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

Vincent C. Alfonso, Ph.D.
Gonzaga University, Spokane, WA

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

THE 1974 WISC-R (12 Subtest) Factor Structure
The new and improved science of psychological assessment is here!
Cattell-Horn Gf-Gc Theory

A Landmark Event in Understanding the Structure of Intelligence

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)

Keith et al. (2006)

Continuum of Progress in Tests of Intelligence and Cognitive Abilities

Continuum of Progress in Methods of Interpretation

What Does the WISC-IV Measure?

Timothy Z. Keith and colleagues (2006)
Continuum of Progress in Methods of Interpretation

KABC
1983
1989-1994

WI-R
Brought Gf and Three-Stratum Theories to School Psychology
1997

Cross-Battery
1998

GT-GfCHC applied to Wechsler Scales
2000

Beyond the Indices...

CHC-based Interpretation and software (2004, 2009)
Revisions and Refinements to CHC Theory

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

School Neuropsychology Consultation in Neurodevelopmental Disorders

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; McCloskey, Fields, & Dykstra, 2007). The CHC model is a conditional model of intelligence, with strict criteria for assignment of factors 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 assessments may differ (Dean et al., 2005). 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 (Hill, 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, & Allmon, 2007). Furthermore, integrating Cross-Battery Assessment approaches within a global hypothesis-testing approach (Hill & Fields, 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

Refinements and Extensions to the CHC-Achievement Relations Research
Summary of Relations between CHC Abilities and Specific Areas of Academic Achievement
(Flanagan, Ortiz, Alfonso & Mascolo, 2006)

<table>
<thead>
<tr>
<th>CHC Ability</th>
<th>Reading Achievement</th>
<th>Math Achievement</th>
<th>Writing Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gf</td>
<td>Language development (L), lexical knowledge (LD), and general information (K0) are important for written expression at all ages.</td>
<td>Math problem solving and advanced mathematics</td>
<td>Math problem solving and advanced mathematics</td>
</tr>
<tr>
<td>Gc</td>
<td>Language development (L), lexical knowledge (LD), and general information (K0) are important for basic writing skills and written expression.</td>
<td>Memory span (MS) and working memory capacity</td>
<td>Memory span (MS) and working memory capacity</td>
</tr>
<tr>
<td>Gom</td>
<td>Memory span (MS) and working memory capacity</td>
<td>Memory span (MS) and working memory capacity</td>
<td>Memory span (MS) and working memory capacity</td>
</tr>
<tr>
<td>Gv</td>
<td>Orthographic Processing - reading fluency</td>
<td>Orthographic Processing - reading fluency</td>
<td>Orthographic Processing - reading fluency</td>
</tr>
<tr>
<td>Ga</td>
<td>Phonemic coding (PC) or &quot;phonological awareness&quot; during all ages for basic writing and written expression.</td>
<td>Phonemic coding (PC) or &quot;phonological awareness&quot; during all ages for basic writing and written expression.</td>
<td>Phonemic coding (PC) or &quot;phonological awareness&quot; during all ages for basic writing and written expression.</td>
</tr>
<tr>
<td>Gs</td>
<td>Naming facility (DF) or &quot;rapid automatic naming&quot; during all ages for basic writing and written expression.</td>
<td>Naming facility (DF) or &quot;rapid automatic naming&quot; during all ages for basic writing and written expression.</td>
<td>Naming facility (DF) or &quot;rapid automatic naming&quot; during all ages for basic writing and written expression.</td>
</tr>
<tr>
<td>Gv</td>
<td>Perceptual speed (P) abilities are important during all ages for basic writing and written expression.</td>
<td>Perceptual speed (P) abilities are important during all ages for basic writing and written expression.</td>
<td>Perceptual speed (P) abilities are important during all ages for basic writing and written expression.</td>
</tr>
</tbody>
</table>
## Definitions of CHC Broad and Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid Reasoning (Gf)</td>
<td>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.</td>
</tr>
<tr>
<td>Induction (I)</td>
<td>The ability to observe a phenomenon and discover the underlying principles or rules that determine its behavior.</td>
</tr>
<tr>
<td>General Sequential Reasoning (RG)</td>
<td>The ability to reason logically, using known premises and principles.</td>
</tr>
<tr>
<td>Quantitative Reasoning (RQ)</td>
<td>The ability to reason, either with induction or deduction, with numbers, mathematical relations, and operators.</td>
</tr>
</tbody>
</table>

**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

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

## Additional Gc Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystallized Intelligence (Gc)</td>
<td>The depth and breadth of knowledge and skills that are valued by one's culture.</td>
</tr>
<tr>
<td>Listening Ability (LS)</td>
<td>The ability to understand speech.</td>
</tr>
<tr>
<td>Communication Ability (CM)</td>
<td>The ability to use speech to communicate one's thoughts clearly.</td>
</tr>
<tr>
<td>Grammatical Sensitivity (MY)</td>
<td>Awareness of the formal rules of grammar and morphology of words in speech.</td>
</tr>
</tbody>
</table>
### Definitions of CHC Broad and Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory Processing (GA)</td>
<td>The ability to detect and process meaningful nonverbal information in sound.</td>
</tr>
<tr>
<td>Phonetic coding (PC)</td>
<td>The ability to hear phonemes distinctly.</td>
</tr>
<tr>
<td>Speech Sound Discrimination (US)</td>
<td>The ability to detect and discriminate differences in speech sounds (other than phonemes) under conditions of little distraction or distortion.</td>
</tr>
<tr>
<td>Resistance to Auditory Stimulus Distortion (UK)</td>
<td>The ability to hear words correctly even under conditions of distortion or loud background noise.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Term Memory (Gsm)</td>
<td>The ability to encode, maintain and manipulate information in one’s immediate awareness.</td>
</tr>
<tr>
<td>Memory Span (MS)</td>
<td>The ability to maintain information in primary memory and immediately reproduce the information in the same sequence in which it was represented.</td>
</tr>
<tr>
<td>Working Memory Capacity (MW)</td>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term Storage and Retrieval (GLR)</td>
<td>The ability to store, consolidate, and retrieve information over periods of time measured in minutes, hours, days, and years.</td>
</tr>
<tr>
<td>Associative Memory (MA)</td>
<td>The ability to remember previously unrelated information as having been paired.</td>
</tr>
<tr>
<td>Meaningful Memory (MM)</td>
<td>The ability to remember narratives and other forms of semantically related information.</td>
</tr>
<tr>
<td>Free Recall Memory (M6)</td>
<td>The ability to recall lists in any order.</td>
</tr>
</tbody>
</table>
### Additional Grl Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term Storage and Retrieval (Grl)</td>
<td>The ability to store, consolidate, and retrieve information over periods of time measured in minutes, hours, days, and years.</td>
</tr>
</tbody>
</table>

### Definitions of CHC Broad and Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Processing (Gv)</td>
<td>The ability to make use of simulated mental imagery (often in conjunction with currently perceived images) to solve problems.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visualization (Vz)</th>
<th>The ability to perceive complex patterns and mentally simulate how they might look when transformed (e.g., rotated, changed in size, partially obscured).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speeded Rotation (SR)</td>
<td>The ability to solve problems quickly by using mental rotation of simple images.</td>
</tr>
<tr>
<td>Closure Speed (CS)</td>
<td>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.</td>
</tr>
</tbody>
</table>

### 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.

### Additional Gv Narrow Abilities

<table>
<thead>
<tr>
<th>Broad Ability</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Processing (Gv)</td>
<td>The ability to make use of simulated mental imagery (often in conjunction with currently perceived images) to solve problems.</td>
</tr>
</tbody>
</table>
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)
Definitions of CHC Broad and Narrow Abilities

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

Broader and Narrow CHC Ability Representation on Seven Current Intelligence Batteries

## Broad and Narrow CHC Ability Representation on Seven Current Intelligence Batteries

<table>
<thead>
<tr>
<th>Gf</th>
<th>Gc</th>
<th>Gs</th>
<th>Gc</th>
<th>Gs</th>
<th>Gc</th>
<th>Gs</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIMC-IT</td>
<td>Perceptual Vocabulary</td>
<td>Gc</td>
<td>Gs</td>
<td>Gs</td>
<td>Gc</td>
<td>Gs</td>
</tr>
<tr>
<td>Saunder, V.R.</td>
<td>Recalling Presented Words</td>
<td>Gc</td>
<td>Gs</td>
<td>Gs</td>
<td>Gc</td>
<td>Gs</td>
</tr>
</tbody>
</table>

### The Cross-Battery Assessment Approach

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)
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 v. Narrow 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, $G_f$, $G_c$, $G_v$, $G_a$, $G_{sm}$, $G_{lr}$, and $G_s$.

**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

1. CHC Theory
2. CHC Broad (Stratum II)
3. 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

- Keith (1997) – KABC, WISC-R
- Roid (2003) – WI III, SBS
- Phelps et al. (2005) – WI III, WISC-III
- Sanders et al. (2007) – WI III, DAS
- Floyd et al. (2010) – WI III, D-KEFS
- (2011) – WAIS-IV, WMS-IV
- 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 is not included in this figure.)
Adequate Construct Representation

The most appropriate description of the ability underlying the WJ-III Gf 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.)

Construct Under-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.)
Content Validity or Expert Consensus Studies – Empirical basis for Narrow Ability Classifications


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 A 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

...
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
- 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
- Surface Dyslexia – difficulty with the rapid and automatic recognition of words in print
- Mixed Dyslexia – multiple reading deficits characterized by impaired phonological and orthographic processing skills. It is probably the most severe form of dyslexia.
- Comprehension Deficits – the mechanical side of reading is fine but difficulty persists deriving meaning from print


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

<table>
<thead>
<tr>
<th>Subtype</th>
<th>Brain Relationship</th>
<th>Description of Disorder</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysphonetic Dyslexia</td>
<td>Supramarginal gyrus located at the juncture of the temporal and parietal lobes</td>
<td>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 circumvent visual route.</td>
<td>Intervention should include an explicit phonological approach, especially with younger children (e.g., Wilson Reading System; Fundations; Fast Forward; Fast Forword; Earobics). Modality based: Horizons (visual phonics approach); Lindamood (tactile cues). Secondary level (morphological cues emphasized - Read 180).</td>
</tr>
<tr>
<td>Surface Dyslexia</td>
<td>Left fusiform gyrus</td>
<td>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 reading. Over-reliance on phonological properties and underappreciation of orthographic or spatial properties of the word; reading is slow and laborious.</td>
<td>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.</td>
</tr>
<tr>
<td>Mixed Dyslexia</td>
<td>Left fusiform gyrus</td>
<td>Multiple reading deficits characterized by impaired phonological and orthographical processing skills. Likely the most severe form of dyslexia; characterized by a combination of poor phonological processing skills, slow rapid and automatic word recognition skills, inconsistent language comprehension skills, and bizarre error patterns in reading.</td>
<td>Intervention should incorporate a balanced literacy approach.</td>
</tr>
</tbody>
</table>

## 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


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

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
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

XBA DMA v2.0

Evaluation of WISC-IV Data

XBA DMA v2.0 Task/Graph Index

3/26/2014
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
    • Gf Factor
    • Gc 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.iqcorner.com/2011_06_01_archive.html
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 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, Ortiz, & Alfonso, 2013)
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).

<table>
<thead>
<tr>
<th>Finding</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The magnitude of the difference between the</td>
<td>The difference between the scores that comprise the composite occurs in &lt; 10%</td>
</tr>
<tr>
<td>highest and lowest score in the composite is</td>
<td>of the general population and, therefore, is considered uncommon. The composite</td>
</tr>
<tr>
<td>uncommon in the general population</td>
<td>is not cohesive, meaning that it is not a good summary of the theoretically</td>
</tr>
<tr>
<td></td>
<td>related abilities it was intended to represent, and should not be interpreted.</td>
</tr>
</tbody>
</table>

| The magnitude of the difference between the  | The difference between the scores that comprise the composite occurs in more    |
| highest and lowest score in the composite is | than 10% of the general population and, therefore, is common. The composite is  |
| common in the general population              | 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, Ortiz, & Alfonso, 2013)
(44 pages; 11 batteries) – WISC-IV VCI Example

Appendix D on the CD of Essentials of Cross-Battery Assessment, 3e (Flanagan, Ortiz, & Alfonso, 2013)
(44 pages; 11 batteries) – WISC-IV PRI Example
Do the Results within Broad Ability Domains Suggest a Need for Follow Up?

Additional Data Collection | Review of Existing Data
---|---
Investigation of cognitive-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 weaknesses or deficits)
Informal assessment of the manifestations of an ability weakness or deficit (e.g., curriculum-based measures, state/local exams) | Outside evaluation corroborates current findings
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 weaknesses or deficits)
Informal assessment of the manifestations of an ability weakness or deficit (e.g., curriculum-based measures, state/local exams) | Outside evaluation corroborates current findings

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

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

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
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

Calculating a Composite

Rule for Calculating a Composite
Interpretation of Two Subtest Configuration

<table>
<thead>
<tr>
<th>Condition</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>If difference between scores is ≤15, then composite is calculated, OR</td>
<td>The difference between the scores that comprise the composite is ≤15, 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.</td>
</tr>
<tr>
<td>If both scores are ≤80 and the difference between them is ≥14, then composite is calculated, OR</td>
<td>Although the difference between the scores is greater than or equal to 14, 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.</td>
</tr>
<tr>
<td>If both scores are &gt;119 and the difference between them is &gt;14, then composite is calculated, OR</td>
<td>Although the difference between the scores is greater than or equal to 14, 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.</td>
</tr>
<tr>
<td>If both scores are &gt;79 and &lt;120 and the difference between them is &gt;14; then no composite is calculated.</td>
<td>The scores comprising the composite fall in different ability ranges and differ from one another by at least 14. 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).</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Rule for Calculating a Composite</th>
<th>Interpretation of Four-Subtest Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the difference between MAX and MIN is ≤ 15, composite is calculated based on all scores (4 subtest composite), OR</td>
<td>The difference between the highest and lowest scores that comprise the composite is less than or equal to 15 SD, therefore, the composite is cohesive. The composite is likely a good summary of the set of theoretically related abilities that it represents. Interpret the composite as an adequate estimate of the ability that it is intended to measure.</td>
</tr>
<tr>
<td>If all scores are &gt; 80 and the difference between MAX and MIN is &gt; 20, composite is calculated for all four scores (4 subtest composite), OR</td>
<td>The difference between the highest and lowest scores that comprise the composite is greater than 20 SD, therefore, the composite is cohesive. The composite is likely a good summary of the set of theoretically related abilities that it represents. Interpret the composite as an adequate estimate of the ability that it is intended to measure.</td>
</tr>
<tr>
<td>If the difference between MAX and MID is &gt; 14 and the difference between MIN and MID is &gt; 14, then no composite is calculated, OR</td>
<td>All scores that comprise the composite differ from one another by at least 15 SD. Therefore, the composite is not considered cohesive. As such, the composite is not likely to be a meaningful summary of the theoretically related abilities it is intended to represent.</td>
</tr>
</tbody>
</table>

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

#### Example 1
- MAX: 120
- MID: 100
- MIN: 80

**Interpretation:**
- Composite is calculated based on all scores (4 subtest composite).
- The difference between the highest and lowest scores (120 - 80 = 40 SD) is great enough to indicate that the composite is likely a good summary of the set of theoretically related abilities that it represents.

#### Example 2
- MAX: 110
- MID: 90
- MIN: 70

**Interpretation:**
- Composite is calculated for all four scores (4 subtest composite).
- The difference between the highest and lowest scores (110 - 70 = 40 SD) is great enough to indicate that the composite is likely a good summary of the set of theoretically related abilities that it represents.

#### Example 3
- MAX: 90
- MID: 80
- MIN: 70

**Interpretation:**
- Composite is calculated based on all scores (4 subtest composite).
- The difference between the highest and lowest scores (90 - 70 = 20 SD) is great enough to indicate that the composite is likely a good summary of the set of theoretically related abilities that it represents.

#### Example 4
- MAX: 120
- MID: 100
- MIN: 80

**Interpretation:**
- Composite is calculated for all four scores (4 subtest composite).
- The difference between the highest and lowest scores (120 - 80 = 40 SD) is great enough to indicate that the composite is likely a good summary of the set of theoretically related abilities that it represents.
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
### 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 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 Gr 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?

- 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?

Is this pattern consistent with SLD?
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

\[ g\text{-Value} = \]

- **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:
  - \( G_c = .2355 \)
  - \( G_f = .1870 \)
  - \( G_{lr} = .1572 \)
  - \( G_{sm} = .1152 \)
  - \( G_s = .1029 \)
  - \( G_s = .0864 \)
  - \( \text{SUM} = 1.0009 \)

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
  - \( G_c \) – Crystallized Intelligence
  - \( G_{lr} \) – Long-term Storage and Retrieval
  - \( G_{sm} \) – Short-term Memory
  - \( G_s \) – Processing Speed
- Grades 3+
  - \( G_c \) – Crystallized Intelligence
  - \( G_{lr} \) – Long-term Storage and Retrieval
  - \( G_{sm} \) – Short-term Memory
  - \( G_f \) – 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**

![Diagram showing g-Value Data Entry Tab example](image)

---

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

![Diagram showing g-Value interpretation](image)
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)
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
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

\[ 85 \pm 5 \text{ (80-90)} \]

90-110 = Average

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

Joe

Grade 1
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)
Based on the most psychometrically defensible analyses of score differences


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

Form downloadable on CD that accompanies Essentials of Cross-Battery Assessment, 3e (Flanagan, Ortiz, & Alfonso, 2013)
Flanagan et al.'s DD/C Definition of SLD: Level II – Review of Exclusionary Factors

Form downloadable on CD that accompanies Essentials of Cross-Battery Assessment, 3e (Flanagan, Ortiz, & Alforno, 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

Guidelines for Differential Diagnosis: Etiology

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

![Image](image-url)


---

**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.

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

XBA Professional Development Training via Webinar
Earn up to 12 Continuing Education Credits!

After purchasing webinars, access them for 6 months;
Comprehensive Handouts accompany each Webinar