Objectives

- Describe the structure of the WISC-IV.
- Describe the interpretive process.
- Analyze sample data to describe cognitive strengths and weaknesses.
- Discuss instructional implications.
Interpretation of WISC-IV
Gloria Maccow, Ph.D., Assessment Training Consultant

WISC-IV Structure

- Verbal Comprehension Scale
  - Core Subtests: Similarities, Vocabulary, Comprehension
  - Supplemental Subtests: Information, Word Reasoning
- Perceptual Reasoning Scale
  - Core Subtests: Block Design, Picture Concepts, Matrix Reasoning
  - Supplemental Subtest: Picture Completion
- Full Scale
  - Working Memory Scale
    - Core Subtests: Digit Span, Letter-Number Sequencing
    - Supplemental Subtest: Arithmetic
  - Processing Speed Scale
    - Core Subtests: Coding, Symbol Search
    - Supplemental Subtest: Cancellation

Verbal Comprehension Index

- VCI measures verbal abilities utilizing
  - Reasoning
  - Comprehension
  - Conceptualization
  - Ability to express responses orally
- All tasks require
  - Understanding of auditory input
  - Accessing verbally-encoded information in long-term memory
  - Ability to express responses orally
### Perceptual Reasoning Index

**Block Design + Matrix Reasoning + Picture Concepts**

**PRI measures**
- Perceptual Reasoning
- Perceptual Organization

**All tasks require**
- Visual perception and organization
- Reasoning with visually-presented nonverbal material
- Executive functions

*Block Design* also requires visual-motor coordination and speed

### Working Memory Index

**Digit Span + Letter-Number Sequencing**

**WMI measures**
- Attention
- Concentration
- Working Memory

**Both tasks require**
- Selective and sustained attention
- Mental manipulation
- *Digit Span Forward* and early items of *Letter-Number Sequencing* require only initial registration (not working memory)
**Processing Speed Index**

**Coding + Symbol Search**

**PSI measures**
- Speed of mental processing
- Speed of graphomotor processing

**Both tasks require**
- Visual perception and organization
- Visual scanning
- Efficient production of multiple motor responses
  - Executive control of attention
  - Sustained effort
  - Speed
- **Coding** performance also dependent on paired-associate learning

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**Sample Data**
### Hayley, Age 11 yrs 3 mos

<table>
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### Hypotheses

**Cognitive Strengths**

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**Cognitive Weaknesses**

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**Full Scale IQ = 114**

### Hypotheses

**Cognitive Strengths**

**Cognitive Weaknesses**

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# Steven, Grade 6, Age 12 years

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**Hypotheses**

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Full Scale IQ = 80

### Hypotheses

**Cognitive Strengths**

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**Cognitive Weaknesses**

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Instructional Implications
Verbal Comprehension Index

Receptive Language

- Shorten/simplify language used with student
  - Especially oral instructions
- Repeat instructions after brief pause
- Have child repeat instructions in own words
- Supplement oral instructions with:
  - Written instructions
  - Worked example, illustration, or demonstration
- Have child demonstrate understanding of instructions by working an item
## Expressive Language

- Provide vocabulary list prior to lesson or discussion
- Reduce classroom language demands
  - Cue student ahead of time what s/he’ll be asked
    - Allows time to prepare oral response
  - Provide student with response options
  - Allow pointing or demonstration of correct answer
- Reduce language demands in assignments
  - E.g., “matching” responses rather than generating them

### Expressive Language

Encourage teachers to wait longer for student responses during discussion

*Longer wait time encourages:*
- Increased participation
- Longer student responses
- Better task-oriented performance
Receptive & Expressive Language

Consider S&L and/or audiology screening or evaluation, especially if you observe:

- Child confuses similar-sounding words on Vocabulary and VCMC subtests
  - E.g., Unanimous/Anonymous, Migrate/Migraine
- Word-finding problems

Retrieval from Long-Term Memory

Use teaching strategies that facilitate retrieval

- Advance organizers
- Linking to prior knowledge
- Mnemonic devices
  - Story mnemonics may be most effective type
- Personal associations to make abstract information more concrete
- Student question generation prior to lesson
**Retrieval from Long-Term Memory**

Evaluate learning using formats that require cued recall or recognition rather than free recall

- E.g., Multiple choice, matching

**Instructional Implications**

**Perceptual Reasoning Index**
Visual Perception & Organization

- For younger children:
  - If visuospatial ("Where") skills (and fine motor skills) are especially deficient, consider trial of OT
  - Encourage visual perceptual ("What" system) development by having child attend to and name visual details in pictures

- Teach older children to use verbal mediators to improve understanding and learning of visual information

Visual Perception & Organization

- Teach keyboarding/word processing skills
  - Reduced demands on spatial and fine motor skills
  - Output rate faster and closer to child’s thinking

- Provide extra space on worksheets and test papers to accommodate larger writing

- Record answers directly in test booklets
Executive Functions

- If performance hampered by impulsive responding, try:
  - “Stop and think” protocols
  - Problem-solving analogues
- For deficient strategizing and/or monitoring:
  - Explicit training in strategy selection and implementation, using “think aloud” modeling and practice (top-down vs. bottom-up)
  - Provide strategy or have child determine it before beginning assignments

Executive Functions

- Ultimate effects of “remediation” uncertain
  - Work toward good compensatory habits
- Use “parts-to-whole” verbal teaching approach
- Present verbal “steps” in correct sequence to encourage learning of generalizable rules
- Explicitly point out “obvious” cause-effect relationships
- Do not expect child to generalize learning without explicit direction and explanation
Instructional Implications

Working Memory Index

WMI - Attention

If part of larger pattern of attentional difficulties, institute modifications and/or accommodations:

- Allow child to work standing up or walking around
- Allow quiet, unobtrusive outlets for fidgeting (e.g., in pocket or desk)
- Short work periods with brief activity breaks
WMI - Attention

Institute modifications and/or accommodations:

- Use verbal and nonverbal cues to focus attention
  - Verbal - “Listen,” “Look,” “Name”
  - Nonverbal - Eye contact, gentle touch
- Ask child to orally summarize information just presented
- Divide work into smaller, manageable steps
  - Provide immediate feedback and guidance at each step

WMI - Mental Manipulation

- Working memory capacity (and speed) not easily improved, except with stimulant medication
- Encourage use of visual reminders
  - Writing down results of interim steps on multi-step math problems
  - Allow child to maintain list of problem-solving steps; fade use over time
- Teach child to categorize or chunk information
**WMI - Mental Manipulation**

- Break down assignments into smaller, more manageable steps
  - Provide interim deadlines and rapid feedback
- Utilize assistive technologies:
  - Calculator to complete/check work
  - Digital watch with multiple alarms
  - Timer
    - Teach use for homework sessions with interspersed activity periods
**Processing Speed**

- *Coding* and *Symbol Search* both likely to be low
  - Reduced graphomotor output requirement does not improve performance
- Look to confirm with slow performance on tasks with *no* written output requirement
- Remember: Impulsive responding and slow processing can (and often do) co-exist

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**Processing Speed**

- Processing speed not amenable to remediation, but may improve with use of stimulant medication.
- Encourage teachers to structure lessons with regular intervals for clarification, consolidation, and “catch-up.”
  - Frequent repetition of points key to maintaining logical chain of understanding.
Graphomotor Speed

- May try OT with younger children
  - Pencil grips, thick pens helpful for some
- Modifications, accommodations:
  - Extended time for written tasks
  - Allow oral responses, testing rather than written
  - Do not penalize for neatness, legibility
    • Ask for clarification
  - Provide training in keyboarding and word processing ASAP

Summary

1. Consider abilities measured by each index.
2. Identify relative strengths and weaknesses.
3. Analyze report to determine which abilities contributed to relatively lower scores.
4. Determine instructional implications of cognitive strengths and weaknesses.