

Functional Cattell-Horn-Carroll (F-CHC) Nomenclature and Its Relationship to Selective Assessment

Presenters:

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Presented at the Texas Association of School Psychologists Fall Conference – November 4, 2017

Presenters

Co-authors of the *Evidence-based Selective Assessment for Academic Disorders* (2017)

- **Dr. Richard W. Woodcock**, senior author of the WJ, WJ-R, WJ-III. Senior Scholar, Department of Psychology and Philosophy, Texas Woman's University.
- **Dr. Daniel C. Miller**, Executive Director, Woodcock Institute, Professor Emeritus, Department of Psychology and Philosophy. Texas Woman's University.
- **Dr. Denise E. Maricle** – Professor, School Psychology Doctoral Program, Texas Woman's University
- **Dr. Ryan McGill** – Assistant Professor. College of William and Mary.


Purpose of Presentation

- Introduce participants to the functional CHC (F-CHC) nomenclature.
- Illustrate how the F-CHC nomenclature can be used to identify selective assessment batteries for the identification of reading, writing, or mathematics disorders and use that information to maximize evidence-based interventions.
- Illustrate the use of F-CHC nomenclature in everyday practice to simplify explaining cognitive strengths and weaknesses to parents and teachers.

Evolution of CHC Nomenclature


- Cattell-Horn-Carroll (CHC) theory grew out of *Gf-Gc* theory
- CHC theory is the dominant theory today defining the structure of cognitive abilities.
- CHC nomenclature (*Gf-Gc* broad and narrow ability labels) has become more complex as some scholars have elaborated upon the theory, introducing their additions and revisions into the taxonomy.

Up to 81 narrow abilities




Evolution of CHC Nomenclature

- For many, a shift toward more "scientific" and less "functional", or clinician/consumer friendly, nomenclature.
- The scientific nomenclature is difficult for consumers, such as parents, clients, or educators to understand and act upon.



Evolution of CHC Nomenclature

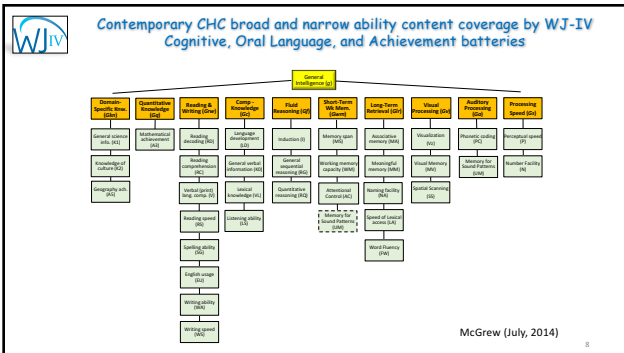


Scientific taxonomies provide greater precision and guide scientific investigation, but the more "functional" or user-friendly nomenclature benefits consumers.

Evolution of CHC Theory in the WJ IV

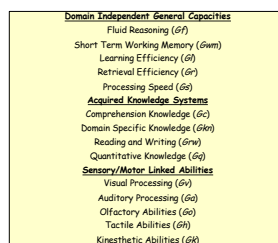


- WJ (1977): Scientific-Empirical (pragmatic)
- WJ-R (1989): Extended Cattell-Horn *Gf-Gc* Theory
- WJ III (2001): CHC Theory
- WJ IV (2014): Beyond CHC Theory (scientific)
- WJ IV & Other Measures (2017): Functional CHC (f-CHC)



McGrew (July, 2014)

Scientific Broad Abilities



(McGrew, 2016; Schneider & McGrew, 2012)

Scientific CHC Narrow Abilities

- | | |
|--|--|
| Fluid Reasoning (Gf) <ul style="list-style-type: none"> I - Induction R6 - General sequential reasoning RQ - Quantitative reasoning | Visual Processing (Gv) <ul style="list-style-type: none"> CF - Closure flexibility CS - Closure Speed IL - Perceptual illusions TM - Imagery LE - Length estimation MV - Visual memory PI - Serial perceptual integration PN - Perceptual alterations SR - Speeded rotation SS - Spatial scanning Vz - Visualization |
| Comprehension-Knowledge (Gc) <ul style="list-style-type: none"> CM - Communication ability KD - General (verbal) information LD - Language development LS - Listening ability MY - Grammatical ability VL - Lexical knowledge | |
| Short-Term Working Memory (Gsm) <ul style="list-style-type: none"> AC - Attentional control MS - Memory span WM - Working memory capacity | Learning Efficiency (Gl) <ul style="list-style-type: none"> M6 - Free recall memory MA - Associative memory MM - Meaningful memory |

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Scientific CHC Narrow Abilities

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|------------------------------|--|--|
| Core CHC Cognitive Abilities | Retrieval Fluency (Gr) <ul style="list-style-type: none"> FA - Free Associative Fluency FE - Expressional Fluency FF - Figural Fluency FL - Ideational Fluency FO - Originality/creativity FX - Figural Flexibility LA - Speed of lexical access NA - Naming facility SP - Sensitivity to problems (solution fluency) WF - Word fluency | Auditory Processing (Ga) <ul style="list-style-type: none"> PC - Phonetic coding U1/U9 - Musical discrimination and judgment U8 - Maintaining and judging rhythm UP - Absolute pitch UL - Sound localization UM - Memory for sound patterns UR - Resistance to auditory stimulus distraction US - Speech sound discrimination |
| | Processing Speed (Gs) <ul style="list-style-type: none"> N - Number facility P - Perceptual speed R9 - Rate-of-test-taking | |
| | | |

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Scientific CHC Narrow Abilities

- | | |
|---|--|
| Reading and Writing (6w) <ul style="list-style-type: none"> EU - English usage RC - Reading comprehension RD - Reading decoding RS - Reading speed SG - Spelling ability V - Verbal (written) language comprehension WA - Writing ability WS - Writing speed | Domain-Specific Knowledge (6n) <ul style="list-style-type: none"> AS - Geography achievement BC - Knowledge in behavioral content K1 - General science information K2 - Knowledge of culture KF - Knowledge of signing KL - Foreign language proficiency LP - Skills in lip reading MP - Mechanical knowledge |
| Quantitative Knowledge (6q) <ul style="list-style-type: none"> A3 - Mathematical achievement KM - Mathematical knowledge | |

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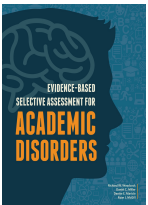
CHC Neuropsychological Narrow Abilities

CHC Narrow Abilities Often Found on Neuropsychology Measures

Psychomotor Speed (<i>Gps</i>) <ul style="list-style-type: none"> • MT - Movement time • PT - Speed of articulation • R3 - Speed of limb movement Reaction and Decision Speed (<i>Gf</i>) <ul style="list-style-type: none"> • IT - Inspection time • R1 - Simple reaction time • R2 - Choice reaction time • R4 - Semantic processing speed • R7 - Mental comparison speed Tactile Abilities (<i>Sh</i>) Kinesthetic Abilities (<i>Gk</i>) Olfactory Abilities (<i>Go</i>)	Psychomotor Abilities (<i>Gp</i>) <ul style="list-style-type: none"> • A1 - Aiming • P1 - Manual dexterity • P2 - Finger dexterity • P3 - Static strength • P4 - Gross body equilibrium • P6 - Multi-limb coordination • P7 - Arm-hand steadiness • P8 - Control precision
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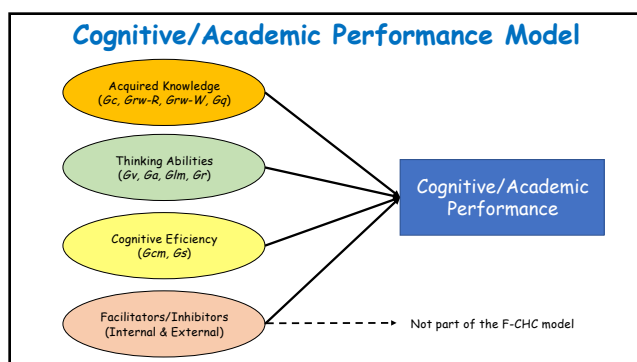
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Functional CHC Nomenclature



- Woodcock, Maricle, Miller, & McGill (2017)
- Suggested simplification of CHC nomenclature makes it easier for parents and teachers to understand.
- Minor revisions to CHC factor labels (e.g., *Gcm* instead of *Gwm* or *Gr* instead of *Gf*).
- Reduces the number of less meaningful narrow ability labels for clinical use.

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Ten Broad Abilities – 20 Narrow Abilities

Each CHC broad ability may be divided into two narrow abilities without significant information needed for clinical utility being lost.

Break Down of f-CHC Broad Abilities into Narrow Abilities

Three Conceptual Domains and 10 Broad Abilities

Functional CHC Nomenclature
Acquired Knowledge <ul style="list-style-type: none"> • Comprehension-Knowledge (<i>Gc</i>) • Reading (<i>Grw-R</i>) • Writing (<i>Grw-W</i>) • Mathematics (<i>Gq</i>)
Thinking Abilities <ul style="list-style-type: none"> • Visual-Spatial Processing (<i>Gv</i>) • Auditory Processing (<i>Ga</i>) • Reasoning (<i>Gr</i>) • Learning and Memory (<i>Glim</i>)
Cognitive Efficiency <ul style="list-style-type: none"> • Conscious Memory (<i>Gcm</i>) • Cognitive Processing Speed (<i>Gs</i>)

(Woodcock, Miller, Maricle, & McGill, 2017)

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Scientific CHC Narrow Abilities Compared to Functional CHC Narrow Abilities

Scientific CHC Nomenclature	Functional CHC Nomenclature
Comprehension-Knowledge (Gc): <ul style="list-style-type: none"> CM - Communication ability KO - General verbal information LD - Language development LS - Listening ability MY - Grammatical sensitivity VL - Lexical knowledge 	Comprehension-Knowledge (Gc): <ul style="list-style-type: none"> K (Factual Knowledge) VA (Verbal Ability)

(McGrew, 2016; Schneider & McGrew, 2012)

(Woodcock, Miller, Maricle, & McGill, 2017)

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Comprehension-Knowledge: Factual Knowledge (Gc-K)

The variety and amount of information one knows (not just verbal knowledge).

Test examples:

- WISC-V: Information (KO: general verbal information)
- WJ IV ACH: Academic Knowledge (KO: general verbal information)
- WJ IV COG: General Information (KO: general verbal information)

Comprehension-Knowledge: Verbal Ability (Gc-VA)

Spoken language skills of lexical knowledge (i.e., vocabulary knowledge and language development (i.e., general development of spoken language skills that do not require reading ability).

Test examples:

- WISC-V: Vocabulary (VL: lexical knowledge)
- WJ IV OL: Picture Vocabulary (VL: lexical knowledge)
- WJ IV OL: Oral Comprehension (LS: listening ability)
- WJ IV OL: Understanding Directions (LS: listening ability)

Scientific CHC Narrow Abilities Compared to Functional CHC Narrow Abilities

Scientific CHC Nomenclature	Functional CHC Nomenclature
Reading and Writing (Grw): <ul style="list-style-type: none"> EU - English usage RC - Reading comprehension RD - Reading decoding RS - Reading speed SG - Spelling ability V - Verbal (print) language WA - Writing ability WS - Writing speed 	Broad Reading (Grw-R): <ul style="list-style-type: none"> RC - Reading comprehension RD - Reading decoding
Quantitative Knowledge (Gq): <ul style="list-style-type: none"> A3 - Mathematical achievement KM - Mathematical Knowledge 	Broad Writing (Grw-W): <ul style="list-style-type: none"> WS - Writing skills WC - Written composition Op - Handwriting
	Broad Mathematics (Gq): <ul style="list-style-type: none"> C - Calculation Ap - Applied math

(McGrew, 2016; Schneider & McGrew, 2012)

(Woodcock, Miller, Maricle, & McGill, 2017)

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Scientific CHC Narrow Abilities Compared to Functional CHC Narrow Abilities

Scientific CHC Nomenclature	Functional CHC Nomenclature
Visual Processing (Gv): <ul style="list-style-type: none"> CF - Closure flexibility CS - Closure speed IL - Perceptual illusions IW - Imagery LE - Length estimation MV - Visual memory PI - Serial perceptual integration PN - Perceptual alterations SR - Speeded rotations SS - Spatial scanning Vz - Visualization 	Visual-Spatial Processing (Gv): <ul style="list-style-type: none"> PP (Pictorial Processing) SP (Spatial Processing)

(McGrew, 2016; Schneider & McGrew, 2012)

(Woodcock, Miller, Maricle, & McGill, 2017)

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Visual-Spatial Processing: Pictorial Processing (Gv-PP)

Ability to identify a familiar meaningful visual object from incomplete visual stimuli, without knowing in advance what the object is.

Test examples:

- KABC-II: Gestalt Closure (CS: closure speed*)
- RIAS-2: What's Missing (CS: closure speed*)

Scientific CHC describes these tests as including a speed factor, whereas, F-CHC emphasizes the pictorial processing.

Visual-Spatial Processing: Spatial Processing (*Gv-SP*)

Measures spatial orientation and the ability to solve problems by using mental rotations of simple images.

Test examples:

- NEPSY-II: Arrows (Vz: visualization)
- KABC-II: Triangles (Vz: visualization)
- WISC-V: Block Design (Vz: visualization)
- WJ IV COG: Visualization (Vz: visualization)

Scientific CHC Narrow Abilities Compared to Functional CHC Narrow Abilities

Scientific CHC Nomenclature	Functional CHC Nomenclature
Auditory Processing (<i>Ga</i>): <ul style="list-style-type: none"> • PC - Phonetic coding • U1/U9 - Musical discrimination • U8 - Maintaining and judging rhythm • UP - Absolute pitch • UL - Sound localization • UM - Memory for sound patterns • UR - Resistance to auditory stimulus distraction • US - Speech sound discrimination 	Auditory Processing (<i>Ga</i>): <ul style="list-style-type: none"> • SD (Sound Discrimination) • PH (Phonetics)

(McGrew, 2016; Schneider & McGrew, 2012)

(Woodcock, Miller, Maricle, & McGill, 2017)

Auditory Processing: Sound Discrimination (*Ga-SD*)

Ability to discriminate speech sounds, or other auditory stimuli, in quiet or noisy conditions.

Test examples:

- A Speech and language test such as the CELF-5 is an example.

Auditory Processing: Phonetics (*Ga-Ph*)

Ability to discriminate, analyze, and synthesize phonological stimuli.

Test examples:

- CTOPP-2: Blending Words, Elision, Sound Matching (PC: phonetic coding)
- WJ IV COG: Nonword Repetitions, Phonological Processing (PC: phonetic coding)
- WJ IV OL: Sound Awareness, Segmentation, Sound Blending (PC: phonetic coding)

Scientific CHC Narrow Abilities Compared to Functional CHC Narrow Abilities

Scientific CHC Nomenclature	Functional CHC Nomenclature
Fluid Reasoning (<i>Gf</i>): <ul style="list-style-type: none"> • I - Induction • RG - General sequential reasoning • RQ - Quantitative reasoning 	Reasoning (<i>Gr</i>): <ul style="list-style-type: none"> • CR (Contextual Reasoning) (replaces and elaborates upon RQ: Quantitative or Numerical Reasoning) • ID (Inductive/ Deductive Reasoning)

(McGrew, 2016; Schneider & McGrew, 2012)

(Woodcock, Miller, Maricle, & McGill, 2017)

Reasoning: Contextual Reasoning (*Gr-CR*)

Ability to use related cues from single-to multi-dimensional matrices of information to solve a problem.

Test examples:

- WISC-V: Figure Weights (RQ: quantitative reasoning)
- WJ IV ACH: Number Matrices (RQ: quantitative reasoning)
- WJ IV COG: Number Series (RQ: quantitative reasoning)*

* Most predictive cognitive test of academic achievement.

Reasoning: Inductive/Deductive Reasoning (Gr-ID)

Ability to use inductive and/or deductive reasoning to solve a novel problem.

Test examples:

- WISC-V: Similarities (I: induction)
- KABC-II: Rover (RG: general sequential reasoning and SS: spatial scanning)
- WJ IV COG: Concept Formation (I: induction), Analysis-Synthesis (RG: general sequential reasoning)

Scientific CHC Narrow Abilities Compared to Functional CHC Narrow Abilities

Scientific CHC Nomenclature	Functional CHC Nomenclature
Learning Efficiency (Gl): <ul style="list-style-type: none"> • M6 - Free recall memory • MA - Associative memory • MM - Meaningful memory <p>Used to be <i>Gr</i> until 2016 - split by McGrew into <i>Gl</i> (learning efficiency) and <i>Gr</i> (retrieval fluency).</p>	Learning and Memory (Glm): <ul style="list-style-type: none"> • IR (Immediate Recall) • MR (Memory Retrieval)

(McGrew, 2016; Schneider & McGrew, 2012)

(Woodcock, Miller, Maricle, & McGill, 2017)

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Learning and Memory: Immediate Recall (Glm-IR)

Ability to hear or learn information and be able to recall it immediately or a short time later.

Test examples:

- WRAML-2: Verbal Learning (M6: free-recall memory)
- WJ IV COG: Story Recall (MM: meaningful memory)
- WJ IV COG: Picture Recognition (MV: visual memory)
- WJ IV COG: Visual-Auditory Learning (MA: associative memory)

Learning and Memory: Memory Retrieval (Glm-MR)

Ability to hear or learn information and be able to retrieve it much later (days or years).

Test examples:

- WRAML-2: Verbal Learning Delayed Recall (M6: free-recall memory)
- TOMAL-2: Memory for Stories Delayed (MM: meaningful memory)
- WISC-V: Recognition Symbol Translation (MA: associative memory)
- WJ IV COG: Retrieval Fluency (FI: ideational fluency)

Scientific CHC Narrow Abilities Compared to Functional CHC Narrow Abilities

Scientific CHC Nomenclature	Functional CHC Nomenclature
Short-Term Working Memory (Gwm): <ul style="list-style-type: none"> • AC - Attentional control • MS - Memory span • WM - Working memory capacity 	Conscious Memory (Gcm): <ul style="list-style-type: none"> • MS (Memory Span) • WM (Working Memory)

(McGrew, 2016; Schneider & McGrew, 2012)

(Woodcock, Miller, Maricle, & McGill, 2017)

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Conscious Memory: Memory Span (Gcm-MS)

Ability to listen to or see a presentation of sequentially ordered information and then recall the sequence immediately.

Test examples:

- DAS-II: Recall of Digits Forward (MS: memory span)
- WISC-V: Digit Span (MS: memory span)
- WJ IV COG: Memory for Words (MS: memory span)
- WJ IV OL: Sentence Repetition (MS: memory span)

Conscious Memory: Working Memory (*Gcm-WM*)

Ability to hold information in consciousness long enough to perform some manipulation, such as reordering, upon it.

Test examples:

- WISC-V: Digit Span Backwards (WM: working memory)
- WJ IV COG: Object-Number Sequencing, Numbers Reversed, Verbal Attention (WM: working memory)

Four Memory Abilities



- Memory Retrieval (*Glm - MR*)
- Immediate Recall (*Glm - IR*)
- Working Memory (*Gcm - WM*)
- Memory Span (*Gcm - MS*)

Scientific CHC Narrow Abilities Compared to Functional CHC Narrow Abilities

Scientific CHC Nomenclature	Functional CHC Nomenclature
Retrieval Fluency (<i>Gr</i>): <ul style="list-style-type: none"> • FA - Associational fluency • FE - Expressional fluency • FF - Figural fluency • FL - Ideational fluency • FO - Originality/creativity • FX - Figural flexibility • LA - Speed of lexical access • NA - Naming ability • SP - Sensitivity to problems (solution fluency) • WF - Word fluency Processing Speed (<i>Gs</i>): <ul style="list-style-type: none"> • N - Number facility • P - Perceptual speed • R9 - Rate-of-test-taking 	Processing Speed (<i>Gs</i>): <ul style="list-style-type: none"> • PS (Perceptual Speed) • TS (Thinking Speed) • Includes academic fluency measures

(McGrew, 2016; Schneider & McGrew, 2012)

(Woodcock, Miller, Maricle, & McGill, 2017)

Cognitive Processing Speed: Perceptual Speed (*Gs-PS*)

Ability to rapidly scan and compare visual symbols.

Test examples:

- WISC-V Cancellation and Symbol Search (P: perceptual speed)
- WJ IV COG: Letter-Pattern Matching and Number-Pattern Matching (P: perceptual speed)

Cognitive Processing Speed: Thinking Speed (*Gs-TS*)

Ability to rapidly name objects, words, or symbols or to identify common semantic features between stimuli.

Test examples:

- WJ IV COG: Rapid Picture Naming (NA: naming facility)
- WJ IV ACH: Sentence Reading Fluency (R9: rate of test-taking)
- WJ IV ACH: Oral Reading and Word Reading Fluency (RS: reading speed), Sentence Writing Fluency (WS: writing speed), Math Facts Fluency (N: number facility)

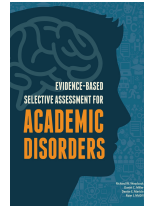
Summary of F-CHC Nomenclature

Acquired Knowledge Comprehension-Knowledge (<i>Gc</i>) <ul style="list-style-type: none"> • K (Factual Knowledge) • VA (Verbal Ability) Reading (<i>Grw-R</i>) <ul style="list-style-type: none"> • RD - Reading decoding • RC - Reading comprehension Writing (<i>Grw-W</i>) <ul style="list-style-type: none"> • WS - Writing skills • WC - Written composition Mathematics (<i>Gq</i>) <ul style="list-style-type: none"> • C - Calculation • Ap - Applied math 	Thinking Abilities Visual-Spatial Processing (<i>Gv</i>) <ul style="list-style-type: none"> • PP (Pictorial Processing) • SP (Spatial Processing) Auditory Processing (<i>Ga</i>) <ul style="list-style-type: none"> • SD (Sound Discrimination) • PH (Phonetics) Reasoning (<i>Gr</i>) <ul style="list-style-type: none"> • CR (Contextual Reasoning) • ID (Inductive/ Deductive Reasoning) Learning and Memory (<i>Glm</i>) <ul style="list-style-type: none"> • IR (Immediate Recall) • MR (Memory Retrieval)
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Summary of F-CHC Nomenclature

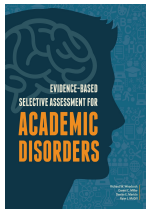
- Cognitive Efficiency**
- Conscious Memory (Gcm)**
 - MS (Memory Span)
 - WM (Working Memory)
 - Cognitive Processing Speed (Gs)**
 - PS (Perceptual Speed)
 - TS (Thinking Speed)

Functional CHC and Selective Assessment



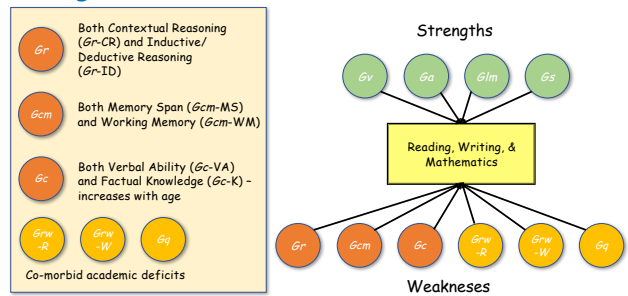
Over 20 years of research regarding CHC cognitive and achievement relationships have provided significant evidence as to which cognitive constructs may relate to academic variables (Flanagan, Ortiz, Alfonso, & Mascolo, 2006; McGrew & Wendling, 2010).

Selective Assessment for Academic Disorders

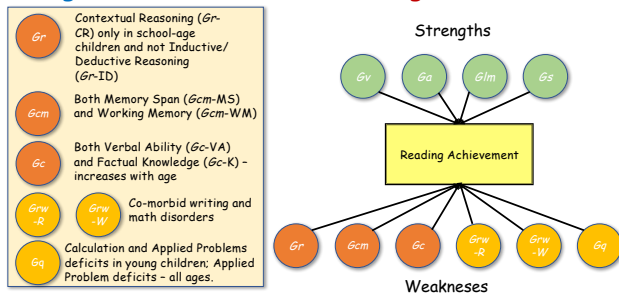


- Woodcock, Maricle, Miller, & McGill (2017)
- Used a large clinical sample for analyses
- Identified the fewest tests that provided the most information for interventions for children and adults identified with reading, writing, or math disorders.

Cognitive Predictors of All Academic Areas



Cognitive Predictors of Reading Achievement



F-CHC Narrow Abilities Strengths and Weaknesses for Children and Adults with Diagnosed Reading Disorders

	5-9 Year Olds (n=273)	10-18 Year Olds (n=335)	19-29 Year Olds (n=114)	30-90 Year Olds (n=47)
Thinking Abilities				
Gv: Visual-Spatial Processing				
• Gv-PP: Pictorial Processing (n/a)	Strength	Strength	Strength	Strength
• Gv-SP: Spatial Processing (e.g., Visualization)	Strength	Strength	Strength	Strength
Ga: Auditory Processing				
• Ga-SD: Sound Discrimination (n/a)		Strength	Strength	Strength
• Ga-Ph: Phonetics (e.g., Sound Awareness)	Strength		Weakness	
Glm: Learning and Memory				
• Glm-IR: Immediate Recall (e.g., Story Recall)	Strength	Strength	Strength	Strength
• Glm-MR: Memory Retrieval (e.g., Retrieval Fluency)	Strength	Strength	Strength	Strength
Gr: Reasoning				
• Gr-CR: Contextual Reasoning (e.g., Number Series)	Weakness	Weakness	Strength	
• Gr-ID: Inductive/Deductive Reasoning (e.g., CF)				

F-CHC Narrow Abilities Strengths and Weaknesses for Children and Adults with Diagnosed Reading Disorders

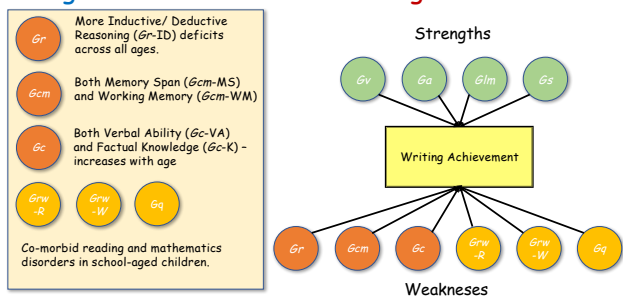
	5-9 Year Olds	10-18 Year Olds	19-29 Year Olds	30-90 Year Olds
Cognitive Efficiency				
<i>Gcm: Conscious Memory</i>				
• Gcm-MS: Memory Span (e.g., Memory for Words)		Weakness	Weakness	Weakness
• Gcm-WM: Working Memory (e.g., Numbers Rev)	Weakness	Weakness	Weakness	Weakness
<i>Gs: Cognitive Processing Speed</i>				
• Gs-PS: Perceptual Speed (e.g., Letter-Pattern M)	Strength		Strength	
• Gs-TS: Thinking Speed (e.g., Rapid Pic Naming)	Strength	Strength		Strength

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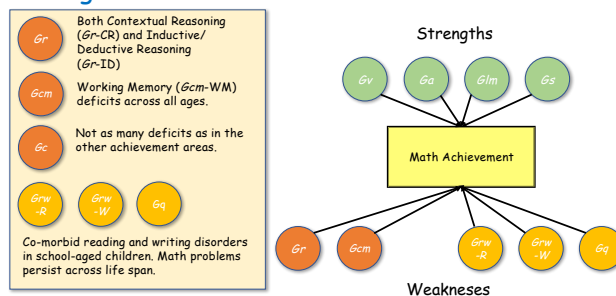
F-CHC Narrow Abilities Strengths and Weaknesses for Children and Adults with Diagnosed Reading Disorders

	5-9 Year Olds	10-18 Year Olds	19-29 Year Olds	30-90 Year Olds
Acquired Knowledge				
<i>Gc: Comprehension-Knowledge</i>				
• Gc-VA: Verbal Ability (e.g., OL: Picture Vocabulary)		Weakness	Weakness	Weakness
• Gc-K: Factual Knowledge (e.g., General Information)		Weakness	Weakness	Weakness
<i>Grw-R: Broad Reading</i>				
• Grw-RS: Reading Skills (e.g., Letter Word Identification)	Weakness	Weakness	Weakness	Weakness
• Grw-RC: Reading Comprehension (e.g., Passage Compreh)	Weakness	Weakness	Weakness	Weakness
<i>Grw-W: Broad Writing</i>				
• Grw-WS: Writing Skills (e.g., Spelling)	Weakness	Weakness	Weakness	Weakness
• Grw-EC: Writing Composition (e.g., Written Expression)	Weakness			Weakness
<i>Gq: Broad Mathematics</i>				
• Gq-C: Calculation (e.g., Calculation)	Weakness	Weakness	Strength	
• Gq-AP: Applied Problems (e.g., Quantitative Concepts)	Weakness	Weakness	Weakness	Weakness
<i>Gp: Handwriting</i>				
	Weakness			

Cognitive Predictors of Writing Achievement



Cognitive Predictors of Math Achievement



Cross-Battery Selection of Tests

The *Evidence-Based Selective Assessment for Academic Disorders* book includes an appendix that listed tests from major cognitive, achievement, and neuropsychology measures that are designed to measure the f-CHC abilities.

Gr (Reasoning) Cross-Battery Test Selection

- Gr** **Gr-CR (Contextual Reasoning)**
 - D-KEFS: Color-Word Interference (Inhibition/Switching)
 - NEPSY-II: Inhibition (Switching)
 - WISC-V: Figure Weights
 - WJ IV ACH: Number Matrices
 - WJ IV COG: Number Series
- Gr-ID (Inductive/Deductive Reasoning)**
 - D-KEFS: Tower, Twenty Questions
 - KABC-II: Rover
 - NEPSY-II: Animal Sorting, Clocks
 - WISC-V: Comprehension, Matrix Reasoning, Similarities
 - WJ IV COG: Analysis-Synthesis & Concept Formation

Gcm (Conscious Memory) Cross-Battery Test Selection



Gcm-MS (Memory Span)

- KABC-II: Number Recall
- NEPSY-II: Sentence Repetition
- WRAML-2: Number/Letter
- WISC-V: Digits Forward
- WJ IV COG: Memory for Words

Gcm-WM (Working Memory)

- SB5: Verbal Working Memory
- WISC-V: Arithmetic, Digit Span Backwards, Picture Span
- WJ IV COG: Object-Number Sequencing, Numbers Reversed, Letter-Number Sequencing

Gc (Comprehension/Knowledge) Cross-Battery Test Selection



Gc-K (Factual Knowledge)

- SB5: Nonverbal Knowledge & Verbal Knowledge
- WISC-V: Information
- WJ IV ACH: Academic Knowledge
- WJ IV COG: General Information

Gc-VA (Verbal Ability)

- KABC-II: Expressive Vocabulary, Listening Comprehension
- NEPSY-II: Body Part Naming, Comprehension of Instructions
- WISC-V: Vocabulary
- WJ IV OL: Picture Vocabulary, Understanding Directions

Presentation Summary

- The presenters have described a functional CHC nomenclature to improve communication and understanding with parents, teachers, and educators.
- The F-CHC classification scheme was applied to a large clinical sample of children and adults with identified learning disorders. The results were published in "*Evidence-based Selective Assessment for Academic Disorders*".

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