in Theories of Intelligence
  - Progress in Test Development
  - Progress in Test Interpretation
- Relations between CHC Abilities and Academic Skills
- Refinements to CHC Theory
- Overview of Cross-Battery Assessment (XBA)
  - Data Management and Interpretive Assistant v2.0
  - Wechsler-based example

Today's Agenda

- Third Method Approaches to SLD Identification
  - Dual Discrepancy/Consistency Operational Definition of SLD (third method, pattern of strengths and weaknesses)
  - XBA PSW-A v1.0 software (Wechsler-based example)
- Conclusions

Continuum of Progress in Psychometric Theories of Intelligence

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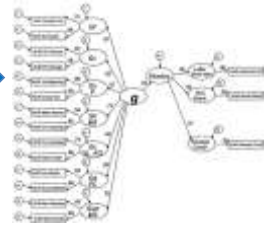
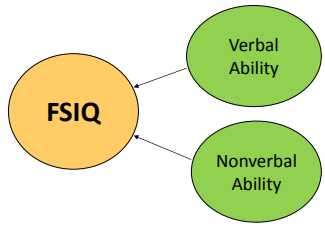
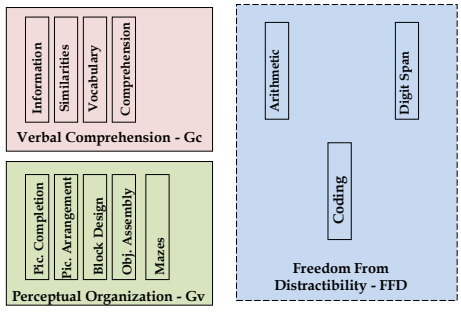


Traditional Cognitive Assessment

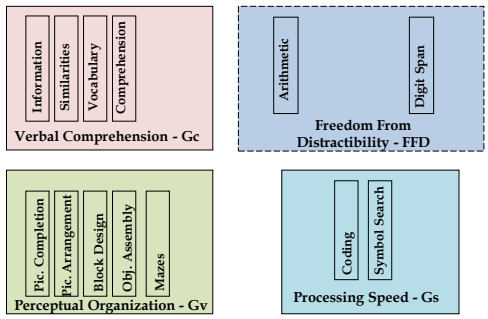


1930s to the late 1990s

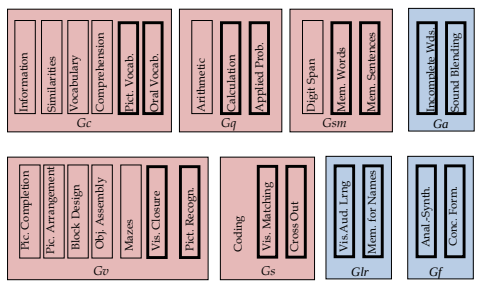
THE 1974 WISC-R (12 Subtest) Factor Structure



WISC-III Factor Structure: 17 YEARS LATER



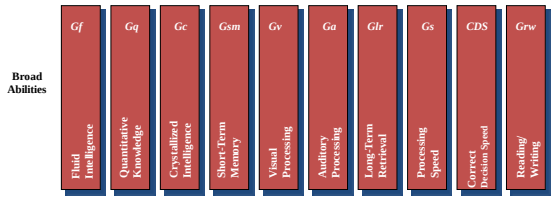
CHC Confirmatory Cross-Battery (or Joint) Factor Analysis of WISC-III and WJ



Note: WJ tests are indicated by bold rectangles

The new and improved science of psychological assessment is here!

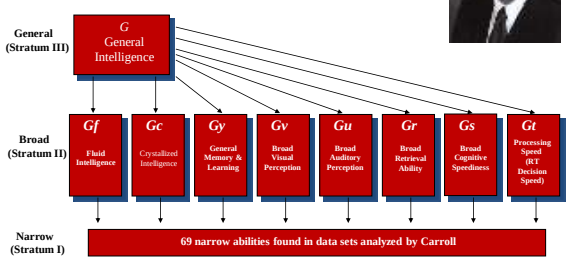
Cattell-Horn *Gf-Gc* Theory

A Landmark Event in Understanding the Structure of Intelligence

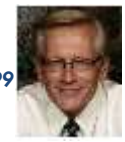
Carroll, J. B. (1993). ***Human cognitive abilities: A survey of factor-analytic studies***. New York: Cambridge University Press


Carroll's (1993) Three-Stratum Theory of Cognitive Abilities

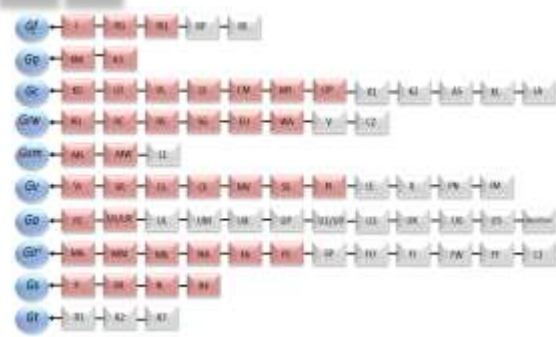


An Integration of the *Gf-Gc* and Three-Stratum Theories of Cognitive Abilities

Based largely on McGrew's analyses in 1997-1999



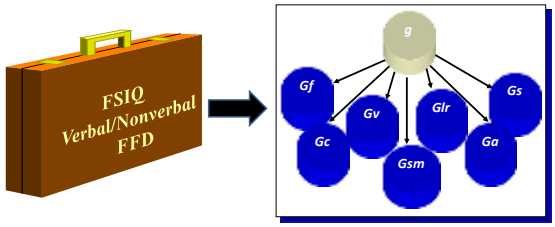
The Cattell-Horn-Carroll (CHC) Model of Cognitive Abilities that Guided Intelligence Test Construction from 2000-2011



We Have Knowledge of What Our Tests Measure According to CHC Theory

- Cross-Battery Assessment Approach
  - Classification system
  - Joint or CB-CFA
  - Expert Consensus
  - Helped to establish a nomenclature for the field

Cross-Battery Approach Assisted in Paving the Way for CHC-based Test Development and Interpretation



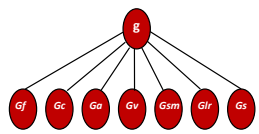
The WJ III

(Woodcock, McGrew, & Mather, 2001)

The first in a flurry of test revisions that represented advances unprecedented in assessment fields

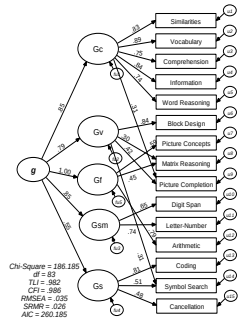
Contemporary Cognitive Assessment

- SB5 (2003) – Based on CHC theory
- KABC-II (2004) – Based on CHC theory and Luria
- DAS-II (2007) – Based on CHC theory



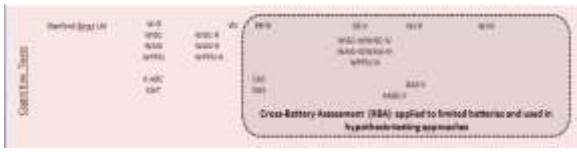
Contemporary Cognitive Assessment

- WISC-IV (2003) – CHC terminology (e.g., Fluid Reasoning, Working Memory) and CHC approach to interpretation (Flanagan & Kaufman, 2004, 2009)
- WAIS-IV (2008) – CHC terminology and interpretive approach (Kaufman & Lichtenberger, 2009)



Keith et al. (2006)

Continuum of Progress in Tests of Intelligence and Cognitive Abilities



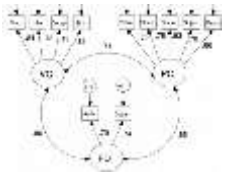
g *VIQ-PIQ-FSIQ* *CHC*

Continuum of Progress in Methods of Interpretation

Table from Kamphaus et al. (2012). A History of Intelligence Test Interpretation. In D.P. Flanagan and P.L. Harrison (Eds.), Contemporary Intellectual Assessment: Theories, Tests and Issues, 3rd edition. New York: Guilford.

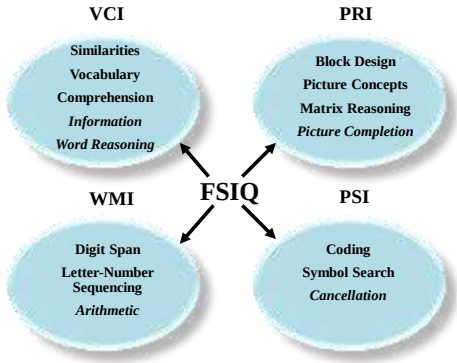
Continuum of Progress in Methods of Interpretation

Factor Analysis – Cohen's Three-factor solution of the WISC



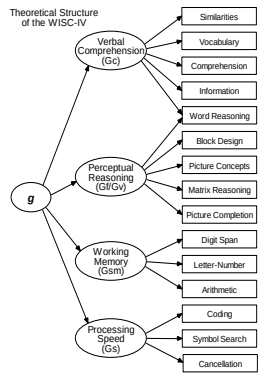
Kaufman's Psychometric Approach

Figure 2.1 WISC-IV Test Framework (p. 6)



Note: Supplemental subtests in italics and do not contribute to FSIQ unless substituted for a core subtest

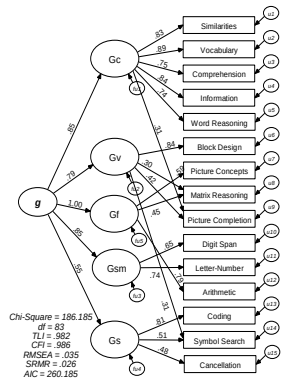
What Does the WISC-IV Measure?



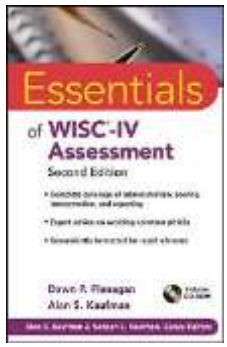
Timothy Z. Keith and colleagues (2006)

Continuum of Progress in Methods of Interpretation

Beyond the Indices…



Timothy Z. Keith and colleagues (2006)



CHC-based Interpretation and software (2004, 2009)

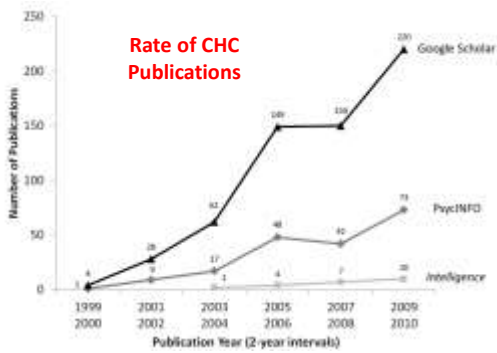


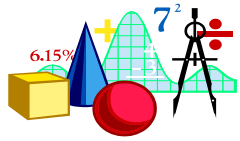
Figure from: Schneider and McGrew (2012). In Flanagan & Harrison (Eds.), *Contemporary Intellectual Assessment: Theories, Tests and Issues* (3rd edition). NY: Guilford.

Continuum of Progress in Methods of Interpretation

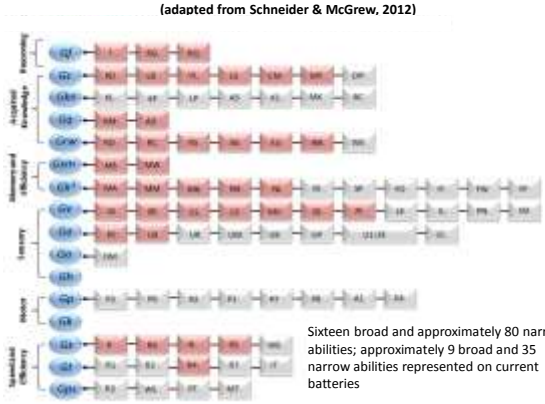
McGrew (2005) and Schneider and McGrew's (2012) Refinements to CHC Theory

Revisions and Refinements to CHC Theory

- Nine of the 10 CHC factors were refined by Schneider and McGrew (2012; Gq remained the same)



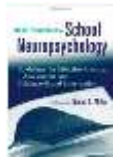
Current and Expanded Cattell-Horn-Carroll (CHC) Model of Cognitive Abilities
(adapted from Schneider & McGrew, 2012)



Sixteen broad and approximately 80 narrow abilities; approximately 9 broad and 35 narrow abilities represented on current batteries

Continuum of Progress in Methods of Interpretation

Integration of CHC and neuropsychological theory for cognitive test interpretation and identification/diagnosis of SLD



- Dan Miller
- Scott Decker
- Brad Hale
- Cyndi Riccio
- George McCloskey
- Denise Maricle

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DOI: 10.1002/pits.20327

SCHOOL NEUROPSYCHOLOGY CONSULTATION IN NEURODEVELOPMENTAL DISORDERS

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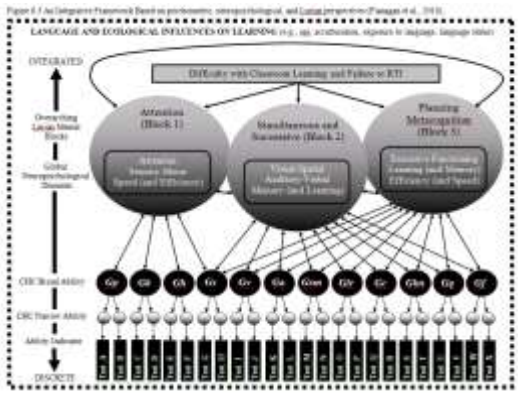
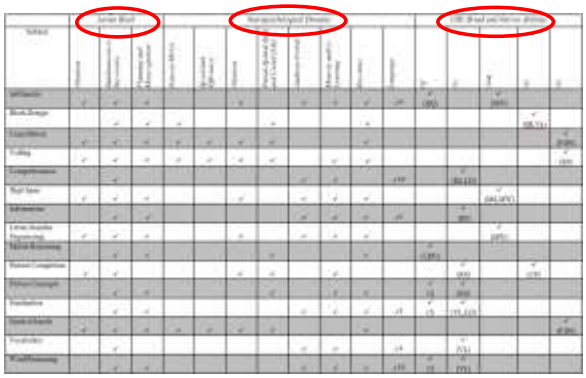
Georgia State University

Additionally, the Cattell-Horn-Carroll (CHC) theory of intelligence and its operationalization in a Cross-Battery Assessment procedure may also improve school psychology assessment practice and facilitate the integration of neuropsychological methodology in school-based assessments. The CHC model benefits from more than a half-century of validity research on psychometric, developmental, heritability, academic outcome, and neurocognitive evidence (Flanagan & Harrison, 2005; Flanagan & Ortiz, 2005; McGrew, Keith, Flanagan, & Vanderwood, 1997). The CHC model is a multitiered model of intelligence, with tiers typically referred to as strata I, II, and III (Carroll, 1997). The broad abilities of stratum II are functionally similar to constructs measured in neuropsychology, although labels used to describe the measurements may differ (Dean et al., 2003). For example, neuropsychologists are familiar with constructs like executive functions, with such tests as the Wisconsin Card Sorting Test, Halstead's Category Test, and the Trail Making Test, whereas school psychologists use equivalent concepts, like fluid intelligence. Psychometrically, these constructs are highly related but may differ in theoretical specifications (Decker, Hill, & Dean, 2007). The CHC and Cross-Battery Assessment approaches shift assessment practice from IQ composites to neurodevelopmental functions. This transition can be facilitated by training in contemporary psychometric models (Flanagan, Ortiz, & Alfonso, 2007). Furthermore, integrating Cross-Battery Assessment approaches within a global hypothesis-testing approach (Hale & Fiorello, 2004) may provide the best "alternative" method that meets federal requirements for a comprehensive evaluation

AN INTEGRATIVE FRAMEWORK BASED ON PSYCHOMETRIC, NEUROPSYCHOLOGICAL, AND LURIAN PERSPECTIVES (Flanagan, Ortiz, Alfonso & Dynda, 2010)



Lurian, Neuropsychological, and Cattell-Horn-Carroll (CHC) Classifications of Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV) Subtests



Continuum of Progress in Methods of Interpretation

Clinical Profile Analysis (Second Wave)	Psychometric Profile Analysis (Third Wave)	Application of Theory to Interpretation (Fourth Wave)	Applications/Refinements to Theory and CHC-based Research to Psychological Test Interpretation (Fifth Wave)

Refinements and Extensions to the CHC-Achievement Relations Research

CATTELL–HORN–CARROLL COGNITIVE-ACHIEVEMENT RELATIONS: WHAT WE HAVE LEARNED FROM THE PAST 20 YEARS OF RESEARCH

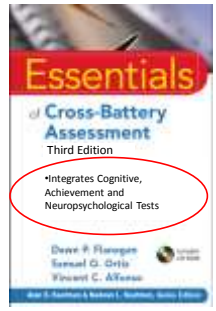
Continuum of Progress in Methods of Interpretation

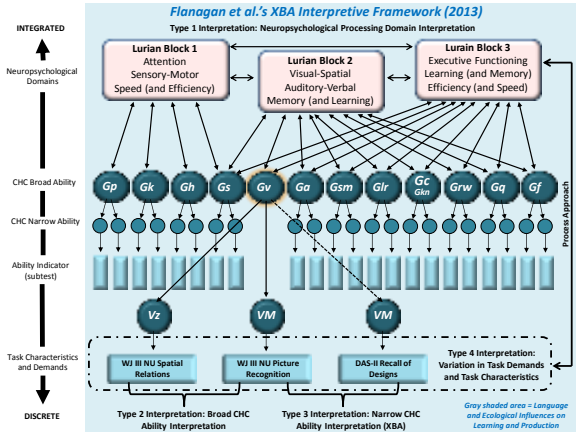
Clinical Profile Analysis (Second Wave) | Psychometric Profile Analysis (Third Wave) | Application of Theory to Interpretation (Fourth Wave) | Applied Clinical Refinements to Theory and CHC-based Research to Psychological Test Interpretation (Fifth Wave)

Refinements and Extensions to the Cross-Battery Approach

Significantly improved evidence base

Significantly improved and expanded software programs





Summary of Relations between CHC Abilities and Specific Areas of Academic Achievement (Flanagan, Ortiz, Alfonso & Mascolo, 2006)

	Reading Achievement	Math Achievement	Writing Achievement
Gf	Inductive (I) and general sequential reasoning (RG) abilities play a moderate role in **reading comprehension.**	**Inductive (I) and general sequential (RG) reasoning abilities are consistently very important for math problem solving at all ages.**	Inductive (I) and general sequential reasoning abilities (RG) are consistently related to **written expression** at all ages.
Gc	**Language development (LD), lexical knowledge (VL), and listening ability (LS) are important at all ages. These abilities become increasingly important with age.**	**Language development (LD), lexical knowledge (VL), and listening abilities (LS) are important at all ages. These abilities become increasingly important with age.**	**Language development (LD), lexical knowledge (VL), and general information (K0) are important primarily after about the 2nd grade. These abilities become increasingly important with age.**
Gsm	Memory span (MS) and **working memory capacity.**	Memory span (MS) and **working memory capacity.**	Memory span (MS) is important to writing, especially **spelling** skills whereas working memory has shown relations with advanced writing skills (e.g., written expression).
Gv	Orthographic Processing – **reading fluency**	May be important primarily for higher level or **advanced mathematics** (e.g., geometry, calculus).	Orthographic Processing - spelling
Ga	**Phonetic coding (PC) or "phonological awareness/processing" is very important during the elementary school years.**		**Phonetic coding (PC) or "phonological awareness/processing" is very important during the elementary school years for both basic writing skills and written expression (primarily before about grade 5).**
Glr	**Naming facility (NA) or "rapid automatic naming" is very important during the elementary school years.** Associative memory (MA) is also important.	Naming Facility (NA); Associative Memory (MA)	Naming facility (NA) or "rapid automatic naming' has demonstrated relations with written expression, primarily **writing fluency.**
Gs	**Perceptual speed (P) abilities are important during all school years, particularly the elementary school years.**	**Perceptual speed (P) abilities are important during all school years, particularly the elementary school years.**	**Perceptual speed (P) abilities are important during all school years for basic writing and related to all ages for written expression.**

Definitions of CHC Broad and Narrow Abilities

Broad Ability	Definition
Fluid Reasoning (Gf)	The deliberate but flexible control of attention to solve novel, "on-the-spot" problems that cannot be performed by relying exclusively on previously learned habits, schemas, and scripts.
Induction (I)	The ability to observe a phenomenon and discover the underlying principles or rules that determine its behavior.
General Sequential Reasoning (RG)	The ability to reason logically, using known premises and principles.
Quantitative Reasoning (RQ)	The ability to reason, either with induction or deduction, with numbers, mathematical relations, and operators.

Refinements: Piagetian Reasoning (RP) and Reasoning Speed (RE) were deemphasized, primarily because there is little evidence that they are distinct factors.

Definitions of CHC Broad and Narrow Abilities

Broad Ability	Definition
Crystallized Intelligence (Gc)	The depth and breadth and of knowledge and skills that are valued by one's culture.
General Verbal Information (K0)	The breadth and depth of knowledge that one's culture deems essential, practical, or otherwise worthwhile for everyone to know.
Language Development (LD)	General understanding of spoken language at the level of words, idioms, and sentences.
Lexical Knowledge (VL)	Extent of vocabulary that can be understood in terms of correct word meanings.

Additional Gc Narrow Abilities

Broad Ability	Definition
Crystallized Intelligence (Gc)	The depth and breadth and of knowledge and skills that are valued by one's culture.
Listening Ability (LS)	The ability to understand speech.
Communication Ability (CM)	The ability to use speech to communicate one's thoughts clearly.
Grammatical Sensitivity (MY)	Awareness of the formal rules of grammar and morphology of words in speech.

Definitions of CHC Broad and Narrow Abilities

Broad Ability	Definition
Auditory Processing (Ga)	The ability to detect and process meaningful nonverbal information in sound.
Phonetic coding (PC)	The ability to hear phonemes distinctly.
Speech Sound Discrimination (US)	The ability to detect and discriminate differences in speech sounds (other than phonemes) under conditions of little distraction or distortion.
Resistance to Auditory Stimulus Distortion (UR)	The ability to hear words correctly even under conditions of distortion or loud background noise.

Definitions of CHC Broad and Narrow Abilities

Broad Ability	Definition
Short-Term Memory (Gsm)	The ability to encode, maintain and manipulate information in one's immediate awareness.
Memory Span (MS)	The ability to maintain information in primary memory and immediately reproduce the information in the same sequence in which it was represented.
Working Memory Capacity (MW)	The ability to direct the focus of attention to perform relatively simple manipulations, combinations, and transformations of information within primary memory, while avoiding distracting stimuli and engaging in strategic/controlled searches for information in secondary memory.

Definitions of CHC Broad and Narrow Abilities

Broad Ability	Definition
Long-Term Storage and Retrieval (Glr)	The ability to store, consolidate, and retrieve information over periods of time measured in minutes, hours, days, and years.
Learning Efficiency	
Associative Memory (MA)	The ability to remember previously unrelated information as having been paired.
Meaningful Memory (MM)	The ability to remember narratives and other forms of semantically related information.
Free Recall Memory (M6)	The ability to recall lists in any order.

Additional Glr Narrow Abilities

Broad Ability	Definition
Long-Term Storage and Retrieval (Glr)	The ability to store, consolidate, and retrieve information over periods of time measured in minutes, hours, days, and years.
Retrieval Fluency	
Ideational Fluency (FI)	The ability to rapidly produce a series of ideas, words, or phrases related to a specific condition or object.
Word Fluency (FW)	The ability to rapidly produce words that share a non-semantic feature.
Figural Fluency (FF)	Ability to rapidly draw or sketch as many things (or elaborations) as possible when presented with a non-meaningful visual stimulus (e.g., a set of unique visual elements).
Naming Facility (NA)	The ability to rapidly name pictures, letters or objects that are known to the individual.

Definitions of CHC Broad and Narrow Abilities

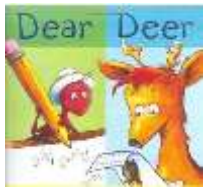
Broad Ability	Definition
Visual Processing (Gv)	The ability to make use of simulated mental imagery (often in conjunction with currently perceived images) to solve problems.
Visualization (Vz)	The ability to perceive complex patterns and mentally simulate how they might look when transformed (e.g., rotated, changed in size, partially obscured).
Speeded Rotation (SR)	The ability to solve problems quickly by using mental rotation of simple images.
Closure Speed (CS)	The ability to quickly identify a familiar meaningful visual object from incomplete (e.g., vague, partially obscured, disconnected) visual stimuli, without knowing in advance what the object is.

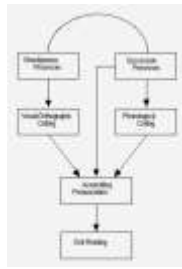
Additional Gv Narrow Abilities

Broad Ability	Definition
Visual Processing (Gv)	The ability to make use of simulated mental imagery (often in conjunction with currently perceived images) to solve problems.
Visual Memory (MV)	The ability to remember complex visual images over short periods of time (less than 30 seconds).
Spatial Scanning (SS)	The ability to visualize a path out of a maze or a field with many obstacles.

Relations between Gv Abilities and Reading Achievement

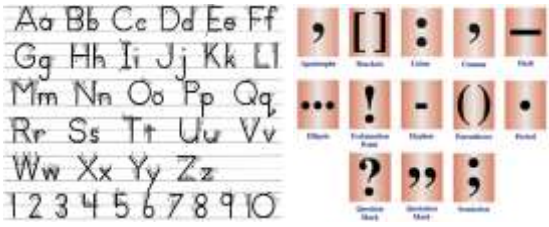
- *Gv* – Orthographic processing





Orthography (Wagner & Barker, 1994)

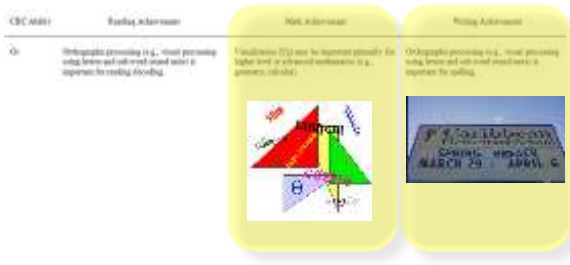
- The system of marks that make up the English language, including upper and lower case letters, numbers, and punctuation marks

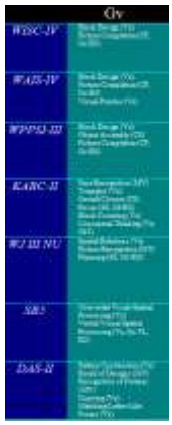


Assessing Visual Processing Related to Reading

- Visual processing must be assessed using *orthography* (letters, words and numbers) rather than abstract designs or familiar pictures

Relationship Between Gv and Achievement





Good representation of Gv abilities; three qualitatively different indicators

No measures of Orthographic Processing on Intelligence and Cognitive Batteries

Most under-represented in area of Gv

Assessing Orthographic Processing Related to Reading

- *Examples of assessments of orthographic processing directly related to reading:*
  - Test of Silent Word Reading Fluency (TOSWRF)
  - Test of Irregular Word Reading Efficiency (TIWRE)
  - Test of Orthographic Competence (TOC)
  - Process Assessment of the Learner (PAL-II)
  - Early Reading Assessment (ERA)

Latest Orthographic Processing Measure

Definitions of CHC Broad and Narrow Abilities

Broad Ability	Definition
Processing Speed (Gs)	The speed at which visual stimuli can be compared for similarity or difference.
Perceptual Speed (P)	The ability at which visual stimuli can be compared for similarity or difference.
Rate-of-Test-Taking (R9)	The speed and fluency with which simple cognitive tests are completed.
Number Facility (N)	The speed at which basic arithmetic operations are performed accurately.
Reading Speed (RS)	The rate of reading text with full comprehension.
Writing Speed (WS)	The rate at which words or sentences can be generated or copied.

Broad and Narrow CHC Ability Representation on Seven Current Intelligence Batteries

Table 1.4. Broad and Narrow CHC Ability Representation on Seven Current Intelligence Batteries

	Gf	Gc	Gv	Gsm	Gs	Ga	Gy
WISC-IV	Matrix Reasoning (I); Picture Concepts (I)	Vocabulary (VL); Information (KO); Similarities (VL, Gf); Comprehension (KO); Word Reasoning (VL, Gf)	Block Design (Vz); Picture Completion (Gv-FI); Visual Puzzles (Vz)	Digit Span (MS, MW); Letter-Number Sequencing (MW); Arithmetic (MW, Gf, RQ)	**Not Measured**	**Not Measured**	Symbol Search (P); Coding (R9); Cancellation (P)
WAIS-IV	Matrix Reasoning (I); Figure Weights (RQ)	Vocabulary (VL); Information (KO); Similarities (VL, Gf); Comprehension (KO)	Block Design (Vz); Picture Completion (Gv-FI); Visual Puzzles (Vz)	Digit Span (MS, MW); Letter-Number Sequencing (MW); Arithmetic (MW, Gf, RQ)	**Not Measured**	**Not Measured**	Symbol Search (P); Coding (R9); Cancellation (P)
WPPSI-IV	Matrix Reasoning (I)	Picture Concepts (Gc, KE, Gf); Vocabulary (VL); Information (KO); Similarities (VL, Gf); Comprehension (KO)	Block Design (Vz); Object Assembly (Gv); Picture Memory (MW)	**Not Measured**	**Not Measured**	**Not Measured**	Animal Coding (R9); Bug Search (P); Cancellation (P) (continued)

Flanagan, Ortiz, and Alfonso (2013). *Essentials of Cross-Battery Assessment, 3rd edition. Hoboken, NJ: Wiley*

Broad and Narrow CHC Ability Representation on Seven Current Intelligence Batteries

Table 1.4. (Continued)

	Gf	Gc	Gv	Gsm	Gp	Glr	Gs
		Receptive Vocabulary (VL) Picture Naming (VL)	Zoo Locations (MV)				
KABC-II	Pattern Reasoning (I, Gf-Vz)[a] Story Completion (RG, Gf-RG)[a]	Expressive Vocabulary (VL) Verbal Knowledge (VL, KR) Riddles (VL; Gf-RG)	Face Recognition (MV) Triangles (Vz) Conrad Cluster (CS) Rover (Gv, Gf-RG) Block Counting (Vz) Conceptual Thinking (Vz; Gf-RG)	Number Recall (MS) Word Order (MS; MW) Hand Movements (MS; Gv-MV)	Atlantis (MA) Rebus (MA) Atlantis Delayed (MA) Rebus Delayed (MA)	**Not Measured**	**Not Measured**
WJ III NU	Concept Formation (I) Analysis-Synthesis (RG)	Verbal Comprehension (VL; Gf) General Information (KR)	Spatial Relations (Vz) Picture Recognition (MV) Planning (SS; Gf-RG)	Memory for Words (MS) Numbers Reversed (MW) Auditory Working Memory (MS; MW)	Visual-Auditory Learning (MA) Retrieval Fluency (FI)	Sound Blending (PC) Auditory Attention (UR) Incomplete Words (PC)	Visual Matching (P) Decision Speed (P) Pair Cancellation (P)

Flanagan, Ortiz, and Alfonso (2013). *Essentials of Cross-Battery Assessment, 3rd edition. Hoboken, NJ: Wiley*

					Memory (MW) Visual-Auditory Learning Delayed (MA) Rapid Picture Naming (NA; Gs-RS)			
SB5	Nonverbal Fluid Reasoning (I, Gv) Verbal Fluid Reasoning (I, RG; Gv-CS) Nonverbal Quantitative Reasoning (RQ; Gp-SA) Verbal Quantitative Reasoning (RQ; Gp-SA)	Nonverbal Knowledge (KR, VL; Gf-RG) Verbal Knowledge (VL-KR)	Nonverbal Visual-Spatial Processing (Vz) Verbal Visual-Spatial Processing (Vz; Gv-VL, KR)	Nonverbal Working Memory (MS; MW) Verbal Working Memory (MS; MW)	**Not Measured**	**Not Measured**	**Not Measured**
DAS-II	Matrices (I) Picture Similarities (I) Sequential & Quantitative Reasoning (RQ)	Early Number Concepts (VL, Gq-KN) Naming Vocabulary (VL)	Pattern Construction (Vz) Recall of Designs (MV)	Recall of Digits Forward (MS) Recall of Digits Backward (MW) Recall of Sequential Order (MW)	Rapid Naming (NA; Gs-RS)[a] Recall of Objects Immediate (MA) Recall of Objects Delayed (MA)	Phonological Processing (PC)	Speed of Information Processing (P)
		Word Definitions (VL) Verbal Comprehension (LD) Verbal Similarities (VL; Gf-I)	Recognition of Pictures (MV) Copying (Vz) Matching Letter-Like Forms (Vz)				

(continued)

The Cross-Battery Assessment Approach

Flanagan, D. P., Ortiz, S. O. and Alfonso, V. C. (2013). *Essentials of Cross-Battery Assessment, 3rd edition. Hoboken, NJ: Wiley*

The CHC Cross-Battery Assessment (XBA) Approach

- Guidelines for Test Selection and Organization
- Classification of Subtests According to CHC Cognitive and Academic Abilities and Neuropsychological Processes
- Guidelines for Hypothesis Testing
- Guidelines for Test Interpretation
- Automated Program to Facilitate Data Management, Interpretation, and Reporting of Test Performance

What is Cross-Battery Assessment?

- An approach that neuropsychologists, and astute clinicians in other assessment-related fields, have always followed
- *Flanagan and colleagues transformed the practice of crossing batteries into a method that is both psychometrically and theoretically defensible*
  - A systematic method of ensuring adequate construct representation across a wide range of cognitive and academic abilities and neuropsychological processes
  - A systematic method of interpreting test data from more than one battery

The Need for Cross-Battery Assessment

A WISC-III detective strives to use ingenuity, clinical sense, a thorough grounding in psychological theory and research, and a willingness to administer supplementary cognitive tests to reveal the dynamics of a child's scaled-score profile

(Kaufman, 1994)

Broad v. Narrow CHC Abilities

- To apply XBA, practitioners need to understand the differences between broad and narrow abilities and how these abilities relate to the reason(s) for and purpose(s) of the referral.

Broad CHC Abilities

- Broad abilities represent "basic constitutional and longstanding characteristics of individuals that can govern or influence a great variety of behaviors in a given domain" (Carroll, 1993, p. 634).
- In general, measurement of broad abilities is done when the purpose of an evaluation is to examine the breadth of broad cognitive constructs that define overall intellectual/cognitive functioning or *g* within the psychometric (CHC) tradition.
- Typically, the breadth of broad cognitive constructs that may be represented in a comprehensive evaluation include, *Gf, Gc, Gv, Ga, Gsm, Glr*, and *Gs*.

Broad CHC Abilities

- The aggregate of broad abilities provides an estimate of overall intellectual/cognitive functioning or *g*.
- It is recommended that at least two subtests be used to measure a broad ability, each subtest measuring a qualitatively different aspect of that broad ability.
- The more qualitatively different aspects of the broad ability that are assessed, the better the measurement and estimate of the broad ability.

Narrow CHC Abilities

- Narrow abilities "represent greater specializations of abilities, often in quite specific ways, that reflect the effects of experience and learning, or the adoption of particular strategies of performance" (Carroll, 1993, p. 634).

Narrow CHC Abilities

- Narrow abilities should also be represented by at least two subtests.
- Because most intelligence batteries do not contain multiple measures of the same narrow abilities (e.g., two or more tests of inductive reasoning; two or more tests of spatial relations), it is typically necessary to cross batteries in an attempt to measure narrow abilities adequately.

Three Pillars of XBA

I **CHC Theory**

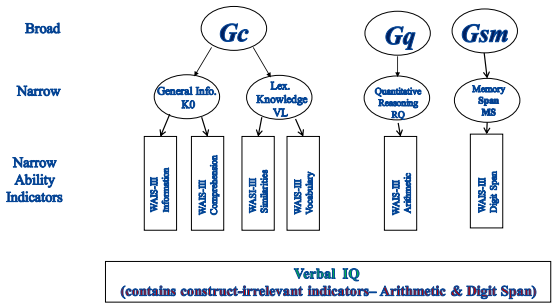
II **CHC Broad (Stratum II)**

III **CHC Narrow (Stratum I)**

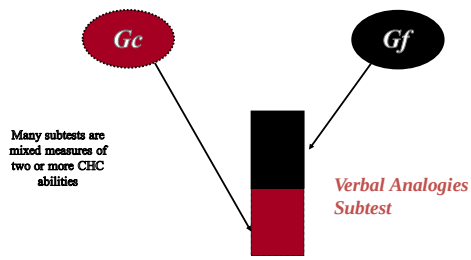
Broad Ability Classifications

- Guard against construct irrelevant variance

Construct Relevant/Irrelevant Variance: A Verbal VIQ Example



Construct Irrelevant Variance at the Subtest Level



Theory-driven Cross-Battery Factory Analyses (CB-FA, CB-CFA) – Empirical Basis for Broad Ability Classifications of Tests

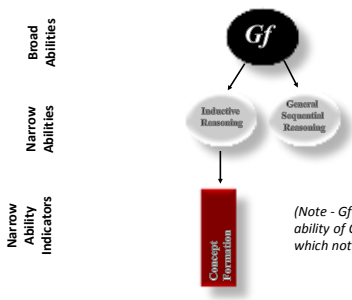
- Woodcock (1990) – WISC-R, WAIS-R, WJ-R, KABC, SB4)
- Stone (1992) – DAS, WISC-R
- McGhee (1993) – WJ-R, DTLA, DAS
- Flanagan and McGrew (1998) – WJ-R, KAIT
- Keith (1997) – KABC, WISC-R
- Keith, Kranzler, and Flanagan (2000) – WJ III, CAS
- Roid (2003) – WJ III, SB5
- Tusing and Ford (2004) – WJ III, DAS
- Phelps et al. (2005) – WJ III, WISC-III
- Hunt (2007) – WJ III, KABC-II
- Sanders et al. (2007) – WJ III, DAS
- Floyd et al. (2010) – WJ III, D-KEFS
- (2011) – WAIS-IV, WMS-IV
- Keith and Reynolds (2010) – WISC-R, KABC (from Keith & Novak, 1987)
- Reynolds et al. (in press) – KABC-2, Wech, WJ III

Narrow Ability Classifications

- Guard against construct underrepresentation

Construct Under-Representation

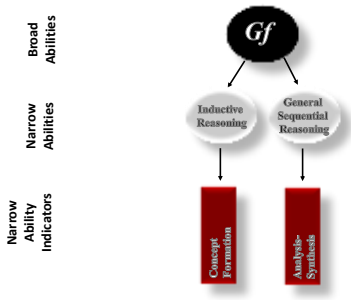
WJ III Gf Example



(Note - Gf also includes the narrow ability of Quantitative Reasoning, which not included in this figure.)

Adequate Construct Representation

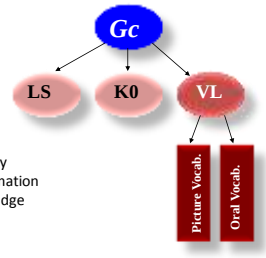
WJ III Gf Example



Construct Under-representation

The most appropriate description of the ability underlying the WJ-R *Gc* cluster *is not broad Gc* as purported but rather, the narrow ability of Lexical Knowledge, which is subsumed by *Gc.*

(Note - Gc includes other narrow abilities not included in this figure.)

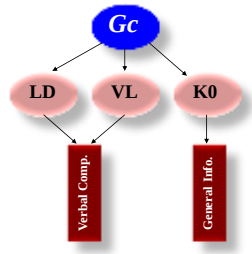


LS - Listening Ability
K0 - General Information
VL - Lexical Knowledge

Adequate Construct Representation

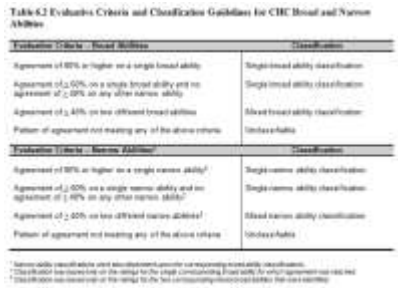
The most appropriate description of the ability underlying the WJ-III *Gc* cluster is *broad Gc* as purported.

(Note - Gc includes other narrow abilities not included in this figure.)



LD – Language Development
K0 - General Information
VL - Lexical Knowledge

Content Validity or Expert Consensus Studies – Empirical basis for Narrow Ability Classifications



Flanagan, Ortiz, Alfonso, and Mascolo (2006). *The Achievement Test Desk Reference: A Guide to Learning Disability Identification*, Second Edition. Hoboken, NJ: Wiley

See Appendix L in *Essentials of Cross-Battery Assessment* for Details of Expert Consensus Study

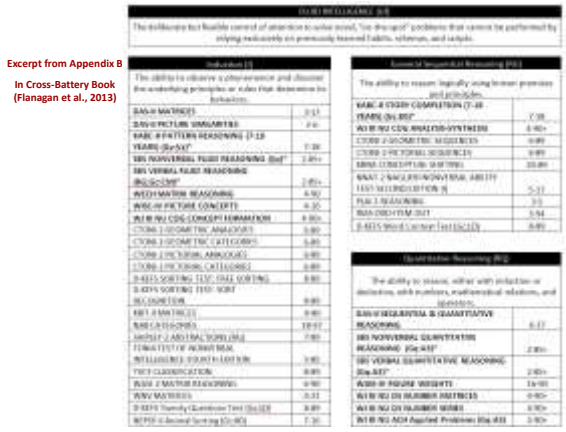
XBA Guiding Principles

I. Select a battery that best addresses the referral concerns
   - Consider co-normed tests first

II. Use clusters based on ***actual norms*** when they are available
   - Clusters yielded from the actual test battery rather than formulae based on subtest reliabilities and intercorrelations (although differences between actual norm-based clusters and those generated via formulae are negligible)

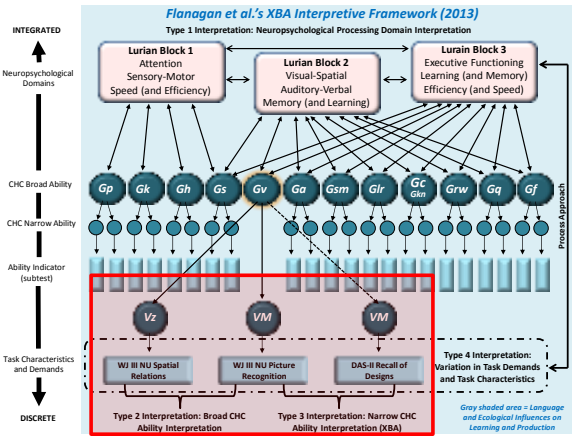
XBA Guiding Principles

III. Select tests classified through an acceptable method
- Factor Analyses or Expert Consensus
  - Use relatively ***PURE*** CHC indicators
    - See Appendix B
  - Use 2 or more *qualitatively different* narrow ability indicators to represent each broad ability domain
    - Better representation with more diversity in narrow abilities
  - Use 2 or more *qualitatively similar* narrow ability indicators to represent each narrow ability domain



Excerpt from Appendix B

In Cross-Battery Book (Flanagan et al., 2013)



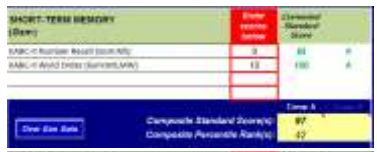
XBA Guiding Principles

IV. When broad abilities are underrepresented, go out of battery
- *Two qualitatively different indicators from another battery*
- *Or one qualitatively different indicator and use CHC Analyzer Tab to create a broad ability composite*

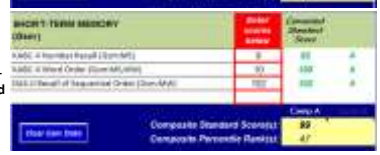
KABC-II Tab of XBA DMIA

Estimate of Memory Span only

KABC-II Data Automatically Transferred to CHC Analyzer



KABC-II/DAS-II Cross-Battery Data Analyzed



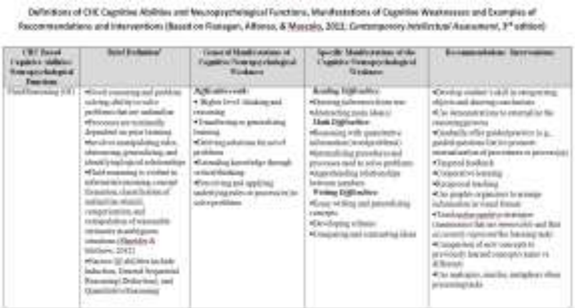
XBA Guiding Principles

V. When crossing batteries use tests developed and normed within a few years of one another
- Flynn effect
- All tests in Cross-Battery book were normed within about 10 years of one another (2001 – 2012)

VI. Select tests from the smallest number of batteries
- to minimize error that may be the result of differences in norm sample characteristics

VII. Establish ecological validity for test findings – e.g., manifestation of weaknesses or deficits

Manifestations of Cognitive Weaknesses and Examples of Recommendations and Interventions (Flanagan, Alfonso, & Mascolo, 2011)



Flanagan, D. P., Alfonso, V. C., & Mascolo, J. T. (2011). A CHC-based Operational Definition of SLD: Integrating Multiple Data Sources and Multiple Data Gathering Methods. In Flanagan, D. P., & Alfonso, V. C. (Eds.), ***Essentials of Specific Learning Disability Identification***. New York, NY: John Wiley & Sons.

What Will the Next Generation of Cognitive Tests Look Like?

Next Generation of Cognitive Tests

- Better measurement of Narrow CHC Abilities
- Bridge CHC and neuropsychological theories
  - KABC-II
  - Miller's (2013) *Essentials of Neuropsych Assessment* Book
  - Flanagan et al.'s (2013) *Essentials of XBA* book
- Greater attention paid to Executive Functions
  - McCloskey's (2013) *Essentials of Executive Functions* book

Next Generation of Cognitive Tests

- More Cross-Battery Assessment (e.g., Pearson Platform for crossing batteries)
- Drill down and understand disorders more precisely (e.g., subtypes)

Cognitive Correlates of Reading Disability Subtypes

• **Dysphonetic Dyslexia** – difficulty sounding out words in a phonological manner	• *(Ga-Phonetic Coding; Gsm-Memory Span, Working Memory)*
• **Surface Dyslexia** – difficulty with the rapid and automatic recognition of words in print	• *(Glr-Naming Facility; Gv-Orthographic Processing; Gs-Perceptual Speed; Gc-Vocabulary Knowledge)*
• **Mixed Dyslexia** – multiple reading deficits characterized by impaired phonological and orthographic processing skills. It is probably the most severe form of dyslexia.	• *(Multiple CHC abilities or processes involved; attention and executive functioning)*
• **Comprehension Deficits** – the mechanical side of reading is fine but difficulty persists deriving meaning from print	• *(Gf-Induction, General Sequential Reasoning; Gc- Language Development; attention and executive functioning)*

Feifer, S. (2011). How SLD Manifests in Reading Achievement. In Flanagan & Alfonso (Eds), *Essentials of Specific Learning Disability Identification*. Hoboken, NJ: Wiley.

Correspondence Between Diagnosis and Treatment

as syndromes/disorders become more discretely defined, there may be a greater correspondence between diagnoses and treatment

Kratochwill and McGivern's (1996; p. 351)

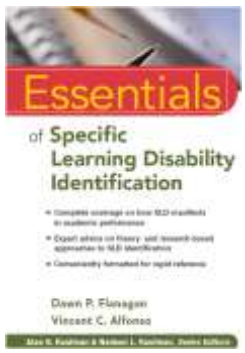
Selecting Interventions Based on Reading Disorder Subtype

Subtype	Brain relationship	Description of Disorder[2]	Intervention
Dysphonetic Dyslexia	*Supramarginal gyrus*, located at the juncture of the temporal and parietal lobes[1]	Difficulty sounding out words in a phonological manner; inability to use phonological route to bridge letters and sounds; over-reliance on visual or orthographic cues; tend to guess on words based on initial letters observed; typically memorize whole words	Intervention should include an explicit phonological approach, especially with younger children (e.g., Wilson Reading System; Fundations; Fast Forword; Earobics I). Modality based: Horizons (visual phonics approach). Lindamood (tactile cues). Secondary Level (morphological cues emphasized - Read 180)
Surface Dyslexia	Left *fusiform gyrus*[3]	Difficulty with the rapid and automatic recognition of words in print; can sound out words, but cannot recognize words in print automatically and effortlessly; letter-by-letter and sound-by-sound readers; over-reliance on phonological properties and underappreciation of orthographic or spatial properties of the word; reading is slow and laborious	Intervention should focus on automaticity and fluency goals (not necessarily an explicit phonological approach); build sight words. Early ages: Reading Recovery; Ages 7-12: Read Naturally; Over Age 12: Read 180; Wilson.
Mixed Dyslexia	Show weaker modulatory effects from the left *fusiform gyrus* to the left inferior parietal lobes, suggesting deficits integrating both the phonological representation and orthographical representation of words	Multiple reading deficits characterized by impaired phonological and orthographic processing skills. Most likely the most severe form of dyslexia; characterized by a combination of poor phonological processing skills, slower rapid and automatic word recognition skills, inconsistent language comprehension skills; bizarre error patterns in reading; *double-deficit*.	Intervention should incorporate a *balanced literacy* approach
Comprehension Deficits	The brain's *executive attention network* – modulated primarily by the *anterior cingulate gyrus* in the frontal lobes[4]	The mechanical side of reading is fine, but difficulty deriving meaning from print	Intervention should be at the *language* level, not the phonological level; externalize the reasoning process – Summarize, Clarify, Question and Predict

Individual Differences

Differential Diagnosis: Intellectual Disability, General Learning Difficulty (Slow Learner), and Specific Learning Disability

THEME: Multi-method, Multi-source Approach to SLD Identification



Some Contributors:
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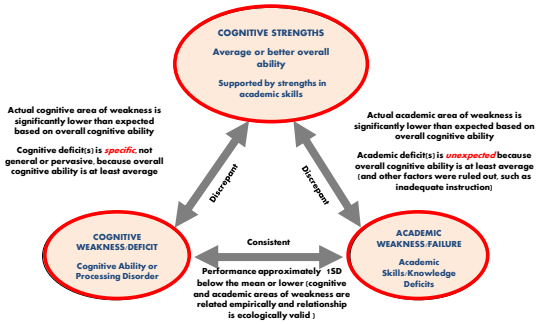
Jack Fletcher
David Geary
Nancy Mather
Sam Ortiz
Elisabeth Wiig

Three Third Method Approaches:
1. Flanagan and Colleagues
2. Hale and Colleagues
3. Naglieri

Conceptual Similarities Among Alternative Research-based Approach to SLD



Flanagan, Alfonso, & Mascolo (2011); Flanagan, Fiorello, & Ortiz (2010); Hale, Flanagan, & Naglieri (2008)

Dual Discrepancy/Consistency (DD/C) Operational Definition of SLD Flanagan, Ortiz, Alfonso, and Mascolo

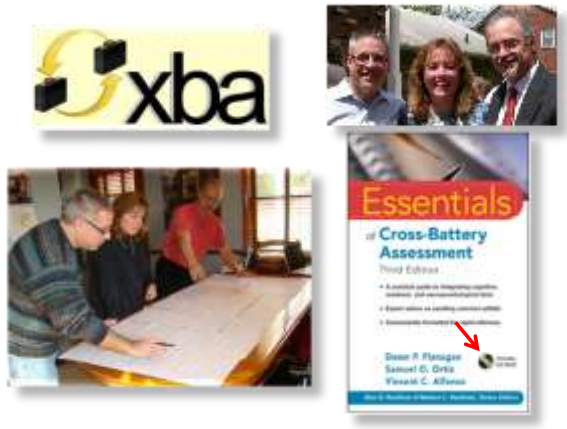
- Definition first presented in 2002
- Revised and updated in 2006
- Updated in 2007
- Revised and updated in 2011
- Updated and Renamed in 3e of Essentials of XBA3

Flanagan, Oritz, & Alfonso (2013). *Essentials of Cross-Battery Assessment, 3rd Edition*. Hoboken, NJ: Wiley.

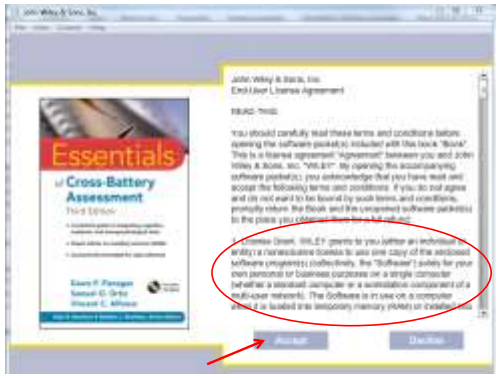
Flanagan, Oritz, & Alfonso (2013). *Essentials of Cross-Battery Assessment, 3rd Edition*. Hoboken, NJ: Wiley.

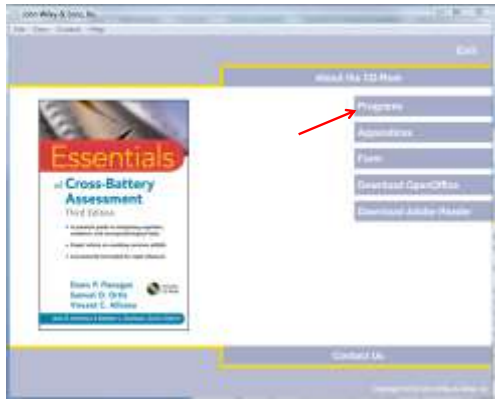
New Features in XBA3

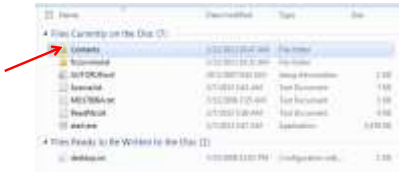
- The **DMIA** was revised extensively. Some revisions included:
  - More test tabs for achievement tests and combinations of cognitive and achievement tests
  - CHC tab calculates composites based on median subtest reliabilities and inter-correlations (no more averaging)
  - CHC tab drop-down menus include cognitive, achievement, special purpose (e.g., memory, speech/language) and neuropsychological tests
  - Includes interpretive statements regarding whether or not a composite is cohesive and, therefore, interpretable
  - Easier to navigate from tab to tab
  - Produces statements regarding whether or not follow up is considered necessary in any given domain and provides a rationale



Insert CD from back of book





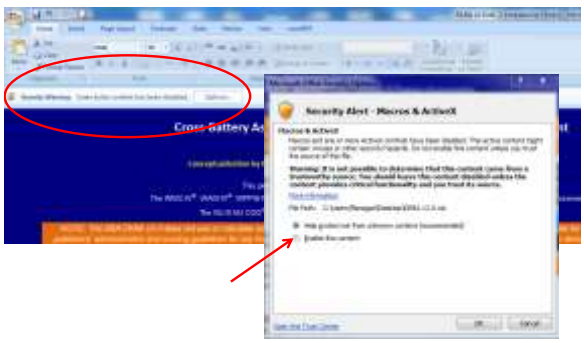


Program Opens to this Tab

Important Considerations Prior to Using the DMIA v2.0

- Programs are meant to be used on a PC (not a Mac)
- Mac programs are now available – contact Wiley/customer service
  - Will not work on Excel for Mac 2008 (must use Excel for Mac 2011 or higher)
  - Trial or "starter" versions of Excel for Mac are not recommended as they will disable macros and VBA support after the trial period is over
- You **MUST** enable macros for the programs to function properly
  - Enable Macros each time you open the program

Enable Macros!



Important Considerations Prior to Using the DMIA v2.0

- View programs at 100% magnification
  - See bottom of introduction tab for "Note"
  - See bottom of window for magnification

Read the Notes Tab – Just those sections that are relevant to your core battery

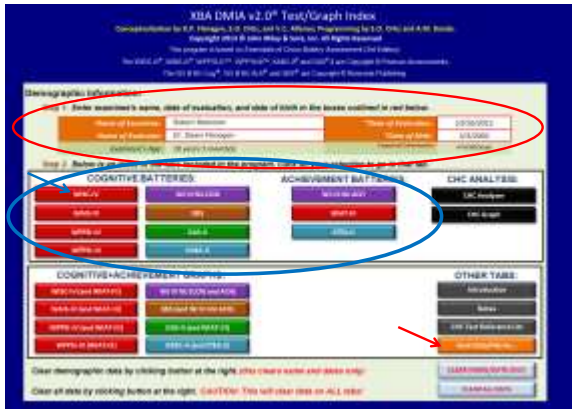
Read the Notes Tab – Just those sections that are relevant to your core battery (and more general sections, such as "Graphs")

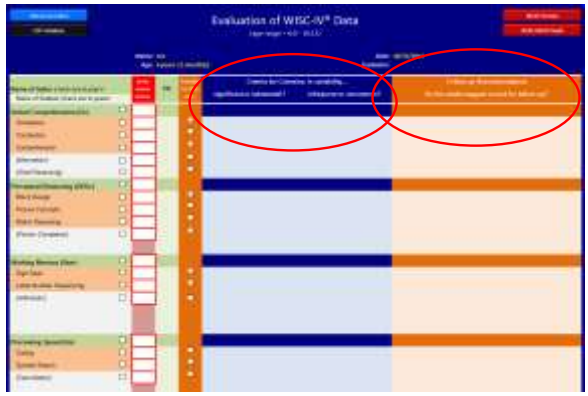
Clinical Clusters Section of the WJ III COG Tab

Bottom Portion of CHC Analyzer Tab – Follow up on Lower Score in the Cognitive Fluency Domain

Appendix B from the Book is included in the program as a "CHC Test Reference List"

Main Index for the Program





For All Composites Entered Into DMIA v2.0

- Examples of Composites:
  - WISC-IV
    - Verbal Comprehension Index
    - Perceptual Reasoning Index
    - Working Memory Index
  - WJ III NU COG
    - *Gc* Factor
    - *Gf* Factor
    - *Glr* Factor
  - KABC-II
    - Sequential/*Gsm* Scale
    - Simultaneous/*Gv* Scale
- Program Answers these Questions:
  - *Is the Composite Cohesive?*
  - *Is there a Need for Follow-up Assessment?*

Cohesion

- When the composite is *cohesive*, it is considered to be a good summary of the theoretically related abilities it is intended to represent
- WJ III NU COG Fluid Reasoning Factor
  - Analysis-Synthesis (General Sequential Reasoning)
  - Concept Formation (Induction)

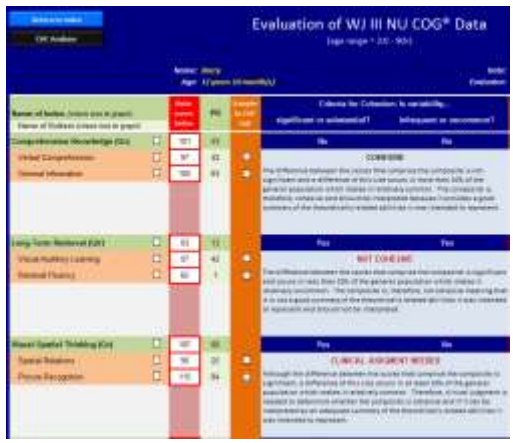
Cohesion

- Two-subtest composites
  - The standard deviation of the distribution of difference scores [SD(diff)] was used in part to determine cohesion
    - For purposes of consistency across batteries included in the DMIA v2.0, a formula was used to calculate the SD(diff) for all two-subtest composites across batteries. Formula takes into account subtest score reliabilities and their inter-correlation
    - The SD(diff) determines whether the difference between the scores that comprise the composite is *statistically significant*.
    - Base rate data also used to determine whether the size of the difference is *infrequent or uncommon* in the general population (i.e., about 10% or less).

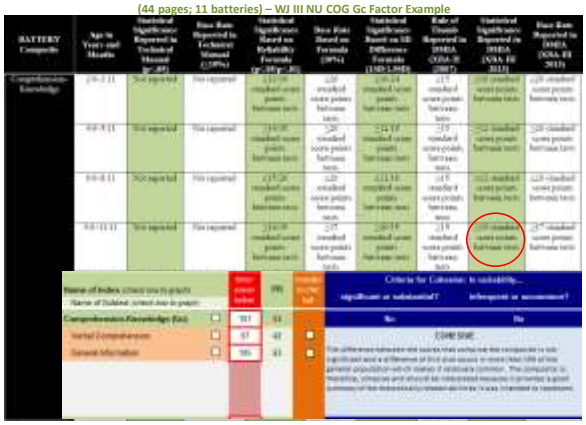
Kevin S. McGrew (June 20, 2011). *IAP 101 Psychometric Brief #9: The problem with the 1/1.5 SD SS (15/22) subtest comparison "rule-of-thumb".* www.iqscorner.com/2011_06_01_archive.html

Rules for Cohesion for Two-Subtest Composites on Test Tabs

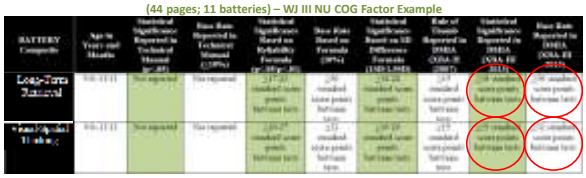
Interpreting Two-Subtest Composites on the Test Tabs of the DMIA v2.0	
Finding	**Interpretation**
The difference between scores is not significant or uncommon	The difference between the scores that comprise the composite is not significant and occurs in more than 10% of the general population and, therefore, is common. The composite is **cohesive** and, therefore, provides a good summary of the theoretically related abilities it was intended to represent and should be interpreted.
The difference between scores is significant but not uncommon	Although the difference between the scores that comprise the cluster is significant, the magnitude of the difference occurs in at least 10% of the general population and, therefore, is common. **Clinical judgment** is needed to determine whether or not the composite is cohesive and, therefore, interpreted as an adequate summary of the theoretically related abilities it was intended to represent.
The difference between scores is significant and uncommon	The difference between the scores that comprise the composite is significant and occurs in ≤ 10% of the general population and, therefore, is considered uncommon. The composite is **not cohesive**, meaning that it is not a good summary of the theoretically related abilities it was intended to represent, and should not be interpreted.



Appendix D on the CD of *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013)
(44 pages; 11 batteries) – WJ III NU COG Gc Factor Example



Appendix D on the CD of *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013) (44 pages; 11 batteries) – WJ III NU COG Factor Example



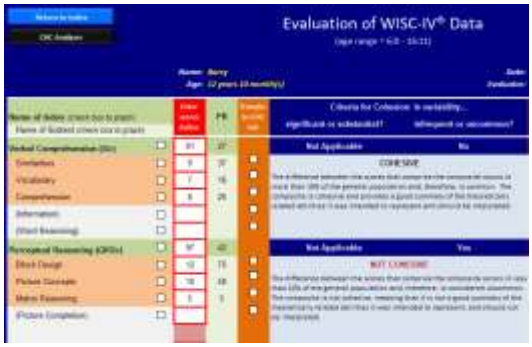
Cohesion

- Three-subtest composites
  - Base rate data used to determine whether the size of the difference between highest and lowest scores is *infrequent or uncommon* in the general population (i.e., about 10% or less).

Interpreting Three (or more)-Subtest Composites on the Test Tabs of the DMIA v 2.0

Finding	Interpretation
The magnitude of the difference between the highest and lowest score in the composite is uncommon in the general population	The difference between the scores that comprise the composite occurs in ≤ 10% of the general population and, therefore, is considered uncommon. The composite is **not cohesive**, meaning that it is not a good summary of the theoretically related abilities it was intended to represent, and should not be interpreted.
The magnitude of the difference between the highest and lowest score in the composite is common in the general population	The difference between the scores that comprise the composite occurs in more than 10% of the general population and, therefore, is common. The composite is **cohesive** and, therefore, provides a good summary of the theoretically related abilities it was intended to represent and should be interpreted.

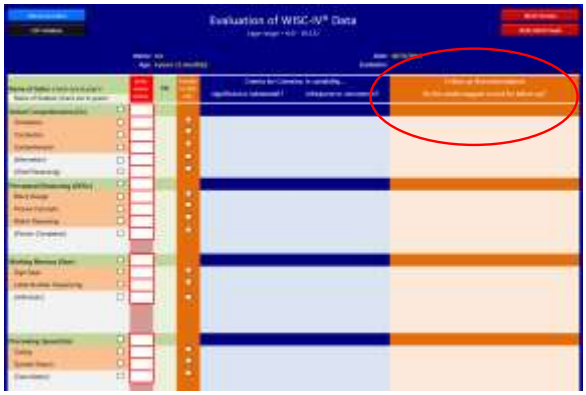
Cohesion of VCI and PRI



Appendix D on the CD of *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013) (44 pages; 11 batteries) – WISC-IV VCI Example

Appendix D on the CD of *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013) (44 pages; 11 batteries) – WISC-IV PRI Example

Do the Results within Broad Ability Domains Suggest a Need for Follow Up?



Examples of what is Meant by *Follow-up* in the DMIA v2.0

Additional Data Collection	Review of Existing Data
Investigation of narrow ability performance via administration of standardized, norm-referenced tests	Evaluation of existing data to determine if it corroborates current test performance (e.g., classroom work samples reveal manifestations of current cognitive ability weakness or deficit)
Informal assessment of the manifestations of an ability weakness or deficit (e.g., curriculum based measures, state/local exams)	Outside evaluation corroborates current findings
Formal and informal testing of hypotheses regarding variation in task characteristics and task demands	Professional, teacher, parent, and/or student report corroborates current findings
Outside evaluation of disorder or condition that may adversely affect test performance (e.g., neuropsychological evaluation of ADHD; psychological evaluation of emotional or personality functioning; functional behavioral assessment)	Error analysis explains inconsistencies in current data or reasons for weak or deficient performance
Consultation with parents, teachers or other professionals	Demand analysis explains inconsistencies in current data or reasons for weak or deficient performance
Classroom observations in areas of concerns	Review attempted interventions

What's the Relationship Between Cohesion and Follow Up?

Cohesion is a judgment based on statistical significance
Follow up is based on clinical judgment

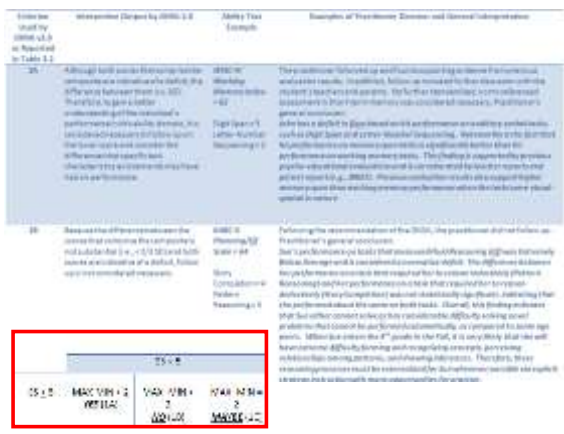
A Composite May be Cohesive, But Follow Up May Still be Necessary

WJ III NU COG Example

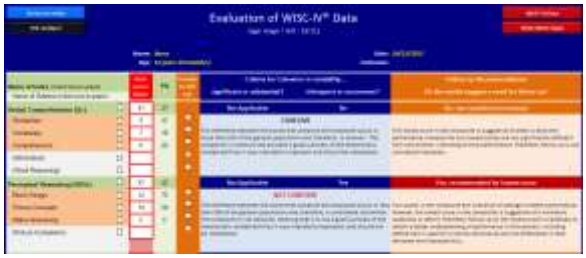
How Does the Program Determine Follow Up Recommendation for Two-subtest Composites?

Criteria in DMIA v2.0 for Follow-up on Lower Score within a Two-Subtest Composite (Subtests With Mean of 10 and Standard Deviation of 3)

Number-Letter Codes (e.g., 1A, 1B, 1C) are linked to Interpretive Statements



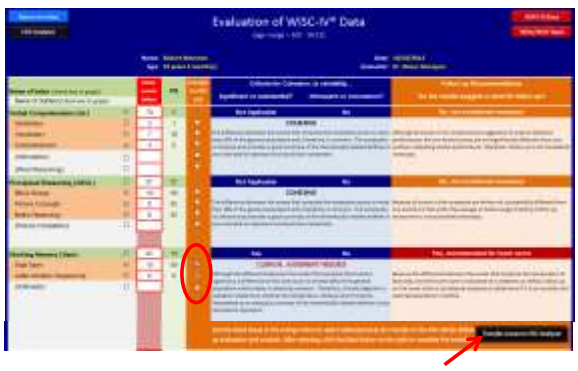
How Does the Program Determine Follow Up Recommendation for Three-subtest Composites?



Criteria Used in DMIA v2.0 for Follow-up on Lower Score within a Three-Subtest Composite (when Subtests are on a Scale Having a Mean of 100 and Standard Deviation of 15)

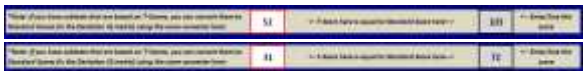
Number-Letter Codes (e.g., 1A, 1B, 1C) are linked to Interpretive Statements

How Do You Follow Up With Additional Tests?
Transfer Data to CHC Tab



CHC Analyzer Tab

CHC Analyzer Tab – *Gsm* Example



Enter XBA Composites on Bottom of Test Tab – *WISC-IV Tab Example*

Enter Data From Supplemental Tests as Necessary

How Does CHC Analyzer Tab of DMIA v2.0 Work?

Examples of TWO Scores Entered into (or Transferred to) the CHC Analyzer tab

Examples of Two Subtest Scores Entered into the CHC Analyzer Tab of DMIA v2.0:
Program Automatically Checks for Cohesion and Provides an Explanation of Outcome

Calculation and Interpretation of Composites Based on Two Subtests Entered into the CHC Analyzer Tab of the DMIA v2.0

Rule for Calculating a Composite	Interpretation of Two-Subtest Configuration
If difference between scores is <15, then composite is calculated, OR	The difference between the scores that comprise the composite is < 1SD and, therefore, the composite is considered **cohesive**. The composite is likely a good summary of the set of theoretically related abilities that comprise it. Interpret the composite as an adequate estimate of the ability that it is intended to measure.
If both scores are <80 and the difference between them is > 14, then composite is calculated, OR	Although the difference between the scores is greater than or equal to 1SD, both scores are less than 80 and represent normative weaknesses or deficits. Therefore, the composite is still considered **cohesive** and may be interpreted as an adequate estimate of the ability that it is intended to measure.
If both scores are >119 and the difference between them is >14, then composite is calculated, OR	Although the difference between the scores is greater than or equal to 1SD, both scores are greater than 119 and represent normative strengths. Therefore, the composite is still considered **cohesive** and may be interpreted as an adequate estimate of the ability that it is intended to measure.
If both scores are >79 and <120 and the difference between them is >14; then no composite is calculated.	The scores comprising the composite fall in different ability ranges and differ from one another by at least 1SD. Therefore, the composite is **not considered cohesive**. As such, the composite is not likely to be a good summary of the theoretically related abilities it is intended to represent. (Note: ability ranges are Below Average: 80-89; Average: 90-109; Above Average: 110-119).

Examples of THREE Scores Entered into (or Transferred to) the CHC Analyzer tab

Calculation and Interpretation of Composites Based on Three Subtests Entered into the CHC Analyzer Tab of the DMIA v2.0

Rule for Calculating a Composite	Interpretation of Three-Subtest Configuration
If the difference between MIN and MAX is < 15, then composite is calculated based on all scores, OR	The difference between the highest and lowest scores that comprise the composite is < 1SD and, therefore, the composite is considered **cohesive**. The composite is likely a good summary of the set of theoretically related abilities that comprise it. Interpret the composite as an adequate estimate of the ability that it is intended to measure.
If all three scores are <80 and the difference between any two of them is > 14, then composite is calculated, OR	Although the difference between the scores is greater than or equal to 1SD, all three scores are less than 80 and represent normative weaknesses or deficits. Therefore, the composite is still considered **cohesive** and may be interpreted as an adequate estimate of the ability that it is intended to measure.
If all three scores are >119 and the difference between any two of them is >14, then composite is calculated, OR	Although the difference between the scores is greater than or equal to 1SD, all scores are greater than 119 and represent normative strengths. Therefore, the composite is still considered **cohesive** and may be interpreted as an adequate estimate of the ability that it is intended to measure.
If the difference between MAX and MID is > 14 and the difference between MIN and MID is > 14, then no composite is calculated, OR	All scores that comprise the composite differ from one another by at least 1SD. Therefore, the composite is **not considered cohesive**. As such, the composite is not likely to be a good summary of the theoretically related abilities it is intended to represent.
If the difference between MIN and MAX is > 14, and the difference between MAX-MID and MID-MIN is equal (and < 15), then calculate composite for MID+MAX and report MIN as divergent (Chaplin Rule), OR If the difference between MIN and MAX is > 14, and MID-MIN > 14 and MAX-MID is < 15, then calculate composite for MID+MAX and report MIN as divergent OR If the difference between MIN and MAX is > 14, and MID-MIN is < 15, and MAX-MID is <15, and MID-MIN > MAX-MID, then calculate composite for MID+MAX and report MIN as divergent (Cheramie Rule A), OR	Because the difference between the highest and lowest scores entered is greater than or equal to 1SD, this set of scores is **not considered cohesive**, indicating that a composite based on all three scores is unlikely to provide a good summary of the ability it is intended to represent. Instead the ***two highest scores form a cohesive composite*** that may be interpreted meaningfully and the lowest value is a divergent score.
If the difference between MIN and MAX is > 14, and MID-MIN is < 15 and MAX-MID > 14, then calculate composite for MIN+MID and report MAX as divergent, OR If the difference between MIN and MAX is > 14, and MID-MIN is < 15, and MAX-MID is <15, and MID-MIN < MAX-MID, then calculate composite for MID+MIN and report MAX as divergent (Cheramie Rule B).	Because the difference between the highest and lowest scores entered was greater than or equal to 1SD, this set of scores is **not considered cohesive**, indicating that a composite based on all three scores is unlikely to provide a good summary of the ability it is intended to represent. Instead the ***two lowest scores form a cohesive composite*** that may be interpreted meaningfully and the highest value is a divergent score.

Examples of FOUR Scores Entered into (or Transferred to) the CHC Analyzer tab

Rapid Reference 3.7

Calculation of Composites Based on Four Subtests Entered into the CHC Analyzer Tab of the XBA DMIA v2.0

Rule for Calculating a Composite	Interpretation of Four-Subtest Configuration
If the difference between MAX and MIN is <21, composite is calculated based on all scores (4 subtest composite), OR	The difference between the highest and lowest scores that comprise the composite is less than or equal to 1 1/2 SD, therefore, the composite is **cohesive**. The composite is likely a good summary of the set of theoretically related abilities that comprise it. Interpret the composite as an adequate estimate of the ability that it is intended to measure.
If all four scores are <80 and the difference between MAX and MIN is >20, composite is calculated for all four scores (4 subtest composite), OR	Although the difference between the highest and lowest scores is greater than or equal to 1 1/2 SD, all four scores are less than 80 and represent normative weaknesses or deficits.

Four Subtest Scores in CHC Analyzer Tab

- Outcome
  - One composite
  - No composite
  - Two composites
  - One composite and one divergent score
  - One composite and two divergent scores

Implementation of XBA: Step 1

❖Selection of an Intelligence Battery
- ❖Consider:
  - ❖Age and Developmental level
    - ❖Floor and Ceiling
  - ❖English language proficiency
    - ❖Cultural Loading
    - ❖Linguistic Demand
  - ❖Specific referral concerns
    - ❖SLD
    - ❖MR (Intellectually Disabled)
    - ❖Gifted

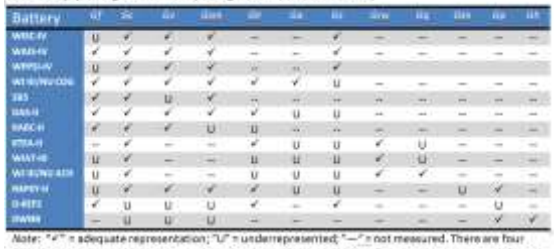
Implementation of XBA: Step 2

❖Identify the CHC ***Broad Abilities*** that are measured by the selected intelligence battery

- ❖*Adequate* = battery has at least 2 qualitatively different indicators of the broad ability.
- ❖*Underrepresented* = only one narrow aspect of the broad ability is included.
- ❖*Not measured*

❖If *underrepresented* or *not measured*:
- ❖Look out of battery to supplement

Rapid Reference 2.5. Representation of Broad CHC Abilities on Selected Cognitive, Achievement and Neuropsychological Batteries (Flanagan, Ortiz, & Alfonso, 2013)



Battery	Gf	Gc	Gv	Gsm	Glr	Ga	Gu	Gsm	Gq	Grw	Gp	Gh
WISC-IV	U	✓	✓	✓	—	—	✓	—	—	—	—	—
WAIS-IV	✓	✓	✓	✓	—	—	✓	—	—	—	—	—
WPPSI-IV	U	✓	✓	✓	--	--	✓					
KABC-II/KAIT-II	✓	✓	✓	✓	✓	✓	U	—	—	—	—	—
DAS	✓	✓	U	✓	--	--	--	--	--	--	--	--
SB5	✓	✓	✓	✓	✓	U	U	--	--	--	--	--
KABC-II	✓	✓	✓	U	U	--	--	--	--	--	--	--
RIAS-II	—	✓	—	—	✓	U	U	✓	U	—	—	—
WJ-III/WJ-III ACH	U	✓	—	—	U	U	U	✓	✓	—	—	—
WJ IV/WJ IV ACH	U	✓	✓	✓	✓	U	U	—	—	U	✓	—
D-KEFS	✓	U	U	U	✓	—	✓	—	—	—	U	—
CMMS	—	U	U	U	—	—	—	—	—	—	✓	✓

Note: "✓" = adequate representation; "U" = underrepresented; "—" = not measured. There are four broad CHC abilities not included in this rapid reference (i.e., Olfactory Abilities [Go], Psychomotor Speed [Gps], Reaction and Decision Speed [Gt], and Kinesthetic Abilities [Gk]). Gf = Fluid Reasoning; Gc = Comprehension-Knowledge; Gv = Visual Processing; Gsm = Short-term Memory; Glr = Long-term Storage and Retrieval; Ga = Auditory Processing; Grw = Reading and Writing; Gq = Quantitative Knowledge; Gkn = Domain-specific Knowledge; Gp = Psychomotor Abilities; Gh = Tactile Abilities; WAIS-IV = Wechsler

Implementation of XBA: Steps 3-5

- Identify the CHC ***Narrow Abilities and Processes*** that are measured by the selected intelligence battery
- Administer and Score Selected Intelligence Battery and Supplemental tests
  - *Follow directions specified by the test publisher's standardization procedures*.
- Enter Scores into the ***XBA Data Management and Interpretive Assistant*** (XBA DMIA v2.0)

Example of a WISC-IV-based Cross-Battery Assessment

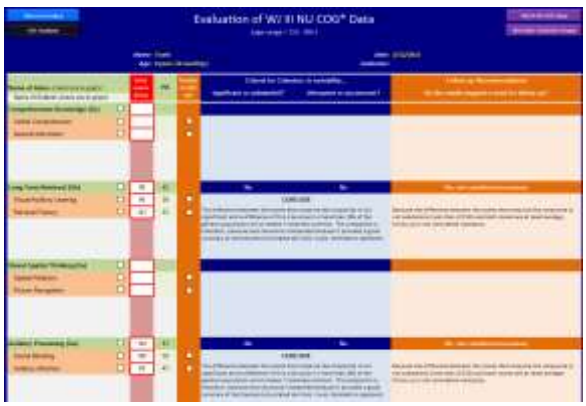
WISC-IV-based Cross-Battery Assessment Continued

WISC-IV-based Cross-Battery Assessment Continued – Utility of Clinical Clusters

WISC-IV Cross-Battery Assessment Continued – Follow up Necessary?

WISC-IV Cross-Battery Assessment Continued – WISC-IV data transferred to CHC Tab

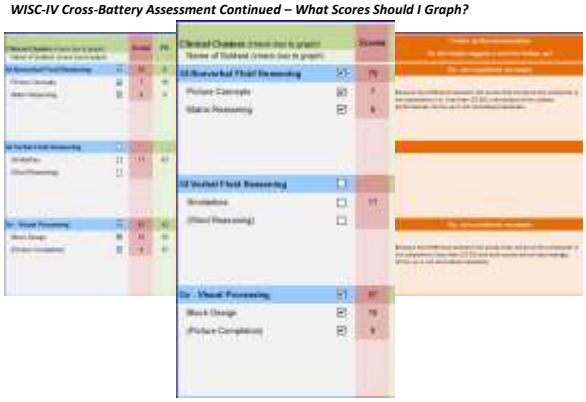
WISC-IV Cross-Battery Assessment Continued – XBA Necessary for Glr and Ga



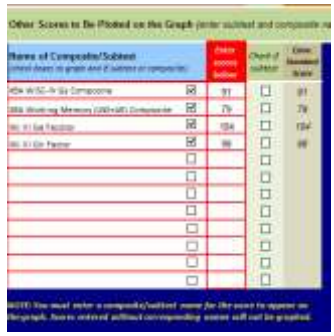
WISC-IV Cross-Battery Assessment Continued – XBA Data Entered at bottom of WISC-IV Tab

WISC-IV Cross-Battery Assessment Continued – What Scores Should I Graph?

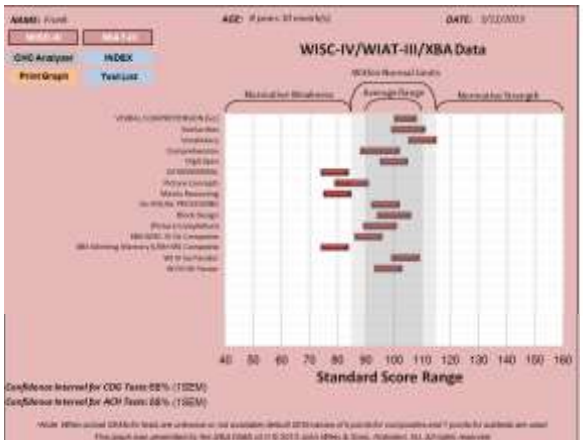
WISC-IV Cross-Battery Assessment Continued – What Scores Should I Graph?



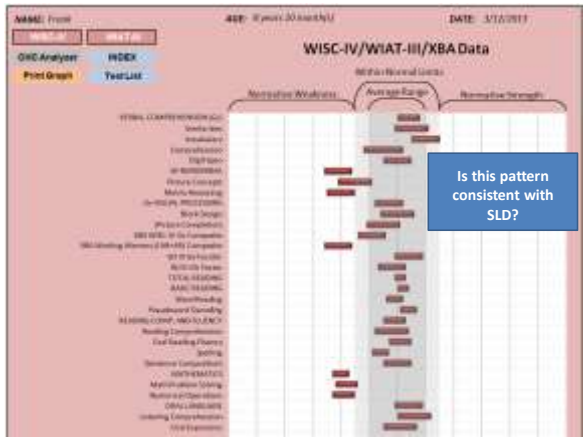
WISC-IV Cross-Battery Assessment Continued – What Scores Should I Graph?

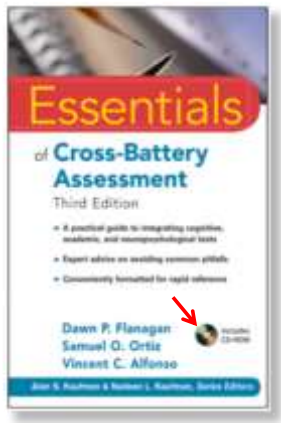


WISC-IV Cross-Battery Assessment Continued – Click on Graph button at Top of WISC-IV Tab?

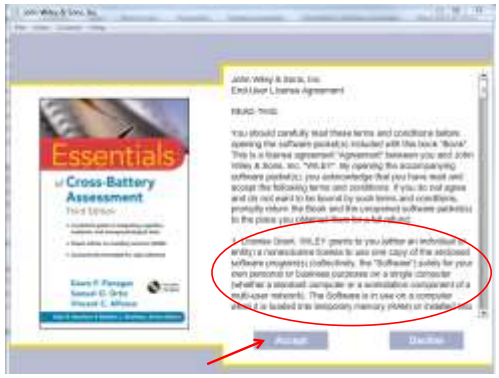


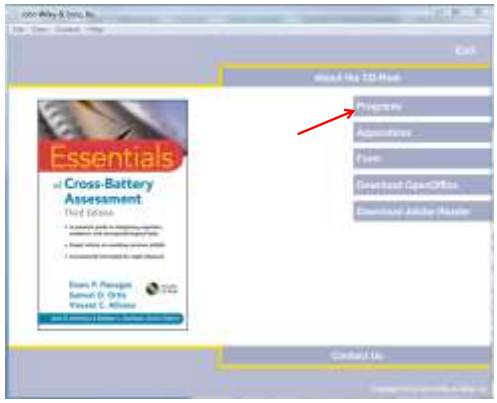
WISC-IV Cross-Battery Assessment Continued – Click on Graph button at Top of WIAT-III Tab?

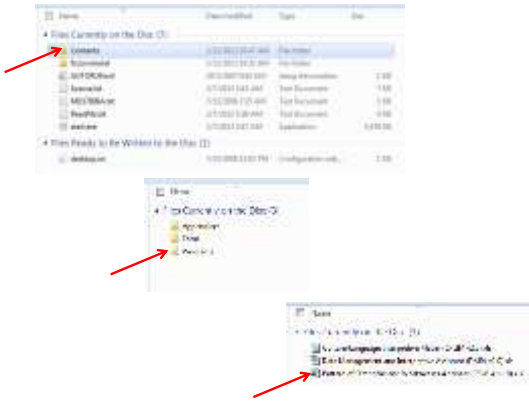


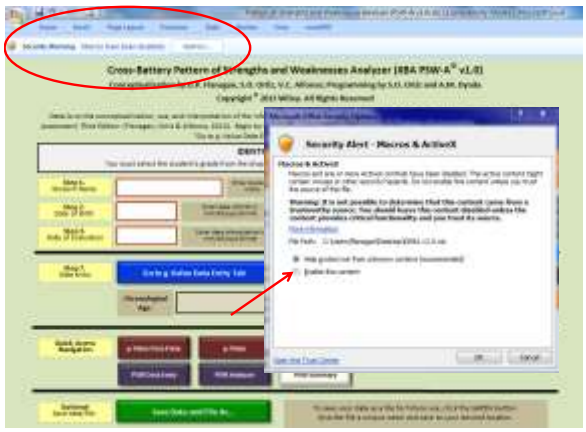


Insert CD from back of book









Important Considerations Prior to Using the PSW-A v1.0

- Programs are meant to be used on a PC (not a Mac)
- Mac programs are now available – contact Wiley/customer service
  - Will not work on Excel for Mac 2008 (must use Excel for Mac 2011 or higher)
  - Trial or "starter" versions of Excel for Mac are not recommended as they will disable macros and VBA support after the trial period is over
- You **MUST** enable macros for the programs to function properly
  - Enable Macros each time you open the program
- View programs at 100% magnification

PSW Data Entry Tab

- It is not necessary to use more than one area of cognitive weakness or more than one area of academic weakness.
  - *You may do so, but it is not necessary once the pattern is established*
  - Do not run more than two comparisons for a student in a cognitive or academic domain, as the program does not control for multiple comparisons
- *Evaluate the area in which there is the most concern, the most relevance to the referral concerns, and the most compelling evidence of deficiency*
- *Form diagnostic impressions prior to using the program*

g-Value =

- ***Sum of g-weights*** for each of the CHC ability domains
  - Program uses average *g*-weights from four sources (WJ III *Technical Manual* and three separate Cross-Battery joint factor analysis studies – all included the seven main cognitive domains)
- The abilities and their corresponding *g*-weights in the order in which they are listed in the *g*-Value Data Entry tab (which generally follows from highest to lowest) are as follows:
  - ***Gc = .2355***
  - ***Gf = .1870***
  - ***Glr = .1572***
  - ***Gsm = .1152***
  - ***Gv = .1167***
  - ***Ga = .1029***
  - ***Gs = .0864***
  - SUM = 1.0009

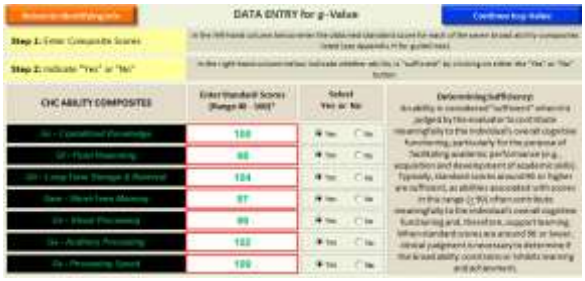
Abilities that are Considered Most Important to Learning and Academic Success in School are Given More Weight in the Calculation of the g-Value

- Grades K-2
  - ***Gc*** – Crystallized Intelligence
  - ***Glr*** – Long-term Storage and Retrieval
  - ***Gsm*** – Short-term Memory
  - ***Gs*** – Processing Speed
- Grades 3+
  - ***Gc*** – Crystallized Intelligence
  - ***Glr*** – Long-term Storage and Retrieval
  - ***Gsm*** – Short-term Memory
  - ***Gf*** – Fluid Reasoning

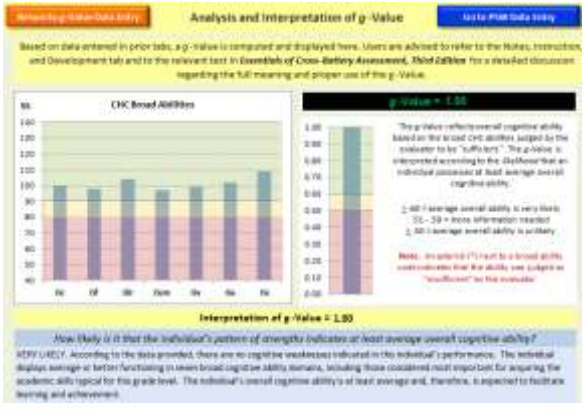
g-Value Data Entry Tab

- "Yes" selected for all seven CHC ability domains
  - ***g*-Value = 1.0**
- "No" selected for all seven CHC ability domains
  - ***g*-Value = 0**

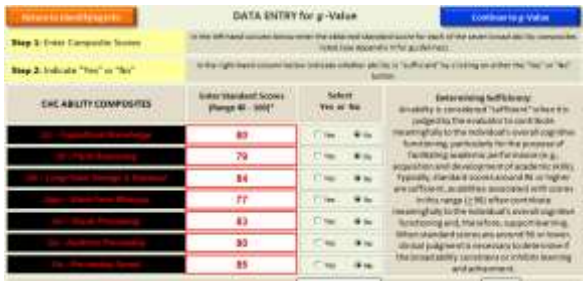
Example of "Yes" Selected for All Areas

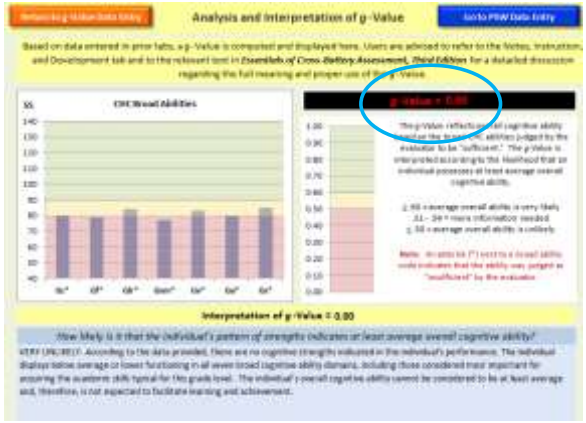


"Yes" Selected for All Areas – *g*-Value = 1.00



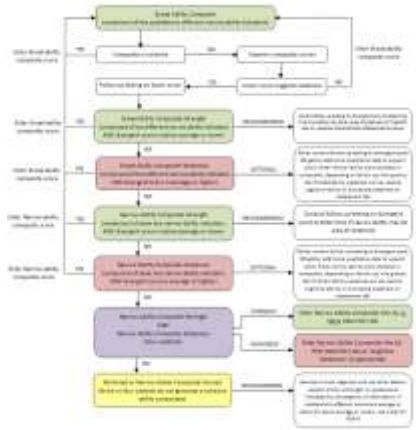
Example of "No" Selected for All Areas





DECISION FLOWCHART FOR DETERMINING SCORES TO BE ENTERED INTO PSW-A (*g*-Value Data Entry Tab)

STEP-BY-STEP Guidance and Examples



g-Value and IA-e

- When *g*-Value is .60 or higher (reported in the color green)
  - The IA-e is almost always in the average range or higher (and reported in the color green)

Example of Relationship between *g*-Value and IA-e

Example of Relationship between *g*-Value and IA-e

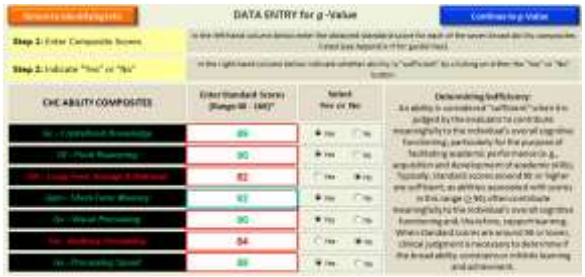
Example of Relationship between *g*-Value and IA-e

g-Value and IA-e

- When *g*-Value is .60 or higher (reported in the color green)
  - The IA-e is almost always in the average range or higher (and reported in the color green)

- ***g*-Value may be .60 or higher (reported in the color green)**
  - ***IA-e may be in the low average range and appear in the color yellow***

Example of Relationship between *g*-Value and IA-e



Example of Relationship between *g*-Value and IA-e

Example of Relationship between *g*-Value and IA-e

Don't Forget:

- *g*-Value is based on the *g-weights* associated with the CHC abilities that were judged to be sufficient

- IA-e is based on the CHC *obtained scores* that were judged to be sufficient

More on the Relationship between the *g*-Value and the IA-e

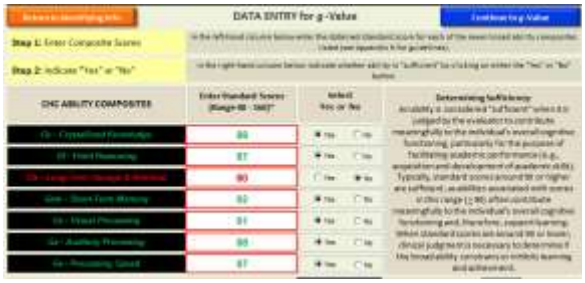
How is IA-e Calculated?

- PSW-A uses a standard formula that incorporates median inter-correlations among and reliabilities of those CHC domains that were judged to be "sufficient"
- Median ***inter-correlations*** among each broad ability and every other broad ability were derived from an investigation of over 240 coefficients reported in the technical manuals of cognitive batteries and included in within-battery and cross-battery independent factor analyses.
- Median ***reliability coefficients*** were derived from a total of 54 coefficients gathered from the technical manuals of cognitive batteries

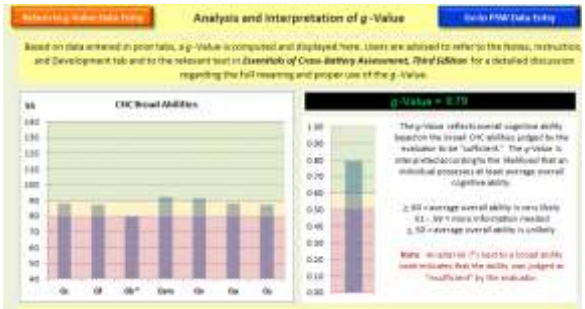
Reliability and Use of the IA-e

- The ***reliability of the IA-e*** (needed for the formula used to generate the predicted score) is calculated based on the reliabilities and inter-correlations among the CHC abilities that are reported to be sufficient
- ***To use the IA-e to generate a predicted cognitive or academic score***, approximately 500 inter-correlations among specific cognitive and academic areas (broad and narrow) and general cognitive ability (e.g., FSIQ and other total test composites from cognitive batteries) were gathered and medians were obtained

Example of Relationship between *g*-Value and IA-e: When "yes" is selected for scores that are in high 80's and low 90's



Example of Relationship between *g*-Value and IA-e: When "yes" is selected for scores that are in high 80's and low 90's

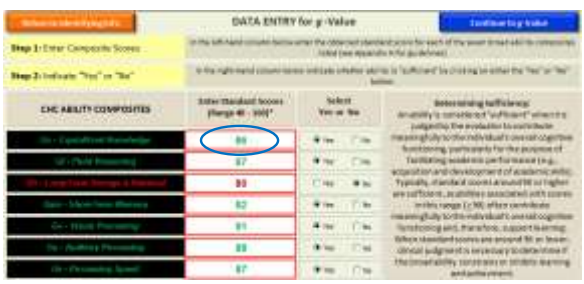


Example of Relationship between *g*-Value and IA-e: When "yes" is selected for scores that are in high 80's and low 90's

85 ± 5 (80-90)

90-110 = Average

Example of Relationship between *g*-Value and IA-e: When "yes" is selected for scores that are in high 80's and low 90's



***Gc* is now and 86, not 88 (all other scores are the same as last example)**

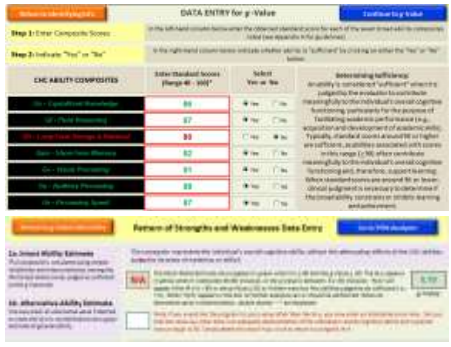
Example of Relationship between *g*-Value and IA-e: When "yes" is selected for scores that are in high 80's and low 90's

IA-e is likely 84 or 83

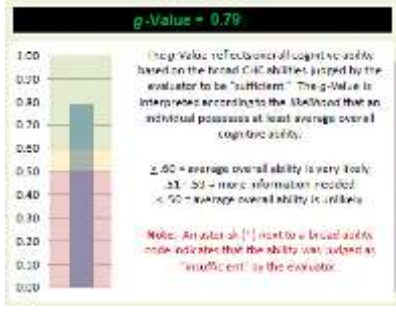
(upper end of CI does not touch or extend into the Average range)

Even with a liberal Confidence Interval, this individual's pattern of strengths does not suggest at least average overall cognitive ability

Pattern Suggests ***General*** Learning Difficulty, Not ***Specific*** Learning Disability



g-Value in Perspective



Most of the time a *g*-Value ≥ .60 will yield an Average or better IA-e

Most of the time a *g*-Value of .51-.59 will yield a g-Value that is low average to average or better, depending on the obtained scores

IA-e in Perspective

- The IA-e appears in **green** when it is ≥ 90 and the *g*-Value is ≥ .60.
- The IA-e appears in **yellow** when it is between 85-89, inclusive, or the *g*-Value is between .51 - . 59, inclusive.
- "**N/A**" appears in the IA-e is < 85 or the *g*-Value is ≤ .50, or if there are too few abilities judged to be sufficient (i.e., < 3).

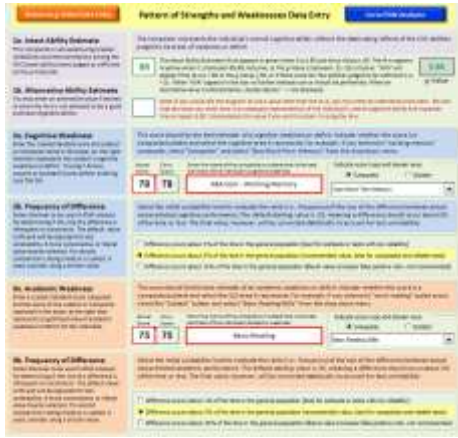
A PSW-A Example

Joe

Grade 1


DATA ENTRY for g -Value
CHC ABILITY COMPOSITES

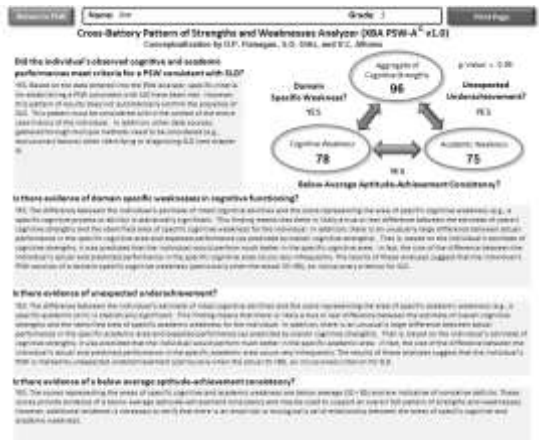

Analysis and Interpretation of g -Value
g -Value = 0.69
Interpretation of g -Value = 0.69

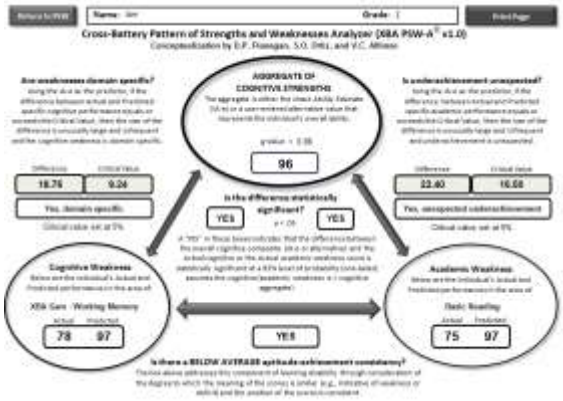

Pattern of Strengths and Weaknesses Data Entry

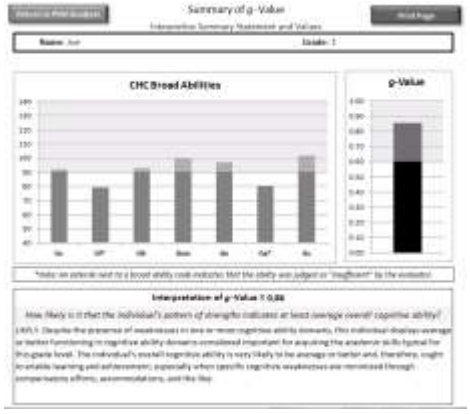
Formulae Used in PSW-A

(see "Notes, Instructions, and Development" tab for More Information)

- Program employs a regression-based prediction discrepancy procedure that corrects for unreliability and, therefore, ***guards against false negatives***
- Default value for statistical significance is set at 95% ($p < .05$), which is the recommended value (Reynolds, 1985; Wright, 2002)
- When difference between IA-e and cognitive or academic weakness score is statistically significant, then the program evaluates the magnitude of the difference between actual and predicted performance and its degree of rarity.
  - *Program uses default value for rarity – i.e., size of difference occurs in about 5% (or less) of the population (one tailed – weakness is assumed to be lower than IA-e)*
- Critical value is adjusted statistically to correct for inherent test unreliability and imperfect correlation so as to not exclude student's whose difference was insufficient to meet or exceed the target value due to measurement error (Reynolds, 1985; Wright, 2002)







PSW-A v1.0

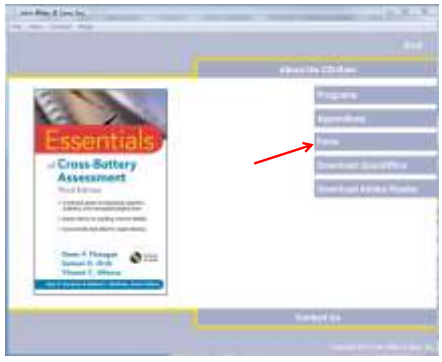
Flanagan, Ortiz, and Alfonso (2013)

- **Based on the most psychometrically defensible analyses of score differences**
  - Reynolds, C. R. (1985). Critical measurement issues in learning disabilities. *Journal of Special Education, 18*, 451-476.
  - Evans, L. D. (1990). A conceptual overview of the regression discrepancy model for evaluating severe discrepancy between I Q and achievement scores. *Journal of Learning Disabilities, 23*, 406-412.
  - Wright, J. (2002). Best practices in calculating severed discrepancies between expected and actual academic achievement scores: A step-by-step tutorial. Retrieved June 1, 2010 from: http://www.kasp.org/Documents/discrepancies.pdf

Evaluation of Below Average Aptitude-Achievement Consistency

- **Three ranges**
  - **< 85**
  - **85-89**
  - **≥ 90**
- **Does the pattern include consistency?**
  - **both scores < 85 = yes**
  - **Both scores ≥ 90 = no**
  - **One score < 85; one score 85-89 = likely**
  - **Both scores 85-89 = possibly**
  - **One score < 85; one score ≥ 90 = possibly**
  - **One score 85-89; one score ≥ 90 = unlikely**
- *Final determination based on clinical judgment, which is bolstered by empirical evidence supporting the relationship and ecological validity*

Exclusionary Factors Form



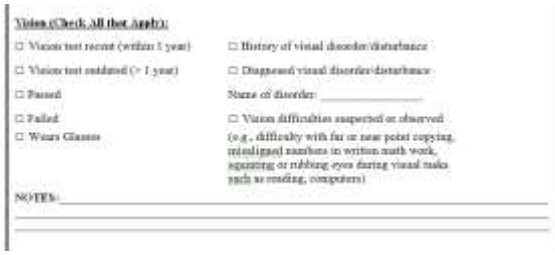
Flanagan et al.'s Operational Definition: Level II – Review of Exclusionary Factors

Evaluation and Consideration of Exclusionary Factors for SLD Identification

An evaluation of specific learning disability (SLD) requires an evaluation and consideration of factors, other than a disorder in one or more basic psychological processes that may be the primary cause of a student's academic skill weaknesses and learning difficulties. These factors include (but are not limited to), visions/hearing[1], or motor disabilities, intellectual disability (ID), social/emotional or psychological disturbance, environmental or economic disadvantage, cultural and linguistic factors (e.g., limited English proficiency), insufficient instruction or opportunity to learn and physical/health factors. These factors may be evaluated via behavior rating scales, parent and teacher interviews, classroom observations, attendance records, social/developmental history, family history, vision/hearing exams[1], medical records, prior evaluations, and interviews with current or past counselors, psychiatrists, and paraprofessionals who have worked with the student. Noteworthy is the fact that students with (and without) SLD often have one or more factors (listed below) that ***contribute*** to academic and learning difficulties. However, the practitioner must rule out any of these factors as being the ***primary*** cause of a student's academic and learning difficulties to maintain SLD as a viable classification/diagnosis.

Form published in Flanagan, Alfonso, Mascolo, & Sotelo-Dynega (2012). Use of Intelligence Tests in the Identification of Specific Learning Disabilities Within the Context of An Operational Definition. *In Flanagan & Harrison (Eds.), Contemporary Intellectual Assessment: Theories, Tests, and Issues (3rd edition). New York: Guilford.*

Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors



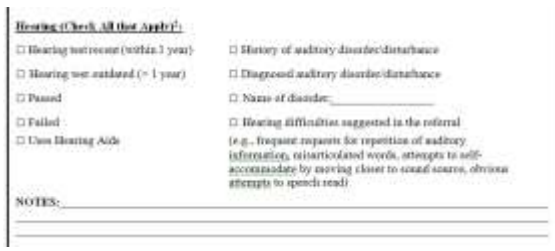
Vision (Check All that Apply):

- ☐ Vision test recent (within 1 year)
- ☐ Vision test outdated (> 1 year)
- ☐ Passed
- ☐ Failed
- ☐ Wears Glasses
- ☐ History of visual disorder/disturbance
- ☐ Diagnosed visual disorder/disturbance
- Name of disorder: _____
- ☐ Vision difficulties suspected or observed (e.g., difficulty with far or near point copying, misaligned numbers in written math work, squinting or rubbing eyes during visual tasks such as reading, computers)

NOTES: _____

Form downloadable on CD that accompanies *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013)

Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors



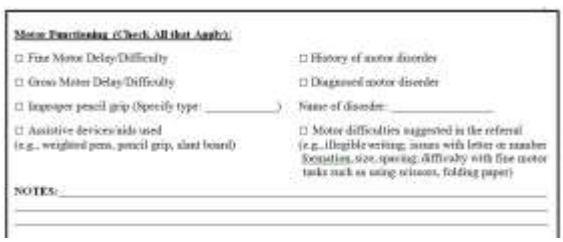
Hearing (Check All that Apply[1]):

- ☐ Hearing test recent (within 1 year)
- ☐ Hearing test outdated (> 1 year)
- ☐ Passed
- ☐ Failed
- ☐ Uses Hearing Aids
- ☐ History of auditory disorder/disturbance
- ☐ Diagnosed auditory disorder/disturbance
- ☐ Name of disorder: _____
- ☐ Hearing difficulties suggested in the referral (e.g., frequent requests for repetition of auditory information, misarticulated words, attempts to self-accommodate by moving closer to sound source, obvious attempts to speech read)

NOTES: _____

Form downloadable on CD that accompanies *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013)

Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors



Motor Functioning (Check All that Apply):

- ☐ Fine Motor Delay/Difficulty
- ☐ Gross Motor Delay/Difficulty
- ☐ Improper pencil grip (Specify type: _____)
- ☐ Assistive devices/aids used (e.g., weighted pens, pencil grip, slant board)
- ☐ History of motor disorder
- ☐ Diagnosed motor disorder
- Name of disorder: _____
- ☐ Motor difficulties suggested in the referral (e.g., illegible writing; issues with letter or number formation, size, spacing; difficulty with fine motor tasks such as using scissors, folding paper)

NOTES: _____

Form downloadable on CD that accompanies *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013)

Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors

Cognitive and Adaptive Functioning (Check All that Apply):

☐ Significantly "subaverage intellectual functioning" (e.g., IQ score of 75 or below)

☐ Pervasive cognitive deficits (e.g., weaknesses or deficits in many cognitive areas, including *Gf* and *Gc*)

☐ Deficits in adaptive functioning (e.g., social, communication, self-care)

Areas of significant adaptive skill weaknesses (check all that apply):

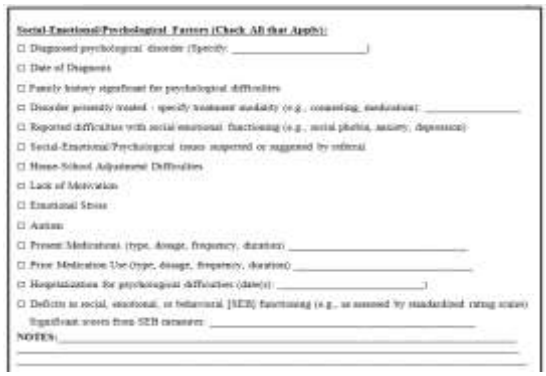
☐ Motor Skill ☐ Communication ☐ Socialization

☐ Daily Living Skills ☐ Behavior/Emotional Skills ☐ Other

NOTES: _____

Form downloadable on CD that accompanies *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013)

Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors



Social-Emotional/Psychological Factors (Check All that Apply):

☐ Diagnosed psychological disorder (Specify: _____)

☐ Date of Diagnosis

☐ Family history significant for psychological difficulties

☐ Disorder presently treated - specify treatment modality (e.g., counseling, medication): _____

☐ Reported difficulties with social emotional functioning (e.g., social phobia, anxiety, depression)

☐ Social-Emotional/Psychological issues suspected or suggested by referral

☐ Home-School Adjustment Difficulties

☐ Lack of Motivation

☐ Emotional Stress

☐ Autism

☐ Present Medications (type, dosage, frequency, duration): _____

☐ Prior Medication Use (type, dosage, frequency, duration): _____

☐ Hospitalization for psychological difficulties (date(s): _____)

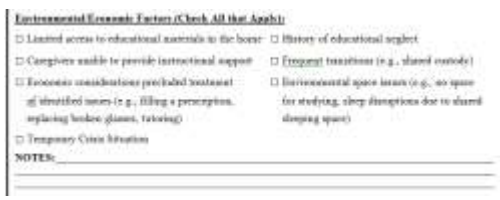
☐ Deficits in social, emotional, or behavioral [SEB] functioning (e.g., as assessed by standardized rating scales)

Significant scores from SEB measures: _____

NOTES: _____

Form downloadable on CD that accompanies *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013)

Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors



Environmental/Economic Factors (Check All that Apply):

☐ Limited access to educational materials in the home ☐ History of educational neglect

☐ Caregivers unable to provide instructional support ☐ Frequent transitions (e.g., shared custody)

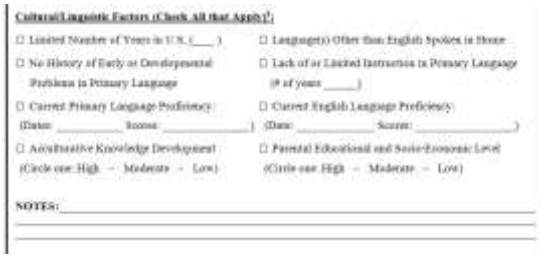
☐ Economic considerations precluded treatment of identified issues (e.g., filling a prescription, replacing broken glasses, tutoring) ☐ Environmental space issues (e.g., no space for studying, sleep disruptions due to shared sleeping space)

☐ Temporary Crisis Situation

NOTES: _____

Form downloadable on CD that accompanies *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013)

Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors



Cultural/Linguistic Factors (Check All that Apply)[1]:

☐ Limited Number of Years in U.S. (____) ☐ Language(s) Other than English Spoken in Home

☐ No History of Early or Developmental Problems in Primary Language ☐ Lack of or Limited Instruction in Primary Language (# of years _____)

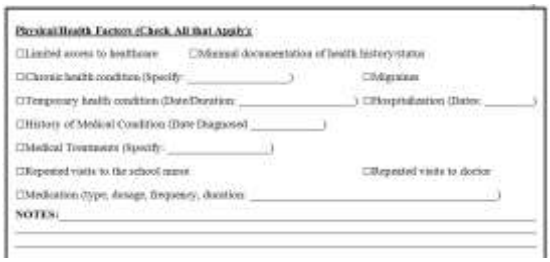
☐ Current Primary Language Proficiency (Dates: _____ Scores: _____) ☐ Current English Language Proficiency (Dates: _____ Scores: _____)

☐ Acculturative Knowledge Development (Circle one: High – Moderate – Low) ☐ Parental Educational and Socio-Economic Level (Circle one: High – Moderate – Low)

NOTES: _____

Form downloadable on CD that accompanies *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013)

Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors



Physical/Health Factors (Check All that Apply):

☐Limited access to healthcare ☐Minimal documentation of health history/status

☐Chronic health condition (Specify: _____) ☐Migraines

☐Temporary health condition (Date/Duration: _____) ☐Hospitalization (Dates: _____)

☐History of Medical Condition (Date Diagnosed _____)

☐Medical Treatments (Specify: _____)

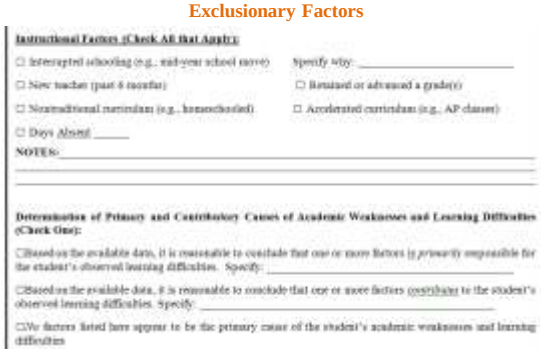
☐Repeated visits to the school nurse ☐Repeated visits to doctor

☐Medication (type, dosage, frequency, duration: _____)

NOTES: _____

Form downloadable on CD that accompanies *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013)

Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors



Instructional Factors (Check All that Apply):

☐ Interrupted schooling (e.g., mid-year school move) Specify Why: _____

☐ New teacher (past 6 months) ☐ Retained or advanced a grade(s)

☐ Nontraditional curriculum (e.g., homeschooled) ☐ Accelerated curriculum (e.g., AP classes)

☐ Days Absent _____

NOTES: _____

Determination of Primary and Contributory Causes of Academic Weaknesses and Learning Difficulties (Check One):

☐Based on the available data, it is reasonable to conclude that one or more factors is *primarily* responsible for the student's observed learning difficulties. Specify: _____

☐Based on the available data, it is reasonable to conclude that one or more factors *contributes* to the student's observed learning difficulties. Specify: _____

☐The factors listed here appear to be the primary cause of the student's academic weaknesses and learning difficulties

Form downloadable on CD that accompanies *Essentials of Cross-Battery Assessment*, 3e (Flanagan, Oritz, & Alfonso, 2013)

General Learning Difficulty

- Overall cognitive ability
  - In the 80s – low 90's range
- Academic Performance
  - In the 80s range
- ***Pervasive*** below average performance
- May have splinter skills (relative strengths)

Program Planning :
****Remediate academic deficits at Tiers II and III of an RTI service delivery model***
****Teach compensatory strategies to assist in minimizing effects of cognitive deficits***
****Small group; ample time to practice skills; emphasize need for several error-free repetitions of newly taught information, etc.***

Guidelines for Differential Diagnosis: Cognitive Ability and Adaptive Behavior

Intellectual Disability (ID)	*General Learning Difficulty (Slow Learner)*	*Specific Learning Disability (SLD)*
General ability ≤ 70–75	General ability > 75 and ≤ 89	General ability ≥ 90
Little variation in cognitive ability and processing profile	Little to moderate variation in cognitive ability and processing profile	Moderate to high (or statistically significant) variation in cognitive ability and processing profile
All or nearly all cognitive areas ≤ 75	May have normative deficits in one or more cognitive and academic areas (≤ 85)	Normative deficits (≤ 85) in specific cognitive abilities and processes; Normative deficits (≤ 85) in specific academic area(s); Empirical or ecologically valid relationship between cognitive and academic deficit(s)
Possible relative strengths in one or more processes or abilities that are not highly g saturated, such as Gc (e.g., phonetic awareness) and Gv (e.g., simple visual-spatial tasks)	May have relative strengths in one or more processes or abilities	Intact functioning (≥ 90 and ≤ 115) in many processes and abilities and possible normative cognitive or academic strengths (> 115)
Deficits (≤ 75) in Adaptive Behavior; little variation in performance across adaptive behavior domains	May have one or more deficits in Adaptive Behavior (but not in all domains)	Minimal to no deficits in Adaptive Behavior

Rapid Reference 4.4. Flanagan, Ortiz, & Alfonso (2013). Essentials of Cross-Battery Assessment, Third Edition. Hoboken, NJ: Wiley.

Guidelines for Differential Diagnosis: Etiology

Intellectual Disability (ID)	*General Learning Difficulty (Slow Learner)*	*Specific Learning Disability (SLD)*
Normative cognitive deficits are explained by **genetic conditions** (e.g., PKU; chromosomal abnormalities, such as Down syndrome and Fragile X syndrome); **problems during pregnancy** (e.g., use of alcohol or drugs, illnesses of the mother); **problems at birth** (premature, low birth weight); **problems after birth** (e.g., childhood diseases, head injuries, lead and mercury exposure); or **poverty and cultural deprivation** (e.g., malnutrition, inadequate medical care, environmental health hazards, under-stimulation). Note: in approximately 1/3 of individuals with ID, the cause is not known.	Underlying causes of generally low average cognitive and academic abilities are typically not known.	SLD has a neurobiological basis. The *pattern of generally average or better overall cognitive ability and below-average performance in related cognitive and academic areas cannot be explained* by exclusionary factors (e.g., poor instruction; sociocultural factors; psychological disturbance; cultural or language differences; environmental deprivation; etc.), **although one or more of these factors may contribute to weak academic performance.**

Rapid Reference 4.4. Flanagan, Ortiz, & Alfonso (2013). Essentials of Cross-Battery Assessment, Third Edition. Hoboken, NJ: Wiley.

Guidelines for Differential Diagnosis: Response to Instruction/Intervention and Programming

Intellectual Disability (ID)	*General Learning Difficulty (Slow Learner)*	*Specific Learning Disability (SLD)*
Progress Monitoring (or other performance indicators) demonstrates very slow rate of response/learning; will not meet typical grade level benchmarks in any academic area	Progress Monitoring (or other performance indicators) demonstrates slow rate of response/learning; may meet typical grade level benchmarks in some, but not all, academic areas	Following a comprehensive evaluation and resultant provision of tailored interventions, accommodations, compensatory strategies, and/or modifications, Progress Monitoring (or other performance indicators) demonstrates rate of response/learning similar to same grade peers; may approximate or meet typical grade level benchmarks
Special Education	Tier II and Tier III interventions in General Education, Remedial Programs, 504	Special Education, Remedial Programs, Inclusion (Tier II and Tier III interventions)
Primary Foci: Self-Help Skills, Functional Academics, Social Skills	*Primary Foci:* Functional Academics, Vocational Training, Accommodations, Compensatory Strategies, Social Skills and Self-Esteem	*Primary Foci:* Grade Level Performance, College Preparation, Accommodations, Compensatory Strategies, Self-Esteem, Self-Advocacy
Use data from strength-based assessment for intervention planning	Use data from strength-based assessment for intervention planning	Use data from strength-based assessment for intervention planning

Rapid Reference 4.4. Flanagan, Ortiz, & Alfonso (2013). Essentials of Cross-Battery Assessment, Third Edition. Hoboken, NJ: Wiley.

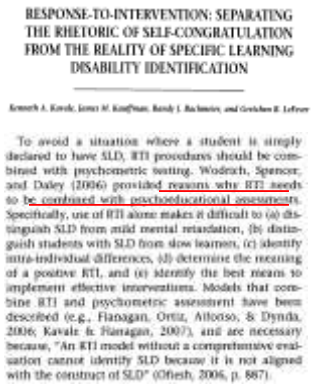
Conclusions

Guiding Principles for Comprehensive Assessment and Evaluation

- Multidisciplinary teams need to differentiate learning disabilities from underachievement and other types of learning and behavior problems.
- Multidisciplinary teams need to consider and integrate cognitive assessment findings.
- Multidisciplinary teams need to work to ensure that administrators and families recognize the benefit of *an accurate diagnosis* to inform instruction.

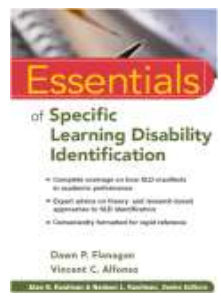
Guiding Principles for Comprehensive Assessment and Evaluation

- Avoid identifying students as having LD when they don't
- Avoid excluding students who have LD
- Recognize intra-individual differences, variation in severity, and need for specialized instruction and accommodations.



RESPONSE-TO-INTERVENTION: SEPARATING THE RHETORIC OF SELF-CONGRATULATION FROM THE REALITY OF SPECIFIC LEARNING DISABILITY IDENTIFICATION

To avoid a situation where a student is simply declared to have SLD, RTI procedures should be combined with psychometric testing. Wodrich, Spencer, and Daley (2006) provided reasons why RTI needs to be combined with psychoeducational assessments. Specifically, use of RTI alone makes it difficult to (a) distinguish SLD from mild mental retardation, (b) distinguish students with SLD from slow learners, (c) identify intra-individual differences, (d) determine the meaning of a positive RTI, and (e) identify the best means to implement effective interventions. Models that combine RTI and psychometric assessment have been described (e.g., Flanagan, Ortiz, Alfonso, & Dynda, 2006; Kavale & Flanagan, 2007), and are necessary because, "An RTI model without a comprehensive evaluation cannot identify SLD because it is not aligned with the construct of SLD" (Ofiesh, 2006, p. 887).

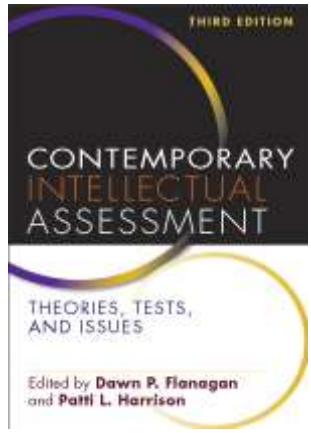


THEME: Multi-source, Multi-method Approach to SLD Identification

Knowledge of School Neuropsychology is Important for SLD Identification and Treatment

Nudging the Field….

Includes contributions by many school neuropsychologists: Dan Miller, Brad Hale, Scott Decker, Cecil Reynolds, Cynthia Riccio, and more



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