

Psychology of gifted learning

Session 6B Psychometric measures and giftedness

John Munro

Objectives At the end of Session 1 you should be able to

- suggest the types of questions that psychometric measures set out to answer
- describe the structure of typical psychometric batteries
- discuss how the WISC III and SF FE are used with gifted children

Content

Psychometric measures are limited in various ways

- measure children's problem solving ability at one point in time
- consist of convergent tasks; they don't allow students to think in divergent ways or in open-ended ways.
- gifted children can often find the tasks difficult because they read into them ideas that other children don't see; they look for answers or solutions that other children don't. They may delay giving an answer because they think the correct answer is too obvious and not the required one.
- performance is affected by the student's past learning opportunities.
- test performance may be affected by motivation, test anxiety, reading ability, language ability, cultural influences, etc.

Which test /s to use ? Cognitive assessment scales differ on a number of dimensions

- what they measure; verbal vs quantitative vs nonverbal reasoning
- the range of task areas; several different types vs one type of task.
- how they measure it; group vs individually administered.

Commonly used cognitive ability scales

	areas measured	number of scales	group or individual	age range	date normed
ACER Tests of Learning Ability (TOLA)	V, Q	3	G	8-13	1976
ACER Tests of Reasoning Ability (TORA)	V, Q	1	G	adult	1990
ACER Intermediate Tests F and G	V, Q	2	G	10-15	1982
Verbal/Non-verbal Reasoning Test Series	V, N	12	G	7-15	1990
ACER Advanced Test B 40 (ATB40)	V, Q	1	G	15+	1983
Jenkins Non-verbal Test (JNV)	S	5	G	gr 3-8	1989
Coloured Progressive Matrices (CPM)	S	1	G	5-11	1995
British Ability Scales (BAS II) 2 Edition	V, N		I	2-17	1996
Slosson Intelligence Test for Children and Adults	V	1	I	4+	1991
Wechsler Intelligence Scale for Children III (WISC III)/WPPSI ?WAIS	V, N	13	I	6-17*	1992
Stanford Binet Intelligence Test (Fourth Edition)(SBFE)	V, N	15	I	6-17	1992

	WISC III	SB-FE
Recall verbal general knowledge, information	Information	
Reason how verbal concepts are similar / differ	Similarities	Verbal Relations
Solve quantitative problems	Arithmetic	Quantitative Equation Building
Describe the meanings of words, vocabulary	Vocabulary	Vocabulary
Explain various phenomena	Comprehension	Comprehension
Retain information in short term memory	Digit Span	Memory for Digits, Memory for Sentences, Memory for Objects, Bead Memory
Comprehend visual information in context	Picture Completion	Absurdities
Arranging picture to tell a story	Picture Arrangement	
Analyse and construct a spatial design	Block Design	Pattern Analysis Paper Folding + Cutting
Analyse and complete a matrix		Matrices
Arrange parts to make an object	Object Assembly	
Learn an arbitrary visual code	Coding	
Reproduce a spatial pattern		Copying

The WISC III

Verbal tasks

Similarities	Reasoning how two verbal concepts are similar
Arithmetic	Solving arithmetic word tasks
Vocabulary	Describing the meanings of words, vocabulary
Comprehension	Explaining various social phenomena
Digit Span	Storing information in short term auditory memory

Nonverbal (performance tasks)

Picture Completion	Recognizing missing features from visual information
Coding	Learning an arbitrary visual code
Picture Arrangement	Arranging picture to tell a story
Block Design	Arranging blocks to make a spatial design
Object Assembly	Arranging parts of an object to make the object
Symbol Search	Searching a set of arbitrary visual symbols for targets.

By administering the various sub-tests you can calculate

- a standard score (the 'scaled score') for each sub-scale on the WISC-III.
- a total verbal area score and a total nonverbal or performance area score.
- a total general ability score (or 'g').
- scores for various factors.

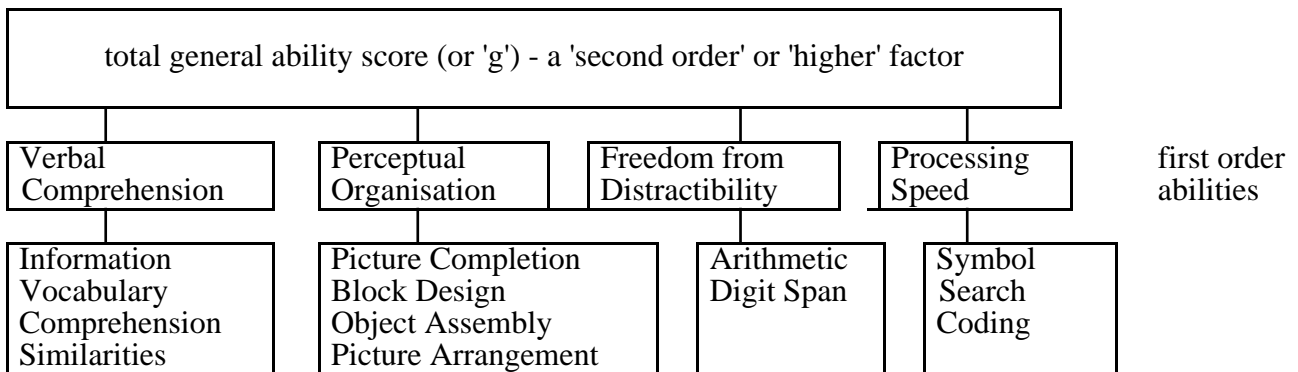
Example for a gifted 8 year old:

Sub-scale	Score	
	PR	level
Verbal tests		
Recalling verbal general knowledge and information	97	superior
Reasoning how two verbal concepts are similar	99	superior
Solving arithmetic word problems	99	superior
Describing the meanings of words, vocabulary	99	superior
Explaining various social phenomena and conventions	95	superior
Retaining information in short term auditory memory	95	superior
Performance (nonverbal) tests		
Recognising missing features from visual information	97	superior
Arranging pictures to tell a story	97	superior
Arranging blocks to make a spatial design	97	superior
Arranging parts of an object to make an object	97	superior
Learning an arbitrary visual code	95	superior
Overall verbal reasoning ability, PR of 99.9; overall non-verbal reasoning ability, PR of 99.9; M displayed superior verbal and nonverbal reasoning abilities.		

When are these types of assessment useful ?

- confirmatory
- where things don't 'mesh'; where a child isn't doing well at school but where the parent knows the child operates at a high level

Factor	Sub-tests that you sum
Verbal Comprehension	Information, Similarities, Vocabulary, Comprehension
Perceptual Organisation	Picture Completion, Picture Arrangement, Block Design, Object Assembly
Freedom from Distractibility	Arithmetic, Digit Span
Processing Speed	Symbol Search, Coding



The WISC Profiles :

Profile	Subtests comprising the profile : lower performance on
ACID	Arithmetic, Coding, Information, Digit Span
ACIDS	Arithmetic, Coding, Information, Digit Span, Symbol Search
SCAD	Symbol Search, Coding, Arithmetic, Digit Span
CAD	Coding, Arithmetic and Digit Span

General ability score	% ranks	Number of SDs (SD =15) above mean	Portion of same age population
100	50	0	1 in every 2
115	84	1	16 in every 100
130	97.5	2	2 in every 100
145	99.9	3	1 in every 1,000
160	9>9.9	4	3 in every 100,000

Use of the WISC III to identify giftedness:

- may not adequately assess giftedness at ages > 14, particularly because of timed bonus- this could penalise reflective students.
- the FSIQ for WISC III is 8-9 points lower than for WISC -R - children who were gifted (superior range) on WISC - R didn't get gifted score on WISC III - WISC III yields lower scores than WISC -R.
- IQ cut-offs

	Portion of normal curve	WISC 111	Stanford Binet 4
Very superior	2.1 - 2.2	130+	132+
Superior	6-8	120-129	121-131
High Average	16	100-119	111-120
Average	50	90-109	89-110

Gifted students show a greater range of subtest variation than average students (Fishkin, Kampsnider & Pack, 1996):

- a larger portion of gifted students score above their mean than average students for
 - Similarities allow students to display superior logical abstract thought and
 - Comprehension to differentiate essential from non-essential detail
 - Vocabulary
- a larger portion of gifted students score below their mean than average students for
 - Coding both tasks involve speed
 - Symbol Search

Gifted profile on the WISC III:

- 'peaks' in Similarities, Comprehension + Vocabulary and valleys in Coding and Symbol Search
- discrepancy between verbal and performance IQ when one is > 130
- variability among index scores with Processing Speed Index lower
- use of Verbal Comprehension Index than FSIQ because it is less affected by speed of performance.

When gifted learning disability is suspected, use SBIV.

Dispute re the version of SBIV to use; see Robinson, (1992) and Silverman & Kearney (1992).

Cognitive style and giftedness

Learners show a level of consistency in how they process information during learning and thinking; cognitive style or cognitive preference.

Two dimensions: how individuals

- manipulate or process information on an analytic - wholistic dimension and
- 'code or represent information on a verbal-imagery dimension.

The information processing distinctions in cognitive style include

analytic	wholistic
field independence	field dependence
reflectivity	impulsivity
convergent	divergent
sharpeners	levellers
serial	wholistic

Some have been well-intercorrelated, while others have not been correlated.

The characteristics of field dependence versus independence distinction

Field independent processing; learners	Field dependent processing; learners
rely on internal frame of reference	rely on external frames of reference
break up organized field into basic elements and organise information into a different structure than suggested by the inherent information	work on wholes, see less differentiation and more fusion in information and to structure the information by using its total background context
provide a structure for an ambiguous stimulus complex	
use more independent and more individualised approaches	prefer to learn in groups and interact with others, teacher
deal better with situations involving impersonal analysis	deal better in situations requiring social perceptiveness and interpersonal skills.
scan objectively the full array of available cues to form the concept in concept formation,	focus on salient cues ; select what they think is salient (use distinctive visual features) in concept formation
have well-defined goals and respond to intrinsic motivation	require more extrinsic motivation and more structured work from teacher
prefer to structure own learning and develop own learning strategies	Need more assistance in problem-solving strategies or more exact definition of outcomes.

Measure field dependence / independence as follows:

$PC + BD + OA / 3 - (PA + C + SS) / 3$; if > 2 - a field dependent preference

Fishkin, A.S., Kampsnider J.J. & Pack, L. (1996). Exploring the WISC III as a measure of giftedness. *Roeper Review*, 18, 3, 226-231.

Robinson, N. (1992). Which Stanford-Binet for the brightest ? *Roeper Review*, 15, 1, 32-34.

Silverman, L.K. & Kearney, K. (1992). The case for the Stanford-Binet L-M as a supplement test *Roeper Review*, 15, 1, 34-37.