

# Ch. 10: Wechsler Scales

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## Review: IQ : # of Factors

Researcher	# of Factors	Comment
<b>Binet</b>	multiple	for practical reasons, only measured 1
<b>Spearman</b>	g	acknowledged other smaller factors (S <sub>i</sub> )
<b>Thurstone (et. al)</b>	g <sub>f</sub> , g <sub>c</sub>	fluid vs. crystallized
<b>Sternberg</b>	3	analytic, creative, practical
<b>Gardner</b>	8	“multiple intelligences” (MI) theory

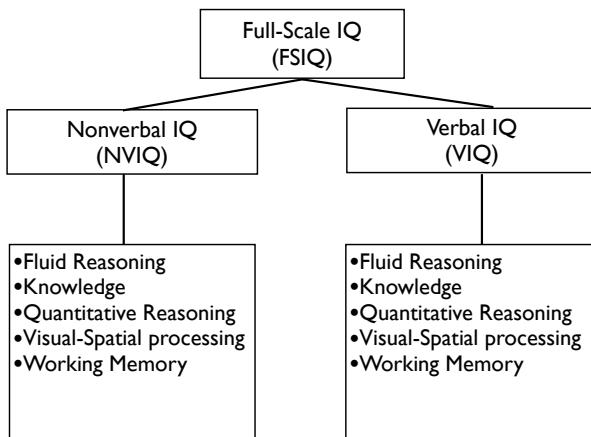
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## Stanford-Binet 5



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## Review: Stanford-Binet IQ Test

- Structure
  - 5 factors (verbal, non-verbal) = 10 tests
- Psychometrics
  - Reliability: Excellent
  - Validity: ???

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## Review: Principles of IQ

- Reification or Nominal fallacy:
  - “Intelligence” is a construct
- Numerical Fallacy:
  - IQ score measures Intelligence
- Ranking Fallacy
  - compare IQ scores, determine worth or value
  - *life-altering* decisions are made

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## IQ Test: Sample Question

- Some of the fastest ships can travel at 30 miles per hour. On such a ship, how many days will it take to make the trip between New York and Paris, a trip of 3600 miles?

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## Cognitive / Info Processing 1

- What is required to correctly answer a single item on an IQ test?
- Verbal comprehension: understand the instructions you hear or read
- Short term memory: remember the instructions
- Long term memory: retrieve answer or procedure
- Working memory: juggle information, do calculations, etc.
- Judgement / Reasoning : decide between competing answers
- Attention / Concentration: remain focused on task

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## Cognitive / Info Processing 2

- Verbal: give reply with voice
- Motor: respond with hands
- Interpersonal: evaluate response of examiner: praise? criticism?
- Intrapersonal / Metacognition: judge performance, adjust strategy accordingly
- Cognitive science believes many of these to be independent processes subsumed by independent brain systems

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## Performance Scale

- Declarative (“knowing that”)
  - What is the distance between NYC and Paris?
  - Dependent on Language
  - Trainable? subject to education / culture?
- Procedural (“knowing how”)
  - Riding a bicycle
  - Arrange blocks to form a pattern
  - Long Division: divide 347 by 19
- Early IQ tests focused more on Declarative tasks

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## Wechsler Scales

- WAIS-4 : Adult Intelligence Scale (2008)
  - Evolved from Wechsler-Bellevue Intelligence Scale (1937)
  - Designed for Adults
  - Point scale rather than Age scale
  - Added *Performance* items (to fill void left by SB's reliance on language/verbal skills)
  - Focused on multiple abilities rather than "g"
- WISC-4 : Intelligence Scales for Children
- WPPSI-3 : Preschool and Primary Scale

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## David Wechsler

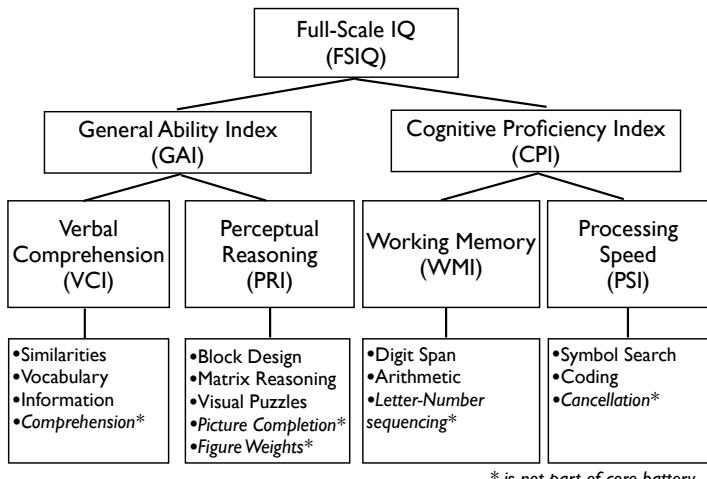
- “[...] Spearman's theory of general intelligence (g) was too narrow. [It is] an effect rather than a cause [...] Non-intellectual factors, such as personality, contribute to the development of each person's intelligence.”
- “Intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment”
- Deviation IQ (DQ) score replaced IQ=MA/CA

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## WAIS-4

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## IQ Terminology

IQ Range (M=100, SD=15)	Stanford-Binet 5	WAIS 4
<b>145-160</b>	Very gifted or highly advanced	Very Superior
<b>130-144</b>	Gifted or very advanced	
<b>120-129</b>	Superior	Superior
<b>110-119</b>	High Average	High Average
<b>90-109</b>	Average	Average
<b>80-89</b>	Low Average	Low Average
<b>70-79</b>	Borderline	Borderline
<b>55-69</b>	Mildly impaired or delayed	
<b>40-54</b>	Moderately impaired or delayed	Very Low

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## WAIS-IV General Ability Index (GAI)

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- Verbal Comprehension Index (VCI)
  - Vocabulary
  - Similarities
  - Information
  - \*Comprehension
- Perceptual-Reasoning (PRI)
  - Block Design
  - Matrix Reasoning
  - Visual Puzzles
  - \*Picture Completion
  - \*Figure Weights

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## VCI: Verbal Comprehension Index

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- Vocabulary
  - “What is a guitar?”
- Similarities
  - “In what way are an apple and a pear alike?”
- Information
  - “How far is it from New York to Paris?”
- Comprehension
  - ...

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## Comprehension Example

- “Why is food often sold in sealed containers?”

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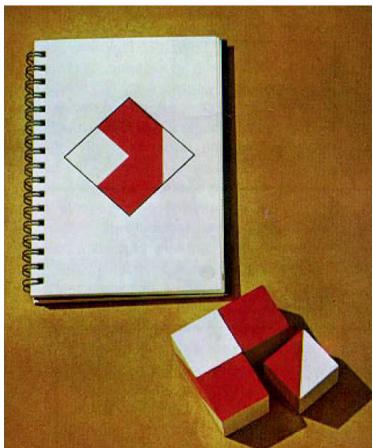
## PRI: Perceptual Reasoning Index

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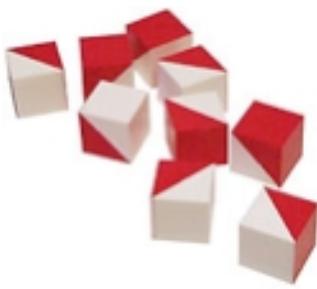
- Perceptual-Reasoning (PRI)
  - Block Design
  - Matrix Reasoning
  - Visual Puzzles
  - \*Picture Completion
  - \*Figure Weights

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## Block Design

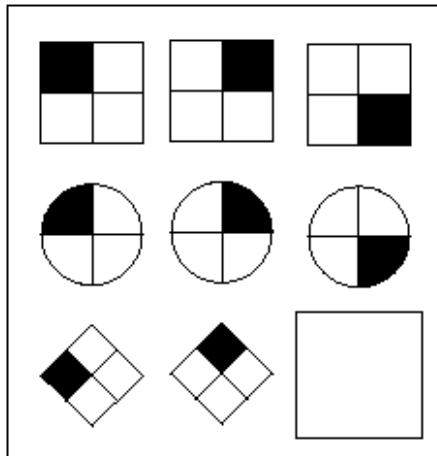


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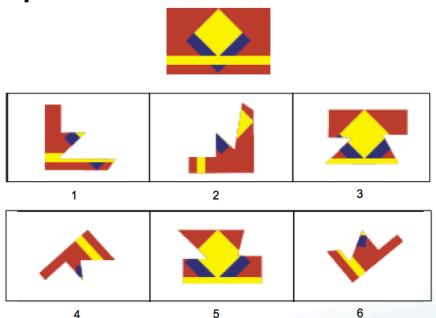
## Matrix Reasoning



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## Visual Puzzles

Which 3 of these pieces go together to make this puzzle?



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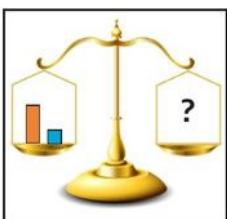
## Picture Completion



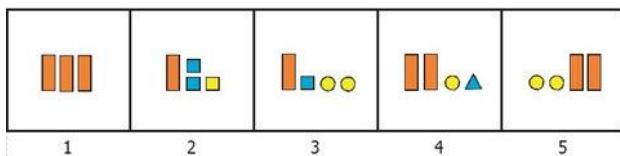
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## Figure Weights



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1

2

3

4

5

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## WMI: Working Memory Index <sup>1271</sup>

- Digit Span
- Arithmetic
- Letter-Number Sequencing

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# Digit Span Example

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# Arithmetic

- “How many 45-cent stamps can you buy for a dollar?”

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# Letter-Number Sequencing

- Repeat Q-1-B-3-J-2 in numerical and alphabetical order

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# PSI: Processing Speed Index

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- Symbol Search
- Coding
- Cancellation

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# Symbol Search

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- Do the two symbols on the left match the symbols on the right?

↔	<	→	∩	~	<		YES	NO
±	+	↔		+	—	→	YES	NO
>	~	≈	≈	×	○	>	YES	NO
∩	+	∅		~	∩	≈	YES	NO
~	—	—	—	—	—	—	YES	NO

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# WAIS-IV: Coding

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Digit symbol substitution test

1	2	3	4	5	6	7	8	9
↔	↓	≡		≠	□	∅	≡	≡

2	9	2	9	4	9	4	9	1	8	9	3	1	7	2	3	6	4	8	3	1	7	8	2	5
4	7	1	7	5	8	4	1	5	2	6	9	9	5	6	7	6	2	9	4	8	7	2	8	6
8	6	2	8	2	9	4	7	4	8	6	7	3	1	6	2	1	8	7	4	3	1	6	2	9
2	5	4	6	1	6	3	1	2	7	2	6	4	9	1	8	5	7	1	5	4	5	3	9	2
3	9	7	1	7	1	3	5	7	6	1	6	5	9	1	3	1	3	9	8	9	7	3	4	3

## WAIS-IV: Cancellation

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## WAIS-4

- Which of these tests are completely “pure” measures of an ability?
  - Verbal / language issues?
  - Cultural bias?
  - Motivation?
  - Expectancy effects?
  - Strategy : speed vs. accuracy?

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## WAIS Psychometrics-Reliability

- 11 subtests, 4 index scores
- Full-Scale IQ (FSIQ)  $r = .98$ 
  - Verbal IQ (VIQ)  $r = .97$
  - Performance IQ (PIQ)  $r = .94$
- FSIQ: SEM = 2.29: 95% of the time a measured score is  $+/- 4.6$  of actual score
- Very good normative sample ( $n=2450$  gender, ethnicity, region, education level)
- Widely researched in many fields (portions of the WAIS are used as neuropsychological tests)

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## WAIS Psychometrics-Validity

- Reliability is good, but...
- How can we measure validity?

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## WAIS Psychometrics-Validity

- Correlations of .93 with WISC
- What should the Criterion be?

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## WAIS Subtest Pattern Analysis

- Can we analyze patterns on subtest scores to make inferences about a person's functioning?
- A person scores highly on a subtest not known to be affected by education (Similarities), but low on a subtest affected by motivation, anxiety and speed(Digit-symbol coding) and low on Information.
- Conclude this person has potential, but has trouble learning or performing in normal situations.
- Issue - test-retest reliabilities are low (.6 to .9) for individual subtests.
- Research supporting Pattern Analysis is weak

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## WISC-IV and WPPSI-III

- WISC - Wechsler Intelligence Scale for Children:
- A version of the WAIS, specially adapted and revised to be more appropriate for children aged 6 thru 16
- WPPSI-III - Wechsler Preschool and Primary Scale of Intelligence:
- for children 2-6 years old

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## Multiple Intelligences

- Both the SB5 and WAIS-4 test multiple *factors* of intelligence
- this is not the same thing as *multiple intelligences*
- Which of Gardner's 8 intelligences are actually measured by the SB5 or WAIS-4?

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## Gardner's 8 Intelligences

- logical-mathematical (\*)
- verbal-linguistic (\*)
- spatial (\*)
- musical
- bodily-kinesthetic
- naturalist
- interpersonal
- intrapersonal

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