A Personal Journey to the Next Generation of Intelligence Tests: Measure Thinking not Knowing

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Disclosures of Tests & Books I have Published related to Equity (1985 – 2022)

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FOR MORE INFORMATION PLEASE GO TO MY WEB PAGES

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PASS Theory of Intelligence and the CAS2

JACK A. NAGLIERI & TULIO M. OTERO

TABLE OF CONTENTS

Free Mini Book

SCAN HERE

www.JackNaglieri.com

PASS Theory of Intelligence and the CAS2

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Core Group Discussion → Deeper Learning

- **C**oach – Help the group stay on topic
- **O**rganizer – Facilitate group discussion
- **R**ecorder – Keep notes and speak for the group

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Topics for Today

My Equity Journey

Historical Context

The American Psychological Association Apology

How to Improve Intelligence Tests

Closing remarks

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Introduction

- My interest in how people learn began when I taught guitar.

1967

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CASE by Tulio Otero: ALEJANDRO (C.A. 7-0 GRADE 1)

REASON FOR REFERRAL

- Does he have ID?
- Academic:
  - Could not identify letters/sounds
  - October. Could only count to 39
  - All ACCESS scores of 1
- Behavior:
  - Difficulty following directions
  - Attention concerns
  - Refusal/defiance

Note: this is not a picture of Alejandro

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WISC-IV ASSESSMENT

KTEA2

Written Language...	78
Written Expression	82
Spelling	77
Math Composite	77
Math Computation	84
Math Concepts &...	76
Reading Composite	79
Reading...	78
Letter & Word...	85

50 60 70 80 90 100

WISC-IV (Spanish)

Full Scale IQ	73
Processing Speed Index	75
Working Memory Index	86
Perceptual Reasoning Index	79
Verbal Comprehension...	75

50 60 70 80 90 100

CAS2

Full Scale	83
Successive	84
Simultaneous	96
Attention	67
Planning	102

50 70 90 110

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The BIG picture

- The comprehensive assessments we provide change the course of a student's life
- The intelligence test we choose has a profound influence on what we learn and say about the student
- Equitable assessment can be achieved if we choose tests that measure how well a student **THINKS** in a way that is not confounded by what a student **KNOWS**

"What is right is not always popular
and
what is popular is not always right."

– Albert Einstein

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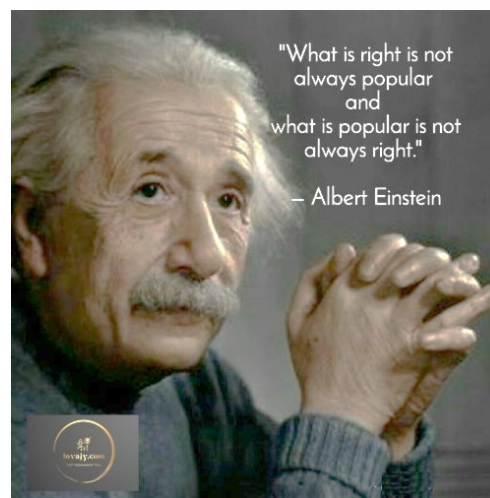
Did You Ever Wonder…

Why the INTELLIGENCE test you give has…
 VOCABULARY   INFORMATION SIMILARITIES ARITHMETIC
subtests?

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Traditional IQ and Achievement Tests

- When I started working as a school psychologist in 1975…I noticed that parts of the intelligence tests we used were VERY similar to parts of the achievement tests
  - For example, the Achievement Test had a General Information and Arithmetic subtests JUST LIKE THE WISC!
- THAT DID NOT MAKE SENSE

1975 Charles Champagne Elementary, Bethpage, NY

It seemed wrong to measure intelligence using questions that clearly measured achievement

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University of Georgia 1977-1979

- Alan and Nadeen Kaufman
- Opportunity to create
- My interest in intelligence test development

Alan S. Kaufman   Nadeen L. Kaufman

MARY FRANCES EARLY COLLEGE OF EDUCATION
ADERHOLD HALL

2022 UGA Lifetime Achievement Alumni Award

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Assistant Professor at Northern Arizona Univ.

- Teaching intellectual assessments in the school psychology program at Northern Arizona University 1979
- Lecture about genetic attributes of Native Americans' intelligence
- An absurd position

Left Brain   Right Brain

V IQ   P IQ

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- Was it reasonable to measure 'intelligence' with questions that required knowledge?

- Testing in Havasupai answered that question

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1981

Test Results and Interpretations:

On the WISC-R, Amanda earned a Performance IQ of 95±7 which falls in the average range of intelligence and at the 37th percentile rank in comparison to the children her age in the standardization sample. In contrast to this score of average non-verbal intelligence was her Verbal IQ of 52±7. This score is quite low and indicates that her level of facility with the English language falls at about the 1st percentile rank. This score can NOT be considered an estimate of verbal intelligence because Amanda speaks mostly Supai and little English. Due to the large difference between these scores, no Full Scale IQ was computed.

Within the WISC-R a clear pattern emerged: Amanda performed well on tasks that required little or no English language comprehension or expression, and poorly on all tasks which did require these linguistic skills. In fact, even if a task was visual and non-verbal, but required English language comprehension of instructions, she performed more poorly.

WISC-V Full Scale

Verbal Comprehension	Visual Spatial	Fluid Reasoning	Working Memory	Processing Speed
Similarities	Block Design	Matrix Reasoning	Digit Span	Coding
Vocabulary	Visual Puzzles	Figure Weights	Picture Span	Symbol Search
Information		Picture Concepts	Letter–Number Sequencing	Cancellation
Comprehension		Arithmetic		

Naglieri, J. A. (1982). Does the WISC-R measure verbal intelligence for non-English speaking children? *Psychology in the Schools, 19*, 478-479.

Naglieri, J. A., & Yazzie, C. (1983). Comparison of the WISC-R and PPVT-R with Navajo children. *Journal of Clinical Psychology, 39*, 598-600. 16

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Is my observation consistent with yours?

Have you wondered about this issue?

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Equitable Assessment of Intelligence

- The questions I had about WISC subtests made me critical of the way intelligence is measured
- Solution?
- Measure how well a person solves problems by **THINKING** in a way that is not dependent upon **KNOWING**
- How can you measure THINKING?
- I started with a progressive matrices test

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Tests that Measure Thinking or Knowing?

Girl is woman as boy is to man ?

3 is to 9 as
4 is to 16 ?

C^7 is to F as
E^7 is to A ?

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How to Evaluate Thinking vs Knowing

What does the examinee have to know to complete a task?
- This is dependent on *instruction*

I know that!

How does the student have to think to complete a task?
- This is dependent **seeing how ideas or things are related to one another** and some tasks just demand remembering
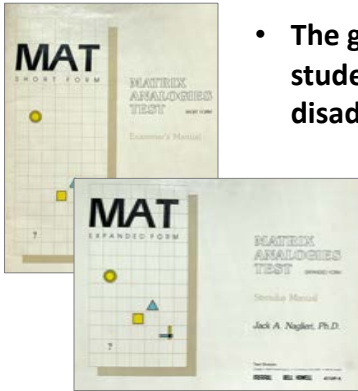
I see the relationships!

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Naglieri's Nonverbal Tests: 1985 to Present

• **First and Second** Versions

• The goal: **equitable measurement of** *general ability* **for ALL students, especially "intellectually gifted children from disadvantaged backgrounds** (Naglieri, 1985, p. 3)."

Validity Results:
1. **Males Females differences were trivial** (< 1 point) on MAT:EF (452) & MAT:SF (N = 2,636)
2. **Differences by Race were trivial (< 1 point) on MAT:EF (N = 110) and MAT:SF (N = 672)**
3. **MAT:SF correlations with reading and math achievement were substantial across grades K-12** (N = 3,022)

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MAT Short and Expanded Forms 1985

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Naglieri's Nonverbal Tests : 1985 to Present

• **Six** Versions of the Naglieri Nonverbal Tests

MAT Short and Expanded Forms 1985 **Naglieri Nonverbal Ability Test 1997** **NNAT –Individual, 2003** **NNAT -2 2008** NNAT3 2016

NNAT Validity:
• **No difference by sex, race or Ethnicity (and Equal ID rates) on EVERY VERSION OF THE NNAT**
• The NAT scores **correlated significantly with Achievement & as well as the WISC!**

The research on all these tests convinced me that measuring intelligence using items that measured how well students **think** in a way that is not influenced by what they **know** was an equitable way to measure **general intelligence 'g'.**

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Tests with Equity as a Goal 1985-Present

Traditional Tests

1. Naglieri, J. A. (1985). **Matrix** *Analogies Test - Expanded Form*. San Antonio: The Psychological Corporation.
2. Naglieri, J. A. (1985). **Matrix** *Analogies Test - Short Form*. San Antonio: The Psychological Corporation.
3. Naglieri, J. A. (1997). **Naglieri** *Nonverbal Ability Test*. San Antonio, TX: The Psychological Corporation.
4. Naglieri, J. A., & Bardos, A. N. (1997). **General** *Ability Scale for Adults*. San Antonio, TX: Pearson.
5. Naglieri, J. A. (2003). **Naglieri** *Nonverbal Ability Test - Individual Form.* San Antonio, TX: Pearson.
6. Wechsler, D., & Naglieri, J. A. (2006). *Wechsler Nonverbal Scale of Ability*. San Antonio, TX: Pearson.
7. Naglieri, J. A. (2008). *Naglieri Nonverbal Ability Test – 2nd Edition.* San Antonio, TX: Pearson.
8. Naglieri, J. A. (2016). *Naglieri Nonverbal Ability Test – Third Edition*. San Antonio, TX: Pearson.

Second Generation

9. Naglieri, J. A., & Das, J. P. (1997). **Cognitive** *Assessment System*. *Austin: ProEd*
10. Naglieri, J. A., Das, J. P., Goldstein, S. (2014). *Cognitive Assessment System Second Edition*. Austin, ProEd.
11. Naglieri, J. A., Das, J. P., & Goldstein, S. (2014). *Cognitive Assessment System Second Edition - Brief*. Austin, ProEd.
12. Naglieri, J. A., Moreno, M. A., & Otero, T. M. (2017). *Cognitive Assessment System – Español*. Austin, ProEd.

13. Naglieri, J. A. (2022). *Naglieri General Ability Test: Nonverbal*. Markham, Canada: MHS.
14. Naglieri, J. A. & Brulles, D. (2022). *Naglieri Ability Test: Verbal*. Markham, Canada: MHS.
15. Naglieri, J. A. & Lansdowne, K. (2022). *Naglieri Ability Test: Quantitative*. Markham, Canada: MHS.
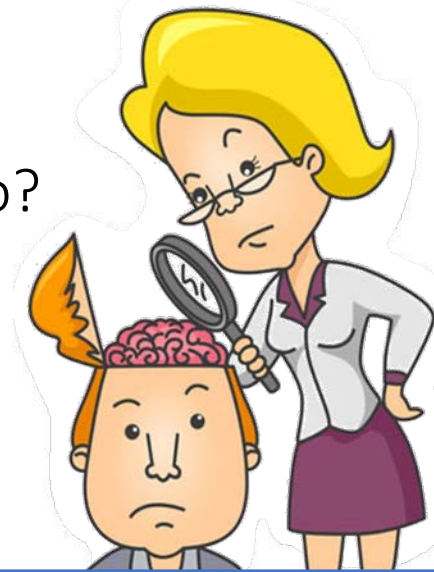
Keep in mind that nonverbal tests are fine to measure *general ability*; but school psychologists typically need to measure MORE than 'g'. I recommend a multi-dimensional theory of intelligence based on brain function (PASS).

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Two Questions:
1. Why do we measure intelligence the way we do?

2. Do the tests measure thinking or knowing?

The early history of IQ tests

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Topics for Today

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Slide 26

Stanford-Binet → Army Mental Tests → Today

When working on the 1911 scale, Binet removed items from 1908 scale because 'they depended too much on school learning'

A. Binet

Terman added items dependent upon school learning into the 1916 Stanford-Binet because he believed 'intelligence at the verbal and abstract levels is the highest form of mental ability'.
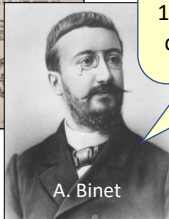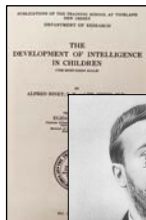
L. Terman

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The 1916 Stanford-Binet was different from the test Binet presented in 1911; I suggest

Binet was right Terman was wrong!

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Stanford-Binet → Army Mental Tests → Today

When working on the 1911 scale, Binet removed items from 1908 scale because 'they depended too much on school learning'
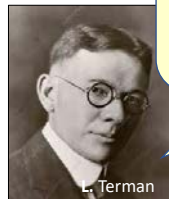
A. Binet

Terman added items dependent upon school learning into the 1916 Stanford-Binet because he believed 'intelligence at the verbal and abstract levels is the highest form of mental ability'.

L. Terman

Arthur Otis (Terman's student) was instrumental in the development of the U.S. Army Alpha (Verbal & Quantitative) and Beta (Nonverbal), the Otis-Lennon Ability Test and known for the multiple-choice format

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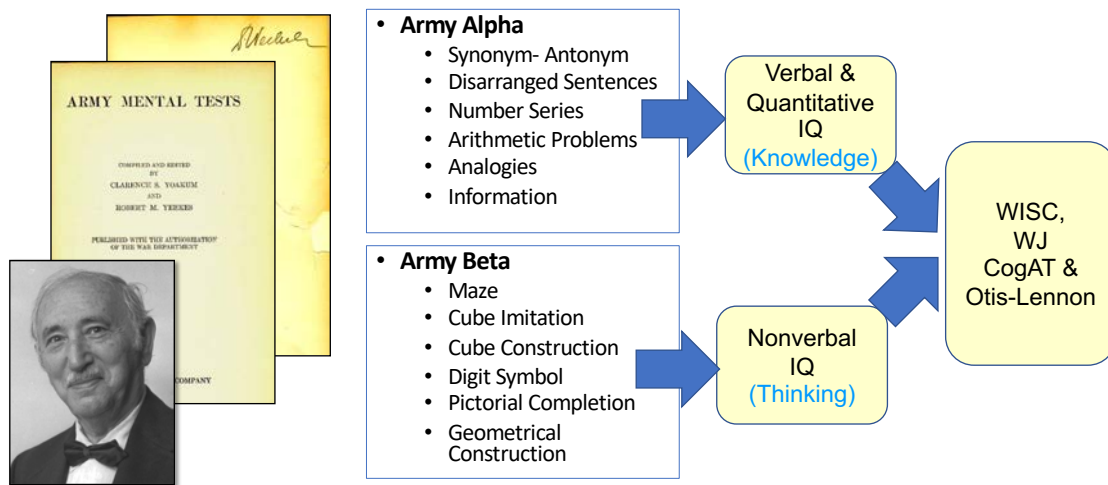
Wechsler's View of General ability

- Wechsler "believed that his Verbal and Performance Scales represented different ways to access *g* (general ability)",
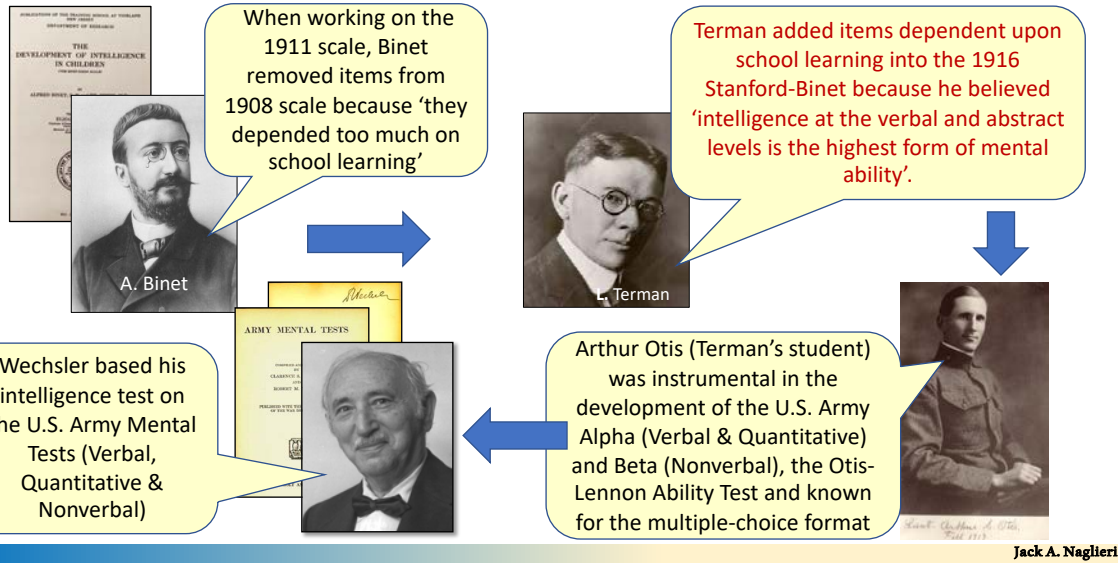- he never believed [in verbal and] nonverbal intelligence as being separate from g.
- he saw the Performance Scale as the most sensible way to measure the general intelligence of people with … limited proficiency in English. (Kaufman, 2008)
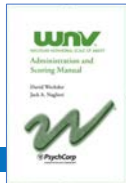
"The aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment (1939)"

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General Ability Definition
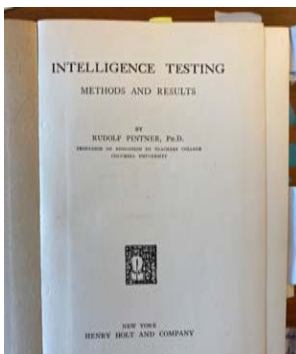
- "we did not start with a clear definition of general intelligence… [but] borrowed from every-day life a vague term implying all-round ability and… we [are] still attempting to define it more sharply and endow it with a stricter scientific connotation" (p. 53, Pintner, 1923)".

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What is the Practical Impact of intelligence tests created without a theory to guide what test items?

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IQ tests & Eugenics

- In the early 1900s (until the 1960s) low IQ scores were described as Morons (50-79), Imbeciles (20-49) and Idiots (below 20).
- During this time the "science" of eugenics was widely accepted, and the consequences of low IQ scores severe
  - institutionalized
  - forced sterilization of women

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Lewis Terman 1916 Stanford-Binet

- Terman predicted that the Stanford-Binet would reveal "significant racial differences in general intelligence…which cannot be wiped out by any scheme of mental culture" (Brookwood, 2021 p. 68)

➢ His aim was identification of low intelligence children and adults who would be involuntarily institutionalized and sterilized for the improvement of society

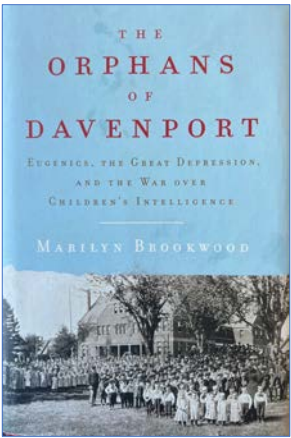Brookwood, M. (2021). The Orphans of Davenport. New York: Norton & Company. See Chapter 4.

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Robert Yerkes – Army Mental Tests 1920

- Robert Yerkes, of Harvard University was president of the *American Psychological Association*
- and leader of the *Eugenics Section of the American Breeders' Association's Committee on the Inheritance of Mental Traits*
- which advocated institutional segregation and sterilization for persons with low intelligence.
- Co-author of the Army Mental Tests
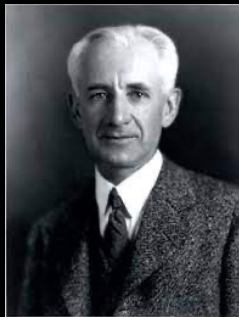
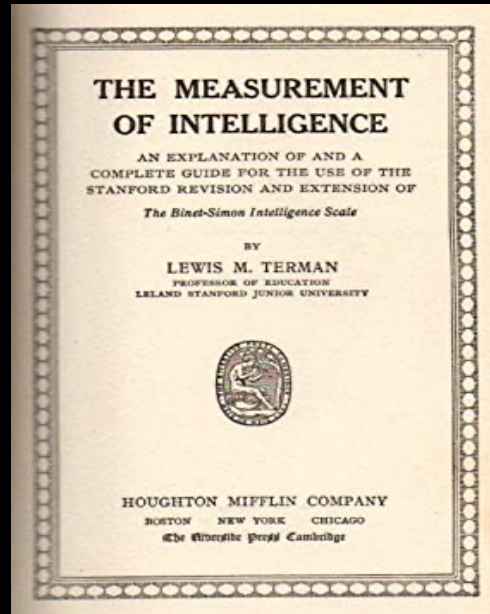Brookwood, M. (2021). The Orphans of Davenport. New York: Norton & Company. See Chapter 4.

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The intelligence test being used at that time was…the Stanford-Binet (Terman, 1916)

THE MEASUREMENT OF INTELLIGENCE

AN EXPLANATION OF AND A COMPLETE GUIDE FOR THE USE OF THE STANFORD REVISION AND EXTENSION OF

The Binet-Simon Intelligence Scale

BY

LEWIS M. TERMAN
PROFESSOR OF EDUCATION
LELAND STANFORD JUNIOR UNIVERSITY

HOUGHTON MIFFLIN COMPANY
BOSTON   NEW YORK   CHICAGO
The Riverside Press Cambridge

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Florence Goodenough 1926

Stanford-Binet "IQ by Racial Stock"

RACIAL DIFFERENCES IN THE INTELLIGENCE OF SCHOOL CHILDREN

BY FLORENCE L. GOODENOUGH

Institute of Child Welfare, University of Minnesota

TABLE II

DISTRIBUTION OF INTELLIGENCE QUOTIENTS BY RACIAL STOCK

IQ	American	Armenian	Italian	Spanish-Mexican	California Negroes	Southern Negroes	Hoopa Valley Indians	Jewish	Chinese	Japanese	Germans	Portuguese	English and Scotch	French and Swiss	Danish, Swedish and Norwegian	Assyrian, Slavonian and Serbian
Total cases	500	123	456	367	69	613	79	55	25	42	29	11	14	14	31	29
Mdn.	100.3	91.8	87.5	87.2	82.7	76.5	85.6	106.3	103.1	99.5	98.8	93.3	99.5	92.8	104.5	94.5
Mean	101.5	92.3	89.1	88.5	85.8	78.7	85.6	106.1	104.1	101.9	101.1	94.5	100.2	94.5	103.5	92.8
S.D.	18.3	15.6	16.0	17.5	18.7	17.5	14.1	16.2	18.0	18.0	19.3	16.5	16.8	19.6	17.8	18.8

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Raymond Cattell - 1933
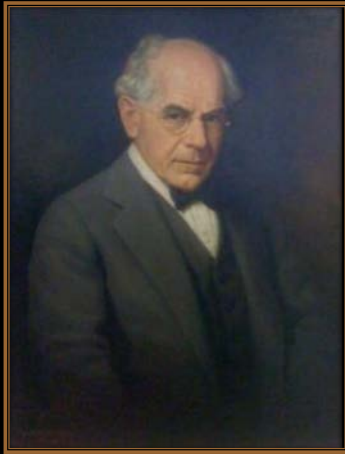
- Cattell spoke out against race mixing, and he lobbied to overturn the 1954 Brown v. Board Education
- Cattell's portrait at corporate headquarters of The Psychological Corporation (now Pearson). He was instrumental in the formation of the company.

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Brookwood, M. (2021). The Orphans of Davenport. New York: Norton & Company. See Chapter 4.

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APA Apology for Promoting Racism

- 'APA recognizes the **roles of psychology in promoting…racism, and the harms that have been inflicted on communities of colo**r … and the ways measurement of intelligence has been systematically used to create the ideology of White supremacy'

- Throughout the 1900s prominent **psychologists involved in IQ test development supported eugenics**

Psychology … **helped to create**, express, and sustain them, **continues to bear their indelible imprint, and often continues to publish research that conforms with White racial hierarchy**

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IQ Tests Defined Intelligence

Edwin Boring: The Stanford-Binet became the **operational definition of intelligence**

Edith Spaulding & William Healy

The claim that we have measured hereditary intelligence has **no scientific foundation**

We cannot measure intelligence *when we have never defined it.*

INHERITANCE AS A FACTOR IN CRIMINALITY.

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Pintner
(Intelligence Testing, 1923)

CONCEPT OF GENERAL INTELLIGENCE 61

The Criteria of a Test of Intelligence. — Influenced both by the theoretical discussion of general intelligence and by the empirical work of testing, we have arrived at certain requirements for a good test of intelligence, which we may discuss under the four following headings:

1. *Tests must be relatively new.* — A good intelligence test must avoid as much as possible anything that is commonly learned by the subjects tested. In a broad sense this rests upon a differentiation between knowledge and intelligence. To use as a test of intelligence something that is commonly taught in school is not desirable, because those children who have reached the particular grade in which this is generally taught have memorized this fact, whereas other children of equal or greater intelligence may have had no opportunity to learn this same fact, simply because they may not have reached this particular grade in their school work. To

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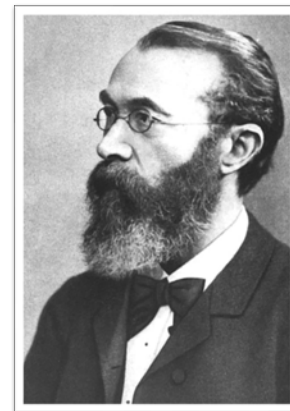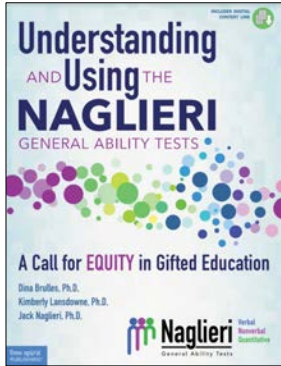
A test of ability should measure how well a student can think to solve problems and should be minimally influenced by what the student knows.

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Including *Knowledge* in "Ability" Tests & Equity

Stanford-Binet-5	WISC-V	WJ-IV	KABC-II	OLSAT	CogAT
• Verbal • Knowledge • Quantitative Reasoning • Vocabulary • Verbal Analogies	• Verbal Comprehension Vocabulary, Similarities, Information & Comprehension • Fluid Reasoning Figure Weights, Arithmetic	• Comprehension Knowledge: Vocabulary & General Information • Fluid Reasoning: Number Series & Concept Formation • Auditory Processing: Phonological Processing	• Knowledge / GC • Riddles, • Expressive Vocabulary, • Verbal Knowledge	• Verbal • Following directions • Verbal Reasoning • Quantitative • Verbal Arithmetic Reasoning	• Verbal Scale • Analogies • Sentence Completion • Verbal Classification • Quantitative • **45 pages of oral instructions**

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Woodcock-Johnson Cognitive & Achievement Tests (CHC)

Very Similar Items on "Different" Tests

Cognitive: Oral Vocabulary #1 subtest has a question like this: Tell me another work for hot. Correct: Warm	Cognitive: Test #17B Reading Vocabulary-Antonyms subtest has a question like this: Tell me the opposite of up Correct: down
Achievement: Reading Vocabulary subtest #17 has a question like this: Tell me another work for Warm. Correct: Hot	Achievement Test #1C Verbal Comprehension-Antonyms has a question like this: Tell me the opposite of down. Correct: up

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National Survey of Gifted Education

EdWeek Research Center
Gifted Education
Results of a National Survey
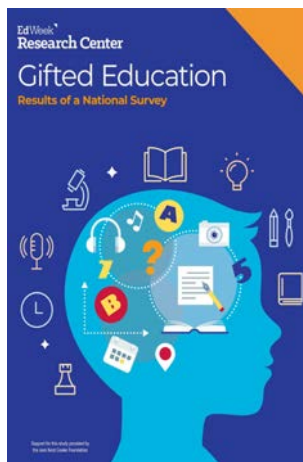
These tests have verbal and quantitative questions and lengthy verbal directions

Which of the following assessments does your district use to identify gifted students? Select all that apply.

CogAT	54%
Wescher Intelligence Scale for Children	40%
Naglieri Nonverbal Ability Test	34%
Woodcock Johnson	26%
ITBS	22%
Otis-Lennon	19%
Screening Assessment for Gifted Elementary Students	17%
Stanford Binet L-M	13%
Test of Nonverbal Intelligence	11%
District-created assessment	10%
ACT	9%
Ravens Progressive Matrix	7%
Test of Mathematical Abilities of Gifted Students	5%
SAT	5%
MAT	2%
SRA	1%
Hemmon-Nelson	<1%
Other	42%

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How Psychometric Bias is Studied (e.g., Jensen's Bias in Mental Tests)

- reliability of internal consistency of items
- reliability of test/retest scores
- rank order of item difficulties
- item intercorrelations
- factor structure of test
- magnitude of the factor loadings & factorial invariance

- slope & intercept of the regression line
- correlation of raw scores with age
- item characteristic curve
- frequencies of choice of error distracters
- interaction of test items by group membership

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Test Bias, Test Equity and Test Content

According to the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014) Psychometric TEST BIAS and TEST EQUITY are two different ways of measuring TEST FAIRNESS.
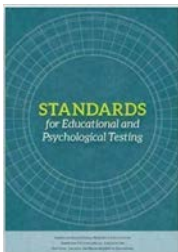
- **… if a person has had limited opportunities to learn the content in a test of intelligence, *that test may be considered unfair* … even if there is no evidence of psychometric test bias.**
- **Evidence of EQUITY is examined by test content and mean score differences.**

STANDARDS for Educational and Psychological Testing

Equity

Bias

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Slide 49

Race and Ethnic Differences for *Traditional* and *Second-Generation* Intelligence Tests

Understanding AND Using THE NAGLIERI GENERAL ABILITY TESTS
A Call for EQUITY in Gifted Education
Dina Brulles, Ph.D.
Kimberly Lansdowne, Ph.D.
Jack Naglieri, Ph.D.

Note: The results summarized here were reported for the Otis-Lennon School Ability Test by Avant and O'Neal (1986); Stanford-Binet IV by Wasserma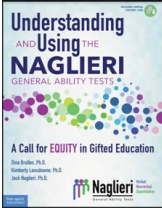n (2000); Woodcock-Johnson III race differences by Edwards and Oakland (2006) and ethnic differences by Sotelo-Dynega, Ortiz, Flanagan, and Chaplin (2013); CogAT7 by Carman, Walther and Bartsch (2018) and Lohman (2016), WISC-V by Kaufman, Raiford, and Coalson (2016); Kaufman Assessment Battery for Children-II by Lichtenberger, Volker, Kaufman & Kaufman, (2006) and Scheiber, C., Kaufman, A.S. Which of the Three KABC-II Global Scores is the Least Biased?. Journal of Pediatric Neuropsychology 1, 21–35 (2015); CAS by Naglieri, Rojahn, Matto, and Aquilino (2005); CAS-2 and CAS2:Brief by Naglieri, Das, and Goldstein (2014a and 2014b), Naglieri Nonverbal Ability Test by Naglieri and Ronning (2000), Naglieri General Ability Tests by Naglieri, Brulles, and Lansdowne (2022 & 2024) and Selvamenan et al., 2024 (in press).
UPDATED 3.6.24

	By Race	By Ethnicity
TRADITIONAL Tests that require knowledge	**9.4**	**6.4**
Otis-Lennon School Ability Test (district wide)	13.6	-
Stanford-Binet IV (normative sample)	12.6	-
CogAT7 Nonverbal	11.8	7.6
WISC-V (normative sample)	11.6	-
WJ- III (normative sample)	10.9	10.7
K-ABC II Fluid-Crystallized Index	9.4	9.8
WISC-V (statistical controls normative sample)	8.7	5.4
K-ABC II Mental Processing Index	8.1	8.2
CogAT-Total (V, Q & NV)	7.0	4.5
CogAT7 - Verbal	6.6	5.3
CogAT- Nonverbal	6.4	2.9
CogAT7-Quantitative	5.6	3.6
SECOND GENERATION Tests that require minimal knowledge	**4.5**	**2.5**
CAS-2 (normative sample)	6.3	4.5
Naglieri General Ability Test-Verbal (Ns= 392 & 709)	6.2	1.0
Naglieri General Ability Test-Quantitative (Ns= 392 & 709)	5.5	4.4
CAS (statistical controls normative sample)	4.8	4.8
Naglieri General Ability Test-Nonverbal (Ns= 392 & 709)	4.4	0.3
CAS-2 (statistical controls normative sample)	4.3	1.8
Naglieri General Ability Test-Quantitative (N = 6,098)	4.3	2.9
NNAT (matched samples)	4.2	2.8
Naglieri General Ability Test-Verbal (N= 5,739)	4.2	1.3
Naglieri General Ability Test-Nonverbal (N=6,887)	3.5	0.9
CAS-2 Brief (normative samples)	2.0	2.8

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Slide 50

Numbers of Gifted Students Missed = 1,266,708

Gifted Enrollment by Race and Ethnicity as of 2020 (updated 2024).

	N in Public Education K-12 in 2020	N Potentially Gifted (8%; 92 percentile)	N Students in gifted programs	Difference Between Potential and Identified
White	23,834,458	1,906,757	1,937,350	30,593
Black	7,754,506	620,360	330,774	-289,586
Hispanic	14,337,467	1,146,997	600,498	-546,499
Native Americans	748,000	59,840	26,700	-33,140
Two or More Races	1,641,817	131,345	105,371	-25,974
Total Non-Whites	**24,481,790**	**1,958,543**	**1,063,343**	**-895,200**

1. Representation Ratio formula: N in Gifted Education / Potential N in Gifted Education.
2. Total Enrollment data from Table 203.60. Enrollment and percentage distribution of enrollment in public elementary and secondary schools, by race/ethnicity and level of education: Fall 1999 through fall 2027. https://nces.ed.gov/programs/digest/d17/tables/dt17_203.60.asp
3. Gifted Enrollment data from Table 204.80. Number of public-school students enrolled in gifted and talented programs, by sex, race/ethnicity, and state: Selected years, 2004 through 2013--14. https://nces.ed.gov/programs/digest/d17/tables/dt17_204.80.asp
4. From: Brulles, D., Lansdowne, K. & Naglieri, J. A. (2022). *Understanding and Using the Naglieri General Ability Tests: A Call to Equity in Gifted Education.* Minneapolis, MN: Free Spirit Publishing.
5. Native American data from: Steven C. Haas, Associate Director, Indigenous Students Leap Ahead (ISLA) Project.

Percent of Schools that do not Identify	41.5%
Additional non-white gifted students = 41.5% of 895,200	N = 371,508
Total non-white gifted students missed	**N = 1,266,708**

Understanding AND Using THE NAGLIERI GENERAL ABILITY TESTS
A Call for EQUITY in Gifted Education

Gifted Education in the United States:
SYSTEM FAILURE
ACCESS DENIED
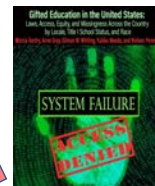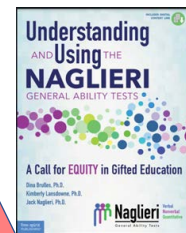
895,200

371,508

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1,266,708 Students Missed Would Connect Denver to San Francisco !

1,100 miles

San Francisco

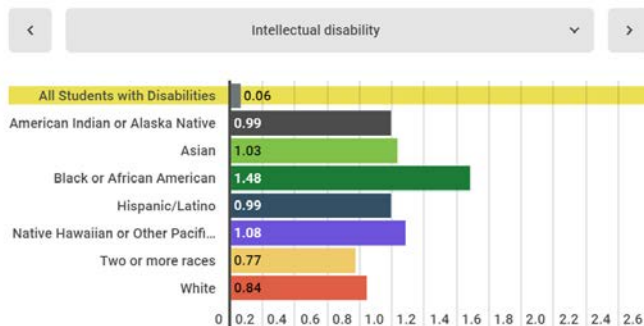Denver

Each Image = 20,000

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OSEP Office of Special Education Programs
Office of Special Education and Rehabilitative Services

OSEP Fast Facts: Race and Ethnicity of Children with Disabilities Served under IDEA Part B

For the purposes of this fact sheet, racial ethnic groups are defined in the IDEA Part B Child Count and Educational Environments for School Year 2019-2020, OSEP Data Documentation. https://www2.ed.gov/programs/osepidea/618-data/collection-documentation/data-documentation-files/part-b/child-count-and-educational-environment/idea-partb-childcountandedenvironment-2019-20.pdf

Risk Ratio of Students with Disabilities by Disability Category and by Specific Race and Ethnicity, Ages 5 (in kindergarten) through 21: SY 2019-20

Intellectual disability

All Students with Disabilities	0.06
American Indian or Alaska Native	0.99
Asian	1.03
Black or African American	1.48
Hispanic/Latino	0.99
Native Hawaiian or Other Pacifi...	1.08
Two or more races	0.77
White	0.84

0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6

The relative risk ratio of students with disabilities under IDEA by race and Ethnicity is the probability of a student with a disability being identified for intellectual disability. The higher the number, the larger the probability. Nationally, **Black Students are 1.48 times more likely to be identified with intellectual disability** compared to all students with disabilities.

https://sites.ed.gov/idea/osep-fast-facts-race-and-ethnicity-of-children-with-disabilities-served-under-idea-part-b/
https://ldaamerica.org/lda_today/disproportionate-identification-of-students-of-color-in-special-education/

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4/25/24

Academic Learning Loss & COVID

- COVID-19 has increased the impact of disparities in access and opportunity for students of color and they are even further behind than they were before.
- Their **scores on traditional intelligence tests** which demand knowledge **are even more inaccurate.**
- **Solutions**:
  - For traditional tests, use post-COVID norms only.
  - Use intelligence tests that are not dependent upon knowledge
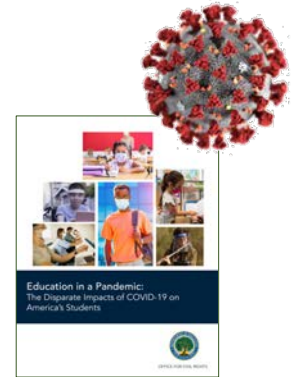
Education in a Pandemic: The Disparate Impacts of COVID-19 on America's Students. US Dept. of Ed- Office of Civil Rights. June, 21, 2021. https://www2.ed.gov/about/offices/list/ocr/docs/20210608-impacts-of-covid19.p

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The test you choose determines the results you receive, the decisions you make, and the future of your students

That is the *Practical Impact* of test selection

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We do the best we can with what we know, and when we know better, we do better.

— *Maya Angelou* —

@InspiringThi...

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What information do we need?

Research on test bias and test equity to determine test fairness

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Core Group Discussion

- **What were the MOST important ideas discussed so far**
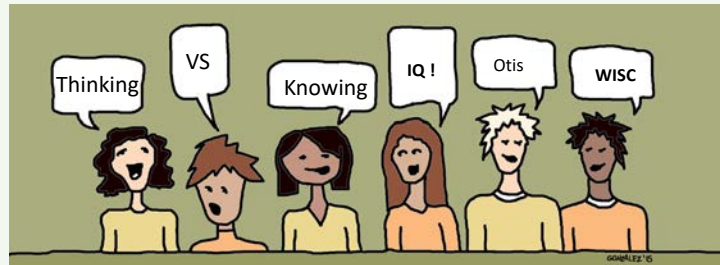
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What is the Practical Impact?

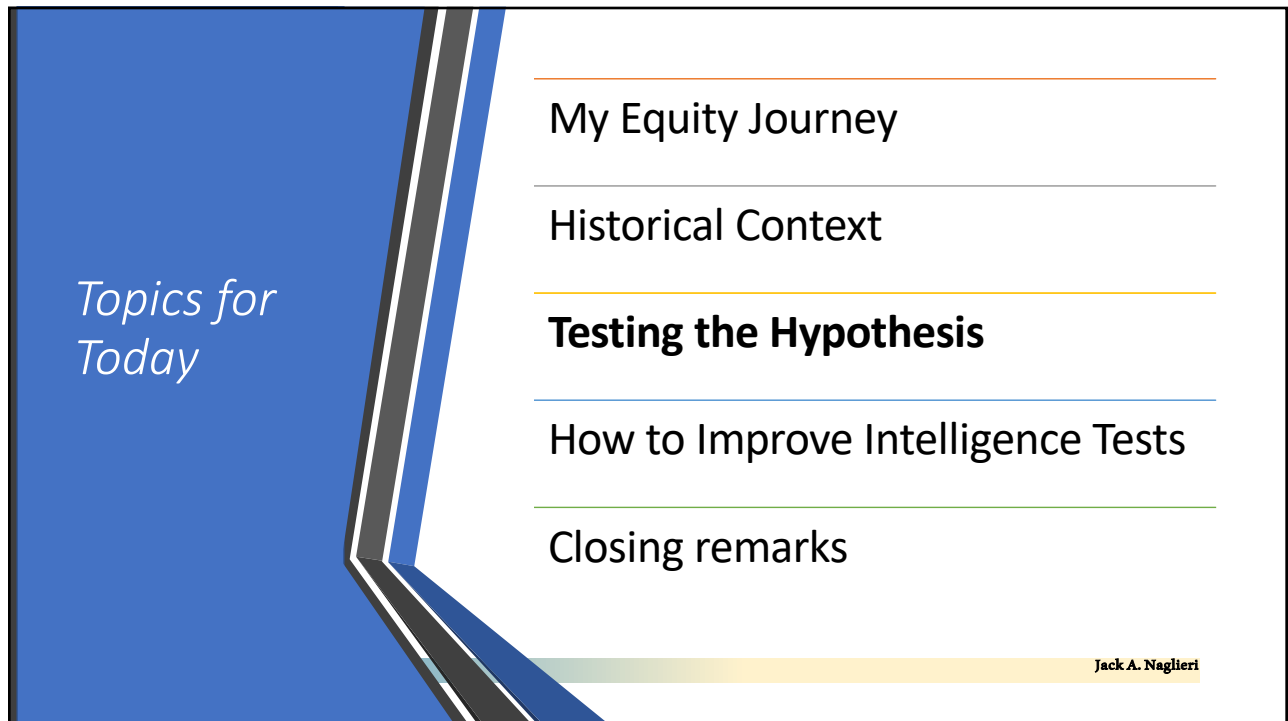**Psychologists attributed IQ test differences to the people instead of the tests**

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We do the best we can with what we know, and when we know better, we do better.

— *Maya Angelou* —

Change Demands Courage to Think Differently

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Topics for Today

My Equity Journey

Historical Context

Testing the Hypothesis

How to Improve Intelligence Tests

Closing remarks

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Slide 61
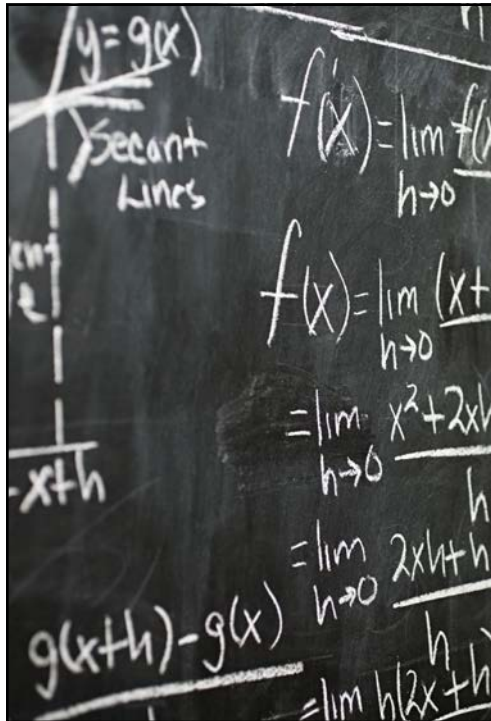
How Can we Test the Hypothesis that Knowledge Confounds the Measurement of General Intelligence?

Create Verbal, Nonverbal and Quantitative tests that measure general intelligence that do not rely on knowledge and DO THE EQUITY RESEARCH!

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Slide 62

PsycARTICLES: Journal Article

Structural validity of the Wechsler Intelligence Scale for Children–Fifth Edition: Confirmatory factor analyses with the 16 primary and secondary subtests.

© Request Permissions

Canivez, Gary L.,Watkins, Marley W.,Dombrowski, Stefan C.
Canivez, G. L., Watkins, M. W., & Dombrowski, S. C. (2017). Structural validity of the Wechsler Intelligence Scale for Children–Fifth Edition: Confirmatory factor analyses with the 16 primary and secondary subtests. *Psychological Assessment*, 29(4), 458–472.
https://doi.org/10.1037/pas0000358

Support for 'g'

Revisiting Carroll's Survey of Factor-Analytic Studies: Implications for the Clinical Assessment of Intelligence

Nicholas F. Benson and A. Alexander Beaujean
Baylor University

Ryan J. McGill
College of William & Mary

Stefan C. Dombrowski
Rider University
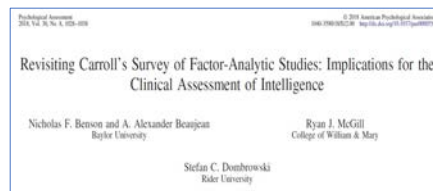
- …The small portions of variance uniquely captured by [subtests]… render the group factors [scales]of questionable interpretive value independent of g (FSIQ general intelligence)
- Present CFA results confirm the EFA results (Canivez, Watkins, & Dombrowski, 2015); Dombrowski, Canivez, Watkins, & Beaujean (2015); and Canivez, Dombrowski, & Watkins (2015).

➢ **The results of this study indicate that most cognitive abilities specified in** John Carroll's **three-stratum theory have little-to-no interpretive relevance above and beyond that of general intelligence**.

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Research Supports 'g' but little More

Benson, N. F., Beaujean, A. A., McGill, R. J, & Dombrowski, S. C. (2018). Revisiting **Carroll's Survey of Factor-Analytic Studies**: Implications for the Clinical Assessment of Intelligence. *Psychological Assessment,* 30, 8, 1028–1038.

Canivez, G. L., Watkins, M. W., & Dombrowski, S. C. (2017). Structural validity of the **Wechsler Intelligence Scale for Children–Fifth Edition:** Confirmatory factor analyses with the 16 primary and secondary subtests. *Psychological Assessment, 29,* 458-472.

Canivez, G. L., & McGill, R. J. (2016). Factor structure of the **Differential Ability Scales–Second Edition**: Exploratory and hierarchical factor analyses with the core subtests. *Psychological Assessment, 28,* 1475-1488. http://dx.doi.org/10.1037/pas0000279

Canivez, G. L., & McGill, R. J. (2016). Factor structure of the **Differential Ability Scales-Second Edition**: Exploratory and hierarchical factor analyses with the core subtests. Psychological Assessment, 28, 1475–1488. https://doi.org/10.1037/pas0000279

Canivez, G. L. (2008). Orthogonal higher order factor structure of the **Stanford-Binet Intelligence Scales-Fifth Edition** for children and adolescents. School Psychology Quarterly, 23, 533–541.

Dombrowski, S. C., **Canivez, G. L.,** & Watkins, M. W. (2017, May). Factor structure of the 10 **WISC–V** primary subtests across four standardization age groups. *Contemporary School Psychology.* Advance online publication.

Dombrowski, S. C., McGill, R. J., & Canivez, G. L. (2017). Exploratory and hierarchical factor analysis of the **WJ IV Cognitive** at school age. *Psychological Assessment, 29,* 394-407.

McGill, R. J., & **Canivez, G. L.** (2017, October). Confirmatory factor analyses of the **WISC–IV Spanish** core and supplemental Subtests: Validation evidence of the Wechsler and CHC models. *International Journal of School and Educational Psychology.* Advance online publication.

Watkins, M. W., Dombrowski, S. C., & **Canivez, G. L.** (2017, October). Reliability and factorial validity of the **Canadian Wechsler Intelligence Scale for Children–Fifth Edition**. *International Journal of School and Educational Psychology.*
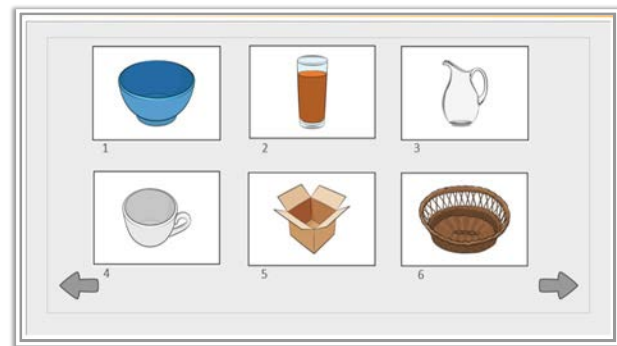
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The **Naglieri-V measures general ability** using pictures of objects representing verbal concepts. The items are comprised of universally recognized pictures that do not rely on knowledge acquired in academic settings.

The student's task is to identify which of the six pictures does *not* represent the verbal concept shared by the other five.
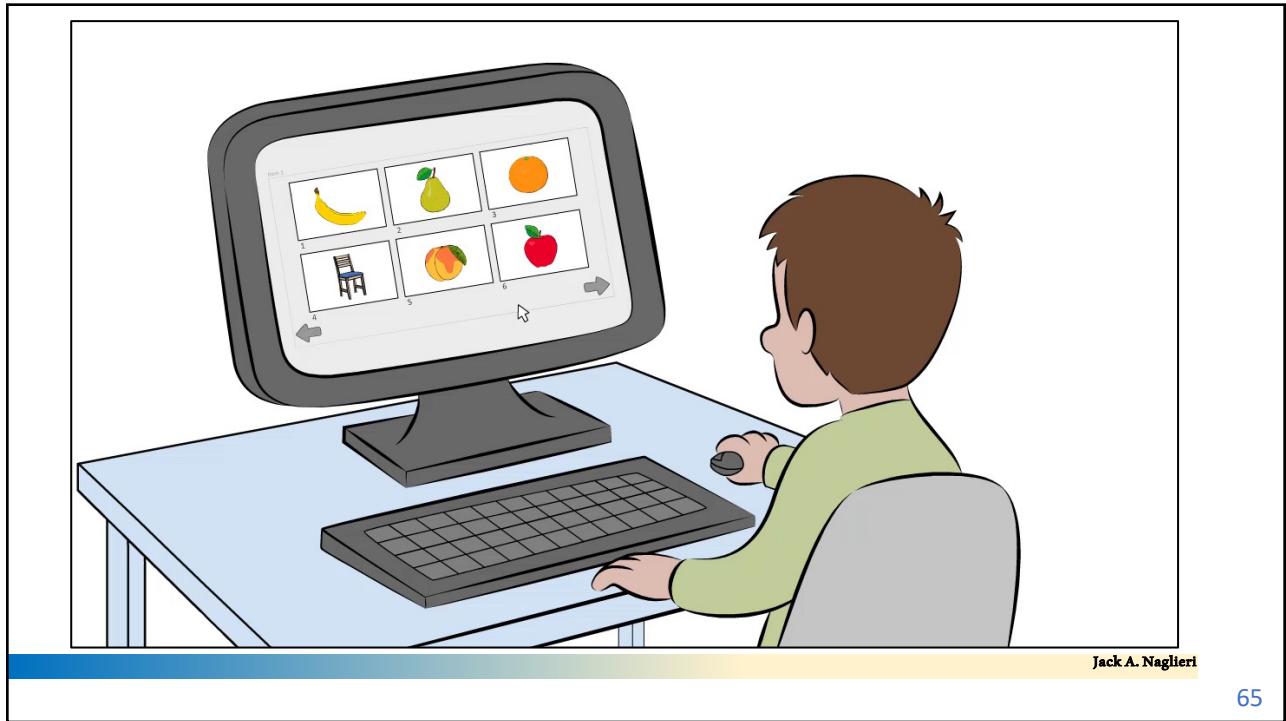
The test items require close examination of *the relationships among the pictures*.

Naglieri General Ability Test – Verbal (Naglieri & Brulles)

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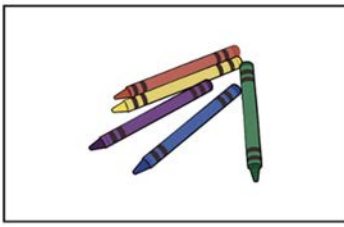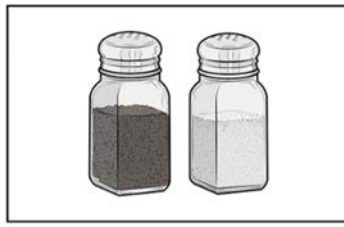
32

Verbal   1ˢᵗ Gr. Easy

1

2

3

4

5

6
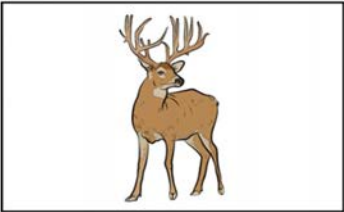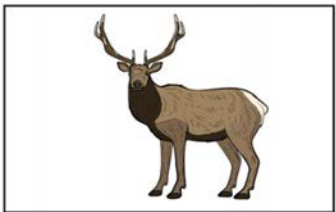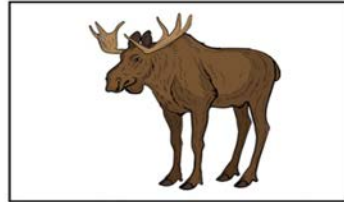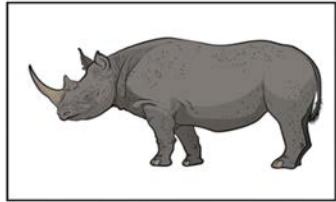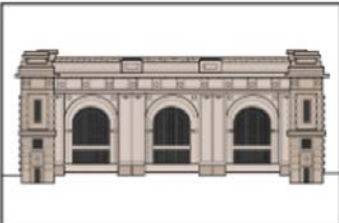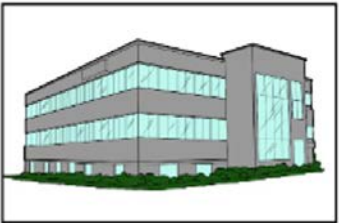
6th Gr. Hard

69

The **Naglieri-NV measures general ability** using questions that require a student to recognize the relationships among the shapes.

The structure of the items varies, but all items require that the student decipher the logic behind *the relationships among the shapes*, sequences, spatial orientations, patterns, and other distinguishing characteristics.

This nonverbal test is conceptually similar to the NNAT3 but it contains many NEW kinds of items not included before.

Naglieri General Ability Test –Nonverbal (Naglieri)

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1st Gr.   Easy

72

1ˢᵗ Gr.   Hard

73

6ᵗʰ Gr.   Hard

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The **Naglieri-Q measures general ability** using numbers and/or symbols. Students must decipher the logic behind the relationships among the numbers and symbols to identify the answer.

Items require the student to determine equivalency of simple quantities, analyze a matrix of numbers and solve mathematical sequences.

Items require minimal academic knowledge, and the calculation requirements are simple.

The items have no verbal requirements (i.e., no math word problems) so that they can be solved regardless of the language used by the student.
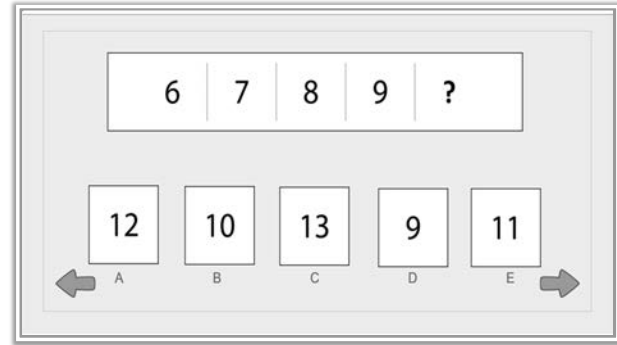
Naglieri General Ability Test – Quantitative (Naglieri & Lansdowne)

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Naglieri General Ability Tests-Grade 1-Easy

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Naglieri General Ability Tests-Grade 6-Easy

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Naglieri General Ability Tests-Grade 1-Hard
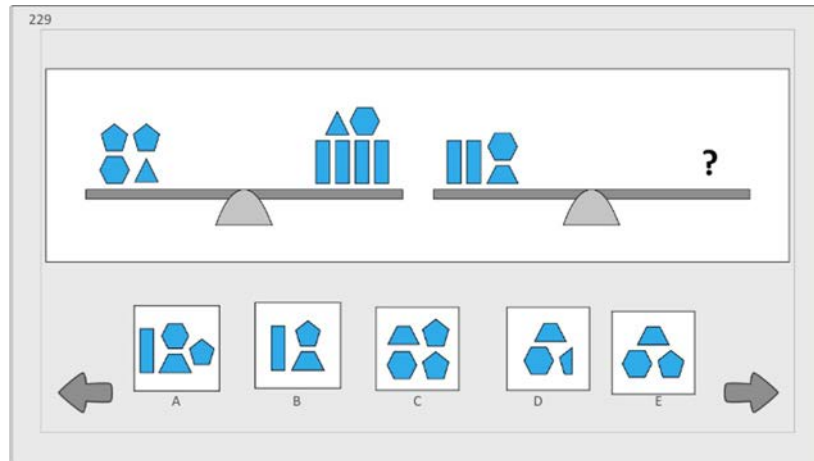
79

Naglieri General Ability Test – Quantitative (Naglieri & Lansdowne)

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Core Group Discussion

- **What reactions do you have about this new way to identify gifted students?**

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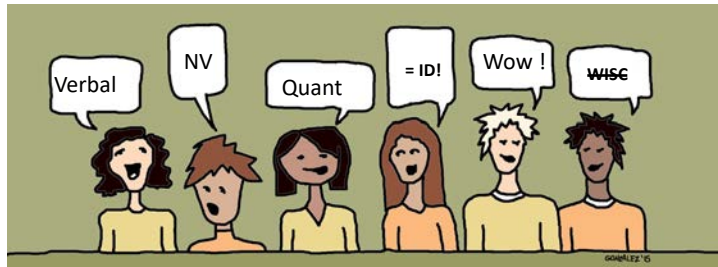
Research Evidence of Equity

Selvamenan, M., Paolozza, A., Solomon, J., Naglieri, J. A., & Schmidt, M. T. (submitted for publication, Nov. 2020). Race, Ethnic, Gender, and Parental Education Level Differences on Verbal, Nonverbal, and Quantitative Naglieri General Ability Tests: Achieving Equity.

NONVERBAL TEST	VERBAL TEST	QUANTITATIVE TEST
• N= 3,630 Sample closely matches the US population on key demographics	• N= 2,482 Sample closely matches the US population on key demographics	• N= 2,841 Sample closely matches the US population on key demographics
• **No GENDER differences** found between **males** and **females** for raw score across all forms	• **No GENDER differences** found between **males** and **females** for raw score across all forms	• **No GENDER differences** found between **males** and **females** for raw score across all forms
• **No RACE/ETHNICITY differences** among **White, Black, & Hispanic** for raw score across all forms	• **No RACE/ETHNICITY differences** among **White, Black, & Hispanic** for raw score across all forms	• **No RACE/ETHNICITY differences** among **White, Black, & Hispanic** for raw score across all forms
• **No PARENTIAL EDUCATIONAL differences** among five education levels (No high school diploma; High School graduate; Some college/Associate's degree; Bachelor's degree; Graduate/professional degree) for raw score across all forms	• **No PARENTIAL EDUCATIONAL differences** among five education levels (No high school diploma; High School graduate; Some college/Associate's degree; Bachelor's degree; Graduate/professional degree) for raw score across all forms	• **No PARENTIAL EDUCATIONAL differences** among five education levels (No high school diploma; High School graduate; Some college/Associate's degree; Bachelor's degree; Graduate/professional degree) for raw score across all forms

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Summary of Reliability, Validity and Fairness

- The Naglieri–V items were subjected to a cultural review
- **Reliability coefficients** for the Verbal, Nonverbal and Quantitative tests were **high and exceed guidelines** for test reliability
- Confirmatory factor analysis of the three tests, independently and in combination supported a broad factor **of general ability**
- The Naglieri–NV correlated significantly **with the NNAT3**
- **Gifted students scored considerably higher** than students from the general population
- All test ITEMS were inspected for fairness by gender, race, ethnicity, parental education level (PEL), and primary language spoken using differential item functioning (DIF) and analyses of covariance; **negligible to small differences were found**
- Overall, initial findings suggest that the Naglieri General Ability Tests meet guidelines for reliability, validity, and fairness

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Comparison of English and Non-English Groups

- Total sample size = 322
- A matched sample was randomly drawn, pairing an English-speaking student with a Non-English-speaking student on the basis of gender, race, ethnicity, region, and age

Table 6.30. Demographic Characteristics of Matched English and Non-English Sample: Naglieri General Ability Tests

Demographic		English		Non-English		Total	
		N	%	N	%	N	%
Grade	Kindergarten	1	0.6	3	1.9	4	1.2
	Grade 1	25	15.5	7	4.3	32	9.9
	Grade 2	36	22.4	68	42.2	104	32.3
	Grade 3–4	55	34.2	41	25.5	96	29.8
	Grade 5–6	23	14.3	21	13.0	44	13.7
	Grade 7–9	21	13.0	21	13.0	42	13.0
Gender	Female	86	53.4	86	53.4	172	53.4
	Male	75	46.6	75	46.6	150	46.6
	Other	0	0.0	0	0.0	0	0.0
Racial/Ethnic Group	Asian	9	5.6	9	5.6	18	5.6
	Black	10	6.2	10	6.2	20	6.2
	Hispanic	85	52.8	85	52.8	170	52.8
	White	55	34.2	55	34.2	110	34.2
	Other	2	1.2	2	1.2	4	1.2
U.S. Region	Midwest	0	0.0	0	0.0	0	0.0
	South	149	92.5	149	92.5	298	92.5
	West	12	7.5	12	7.5	24	7.5
Age in years M (SD)		9.1 (2.2)		9.1 (2.2)		9.1 (2.2)	
Total		161	100.0	161	100.0	322	100.0

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Group Differences by Primary Language Spoken

Trivial Standard Score Differences
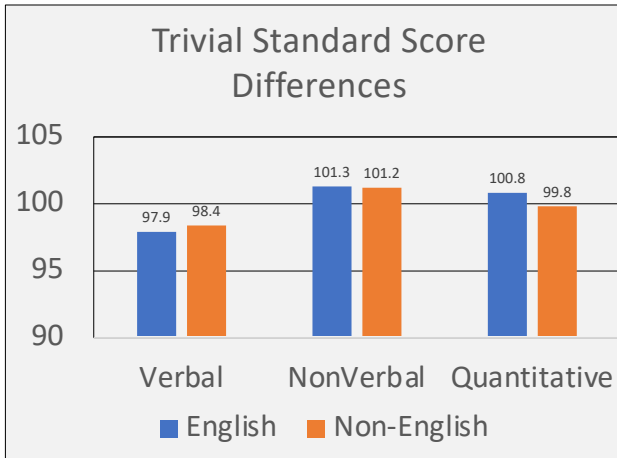
Table 6.31.	Group Differences by Primary Language Spoken: Naglieri General Ability Tests					
Test	Language Spoken	Descriptives		Differences		
		M	SD	Cohen's d	95% CI	t
Naglieri-V	English	97.9	14.5	-0.04	-0.07, 0.13	-0.32
	Non-English	98.4	14.8			
Naglieri-NV	English	101.3	14.1	0.00	-0.17, 0.02	0.04
	Non-English	101.2	13.5			
Naglieri-Q	English	100.8	14.1	0.07	-0.07, 0.13	0.65
	Non-English	99.8	12.9			

Note. N = 161 for each English and Non-English group. t statistic produced from a Welch Two Sample test. Cohen's |d|: small effect size = 0.20 to 0.49; medium effect size = 0.50 to 0.79; large effect size ≥ 0.80. Positive d values indicate higher scores for English Primary students. Naglieri-V = Naglieri General Ability Tests-Verbal; Naglieri-NV = Naglieri General Ability Tests-Nonverbal; Naglieri-Q = Naglieri General Ability Tests-Quantitative.

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Female (N = 3,000) Male (N = 2,999) Differences
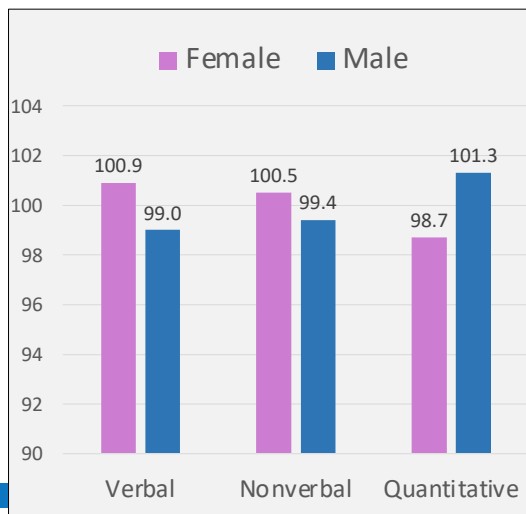
Table 7.9. Group Differences by Gender: Naglieri General Ability Tests				
Test		Gender		Cohen's d
		Female	Male	
Naglieri–V	M	100.9	99.0	0.13
	SD	14.7	15.2	
Naglieri–NV	M	100.5	99.4	0.08
	SD	14.7	15.3	
Naglieri–Q	M	98.7	101.3	-0.17
	SD	14.4	15.4	
Total Score	M	100.1	99.9	0.01
	SD	14.7	15.3	

Note. Female N = 3,000 and Male N = 2,999. Guidelines for interpreting Cohen's |d|: small effect size = 0.20 to 0.49; medium effect size = 0.50 to 0.79; large effect size >= 0.80. Positive Cohen's d values imply higher scores for females. Naglieri–V = Naglieri General Ability Tests–Verbal; Naglieri–NV = Naglieri General Ability Tests–Nonverbal; Naglieri–Q = Naglieri General Ability Tests–Quantitative. Naglieri–V = Naglieri General Ability Tests–Verbal; Naglieri–NV = Naglieri General Ability Tests–Nonverbal; Naglieri–Q = Naglieri General Ability Tests–Quantitative; Total Score = Naglieri General Ability Tests–Total Standard Score.

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POST COVID National Norms

Grade-based National Norms 1,000 students pre grade (K to grade 5).

Table 1. National Norm Sample Characteristics.

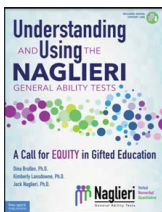| Demographic		N	%	U.S. Census (%)	Difference (%)
Race/Ethnicity	Asian	235	3.9	4.7	-0.8
	Black	919	15.3	12.9	2.4
	Hispanic	1,261	21.0	23.3	-2.3
	White	2,914	48.6	46.1	2.5
	Other	671	11.2	12.9	-1.7
U.S. Region	Northeast	804	13.4	15.9	-2.5
	Midwest	1,270	21.2	20.2	1.0
	South	2,328	38.8	38.1	0.7
	West	1,598	26.6	25.7	0.9
Total National Norm Sample		6,000	100.0		

Note. U.S. population derived from the 2019 American Community Survey.[4]

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Race and Ethnic Differences for *Traditional* and *Second-Generation* Intelligence Tests

Note: The results summarized here were reported for the Otis-Lennon School Ability Test by Avant and O'Neal (1986); Stanford-Binet IV by Wasserman (2000); Woodcock-Johnson III race differences by Edwards and Oakland (2006) and ethnic differences by Sotelo-Dynega, Ortiz, Flanagan, and Chaplin (2013); CogAT7 by Carman, Walther and Bartsch (2018) and Lohman (2016), WISC-V by Kaufman, Raiford, and Coalson (2016); Kaufman Assessment Battery for Children-II by Lichtenberger, Volker, Kaufman & Kaufman, (2006) and Scheiber, C., Kaufman, A.S. Which of the Three KABC-II Global Scores is the Least Biased?. Journal of Pediatric Neuropsychology 1, 21–35 (2015); CAS by Naglieri, Rojahn, Matto, and Aquilino (2005); CAS-2 and CAS2:Brief by Naglieri, Das, and Goldstein (2014a and 2014b), Naglieri Nonverbal Ability Test by Naglieri and Ronning (2000), Naglieri General Ability Tests by Naglieri, Brulles, and Lansdowne (2022 & 2024) and Selvamenan et al., 2024 (in press). UPDATED 3.6.24

	By Race	By Ethnicity
TRADITIONAL Tests that require knowledge	**9.4**	**6.4**
Otis-Lennon School Ability Test (district wide)	13.6	-
Stanford-Binet IV (normative sample)	12.6	-
CogAT7 Nonverbal	11.8	7.6
WISC-V (normative sample)	11.6	-
WJ- III (normative sample)	10.9	10.7
K-ABC II Fluid-Crystallized Index	9.4	9.8
WISC-V (statistical controls normative sample)	8.7	5.4
K-ABC II Mental Processing Index	8.1	8.2
CogAT-Total (V, Q & NV)	7.0	4.5
CogAT7 - Verbal	6.6	5.3
CogAT- Nonverbal	6.4	2.9
CogAT7-Quantitative	5.6	3.6
SECOND GENERATION Tests that require minimal knowledge	**4.5**	**2.5**
CAS-2 (normative sample)	6.3	4.5
Naglieri General Ability Test-Verbal (Ns= 392 & 709)	6.2	1.0
Naglieri General Ability Test-Quantitative (Ns= 392 & 709)	5.5	4.4
CAS (statistical controls normative sample)	4.8	4.8
Naglieri General Ability Test-Nonverbal (Ns= 392 & 709)	4.4	0.3
CAS-2 (statistical controls normative sample)	4.3	1.8
Naglieri General Ability Test-Quantitative (N = 6,098)	4.3	2.9
NNAT (matched samples)	4.2	2.8
Naglieri General Ability Test-Verbal (N= 5,739)	4.2	1.3
Naglieri General Ability Test-Nonverbal (N=6,887)	3.5	0.9
CAS-2 Brief (normative samples)	2.0	2.8

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How do *different* tests use the *same* ability?

- Even though the tests have different content (shapes, words, numbers) they all rely on **general ability ('g')**

- They all require understanding relationships among things or ideas *Jack A. Naglieri*

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Interpretive Considerations for 3 Test Scores

- The suite of Naglieri General Ability tests includes **three separate tests designed to measure "general ability**, or g"

- The three tests use questions that have different content- Verbal, Nonverbal and Quantitative and different authors.

- This provides MULTIPLE measures of general ability, 3 Total Scores and a Composite score (V, NV and Q).

- We examined how many students in the normative sample would be identified if various combinations of the three tests were given.
  - For example: "How many students had a standard score of 120 (91st percentile) on one, two or all three of these tests."

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Number of Girls and Boys at 90th Percentile

Percentage of Students with a Score of 119 and Above on Each Test and a Composite of the Three Tests
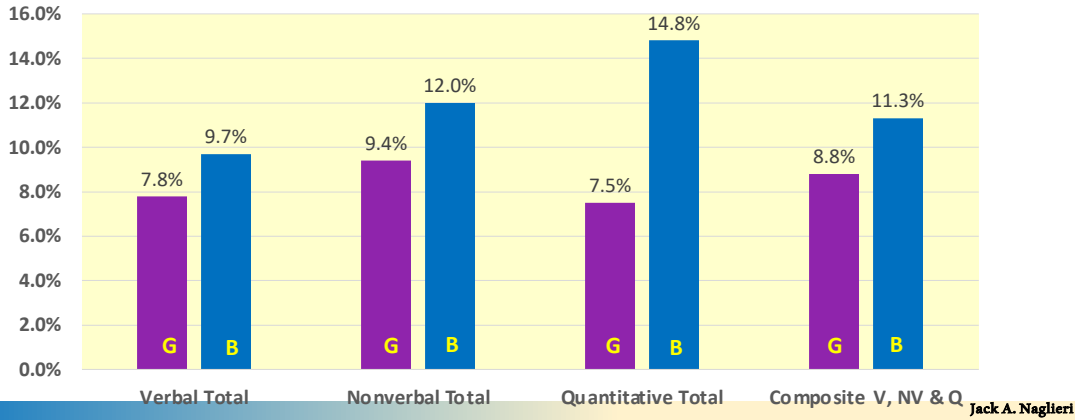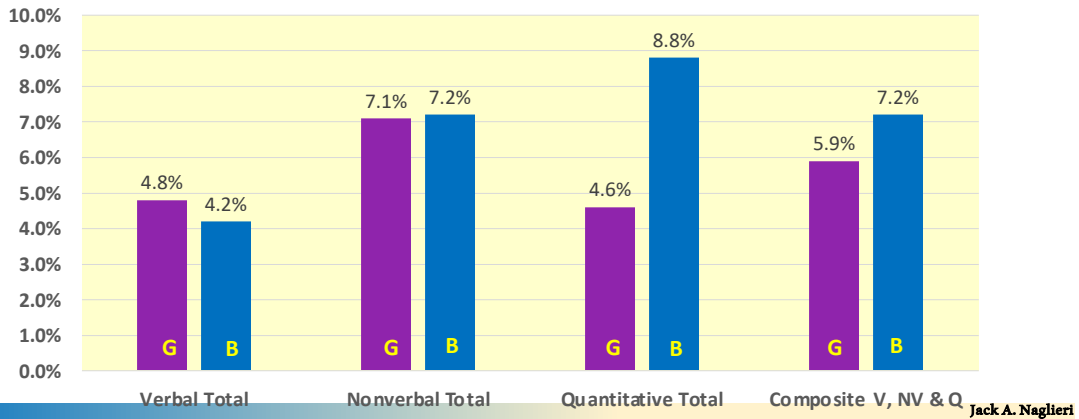

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Number of Girls and Boys at 95th Percentile

Percentage of Students with a Score of 120 and Above on Each Test and a Composite of the Three Tests BY SEX

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Summary: Equitable Assessment of Intelligence

- **Equitable evaluation of intelligence** demands test questions that can be solved regardless of the amount of academic knowledge and facility with language a student has
- We have shown that
  - General ability (*g*) **can be measured equitably** across Verbal, Quantitative and Nonverbal content if the tests do not require academic knowledge
- Verbal, Quantitative and Nonverbal are **a description of the content of the tests'** questions **NOT** different types of intelligence
- Equitable tests measure THINKING in a manner that is minimally influenced by KNOWING

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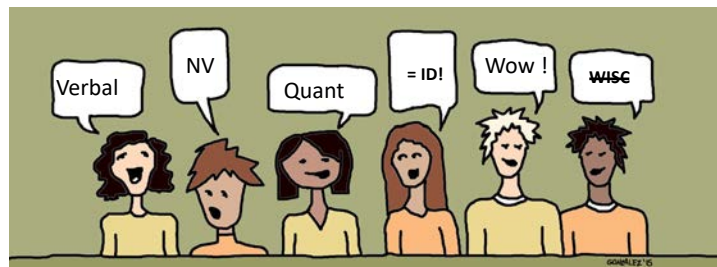
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Core Group Discussion

- **Which sources of evidence was most important to you?**

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Time for Thoughts, Questions and Answers

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General Ability tests can be used for large scale group testing

BUT – A test of GENERAL ABILITY IS **NOT** SUFFICIENT FOR understanding Learning Disabilities, ADHD, ASD, Etc.

What is the solution?

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Topics for Today

My Equity Journey

Historical Context

The American Psychological Association Apology

How to Improve Intelligence Tests

Closing remarks

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Five Key Attributes of a Second-Generation Intelligence Test

1. **Start** with a **THEORY** of intelligence based on the **BRAIN**

2. Ensure that the test questions measure THINKING

3. Ensure that KNOWING is minimized

4. Test the TEST – Do not advocate in advance of the science

5. Provide research to demonstrate that the test is equitable, interpretable beyond the total score, yields profiles for strengths and weaknesses, and leads to intervention

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PASS Neurocognitive Theory
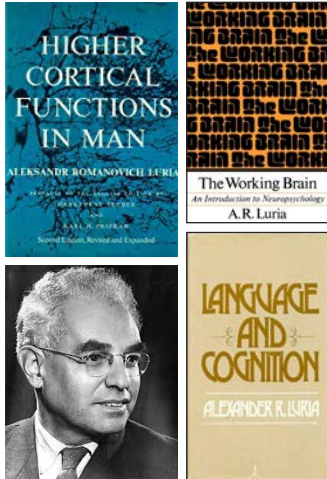
- **P**lanning = THINKING ABOUT HOW YOU DO WHAT YOU DECIDE TO DO
- **A**ttention = FOCUSED THINKING AND RESISTING DISTRACTIONS
- **S**imultaneous = THINKING ABOUT HOW THINGS GO TOGETHER (BIG PICTURE)
- **S**uccessive = THINKING ABOUT THE SEQUENCE
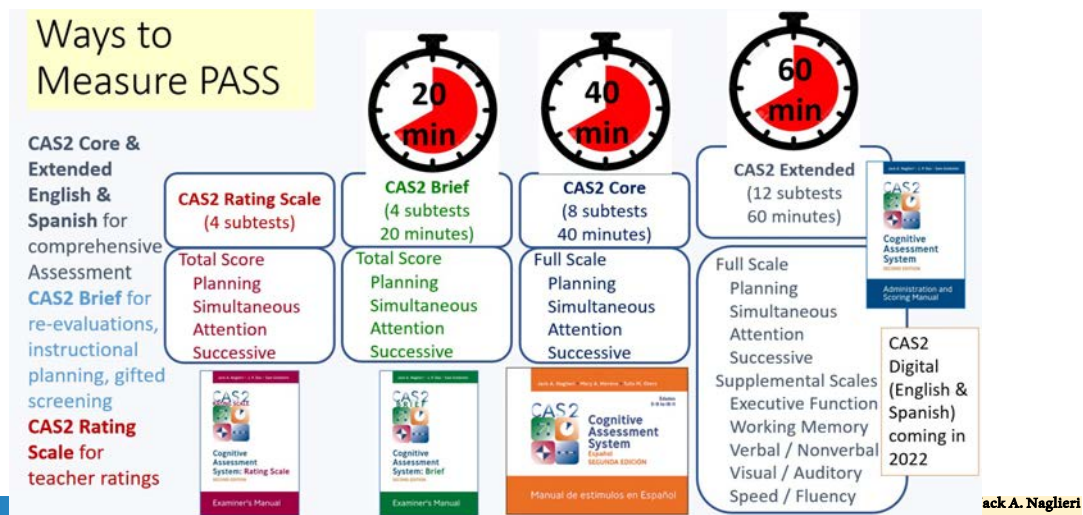
PASS = 'basic psychological processes'

NOTE: Easy to understand concepts!

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PASS Comprehensive System
(Naglieri, Das, & Goldstein, 2014)

Ways to Measure PASS

CAS2 Core & Extended English & Spanish for comprehensive Assessment
CAS2 Brief for re-evaluations, instructional planning, gifted screening
CAS2 Rating Scale for teacher ratings

CAS2 Rating Scale (4 subtests)
Total Score
Planning
Simultaneous
Attention
Successive

CAS2 Brief (4 subtests 20 minutes)
Total Score
Planning
Simultaneous
Attention
Successive

CAS2 Core (8 subtests 40 minutes)
Full Scale
Planning
Simultaneous
Attention
Successive

CAS2 Extended (12 subtests 60 minutes)
Full Scale
Planning
Simultaneous
Attention
Successive
Supplemental Scales
Executive Function
Working Memory
Verbal / Nonverbal
Visual / Auditory
Speed / Fluency

CAS2 Digital (English & Spanish) coming in 2022

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Support for INTERPRETATION OF THE FOUR PASS Scales

Hierarchical Factor Structure of the Cognitive Assessment System: Variance Partitions From the Schmid–Leiman (1957) Procedure

Gary L. Canivez
Eastern Illinois University

Orthogonal higher-order factor structure of the Cognitive Assessment System (CAS; Naglieri & Das, 1997a) for the 5–7 and 8–17 age groups in the CAS standardization sample is reported. Following the same procedure as recent studies of other prominent intelligence tests (Dombrowski, Watkins, & Brogan, 2009; Canivez, 2008; Canivez & Watkins, 2010a, 2010b; Nelson & Canivez, 2011; Nelson, Canivez, Lindstrom, & Hatt, 2007; Watkins, 2006; Watkins, Wilson, Kotz, Carbone, & Babula, 2006), three- and four-factor CAS exploratory factor extractions were analyzed with the Schmid and Leiman (1957) procedure using MacOrtho (Watkins, 2004) to assess the hierarchical factor structure by sequentially partitioning variance to the second- and first- order dimensions as recommended by Carroll (1993, 1995). Results showed that greater portions of total and common variance were accounted for by the second-order, global factor, but compared to other tests of intelligence CAS subtests measured less second-order variance and greater first-order Planning, Attention, Simultaneous, and Successive (PASS) factor variance.

Keywords: CAS, construct validity, hierarchical exploratory factor analysis, Schmid–Leiman higher-order analysis, structural validity
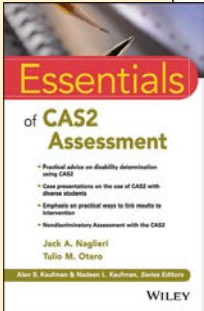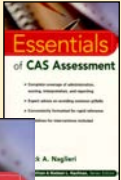
- "…compared to the WISC–IV, WAIS–IV, SB–5, RIAS, WASI, and WRIT, the CAS subtests had less variance apportioned to the higher-order general factor (g) and *greater proportions of variance apportioned to first-order (PASS…) factors*.
- This is consistent with the subtest selection and construction in an attempt to measure PASS dimensions linked to PASS theory … and neuropsychological theory (Luria)." (p. 311)
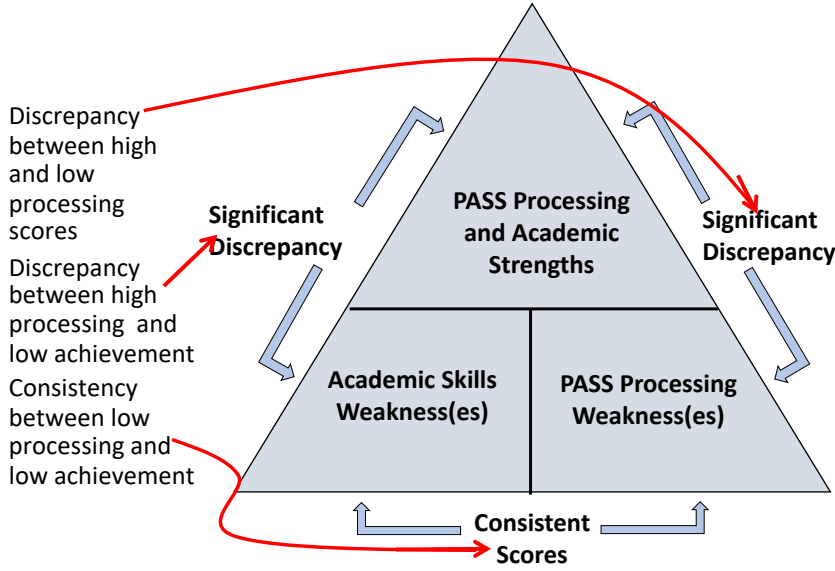
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- The Discrepancy Consistency Method (DCM) was first introduced in 1999 (most recently in 2017)

Essentials of CAS Assessment

Essentials of CAS2 Assessment
Jack A. Naglieri
Tulio M. Otero
Alan S. Kaufman & Nadeen L. Kaufman, Series Editors
WILEY

Discrepancy between high and low processing scores

Discrepancy between high processing and low achievement

Consistency between low processing and low achievement
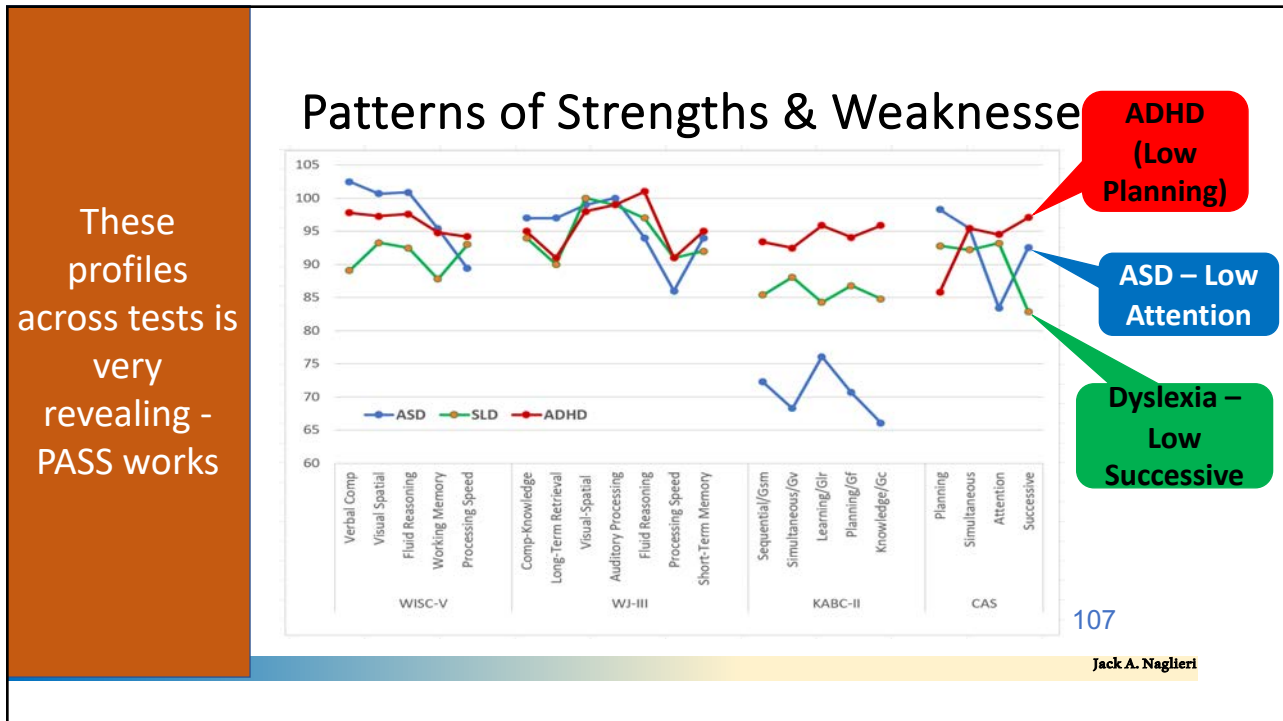
Significant Discrepancy

Significant Discrepancy

PASS Processing and Academic Strengths

Academic Skills Weakness(es)

PASS Processing Weakness(es)

Consistent Scores

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Patterns of Strengths & Weaknesses

These profiles across tests is very revealing - PASS works

ADHD (Low Planning)

ASD – Low Attention

Dyslexia – Low Successive

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Georgiou, G., Guo, K., Naveenkumar, N., Vieira, A. P. A., & Das, J. P. (2019) PASS theory of intelligence and academic achievement: A meta-analytic review. *In press Intelligence.*

PASS Research

- "The **CAS is highly correlated** with reading and math.

- "**The correlations are significantly stronger … than the correlations reported in previous meta-analysis for other measures of intelligence** (e.g., Peng et al., 2019; Roth et al., 2015)…(e.g., WISC) that include tasks (e.g., Arithmetic, Vocabulary)…"

- "if we **conceptualize intelligence as …[PASS] cognitive processes that are linked to the functional organization of the brain**" it leads to significantly higher relations with academic achievement."

- "and **these processes have direct implications for instruction and intervention**…"

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Race and Ethnic Differences by Ability Test

Understanding AND Using THE **NAGLIERI** GENERAL ABILITY TESTS

A Call for EQUITY in Gifted Education

Dina Brulles, Ph.D.
Kimberly Lansdowne, Ph.D.
Jack Naglieri, Ph.D.

Naglieri General Ability Tests

Traditional and *2nd-Generation* Ability Tests

See Brulles, D., Lansdowne, K. & Naglieri, J. A. (2022). Understanding and Using the Naglieri General Ability Tests: A Call to Equity in Gifted Education. Minneapolis, MN: Free Spirit Publishing for more details.

Note: Even though a test may not show psychometric bias those tests with academic content that show large mean score differences are not equitable and are unfair.

	By Race	By Ethnicity
Tests that require knowledge	**Mn = 9.5**	**Mn = 5.2**
Otis-Lennon School Ability Test (distric wide)	13.6	
Stanford-Binet IV (normative sample)	12.6	
WISC-V (normative sample)	11.6	
WJ- III (normative sample)	10.9	10.7
CogAT7 (Nonverbal scale)	11.8	7.6
CogAT7 - Verbal	6.6	5.3
CogAT7-Quantitative	5.6	3.6
CogAT- Nonverbal	6.4	2.9
CogAT-Total (V, Q & NV)	7.0	4.5
WISC-V (statistical controls normative sample)	8.7	
Tests that require minimal knowledge	**Mn = 4.3**	**Mn = 2.9**
K-ABC (normative sample)	7.0	
K-ABC (matched samples)	6.1	
KABC-II (adjusted for gender & SES)	6.7	5.4
CAS-2 (normative sample)	6.3	4.5
CAS (statistical controls normative sample)	4.8	4.8
CAS-2 (statistical controls normative sample)	4.3	1.8
CAS-2 Brief (normative samples)	2.0	2.8
NNAT (matched samples)	4.2	2.8
Naglieri General Ability Test-Verbal	2.2	1.6
Naglieri General Ability Test-Nonverbal	1.0	1.1
Naglieri General Ability Test-Quantitative	3.2	1.3

Note: The results summarized here were reported for the Otis-Lennon School Ability Test by Avant and O'Neal (1986); Stanford-Binet IV by Wasserman (2000); Woodcock-Johnson III race differences by Edwards and Oakland (2006) and ethnic differences by Sotelo-Dynega, Ortiz, Flanagan, and Chaplin (2013); CogAT7 by Carman, Walther and Bartsch (2018) and Lohman (2016), WISC-V by Kaufman, Raiford, and Coalson (2016); Kaufman Assessment Battery for Children-II by Lichtenberger, Volker, Kaufman & Kaufman, (2006); CAS by Naglieri, Rojahn, Matto, and Aquilino (2005); CAS-2 and CAS2:Brief by Naglieri, Das, and Goldstein, 2014a and 2014b; Naglieri Nonverbal Ability Test by Naglieri and Ronning (2000), and Naglieri General Ability Tests by Naglieri, Brulles, and Lansdowne (2022).

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CAS2 IS THE MOST EQUITABLE INTELLIGENCE TEST

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We do the best we can with what we know, and when we know better, we do better.
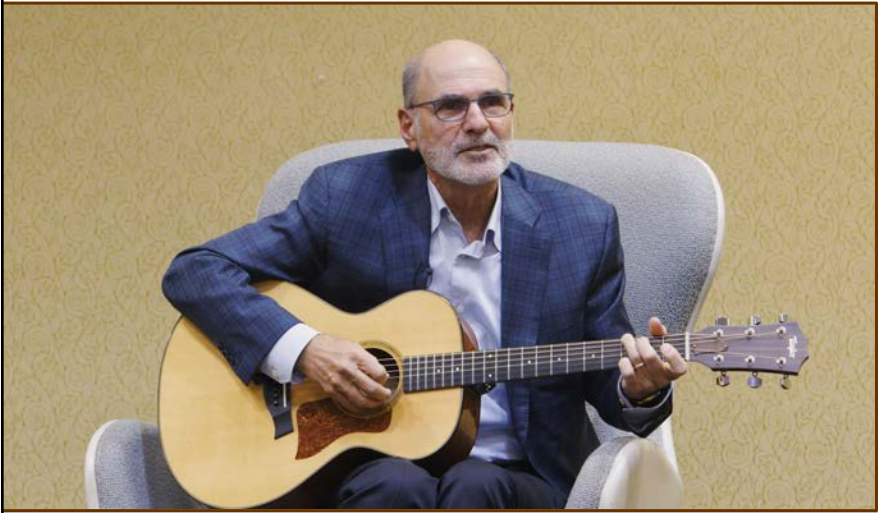
— *Maya Angelou* —

Change Demands Courage to Think Differently

Socially just identification of all students requires self-reflection and self-correction in response to current research

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Maybe It's Time to Let the Old Ways Die
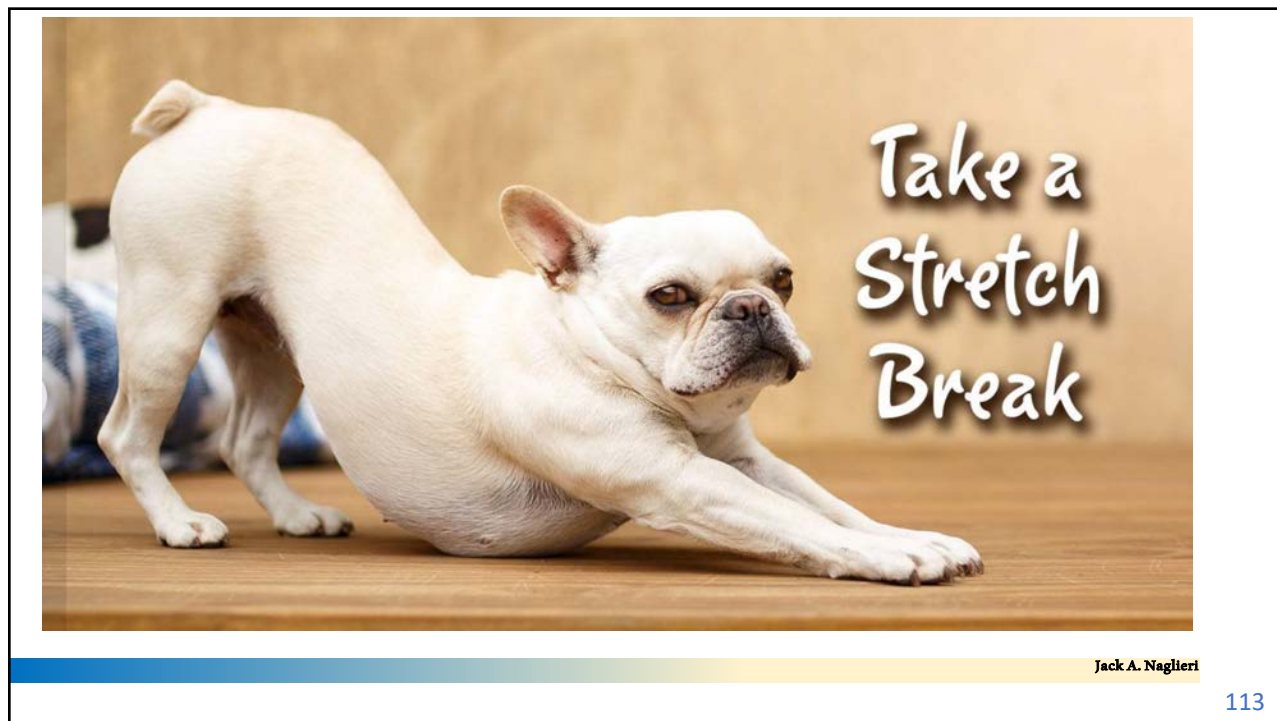

NYASP 2022
Legends in School
Psychology Award
Interview

Jack A. Naglieri

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Take a Stretch Break

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Thank You!

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