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

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Spokane, WA March 28, 2014

# 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



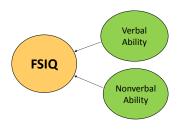
- Third Method Approaches to SLD Identification
  - Dual Discrepancy/Consistency Operational Definition of SLD (third method, pattern of strengths and weaknesses)
  - XBA PSW-A v1.0 software (Wechsler-based example)
- Conclusions

# Continuum of Progress in Psychometric Theories of Intelligence



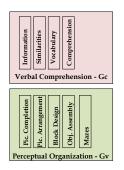


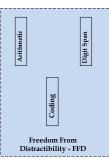
# **Traditional Cognitive Assessment**



1930s to the late 1990s

# THE 1974 WISC-R (12 Subtest) Factor Structure





WISC-III Factor Structure: 17 YEARS LATER	
Verbal Comprehension - Gc  Verbal Comprehension - Gc  Verbal Comprehension - Gc  Digit Span  Distractibility - FFD	
Per Completion  Symbol Search  Brock Design  Per Completion  P	
CHC Confirmatory Cross-Battery (or Joint) Factor Analysis of WISC-III and WJ	
Information Similarities Vocabulary Comprehension Pkt. Vocab Crelulation Aptikel Frob. Digit Span Mem. Words Mem. Sentences Incomplete Wds Sound Blending.	
Pic. Completion Pic. Arrangement Pic. Arrangement Pic. Arrangement Pic. Arrangement Mazes Vis. Closure Vis. Closure Pict. Recogn.  Coding Anal. Synth Core. Form.  Core. Form.	
Note: WJ tests are indicated by bold rectangles	
The new and improved science of	
psychological assessment is here!	

# Cattell-Horn Gf-Gc Theory



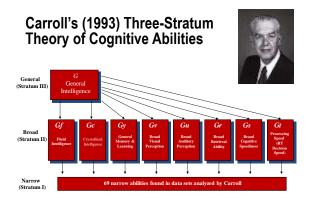


# A Landmark Event in Understanding the Structure of Intelligence

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







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

Based largely on McGrew's analyses in 1997-1999

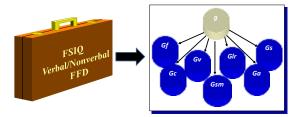


	Carroll (CHC) Model of Cognitive Abilities ligence Test Construction from 2000-2011
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# We Have Knowledge of What Our Tests Measure According to CHC Theory

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

<b>Cross-Battery</b>	Approach As	ssisted in	Paving the	Way	for CHC-based	Test
	Develo	pment ar	nd Interpret	ation	1	



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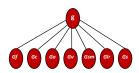


(Woodcock, McGrew, & Mather, 2001)

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

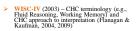






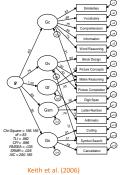


# **Contemporary Cognitive Assessment**



 WAIS-IV (2008) – CHC terminology and interpretive approach (Kaufman & Lichtenberger, 2009)





# Continuum of Progress in Tests of Intelligence and Cognitive Abilities









# Continuum of Progress in Methods of Interpretation

General Francis Stratigues (Sanomit Westel)	Psychonomic Prefile Analysis (Their Mane)	Application of Theory to interpretation (Fourth Word)	Application of References to Theory and CHC based Research to Psychological Ten- transproportion (Inth: Ware)
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Table from Kamphaus et al. (2012). A History of Intelligence Test Interpretation. In D.P. Flanagan and P.L. Harrison (Eds.), Contemporar Intelligence In Intelligence Test and Issues and I

# Continuum of Progress in Methods of Interpretation

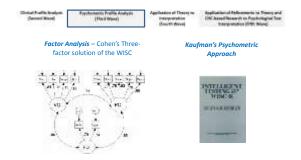
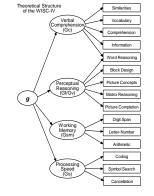


Figure 2.1 WISC-IV Test Framework (p. 6)



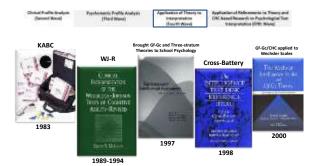
Note: Supplemental subtests in italics and do not contribute to FSIQ unless substituted for a core subtest

What Does the WISC-IV Measure?



Timothy Z. Keith and colleagues (2006)

# Continuum of Progress in Methods of Interpretation



# Beyond the Indices... | GC | GC | Competencion | GC | Competencio

Timothy Z. Keith and colleagues (2006)

Essentials

of WISC-IV
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CHC-based Interpretation and software (2004, 2009)

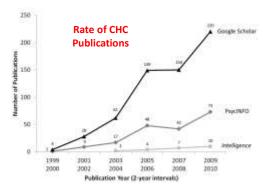


Figure from: Schneider and McGrew (2012). In Flanagan & Harrison (Eds.), *Contemporary Intellectual Assessment: Theories, Tests and Issues* (3<sup>rd</sup> edition). NY: Guilford.

# Continuum of Progress in Methods of Interpretation

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Interpretation

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



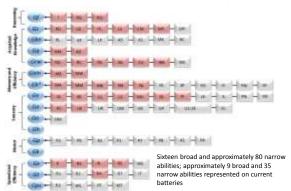


# **Revisions and Refinements to CHC Theory**

 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)



# 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 •Cvndi Riccio •George McCloskey •Denise Maricle

Psychology to the Schools, Vol. 25/9, 2006. Published online on Water Interfacement (1999).

(\* 2001 Wito Periodicals, for DOI: 10.1002/pm.2002\*

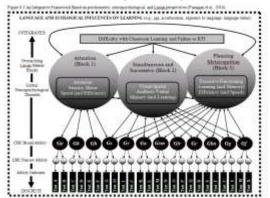
### SCHOOL NEUROPSYCHOLOGY CONSULTATION IN NEURODEVELOPMENTAL DISORDERS

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Additionally, the Catteft-Hom-Carroll (CHC) theory of intelligence and its operationalization in a Cross-Bathery Assessment procedure may also improve whost psychology assessment practice and facilities the integration of numpsychological methodology in school-based assessments. The CHC model benefits from more than a half-scenary of validity research on psychoteetic, developmental. heritability, academic outcome, and neurocognitive evidence (Flangan & Harrison, 2005; Flangan & Ortiz, 2005; McGeew, Kesth, Flangan, & Vanderwood, 1997). The CHC model is a multifiered model of intelligence, with view typically referred to as sents I, II, and III (Caroll, 1997). The broad ubilities of visitum II are functionally similar to construct measured in neuropsychology, siltough labels used to describe the measurements may differ (Dem et al., 2003). For example, among tooks use or reserve the measurements may unter Oren e.g., 2005; Fur cample, corresponding the architecture for the vercuite functions, with such tests as the Wisconsin Card Sorting Test, Haltecal's Cargary Test, and the Trail Making Test, whereas school psychologists use equivalent concepts like fluid melligence. Psychonomically, these constructions are highly related for may differ in theoretical specifications discore, Hill, & Davis, 2007; The the dign feator of may district in the ordered spectroston stocker, fill, & Osta, 2007. In: CHC and Cross-Bozzay Assessment approaches shift nonessment spectroston practice from Egy Composites to neurodesclopmental functions. This transition can be facilitated by maining in contemporary psychometric models (Phanagan, Onta, & Alfonson, 2007). Furthermore, imaginating Cross-Bartery Assessment approaches within a global hypothesis-tooting approach (Make & Foredles, 2004) may provide the best "alternative" method that mosts federal supirements 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

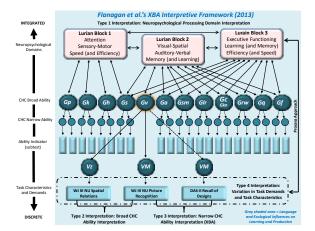
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# Continuum of Progress in Methods of Interpretation

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# Continuum of Progress in Methods of Interpretation





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

		<u> </u>	
	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 2 <sup>nd</sup> 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

# **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.
G 2 10 22 2 200	
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 B	Broad and Narrow Abilitie
Definitions of CHC B	Broad and Narrow Abilitie
Broad Ability  Short-Term Memory (Gsm)	
Broad Ability  Short-Term Memory (Gsm)	<b>Definition</b> The ability to encode, maintain and manipulate
Broad Ability  Short-Term Memory (Gsm)	Definition  The ability to encode, maintain and manipulate information in one's immediate awareness.  The ability to maintain information in primary
Broad Ability Short-Term Memory (Gsm)	Definition  The ability to encode, maintain and manipulate information in one's immediate awareness.
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Broad Ability Short-Term Memory (Gsm)  i  Memory Span (MS)	Definition  The ability to encode, maintain and manipulate information in one's immediate awareness.  The ability to maintain information in primary memory and immediately reproduce the information in the same sequence in which it was represented.  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
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# **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.
Re	trieval 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**

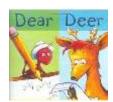
	Broad Ability	Definition
Visual Pro	cessing (Gv)	The ability to make use of simulated mental imagery
		(often in conjunction with currently perceived images)
		to solve problems.
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Visualizati	on (VZ)	The ability to perceive complex patterns and mentally simulate how they might look when transformed (e.g.,
		rotated, changed in size, partially obscured).
Speeded R	otation (SR)	The ability to solve problems quickly by using mental
		rotation of simple images.
Closure Sp	peed (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.

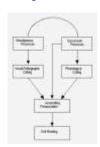
# **Additional Gv Narrow Abilities**

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

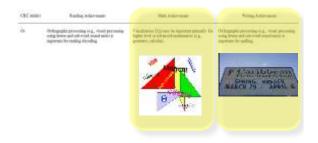


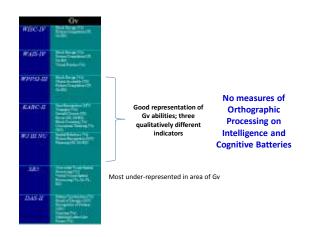
# Assessing Visual Processing Related to Reading

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



# Relationship Between Gv and Achievement





# 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

NEW		ERA
Now available from PRO-EDI	R	7-1-
Ages: 4-0 to 7-11 years Testing Time: 10-15 minutes Administration: Individual	Vision 1	-
The Early Reading Assessment (ERA) is an easily administered		

# **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

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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

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

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# **The Cross-Battery Assessment Approach**



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

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# 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)

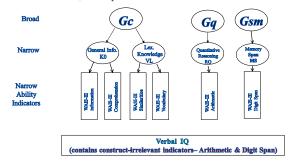
Broad v. Narrow CHC Abilities	
broad v. Narrow erre Abilities	
<ul> <li>To apply XBA, practitioners need to understand the differences between broad</li> </ul>	
and narrow abilities and how these abilities relate to the reason(s) for and purpose(s) of	
the referral.	
<b>Broad CHC Abilities</b>	
Broad 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).	
<ul> <li>In general, measurement of broad abilities is done when the purpose of an evaluation is to examine the</li> </ul>	
breadth of broad cognitive constructs that define overall intellectual/cognitive functioning or $g$ within the psychometric (CHC) tradition.	
<ul> <li>Typically, the breadth of broad cognitive constructs that may be represented in a comprehensive evaluation include, Gf, Gc, Gv, Ga, Gsm, Glr, and Gs.</li> </ul>	
Broad CHC Abilities	
<ul> <li>The aggregate of broad abilities provides an estimate of overall intellectual/cognitive functioning or g.</li> </ul>	
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.	
<ul> <li>The more qualitatively different aspects of the broad ability that are assessed, the better the</li> </ul>	
measurement and estimate of the broad ability.	

Narrow CHC Abilities	
No. 1999 W. C.	
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.	
<b>● XDa</b>	
Three Pillars of XBA	
CHC Theory	
CHC Broad (Stratum II)	
CHC Narrow (Stratum I)	
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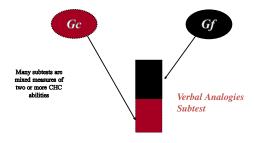
<b>Broad</b>	Abilit	v C	lassi	fica	tions
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• Guard against construct irrelevant variance

# 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

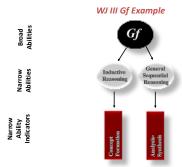
# **Construct Under-Representation**

WJ III Gf Example



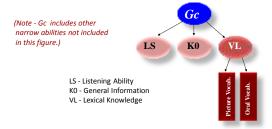
(Note - Gf also includes the narrow ability of Quantitative Reasoning, which not included in this figure.)

# **Adequate Construct Representation**



# 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.



# 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
KO - General Information
VL - Lexical Knowledge

Content '	Validity	or E	xpert	Conse	nsus	Studie	s <b>–</b>
<b>Empirical</b>	basis fo	r N	arrow	Ability	Clas	sification	ons

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

# SUMMARY—Analysis of XBA Expert Consensus Procedure (Flanagan, Ortiz, & Affonso, 2913) Constitution of Oroco Admits Statement of Service Statement (September Service Service

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

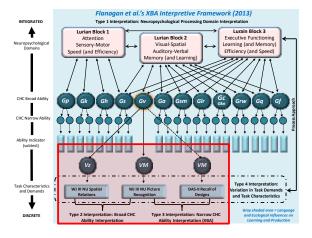


Excerpt from Appendix B In Cross-Battery Book (Flanagan et al., 2013)

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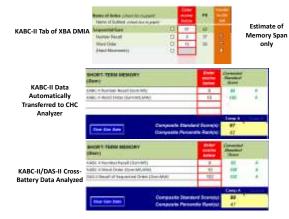
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# **XBA Guiding Principles**

- 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





# **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)

Definitions of CHE Cagnitive Abilities and Vescoprychalapical Functions, Washinstations of Cagnitive Washinstan and Examples of Faccommendations and Interventions (Based on Familian), Alfonso, & Margale, 2011. Currentproney Intelligets of Assessment, 3° addition)

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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 & Source

# 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	
<ul> <li>More Cross-Battery Assessment (e.g., Pearson Platform for crossing batteries)</li> <li>Drill down and understand disorders more precisely (e.g., subtypes)</li> </ul>	
T	
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  • (GIr-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)	
eifer, 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 <sup>2</sup>	Intervention
Dysphonetic Dyslexia	Supramarginal gyrus, located at the juncture of the temporal and parietal lobes <sup>1</sup>	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 <sup>1</sup>	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 pariental lobes, suggesting deficits integrating both the phonological representation and orthographical representation of words	Multiple reading delicits characterized by impaired phonological and orthographic processing skills. Most likely the most severe form of dyslexis; characterized by a combination of poor phonological processing skills, sower rapid and automatic word recognition skills, inconsistent language comprehension skills; bizarre error patterns in reading; double-deficit.	Intervention should incorporate a bolanced literacy approach
Comprehension Deficits	The brain's executive attention network – modulated primarily by the anterior cingulate gyrus in the frontal lobes <sup>4</sup>	The mechanical side of reading is fine, but difficulty deriving meaning from print	Intervention should be at the longuage 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



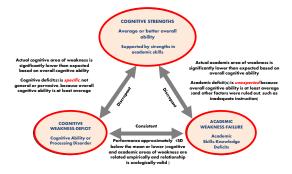
# Some Contributors:

Virginia Berninger Steve Fiefer 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



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Flanagan, Oritz, & Alfonso (2013). Essentials of Cross-Battery Assessment,  $3^{rd}$  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

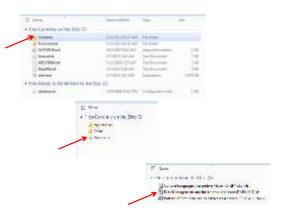




### Insert CD from back of book







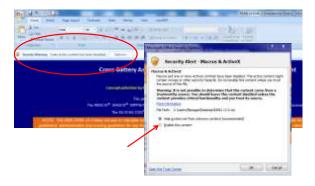
### Program Opens to this Tab

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# 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

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#### 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")

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#### 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







- Two
  - 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". <a href="https://www.igscorner.com/2011">www.igscorner.com/2011</a> 06 01 archive.html

#### Rules for Cohesion for Two-Subtest Composites on Test Tabs

Finding	sites on the Test Tabs of the DMIA v2.0 Interpretation
The difference between scores is not significant or	The difference between the scores that comprise the
uncommon	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	Although the difference between the scores that comprise the
uncommon	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	The difference between the scores that comprise the
uncommon	composite is significant and occurs in ≤ 10% of the general
	population and, therefore, is considered uncommon. The
	composite is <b>not cohesive</b> , 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



BATTERY No. 10 Experience Reported in Real	tery Assessment, 3e (Flanagan, Oritz, & Alfonso, 201 WJ III NU COG Factor Example	Eas.
Companie Vegit and Tachard College DAM Harde Hanne College DAM Long-Torna Zamoval Statist College DAM Long-Torna Lon	Transite Deliverse (MA   1974)   1984   1974	AN A
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	where the major that the other properties of the reduct of	
Francisco De Company (1940 (1950 (19	The Linear Advantage of Total Control of	
	and company to a contract to the contract of t	
Coh	esion	
<ul> <li>Three-subtest composit</li> <li>Base rate data used to d</li> </ul>	ees etermine whether the size of	
infrequent or uncommo	highest and lowest scores is n in the general population (i.e	<u> </u>
about 10% or less).		
	test Composites on the Test Tabs of the	
DM	IIA v 2.0	
Finding  The magnitude of the difference between the	IIA v 2.0  Interpretation  The difference between the scores that comprise the	
DM	IIA v 2.0	
Finding  The magnitude of the difference between the highest and lowest score in the composite is	Interpretation  The difference between the scores that comprise the composite occurs in ≤ 10% of the general population and, therefore, is considered uncommon. The composite is <b>not cohesive</b> , meaning that it is not a good	
Finding  The magnitude of the difference between the highest and lowest score in the composite is	IIA v 2.0  The difference between the scores that comprise the composite occurs in ≤ 10% of the general population and, therefore, is considered uncommon. The composite is <b>not cohesive</b> , meaning that it is not a good summary of the theoretically related abilities it was	
Finding  The magnitude of the difference between the highest and lowest score in the composite is	Interpretation  The difference between the scores that comprise the composite occurs in ≤ 10% of the general population and, therefore, is considered uncommon. The composite is <b>not cohesive</b> , meaning that it is not a good	
Finding The magnitude of the difference between the highest and lowest score in the composite is uncommon in the general population	Interpretation  The difference between the scores that comprise the composite occurs in ≤ 10% of the general population and, therefore, is considered uncommon. The composite is <b>not cohesive</b> , meaning that it is not a good summary of the theoretically related abilities it was intended to represent, and should not be interpreted.	
Finding  The magnitude of the difference between the highest and lowest score in the composite is uncommon in the general population  The magnitude of the difference between the highest and lowest score in the composite is	IIA v 2.0  Interpretation  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 difference between the scores that comprise the composite occurs in more than 10% of the general	
Finding  The magnitude of the difference between the highest and lowest score in the composite is uncommon in the general population  The magnitude of the difference between the	IIA v 2.0  Interpretation  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 difference between the scores that comprise the composite occurs in more than 10% of the general population and, therefore, is common. The composite is	
Finding  The magnitude of the difference between the highest and lowest score in the composite is uncommon in the general population  The magnitude of the difference between the highest and lowest score in the composite is	IIA v 2.0  Interpretation  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 difference between the scores that comprise the composite occurs in more than 10% of the general	

#### 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

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#### 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

time per unuality sitted quit or fusion sit to Table 5.2	Management Databash kg (1990). 3 Il	Alementos Ecomple	Sumples of Franciscopy Encous and Decree Undergrate place
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## 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)

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	No.	SECOLO	100 AND	MOMENTS od CS:	MICH	mad + Vit			Min deser-	*	
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	N+W	Militar Militar	10.04 10.05 10.05	MOMENTS		MICAMIN - Award 190 and 1904			ME-MA-10 METRIC	000,000 o pot + 15 (00000 (**)	
Ť		Miles	History			-			7	-	
		The communication with indicated A, E, and C, an all writter different resigns and METAMA C (E, ME) (1981).  If the communication in the Selection AA, and C, an all within this communication in the AMA (A) (A) (A) (A) (A) (A) (A) (A) (A) (A									

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



No. for the state of the last of the party of the last	58	***************************************	.10	r-desclorer one
There is the contract the property of the contract the con-	-11		TE .	- Deplement

Enter XBA Composites on Bottom of Test Tab – WISC-IV Tab Example	
Enter Data From Supplemental Tests as Necessary	
XEA CHIRA V2.07 - WISC-07 CADA Executation Tall	
In this time time to the control of	
G C C C C C C C C C C C C C C C C C C C	
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How Does CHC Analyzer Tab of	
DMIA v2.0 Work?	
Francisco of TMO Coores	
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 Co	mposites 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 The difference between the scores that comprise the composite is			
calculated, OR	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 >	Although the difference between the scores is greater than or equal		
14, then composite is calculated, OR	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	Although the difference between the scores is greater than or equal		
>14, then composite is calculated, OR	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	The scores comprising the composite fall in different ability ranges		
them is >14; then no composite is calculated.	and differ from one another by at least 1SD. Therefore, the		
	composite is <b>not considered cohesive</b> . 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-		
	00: 4: 00 400: 41 4: 440 440)		

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

	osites Based on Three Subtests Entered int Tab of the DMIA v2.0	0
Rule for Calculating a Composite  If the difference between MIN and MAX is < 15, then composite is calculated based on all scores, OR	Interpretation of Three-Subtest Configuration The difference between the highest and lowest zones that comprise the composite is < 150 and therefore, the composite is considered collegates. The composite is labely agood summary of the of theoretically related abilities that comprise it. Interpret the composite as an adequate estime of the ability that it is intended to measure.	set
	Although the difference between the scores is greater than or equal to 150, all three scores are 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.	
composite is calculated, OR  If the difference between MAX and MID is > 14 and the difference between MIN and	Although the difference between the scores is greater than or equal to 150, all scores are greate than 19 and represent normative strengths. Therefore, the composite is still considered colle- and may be interpreted as an adequate scientar of the ability that it is intended normacure. All scores that comprise the composite differ from one another by at least 150. Therefore, the	
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	composite is <b>not considered cohesive</b> . As such, the composite is not likely to be a good summa of the theoretically related abilities it is intended to represent. Because the difference between the highest; and clowest scores entered is greater than or equal 150), this set of scores is <b>not considered cohesive</b> , 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 if two highest access form a cohesive composite that may be interpreted meaningfully and the lowest value is a divergent score.	
MID+MAX and report MIN as divergent (Cheramie Rule A), OR If the difference between MIN and MAX is 5-14, and MID-MIN is <55 and MAX-MID > 14, then calculate composite for MINHOID and report MAX as divergent, OR If the difference between MIN and MAX is > 14, and MID-MIN is <55, and MAX-MID is	Because the difference between the highest and lowest scores entered was greater than or equi- 150; 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 from a cohesive composite that may be interpreted minaringfully and the	
MXX as divergent (Cheramin Rule B).	highest value is a divergent score.	
<b>Examples of</b>	<b>FOUR Scores</b>	
Enter	ed into	
-	ferred to)	
the CHC A	nalyzer tab	
• ***		
= Rapid Reference 3.7  Calculation of Composites Based on Four Subtests Entered into the		
CHC Analyzer Tab of the XBA I	OMIA v2.0	
Rule for Calculating a Composite If the difference between MAX and MIN is <21, composite is calculated based on all scores	Interpretation of Four-Subtest Configuration  The difference between the highest and lowest scores that comprise the composite is less than or equal to 11/1.	
(4 subtest composite), OR	5D, therefore the composite is cohesive. The composite is likely a good summary of the set of theoretically related abilities that comprese it. Interpret the composite as an adequate estimate of the ability that	
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	it is intended to measure.  Although the difference between the highest and lowest soores is gnater than or equal to 1 ½, 3D, all four scores are less than 80 and represent pormative veral/resons or deficits.	

our 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	
<ul> <li>Selection of an Intelligence Battery</li> <li>◆Consider:</li> <li>◆Age and Developmental level</li> <li>◆Floor and Ceiling</li> <li>◆English language proficiency</li> <li>◆Cultural Loading</li> <li>◆Linguistic Demand</li> <li>◆Specific referral concerns</li> <li>◆SLD</li> <li>◆MR (Intellectually Disabled)</li> <li>◆Gifted</li> </ul>	
Implementation of XBA: Step 2	
❖Identify the CHC Broad Abilities that are measured by the selected intelligence battery	
<ul> <li>Adequate = battery has at least 2 qualitatively different indicators of the broad ability.</li> <li>Underrepresented = only one narrow aspect of the broad ability is included.</li> <li>Not measured</li> </ul>	
If underrepresented or not measured:  ❖Look out of battery to supplement	



#### WISC-IV-based Cross-Battery Assessment Continued



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



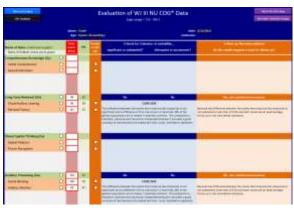
#### WISC-IV Cross-Battery Assessment Continued – Follow up Necessary?



#### ${\it WISC-IV\ Cross-Battery\ Assessment\ Continued-WISC-IV\ data\ transferred\ to\ CHC\ Tab}$



#### ${\it WISC-IV\ Cross-Battery\ Assessment\ Continued-XBA\ Necessary\ for\ GIr\ and\ Ga}$



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

Name of Composite/Subtest Part times to proch only subtest in surgest	mr.	Circles Section	Chesk of Justinet	Start Start
KER NYSCHY As tomperate		111	п	21
die Worden Neman (UNI-AR) Composite		79		79
Will De Paroler		107		194
Wild Bir Factor		95		100
		1		
		2 2		
			U	
			0	
	П		П	
	0		0	



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

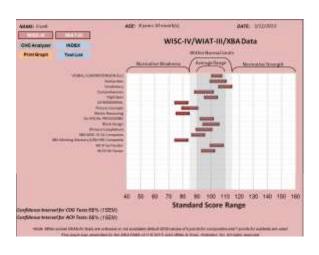


 ${\it WISC-IV\ Cross-Battery\ Assessment\ Continued-What\ Scores\ Should\ I\ Graph?}$ 



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

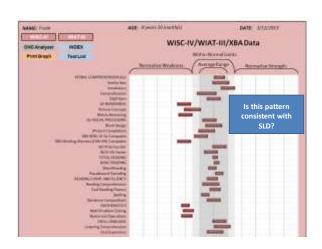


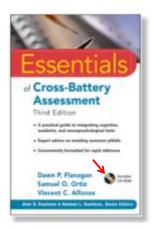




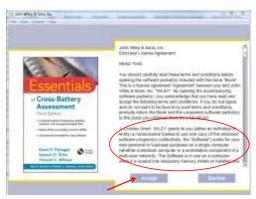
WISC-IV Cross-Battery Assessment Continued - Click on Graph button at Top of WIAT-III Tab?



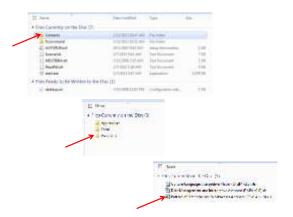


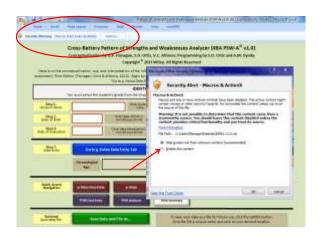


#### Insert CD from back of book









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

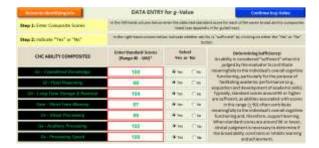
- Programs are meant to be used on a PC (not a Mac)
- Mac programs are now available contact Wiley/customer service
  - Will not work on Excel for Mac 2008 (must use Excel for Mac 2011 or higher)
  - Trial or "starter" versions of Excel for Mac are not recommended as they will disable macros and VBA 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	
	<ul> <li>It is not necessary to use more than one area of cognitive weakness or more than one area of academic weakness.</li> </ul>	
	<ul> <li>You may do so, but it is not necessary once the pattern is established</li> </ul>	
	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	
	<i>g</i> -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 <i>g</i> -weights in the order in which they are listed in the <i>g</i> -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	
	30III - 1.0003	
	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 • Grades 3+	
	<ul> <li>Gc - Crystallized</li> <li>Intelligence</li> <li>Intelligence</li> </ul>	
	- GIr - Long-term Storage and Retrieval and Retrieval	
	<ul><li>- Gsm – Short-term</li><li>- Gsm – Short-term</li><li>Memory</li><li>Memory</li></ul>	
	<ul><li>– Gs – Processing Speed</li><li>– Gf – Fluid Reasoning</li></ul>	

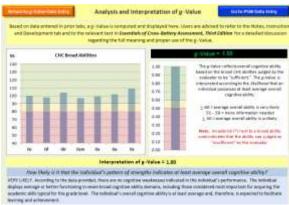
### g-Value Data Entry Tab

- "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



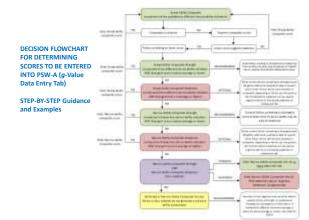
#### "Yes" Selected for All Areas – g-Value = 1.00



#### Example of "No" Selected for All Areas

Notice to the Big Spirite	DATA ENTRY	for y-Value	Confinency Value
Step 2 (new Companies Seniors	to the life hand conventions		the state for each of the sales local de To communities. He strike guideliness
Step 2 Indicate "Fee" or "fee"	to the right based consent here	ne tratage communication part	non-Acertacological entrance (Ac
CHCABUTY COMPOSITIS	Florige 60 - 1000*	Select Yea or No	Enterly Self-body Shalley be seldend halfbank when the page 10 To contain to contain to
the land of the land of	80	TH- 44	reservation to the individual's overall cognitive.
Total Control	79		Territoring weather in performance in g. acquisition and development of academic state.
All proplets being the second	. 14	Cm +w	Typically, standard constitutional Not higher are sufficient, as sold the associated with consti-
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the Real Property	40	Dw 46	incomplete to the national is event supmer. Restroop and the allow, supplementing.
in July Security	90	Cm +w	What shanded some are arrested MI or lesses, strated pulgreen to receive y located some if
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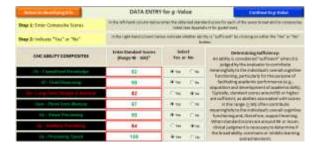




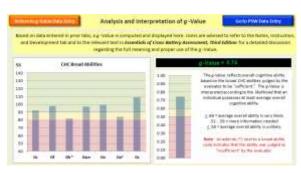
### g-Value and IA-e

- 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

making manifest tray	Pattern of Strengths and Weaknesses Date Entry
In Pract ANDLY Drivets	The comprehensive extensive minority is not all regarders within white the entertainty offsets of the FFE applies adjacent to what of statements of define
TO SE CONTROL OF STATE OF STAT	SS indicate the same that is present in present in present in a presen
Se. Cage thire Week need	The special bear the property of the contraction of the special bear of the special be

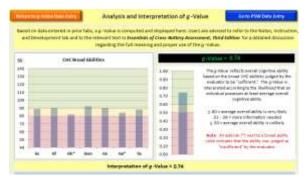
### g-Value and IA-e

- 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

Management Inc.	Pattern of Strengths and Westinesses Data Entity	
In Seture Mility Enteres	The companies recovered the reduction of a contribution which collected the electronic problem of the DC (algorithe to control of contracts or differ.)	milion
Different and the company of the process.  15. Afternative Africa Extracts	The Print Admy I Trade Chief Copper Copper Chief Copper Chief Chie	178 false
This way come an observation value illustrated an order residence out out to be a 14000 personale of ground salesty.	See, A part and the first property of the control of the Chair and the control of	

#### 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

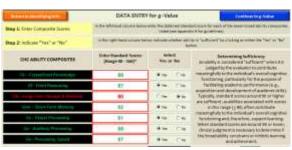
#### How is IA-e Calculated?

- 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

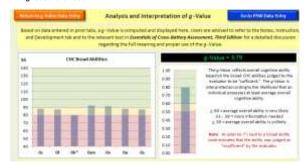
### Reliability and Use of the IA-e

- 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 <u>+</u> 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

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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

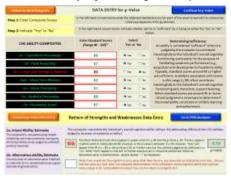


#### IA-e is likely 84 or 83

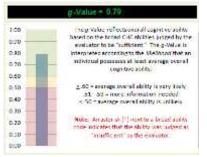
(upper end of CI does not touch or extend into the Average range)

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

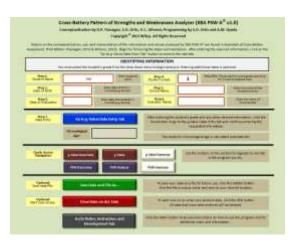
Most of the time a g-Value of .51-.59 will yield a g-Value that is low average to average or better, depending on the obtained scores

### IA-e in Perspective

- The IA-e appears in green when it is  $\geq$  90 and the *g*-Value is  $\geq$  .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

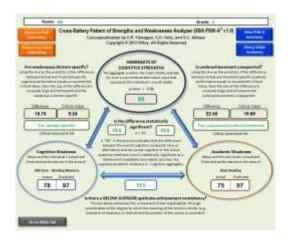
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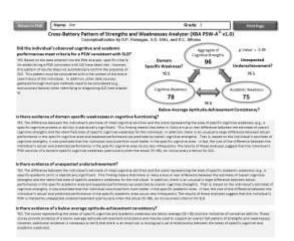

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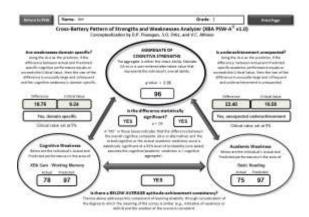


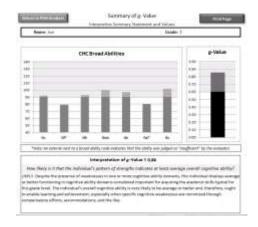
#### Formulae Used in PSW-A

(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 (1.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 stepby-step tutorial. Retrieved June 1, 2010 from: <a href="http://www.kasp.org/Documents/discrepancies.pdf">http://www.kasp.org/Documents/discrepancies.pdf</a>

Evaluation of Below	Average Aptitu	ıde-Achievement	Consistency

- Three ranges
  - < 85
  - 85-89
  - ≥ 90
- · Does the pattern include consistency?
  - both scores < 85 = yes</p>
  - Both scores ≥ 90 = no
  - One score < 85; one score 85-89 = likely
  - Both scores 85-89 = possibly
  - One score < 85; one score ≥ 90 = possibly</p>
  - 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 As evaluation of specific learning disability (SLD) regions as evaluation and consideration of factors, other than a discrete in one or more had perspectively seed to make the the plantage cause of a student has discrete in one or more had bearing difficulties. These factors include that are set British (e.g., victor learning), or motor disabilities, intellectual standards, edition for the set of the set of the disability (III), social/martinoid or psychological distributions extramation or psychological distributions intellectually and produced and linguistic factors (e.g., intellectual standards, intellectual standards, and the set of the s

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 Blanagan & Harrison (Eds.), Contemporary Intellectual Assessment: Theories, Ess., and Issues (3<sup>rd</sup> edition). New York: Guilford.

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

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### **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

\*Ieacn compensatory strategies to assist in minimizing effects of cognitive aeficits
 \*Small group; ample time to practice skills; emphasize need for several error-free repetitions of newly taught information, etc.

#### <u>Guidelines</u> for Differential Diagnosis: Cognitive Ability and Adaptive Behavior

Intriffectual Disability (III)	General Learning Difficulty (Slow Learner)	Specific Century Distabley (SLE)
General ability si 78-79	General shifty > 75 and ± 90	General ability ± 90.
Little resistan, in cognitive strikty and processing profits	Little to number of varieties in cognitive ability and process-ing profile.	Moderate to high the entertainily significant variation to cognitive shifts and processing profile
All or more all congress on mar 2.79	May have normality deferre to one or more regarding and scaldenic areas (). 87)	Numerica deficie (n. 16) to specific cognitive abilities and processor. Numerical picture is 20 to a specific academic sector). Empirical or endoglessity solid militiated printers cognitive and makings abilities.
Planchic relation stotogills in one or more processes or shiftees that are not highly a saltration, such as two (a.g., placeation overcoses) and (b. o.g., stopic electronic type tasks).	May have relative accounts in one in race: processes at whites	Interest Employees (i. 94 mol : 115) es vannig personnes and abilities and personal nerventive cognitive or academia vivengthe (+125)
Defusio (c. 75) in Adaptive Schwier, httle versities in perference actes, absente behavior demons	May have one or some definite in Adaptive Ballarvice (Ind and it all demons).	Manual to se deficite in Adaptive Bellessee

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

#### **Guidelines** for Differential Diagnosis: Etiology

Anterior Total (Monthlety (100)	General Learning Difficulty Mary Learners	Specific Learning Disability (SLD)
Nometer cognition delicate are explained by genetic condition in 22, 2002. Indicates and a financial and a fin	United by a consider of a permitte here a recognitive and anothers while they are typically and known.	3.0.0 на посробнобрада Тана. Тан протого ді регилий достуро не пере селе ді передости дібір не ді байна темпра пости посро за передости посро пости посро за передости пости пости посро за передости пости пости пости пости

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

# <u>Guidelines</u> for Differential Diagnosis: Response to Instruction/Intervention and Programming

Dentisched Directory (10)	General Learning Difficulty Oliver Learners	Specific Learning Disability (NLC)
Property Modelsking to other performance subsensed department say after rate of outproach bed may self- ant most typical pinds bend benchmarks to one analysis are:	Proposition Monthly age of other performance collections international claim rate of requirement functions; song scale typical grade positions that are not seen, but not all, as offends areas.	Following a comprehensive or inflation and months provious of milesel between the communities; prospecting the singles, under modely down, freques Montening for which professions; including his which profession bearing under to some paids port, and approximate or mail port, and approximate or profession bearing under the profession bearing under profession bearing under pro
Psychol Education	Tier II and Tier III soler-cations is Orested. Education, Republish Programs; 504	Special Education, Reported Programs, Surfacion (For E and Tier III Interventions)
Printer Pert McHale Skills, Funtional Academics, Social Skills	Primary Foot: Franciscus Academics, Ventional Tenning, Academical Series, Compensation, Strangue, Sacial Selfa and Salt Footons.	Process Park Confe Level Performance College Department, Associational Companion of States and States and Companion of States and St
Use data from strength-based assertaneer. for intervention planning	Use data from strength-based assessment for intervention planning	Use data from strength-board assessment for externations 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

Armsch A. Kovele, James M. Konfrans, Bandy J. Bachmeier, and Greichen B. Leftwa

To avoid a situation where a student is simply declared to have SLD. BTI procedures sheldal be construed with psychometric souting. Workers, Spencer, and Daley (1996) provided reasons who ETT acoust to be combined with procedurational assumption. Specifically, our of ITT about a student of the declaration of the students of the stud



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

Knowledge of School Neuropsychology is Important for SLD Identification and Treatment





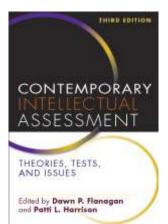






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session 3

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SESSION 4

Cross-Bettery Assessment of Executive Functions Present by Dr. Zuzzanas Kirdy

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