## Manifestations of CHC Ability Weaknesses and Empirically-based Recommendations and Interventions (Flanagan, Alfonso, & Mascolo, 2011)

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| Processing Speed (Gs) | • Speed of processing, particularly when pressured to pay focused attention  
• Usually measured by tasks that require rapid processing, but are relatively easy | **Difficulties with:**  
• Efficient processing of information  
• Quickly perceiving relationships (similarities and differences between stimuli or information)  
• Working within time parameters  
• Completing simple, rote tasks quickly | **Reading Difficulties:**  
• Slow reading speed  
• Impaired comprehension  
• Need to reread for understanding  
**Math Difficulties:**  
• Automatic computations  
• Computational speed is slow despite accuracy  
• Slow speed can result in reduced accuracy due to memory decay  
**Writing Difficulties:**  
• Limited output due to time factors  
• Labored process results in reduced motivation to produce  
**Language Difficulties:**  
• Cannot retrieve information quickly – slow, disrupted speech as cannot get out thoughts quickly enough  
• Is slow to process incoming information, puts demands on memory store which can result in information overload and loss of meaning | • Repeated practice  
• Speed drills  
• Computer activities that require quick, simple decisions  
• Extended time  
• Reducing the quantity of work required  
• Increasing “wait” times both after questions are asked and after responses are given |
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| Fluid Reasoning (Gf) | • Novel reasoning and problem solving  
• Processes are minimally dependent on learning and acculturation  
• Involves manipulating rules, abstracting, generalizing, and identifying logical relationships | **Difficulties with:**  
• Higher level thinking  
• Transferring or generalizing learning  
• Deriving solutions for novel problems  
• Extending knowledge through critical thinking  
• Perceiving and applying underlying rules or process(es) to solve problems | **Reading Difficulties:**  
• Inferential reading comprehension  
• Abstractive main idea(s)  

**Math Difficulties:**  
• Math reasoning (word problems)  
• Internalizing procedures and processes used to solve problems  
• Apprehending relationships between numbers  

**Writing Difficulties:**  
• Essay writing and generalizing concepts  
• Developing a theme  
• Comparing and contrasting ideas | • Develop student’s skill in categorizing objects and drawing conclusions  
• Use demonstrations to externalize the reasoning process  
• Gradually offer guided practice (e.g., guided questions list) to promote internalization of procedures or process(es)  
• Targeted feedback  
• Cooperative learning  
• Reciprocal teaching  
• Graphic organizers to arrange information in visual format  
• Metacognitive strategies  
• Comparison of new concepts to previously learned (same vs. different)  
• Using analogies, similes, metaphors when presenting tasks |
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| Crystallized Intelligence (Gc) | • Breadth and depth and knowledge of a culture  
• Developed through formal education and general learning experiences  
• Stores of information and declarative and procedural knowledge  
• Ability to verbally communicate and reason with previously learned procedures | **Difficulties with:**  
• Vocabulary acquisition  
• Knowledge acquisition  
• Comprehending language  
• Fact-based/informational questions  
• Using prior knowledge to support learning | **Reading Difficulties:**  
• Decoding and comprehension  
**Math Difficulties:**  
• Understanding math concepts and the “vocabulary of math”  
**Writing Difficulties:**  
• Grammar (syntax)  
• Bland writing with limited descriptors  
• Verbose writing  
• Inappropriate word usage  
**Language Difficulties:**  
• Understanding class lessons  
• Expressive language – “poverty of thought” | • Provide an environment rich in language and experiences  
• Frequent practice with and exposure to words  
• Read aloud to children  
• Vary reading purpose (leisure, information)  
• Work on vocabulary building  
• Teach morphology  
• Use text talks |
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| Auditory Processing (Ga) | • Ability to analyze and synthesize auditory information | **Difficulties with:**  
  • Hearing information presented orally, initially processing oral information  
  • Paying attention especially in the presence of background noise  
  • Discerning the direction from which auditory information is coming  
  • Foreign language acquisition  
  • Acquiring receptive vocabulary | **Reading Difficulties:**  
  • Acquiring phonics skills  
  • Decoding and comprehension  
  • Using phonetic strategies  
  **Math Difficulties:**  
  • Word problems  
  **Writing Difficulties:**  
  • Spelling  
  • Note taking  
  • Poor quality of writing | • Phonemic awareness activities  
  • Emphasis on sight-word reading  
  • Teach comprehension monitoring (e.g., does the word I heard/read make sense in context?)  
  • Announcing sounds in words in an emphatic manner when teaching new words for reading or spelling  
  • Use work preview/text preview to clarify unknown words  
  • Provide guided notes during note taking activities  
  • Build in time for clarification questions related to “missed” or “misheard” items during lecture  
  • Supplement oral instructions with written instructions  
  • Shortening instructions  
  • Preferential seating  
  • Localizing sound source for student  
  • Minimizing background noise |
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| Long-Term Retrieval (Gtr) | • Ability to store information (e.g., concepts, words, facts) and fluently retrieve it later through association | Difficulties with:  
• Learning new concepts  
• Retrieving or recalling information by using association  
• Performing consistently across different task formats (e.g., recognition versus recall formats)  
• Speed with which information is retrieved and/or learned  
• Paired learning (visual-auditory)  
• Recalling specific information (words, facts) | **Reading Difficulties:**  
• Accessing background knowledge to support new learning while reading (Associative Memory deficit)  
• Slow to access phonological representations during decoding (RAN deficit)  
**Math Difficulties:**  
• Recalling procedures to use for math problems  
• Memorizing and recalling math facts  
**Writing Difficulties:**  
• Accessing words to use during essay writing  
• Specific writing tasks (compare and contrast; persuasive writing) conceptual  
• Note-taking  
**Language Difficulties:**  
• Expressive – circumlocutions, speech fillers, “interrupted” thought, pauses  
• Receptive – making connections throughout oral presentations (e.g., class lecture) | • Repeated practice with and review of newly presented information  
• Teach memory strategies (verbal rehearsal to support encoding, use of mnemonic devices)  
• Use multiple modalities when teaching new concepts (pair written with verbal information)*  
• Limit the amount of new material to be learned; introduce new concepts gradually and with a lot of context  
• Be mindful of when new concepts are presented  
• Make associations between newly learned and prior information explicit  
• Use lists to facilitate recall (prompts)  
• Expand vocabulary to minimize impact of word retrieval deficits  
• Build in wait-time for student when fluency of retrieval is an issue  
• Provide background knowledge first before asking a question to “prime” student for retrieval |
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<td>Visual Processing (Gv)</td>
<td>• Ability to analyze and visualize information</td>
<td>Difficulties with:</td>
<td>Reading Difficulties:</td>
<td>• Capitalize on student’s phonemic skills for decoding tasks</td>
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<td>• Recognizing patterns</td>
<td>• Orthographic coding (using visual features of letters to decode)</td>
<td>• Sight-word acquisition</td>
<td>• Teach orthographic strategies for decoding (e.g., word length, shape of word)</td>
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<td>• Reading maps, graphs, charts</td>
<td>• Using charts and graphs within a text in conjunction with reading</td>
<td>• Comprehension of text involving spatial concepts (e.g., social studies text describing physical boundaries, movement of troops along a specified route)</td>
<td>• Overlay graphs and charts with visual labels</td>
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<td>• Attending to fine visual detail</td>
<td>• Comprehension of text involving spatial concepts (e.g., social studies text describing physical boundaries, movement of troops along a specified route)</td>
<td>• Review spatial concepts and support comprehension through the use of hands-on activities and manipulatives (e.g., using models to demonstrate the moon’s orbital path)</td>
<td>• Provide written or oral explanation for visual concepts</td>
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<td>• Recalling visual information</td>
<td>Writing Difficulties:</td>
<td>• Highlight margins during writing tasks</td>
<td>• Review spatial concepts and support comprehension through the use of hands-on activities and manipulatives (e.g., using models to demonstrate the moon’s orbital path)</td>
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<td>• Appreciation of spatial characteristics of objects (e.g., size, length)</td>
<td>• Spelling sight-words</td>
<td>• Provide direct handwriting practice</td>
<td>• Use graph paper to assist with number alignment</td>
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<td>• Recognition of spatial orientation of objects</td>
<td>• Spatial planning during writing tasks (e.g., no attention to margins, words that overhang a line)</td>
<td>• Inconsistent size, spacing, position, and slant of letters</td>
<td>• Use graph paper to assist with number alignment</td>
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| Short-Term Memory ($Gsm$) | • Ability to hold information in immediate awareness and use or transform it within a few seconds | **Difficulties with:**  
  • Following oral and written instructions  
  • Remembering information long enough to apply it  
  • Remembering the sequence of information  
  • Rote memorization | **Reading Difficulties:**  
  • Reading comprehension  
  • Decoding multisyllabic words  
  • Orally retelling or paraphrasing what one has read  
  **Math Difficulties:**  
  • Rote memorization of facts  
  • Remembering mathematical procedures  
  • Multi-step problems and regrouping  
  • Extracting information to be used in word problems  
  **Writing Difficulties:**  
  • Spelling multisyllabic words  
  • Redundancy in writing (word and conceptual levels)  
  • Note taking | • Provide opportunities for repeated practice and review  
  • Provide supports (e.g., lecture notes, study guides, written directions) to supplement oral instruction  
  • Break down instructional steps for student  
  • Provide visual support (e.g., times table) to support acquisition of basic math facts  
  • Outline math procedures for student and provide procedural guides or flashcards for the student to use when approaching problems  
  • Highlight important information within a word problem  
  • Have student write all steps and show all work for math computations |