Educational Implications of Low WISC-V Subtest Scores

Verbal Comprehension Index (VCI)

The VCI measures ability to access and apply acquired word knowledge. Low VCI scores indicate a poorly-developed verbal reasoning system with

- Limited receptive vocabulary
- Ineffective information retrieval
- Difficulty understanding and expressing himself/herself through oral language
- At risk for reading comprehension problems

Suggestions:
- Keep language of instruction as simple as possible
- Use multisensory strategies not reliant on language (e.g. pictures, charts, graphs)
- Shared reading activities such as dialogic reading

VCI Subtests:

Similarities (SI) measures verbal reasoning and concept formation. The child is read two words that represent common objects or concepts and describes how they are similar.

Low scores may be an indication of:
- A concrete thinker
- Word retrieval problems
- Problems with classification
- May know material, yet may give a response that is imprecise

Suggestions:
- Activities to help build thinking skills such as analogies and metaphors
- May need additional time to organize a coherent verbal response to orally presented prompts

Vocabulary (VC) measures word knowledge and verbal concept formation. For picture items, child names the depicted object. For verbal items, child defines the word that is read aloud.

Low scores may be an indication of:
- Weak auditory reception
- Poor language development
- Generalized or specific retrieval problems
- Negative effect on reading recognition and comprehension

Suggestions:
- Word Roots and affixes
- Vocabulary Cartoons
- Have student “echo” directions

Visual Spatial Index (VSI)

The VSI measures the ability to evaluate visual details and understand part-whole relationships.

Low scores may be an indication of:
- Difficulty remembering and differentiating left and right
- Difficulty remembering letter formations and letter patterns
- Difficulty with far-point copying (i.e. Smartboard) and near-point copying (i.e. textbook)

Suggestions:
- Work on large surfaces first (i.e. Smartboard, sidewalk)
- Provide lots of practice and clear verbal instructions for tasks requiring spatial organization (i.e. letter
VSI Subtests:
Block Design (BD) measures ability to analyze and synthesize abstract visual stimuli. The child views a model and/or a picture and uses two-color blocks to re-create the design within a specified time limit.

Low scores may be an indication of:
- Difficulty with abstract conceptualizing ability
- May be slow to respond to prompts or questions
- Problems in learning to tie shoes and other fine motor/planning tasks
- Input of the visual material may be related to inaccurate perception rather than problem-solving ability or motor output
  ➢ Performance influenced by motor skills, spatial abilities, working under time pressure, perseverance, rigidity, speed of mental processing, carelessness, ability to benefit from feedback, any type of brain injury (especially to right hemisphere)

Suggestions:
- Teach student to write from left to right. Use a green for "go" margin on the left side of the paper to illustrate where to begin writing. Use a red for "stop" margin on the right side of the paper.
- Cut up newspaper comics and place in order
- Use magnetic letters to spell or put in alphabetical order beginning with the left side
- Provide clear verbal instructions for tasks requiring spatial organization (i.e. letter formation)
- Practice letter formation using dotted or highlighted model

Visual Puzzles (VP) Measures ability to analyze and synthesize abstract information. Child views completed puzzle and selects three response options that combine to reconstruct the puzzle. Time limit: 30 seconds

Low scores may be an indication of:
- Weak ability to maintain a visual image in mind temporarily while mentally rotating, inverting, and otherwise manipulating that image and matching the resulting percept to a visual target
- Missing visual details

Suggestions:
- Provide direct instruction in reading
- Keep workspace free from distractions

Fluid Reasoning Index (FRI)

The FRI measures logical thinking skills and the ability to use reasoning to apply rules. Moderately contributes to development of reading skills.

Low scores may be an indication of:
- Difficulty drawing inferences from information presented
- Difficulty transferring and generalizing information to new situations

FRI Subtests:
Matrix Reasoning (MR) measures problem-solving ability and provides a reliable estimate of general nonverbal intelligence. The child views an incomplete matrix and selects the response option that completes the matrix.

Low scores may be an indication of:
- Difficulty with pattern recognition
- Problems with classification tasks
- Low score may indicate need for feedback
- Students with visual/perceptual problems may experience stimulus overload when presented with complex visual stimuli
Suggestions:
- Teach student to use self-talk to mediate tasks
- Explain assignments in a step-by-step manner
- When providing instruction, avoid:
  - Complicated and lengthy directions
  - Figurative language (student is likely to interpret literally)
- Visual Discrimination activities

**Figure Weights (FW)** Measures quantitative and analogical fluid reasoning. Child views scale with missing weight(s) and selects the response option that balances the scale. Item time limit of 20 or 30 seconds.

**Low scores may be an indication of:**
- Difficulty recognizing, forming, and understanding concepts
- Difficulty drawing inferences from information presented

Suggestions:
- Provide verbal instructions to all tasks
- Provide repetition and review of concepts to ensure over-learning
- Teach reading comprehension skills as early as possible so student can rely on reading and rereading to aid comprehension of concepts

**Working Memory Index (WMI)**

The WMI measures ability to register and manipulate visual and auditory information in conscious awareness.

- Low WMI scores may indicate:
  - Difficulty following directions beyond first steps
  - Forgetting what the student needs to do next
  - Difficulty with sentence writing or paragraph writing
  - Low WMI scores indicate that the student is more likely to forget assignments.

**WMI Subtests:**

**Digit Span (DS)** measures auditory short-term memory, sequencing skills, attention, and concentration. The child is read a sequence of numbers in the same order (Forward task), reverse order (Backward task), and ascending order (Sequencing task).

**Low scores may be an indication of:**
- Short term memory is weak
- May confuse phonetic sounds
- Problems sequencing and/or following directions
- Difficulty remembering what has just been taught

Suggestions:
- Incorporate multisensory strategies when learning new concepts (VAKT)
- Give brief, simple instructions
- Have student repeat instructions back to you—Echo

**Picture Span (PSp)** Assesses visual working memory. Child views one or more pictures, then selects them in sequential order from a larger picture array

**Low scores may be an indication of:**
- Attentional difficulties
- Difficulty filtering out distractions

Suggestions:
- Reduce distractions
• Keep work area uncluttered
• Use E-Z Reader strips to block out text from lines above or below the line of focus

**Processing Speed Index (PSI)**

The Processing Speed Index measures ability to quickly and correctly scan visual information.

**Low scores may be an indication of:**
- Poorly-developed ability to rapidly identify visual information
- Difficulty making quick and accurate decisions
- Difficulty rapidly implementing those decisions

The subtests contributing to the PSI are not measures of simple reaction time or simple visual discrimination; a cognitive decision-making and learning component is involved.

**PSI Subtests:**

**Coding** measures short-term memory, learning ability, visual perception, visual-motor coordination, visual scanning ability, cognitive flexibility, attention, and motivation. Working within a specified time limit, the child copies symbols that correspond with simple geometric shapes or numbers.

**Low scores may be an indication of:**
- Written language disorder
- Poor visual motor coordination
- May have problems with copying

**Suggestions:**
- Practice near- and far-point copying
- Draw shapes with a highlighter for the child to trace over

**(Symbol Search/SS)** measures processing speed, short-term visual memory, visual-motor coordination, cognitive flexibility, visual discrimination, and concentration. Working within a specified time limit, the child scans search groups and indicates if target symbols are present.

**Low scores may be an indication of:**
- Poor visual memory
- Weak visual discrimination
- Weak visual-motor coordination

**Suggestions:**
- Visual Perceptual Skill Building Activities:
  - Navigate through an obstacle course
  - Shapes- Show the child a shape and encourage him/her to copy it as accurately as possible
Ancillary Index Scales and Complementary Index Scales

Ancillary Index Scales Designed to measure processes related to learning difficulties.

Quantitative Reasoning Index (QRI) measures ability to perform mental math operations. May be of special interest if SLD in mathematics is suspected.

Auditory Working Memory Index (AWMI) measures ability to remember information presented verbally. The AWMI is a purer measure of auditory working memory.
Low scores may be an indication of:
• Difficulty registering, maintaining, and/or manipulation verbally-presented information

Nonverbal Index (NI) is a measure of general ability that minimizes verbal expression. Useful when examinee has obvious verbal difficulties – ELL – ASD with Language Impairment
Low scores may be an indication of:
• Slow processing speed
• Low working memory
• Low abstract and conceptual reasoning abilities

General Ability Index (GAI) provides an estimate of general intellectual ability that is less reliant on working memory and processing speed than the FSIQ
Low scores may be an indication of:
• Poor reasoning skills
• Visual-spatial processing difficulties
• Language deficits

Cognitive Proficiency Index (CPI) provides a summary score of working memory and processing speed performance.
Low scores may be an indication of:
• Visual or auditory processing deficits
• Visuomotor difficulties
• Limited working memory storage or mental manipulation capacity

Complementary Index Scales designed to measure complex cognitive processes and enhance assessment of children with learning difficulties.

Naming Speed Index (NSI) provides a broad estimate of automaticity of basic naming ability.
Low NSI scores may be an indication of:
• Weak language skills
• Visual-processing deficits
• Information retrieval difficulties

Symbol Translation Index (STI) broad estimate of visual verbal associative memory.
Low STI scores may be an indication of:
• Visual or verbal processing deficits
• Rapid forgetting
• Poor information encoding

Storage and Retrieval Index (SRI) broad estimate of long-term storage and retrieval accuracy and fluency.
Low SRI scores may be an indication of:
• Difficulty encoding and/or retrieving information from long-term memory
• Slow processing speed
• Visual and/or language processing deficits

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**Red Flags**

If VCI and AWMI/WMI are low, you would predict general deficits in academic functioning suggesting that these measures should be included as part of all LD evaluations. New Ancillary measures provide information that is different from primary and complimentary measures.

**Low scores:**

*Word Reading and Non-Word Reading*

- **Word Reading**
  - Indexes: VCI and AWMI
  - Subtest DS VC (IN, CO)
  - Complementary Measures
    - Delayed Symbol Translation
    - Naming Speed Literacy

- **Pseudoword Decoding**
  - Indexes: VCI, WMI, NSI
  - Subtest DS VC (IN, CO)
  - Complementary Measures
    - Delayed Symbol Translation

*Naming Speed Literacy*

- **Reading Comprehension**
  - Indexes: VCI, FRI and AWMI
  - Subtest SI, VC (CO), MR (AR)
  - Complementary Measures
    - Delayed Symbol Translation

- **Oral Reading Fluency**
  - Indexes: VCI, NSI, AWMI
  - Subtest VC, CD, DS (LNS), SI
  - Complementary Measures
    - Naming Speed Literacy
    - Delayed Symbol Translation

- **Basic Reading**
  - Indexes: VCI, AWMI, WMI, NSI
  - Subtest VC (IN), DS, AR
  - Complementary Measures
    - Naming Speed Literacy

- **Total Reading**
  - Indexes: VCI, AWMI, SRI
  - Subtest DS, SI, VC (CO, IN), AR
  - Complementary Measures
    - Naming Speed Literacy
    - Delayed Symbol Translation
**Full Scale IQ (FSIQ)** is calculated using the five index scores: VCI, VSI, FRI, WMI, and PSI; mean = 100; SD = 15

<table>
<thead>
<tr>
<th>Index scores:</th>
<th>Subtest scores:</th>
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<tbody>
<tr>
<td>Standard Scores (SS)</td>
<td>Scaled Scores (ss)</td>
</tr>
<tr>
<td>mean = 100; SD = 15</td>
<td>Range from 1—19</td>
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<tr>
<td>130+ = Extremely High</td>
<td>19-16 = Extremely High</td>
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<tr>
<td>129-120 = Very High</td>
<td>15-14 = Very High</td>
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<tr>
<td>119-110 = High Average</td>
<td>13 = High Average</td>
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<tr>
<td>109-90 = Average</td>
<td>12-8 = Average</td>
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<tr>
<td>80-89 = Low Average</td>
<td>7-6 = Low Average;</td>
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<tr>
<td>70-79 = Very Low</td>
<td>5-4 = Very Low</td>
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<tr>
<td>&lt;70 = Extremely Low</td>
<td>&lt;4 = Extremely Low</td>
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</tbody>
</table>

Katie 10-year-old female example:

<table>
<thead>
<tr>
<th>Standard Score or Scaled Score</th>
<th>Verbal Comprehension</th>
<th>65</th>
<th>Working Memory</th>
<th>91</th>
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<tbody>
<tr>
<td>WISC-V Full Scale IQ</td>
<td></td>
<td></td>
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<tr>
<td>Similarities</td>
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<td>4</td>
<td>Digit Span</td>
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<tr>
<td>Vocabulary</td>
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<td>3</td>
<td>Picture Span</td>
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<tr>
<td>(Information)</td>
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<td>3</td>
<td>(Letter-Number Sequencing)</td>
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<tr>
<td>(Comprehension)</td>
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<tr>
<td>Visual Spatial</td>
<td>102</td>
<td></td>
<td>Processing Speed</td>
<td>108</td>
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<tr>
<td>Block Design</td>
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<td>10</td>
<td>Coding</td>
<td>9</td>
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<td>Visual Puzzles</td>
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<td>11</td>
<td>Symbol Search</td>
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<td>(Cancellation)</td>
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<tr>
<td>Fluid Reasoning</td>
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<td>Matrix Reasoning</td>
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<tr>
<td>(Picture Concepts)</td>
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<tr>
<td>(Arithmetic)</td>
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<td>12</td>
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Ancillary & Complementary Summary

<table>
<thead>
<tr>
<th>Ancillary</th>
<th>Index Score</th>
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<tbody>
<tr>
<td>Quantitative Reasoning (QRI)</td>
<td>91</td>
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<tr>
<td>Auditory Working Memory (AWMI)</td>
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<td>Nonverbal (NVI)</td>
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<td>General Ability (GAI)</td>
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<td>Cognitive Proficiency (CPI)</td>
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<td>Naming Speed (NSI)</td>
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<td>Symbol Translation (STI)</td>
<td>108</td>
</tr>
<tr>
<td>Storage &amp; Retrieval (SRI)</td>
<td>97</td>
</tr>
</tbody>
</table>

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Katie is a 10 year-old female student in 5th grade. Her performance on the WISC-V indicated that her overall cognitive functioning fell within the Low Average range when compared with other children her age (FSIQ = 85, PR = 16). Upon repeated administrations of the WISC-V, we could expect that her performance would fall within a range of 80 to 91, 95% of the time. It should be noted that there was a significant amount of scatter amongst Katie’s performances within the five indexes of cognitive functioning. Therefore, it is important to focus primary attention on Katie’s index performances to best understand her cognitive functioning in several domains and to inform educational practices.

Primary Indexes

Her overall score on the VCI fell in the Extremely Low range (VCI = 65). As her weakest area of performance, this indicates that Katie may benefit from practice on verbally based tasks and interventions aimed at strengthening verbal skills. Instructions should be kept as simple as possible and activities to build thinking skills should be provided. On the Visual Spatial Index (VSI), Katie’s overall score was in the Average range (VSI = 102). The Fluid Reasoning Index (FRI) measured Katie’s logical thinking skills and her ability to use reasoning to apply rules. Her overall score on the FRI fell in the Average range (FRI = 103). Katie’s fluid reasoning skills were one of her strongest areas of performance and may be an area for continued growth. The Working Memory Index (WMI) measured Katie’s attention, concentration, and mental control. Her overall score on the WMI fell in the Average range (WMI = 91). On the Processing Speed Index (PSI), which measures the ability to quickly and correctly scan visual information, Katie’s overall score was in the Average range (PSI = 108). Katie’s processing speed performance is relatively strong compared to her overall level of ability. This may be an area that can be built upon in the future.

Ancillary Indexes

Ancillary Index scores revealed additional information about Katie’s cognitive abilities using unique subtest groupings to better interpret clinical needs. Her capacity to perform mental math operations and understand quantitative relationships, as measured by the Quantitative Reasoning Index (QRI), fell in the Average range (QRI = 91). The Auditory Working Memory Index (AWMI) measured her ability to register, maintain, and manipulate information that was presented orally. Her score on this index was Average for her age (AWMI = 94). On the Nonverbal Index (NVI), a measure of general intellectual ability that minimizes expressive language demands, her performance was Average for her age (NVI = 98). She scored in the Low Average range on the General Ability Index (GAI), which provides an estimate of general intellectual ability that is less reliant on working memory and processing speed relative to the FSIQ (GAI = 83). Performance on the Cognitive Proficiency Index (CPI), which captures the efficiency with which she processes information, was comparatively strong, falling in the Average range (CPI = 100).

Complementary Indexes

Complementary Index scores measured Katie’s abilities as they relate to academic achievement and learning-related issues. The Storage and Retrieval Index (SRI) provides a broad estimate of long-term storage and retrieval accuracy and fluency. This score is derived from tasks on the Naming Speed Index (NSI) and Symbol Translation Index (STI). The NSI measures basic naming automaticity. Katie’s NSI score was in the Low Average range (NSI = 88). The STI measures visual-verbal associative memory. Her score on the STI fell in the Average range (STI = 108). It is important to compare her performance across the three STI subtests, when interpreting her associative memory ability. Her performance on the SRI was diverse, but overall was Average for her age (SRI = 97; STI > NSI, BR = 10.0%). When evaluating Katie’s performance across the subtests in the NSI (i.e., NSL and NSQ), it appears that she has greater naming facility on tasks related to mathematical, rather than reading, skills (NSL < NSQ, BR = 2.2%).