Social Justice, IQ tests and Identification of Gifted Students

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Abstract

Traditional intelligence tests with their verbal, nonverbal, and quantitative content were developed for the US Military in the early 1900s. At that time, researches noted that the accurate evaluation of intelligence for diverse populations, especially those with limited opportunity to learn and use English, was unjust. Intelligence testing was seen as a social justice issue then, and it remains one today.

Traditional IQ tests have a long history in gifted education. You will learn to recognize whether IQ (and ability) test questions measure thinking (ability) or knowing English. Questions that require knowledge of English are considered unjust.

Intelligence tests have played a critical role in determining eligibility for gifted services. In an increasingly diverse country, we must recognize that tests pose problems for those with limited educational opportunity and language skills.

Can we take English out to make them more just? Our research suggests yes.

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Website & Disclosures

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Conclusions

- Gifted identification based on verbal, nonverbal and quantitative tests requires too much verbal comprehension of DIRECTIONS, knowledge of English in the TEST ITEMS, and verbal expression in the ANSWERS to the questions
  - Students who come from low income families, are culturally different, or limited English skills are not assessed accurately
  - Many Hispanic and Black students are denied entry to gifted education and therefore they don't reach their potential
  - BUT…WE CAN DO BETTER !

Ideas to Consider

1. Traditional intelligence tests' content
   - Verbal (1) comprehension of directions, (2) content of questions, (3) expression
2. Intelligence testing as a social justice issue
   - 100 years ago and today
3. Intelligence tests and eligibility for gifted services.
   - Which tests are used
   - What they measure
4. Improving traditional intelligence tests
   - Evidence of equity across Verbal, Nonverbal and Quantitative tests of general ability

IQ Tests and Equity

- In 1975 I noticed that questions on the WISC were VERY similar to those on the achievement test
- In 1977 Kaufman said VIQ=achievement
- In 1979 Assistant Prof NAU I objected to using WISC for Native students
  - Naglieri, J. A. (1982). Does the WISC-R measure verbal intelligence for non-English speaking children? *Psychology in the Schools, 19*, 478-479.
- 1985+ Published Matrix Analogies Tests → NNAT for fair testing
- 1999 *Essentials of CAS Assessment* – emphasis on fair assessment
- 2003 Naglieri & Ford. Addressing Under-representation of Gifted Minority Children Using the Naglieri Nonverbal Ability Test (NNAT). Gifted Child Quarterly,
- 2009 *Helping All Gifted Students Learn* –fair assessment of gifted students with Dina Brulles & Kim Lansdowne
- 2021 *Naglieri General Ability Tests: Verbal, Nonverbal & Quantitative*

1975 Charles Champagne Elementary, Bethpage, NY

Gifted Identification

- This presentation is about children who may not have good grades, or the academic skills or command of English, yet they are very smart – **gifted**
- These children can become very **talented** given the opportunity to learn
- How many children like this are in our country?

Number of Students Missed = 848,402

848,400 non-White
247,500 ELL gifted in grades K-12 not served

Table 1. Number of Students in US Public Schools Grades K-12 in 2018

	US Population	Potentially Gifted (8%) of US Population	Actual Numbers of Students in Gifted & Talented Programs	Numbers of students Not Identified
White	26,822,930	2,145,834	2,065,366	80,468
Black	8,530,756	682,460	366,823	315,637
Hispanic	15,888,681	1,271,094	778,545	492,549
Native American	572,330	45,786	25,183	20,603
Two or More Races	1,782,991	142,639	123,026	19,613
Total non-White	26,774,758	2,141,979	1,293,577	848,402

From: Naglieri, J. A. (in preparation). *Manual for the Naglieri Ability Test: Nonverbal.*

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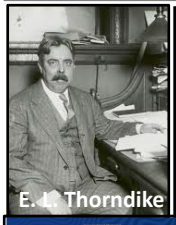
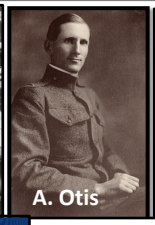
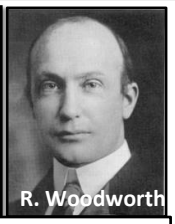
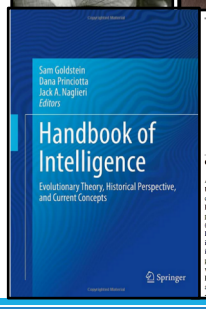
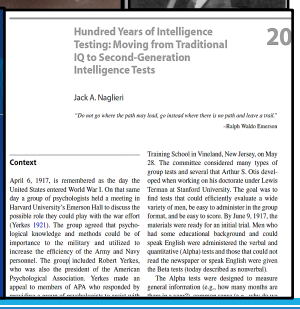
Army Mental Testing (Yoakum & Yerkes)
http://www.jacknaglieri.com/cas2.html


E. L. Thorndike


A. Otis


R. Woodworth




Hundred Years of Intelligence Testing: Moving from Traditional IQ to Second-Generation Intelligence Tests

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Jack A. Naglieri

"Do not go where the path may lead, go instead where there is no path and leave a trail."
—Ralph Waldo Emerson

Context

April 6, 1917, is remembered as the day the United States entered World War I. On that same day a group of psychologists held a meeting in Harvard University's Emerson Hall to discuss the possible role they could play with the war effort (Yerkes 1921). The group agreed that psychological knowledge and methods could be of importance to the military and utilized to increase the efficiency of the Army and Navy personnel. The group included Robert Yerkes, who was also the president of the American Psychological Association. Yerkes made an appeal to members of APA who responded by

Training School in Vineland, New Jersey, on May 28. The committee considered many types of group tests and several that Arthur S. Otis developed when working on his doctorate under Lewis Terman at Stanford University. The goal was to find tests that could efficiently evaluate a wide variety of men, be easy to administer in the group format, and be easy to score. By June 9, 1917, the materials were ready for an initial trial. Men who had some educational background and could speak English were administered the verbal and quantitative (Alpha) tests and those that could not read the newspaper or speak English were given the Beta tests (today described as nonverbal).

The Alpha tests were designed to measure general information (e.g., how many months are

- A group of psychologists met at Harvard in April of 1917 to construct an ability test to help the US military evaluate recruits (WWI) for responsible positions
- Their goal was to develop a workable set of tests called the Army Alpha & Beta
- That became Verbal & Performance on WISC

From Alpha & Beta to Wechsler IQ

- **Army Alpha**
  - Synonym- Antonym
  - Disarranged Sentences
  - Number Series
  - Arithmetic Problems
  - Analogies
  - Information

→ Verbal & Quantitative → Verbal and Quantitative on WISC-V, CogAT & Otis-Lennon

- **Army Beta**
  - Maze
  - Cube Imitation
  - Cube Construction
  - Digit Symbol
  - Pictorial Completion
  - Geometrical Construction

→ Originally called Performance now Nonverbal → Wechsler Nonverbal, Naglieri Nonverbal Ability Tests

1920 Army Testing (Yoakum & Yerkes)

Note there is no mention of measuring verbal and nonverbal intelligences – **using knowledge tests was seen as a social justice issue…and today in the era a BLM the problem is even more apparent**

Alpha Test → Verbal & Quantitative

Beta Test → Nonverbal

Why Nonverbal?

METHODS AND RESULTS 19

Men who fail in alpha are sent to beta in order that injustice by reason of relative unfamiliarity with English may be avoided. Men who fail in beta are referred for individual examination by means of what may appear to be the most suitable and altogether appropriate procedure among the varied methods available. This reference for careful individual examination is yet another attempt to avoid injustice either by reason of linguistic handicap or accidents incident to group examining.

Illinois School District U-46

Main question: Does the District's gifted program unlawfully discriminate against Hispanic Students?

The district with 42% Hispanics but only 2% of students in gifted were Hispanic.

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

DANIEL, DINAH and DEANNA MCFADDEN, minors, by their parent and next friend, Tracy McFadden; KAREN, RODOLFO and KIARA TAPIA, minors, by their parent and next friend, Mariela Montoya; JOCELYN BURCIAGA, minor, by her parent and next friend, Griselda Burciaga; and KASHMIR IVY, minors, by their parent and next friend, Beverly Ivy; KRISTIANNE SIFUENTES, minors, by her parent and next friend, Irma Sifuentes,

Plaintiffs,

v.

BOARD OF EDUCATION FOR ILLINOIS SCHOOL DISTRICT U-46,

Defendant.

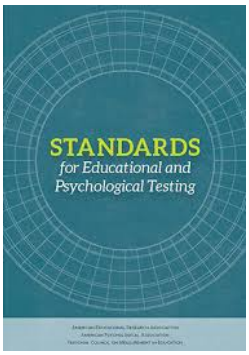
No. 05 C 0760

Judge Robert W. Gettleman

On July 11, 2013, Judge Robert Gettlemen issued a decision holding that District U-46 *intentionally* discriminated against Hispanic students specific in their gifted programming (placement), and found problems with policies and instruments for screening and identification, (c) use of both verbal and math scores at arbitrary designated levels for screening and for identification, (d) use of weighted matrix, as well as content and criteria in weighted matrices that favored achievement and traditional measures, (e) too little reliance on a nonverbal test (Naglieri Nonverbal Ability Test) for admission to

Opportunity to learn and Test Bias

- *According to the Standards for Educational and Psychological Testing* (AERA, APA & NCME, 2014), if a person has had limited opportunities to learn the content in a test of intelligence, that test may be considered **unfair because** it penalizes students for not having learned the content
- **Equitable assessment** can be achieved if all examinees have equal opportunity to perform
- The Standards also remind us that **even if the norming data do not demonstrate psychometric bias tests can still be considered unfair.**



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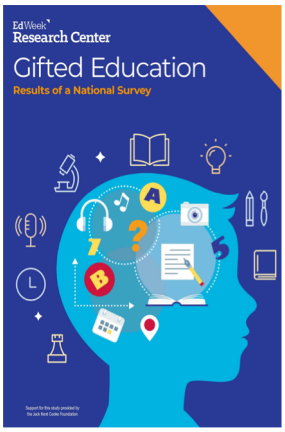
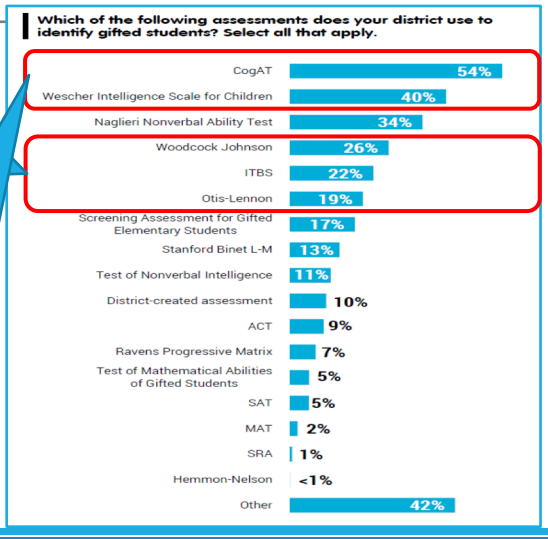
National Survey of Gifted Education



These tests require: comprehension of verbal instructions, verbal and quantitative knowledge, and for the individually administered tests verbal expression

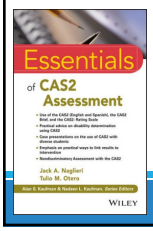


Amount of Knowledge in Ability Tests

Stanford-Binet 5	WISC-V	CogAT	NNAT-3
• Verbal • Knowledge • Quantitative Reasoning • Vocabulary • Verbal Analogies	• Verbal Comprehension: Vocabulary, Similarities, Information & Comprehension • Fluid Reasoning: Figure Weights, Picture Concepts, Arithmetic	• Verbal Scale • Quantitative Scale • Nonverbal Scale test instructions	• none

Race & IQ

- Taking the knowledge out of the ability test makes a difference
- K-ABC, KABC-2, CAS and CAS2 have the smallest differences



For more

Mean Score Differences in Total scores by Race by Intelligence Test.

IQ tests MOST knowledge	
SB-IV (matched samples)	12.6
WISC-V (normative sample)	11.6
WISC–IV (normative sample)	11.5
WJ- III (normative sample)	10.9
WISC–IV (matched samples)	10.0
WISC-V (statistical controls normative sample)	8.7
Intelligence Tests With Least Knowledge	
K-ABC (normative sample)	7.0
K-ABC (matched samples)	6.1
KABC-2 (matched samples)	5.0
CAS-2 (normative sample)	6.3
CAS (statistical controls normative sample)	4.8
CAS-2 (statistical controls normative sample)	4.3
NNAT (matched samples)	4.2

Note: The data for these results are reported for the Stanford-Binet IV from Wasserman (2000); Woodcock-Johnson III from Edwards & Oakland (2006); Kaufman Assessment Battery for Children from Naglieri (1986); Kaufman Assessment Battery for Children-II from (Lichenberger, Sotelo-Dynega & Kaufman, 2009); CAS from Naglieri, Rojahn, Matto & Aquilino (2005); CAS-2 from Naglieri, Das & Goldstein, 2014; Wechsler Intelligence Scale for Children – IV (WISC-IV) from O'Donnell (2009), WISC-V from Kaufman, Raiford & Coalson (2016). Reynolds Intellectual Assessment Scale -2 Reynolds, C. R., & Kamphaus, R. W. (2015)

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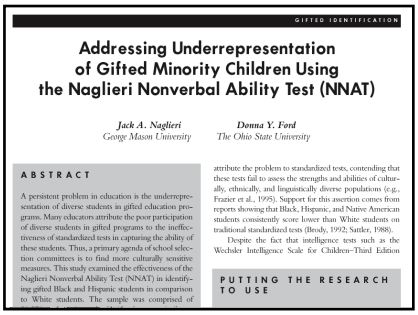
NNAT Identified Equal Percentages

Table 2

NNAT Scores

	White		Black		Hispanic		Expected
	n	%	*n*	%	*n*	%	%
120 & above	1,571	10.3	269	9.4	190	9.5	9.0
125 & above	906	5.6	145	5.1	88	4.4	5.0
130 & above	467	2.5	75	2.6	46	2.3	2.0
135 & above	190	1.1	42	1.5	18	0.9	1.0
140 & above	90	0.6	19	0.6	9	0.4	0.4
Total Sample *n*	14,141		2,863		1,991		

Note. Expected percentage values are those associated with normal curve probabilities.



GIFTED IDENTIFICATION

Addressing Underrepresentation of Gifted Minority Children Using the Naglieri Nonverbal Ability Test (NNAT)

Jack A. Naglieri
George Mason University

Donna Y. Ford
The Ohio State University

ABSTRACT

A persistent problem in education is the underrepresentation of diverse students in gifted education programs. Many educators attribute the poor participation of diverse students in gifted programs to the ineffectiveness of standardized tests in capturing the ability of these students. Thus, a primary agenda of school selection committees is to find more culturally sensitive measures. This study examined the effectiveness of the Naglieri Nonverbal Ability Test (NNAT) in identifying gifted Black and Hispanic students in comparison to White students. The sample was comprised of

attribute the problem to standardized tests, contending that these tests fail to assess the strengths and abilities of culturally, ethnically, and linguistically diverse populations (e.g., Frazier et al., 1995). Support for this assertion comes from reports showing that Black, Hispanic, and Native American students consistently score lower than White students on traditional standardized tests (Brody, 1992; Sattler, 1988).

Despite the fact that intelligence tests such as the Wechsler Intelligence Scale for Children–Third Edition

PUTTING THE RESEARCH TO USE

Very Similar percentages of Black, White and Hispanic students earned a standard score of 125 (95th percentile) or above

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CogAT Results by Race & Ethnicity

Table 9

Descriptive Statistics, All CogAT 7 Battery Scores by Race, including 2016, 2017, 2018 Data

Race	CogAT Battery	*n*	M	*SD*
American Indian	Verbal	60	51.72	29.07
	Quantitative	57	61.58	26.19
	Nonverbal	62	58.85	25.28
Asian	Verbal	942	64.12	24.22
	Quantitative	946	76.81	20.67
	Nonverbal	971	72.08	22.16
Black	Verbal	1036	46.70	25.16
	Quantitative	991	55.98	24.59
	Nonverbal	1088	49.11	24.02
Hispanic	Verbal	2114	46.57	25.16
	Quantitative	2036	58.52	23.91
	Nonverbal	2215	54.86	24.92
Multi-Racial	Verbal	878	57.70	25.90
	Quantitative	843	65.79	23.76
	Nonverbal	899	62.32	24.42
White	Verbal	5918	61.72	25.27
	Quantitative	5762	70.78	21.73
	Nonverbal	6053	67.77	23.05

VQNV Mn 50.6

VQNV Mn 53.3

VQNV Mn 66.8

INCLUSIVE PATHWAYS TO GIFTED EDUCATION:

EXAMINING GIFTED REFERRAL PROCESSES

by

MELISSA DAYLE DURTSCHI

B.S., Brigham Young University, 2004

M.A., Adams State University, 2016

"Table 23 gives the overall referral rate for each demographic as a percentage of all gifted referrals across the district. … these percentages should closely align if referrals are equitable across demographic groups. These frequencies were then used in the ANOVA testing to check for equitability across racial group (p. 55)"

Table 23

Relative Frequency of Gifted Referral (95th Percentile) by Race

Race	N	Frequency	% of Racial Population	% of Gifted Referrals from 95th Percentile	% of Whole Student Population
American Indian	60	10	16.7	0.6	0.6
Asian	943	261	26.5	15.9	8.7
Black	1017	42	3.7	2.6	9.4
Hispanic	2069	147	6.4	8.9	19.1
Multi-Racial	873	125	14.3	7.6	8.1
White	5850	1059	18.1	64.4	54.1

Wechsler and General Ability

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

Journal Information
Journal TOC

PsycARTICLES: Journal Article

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

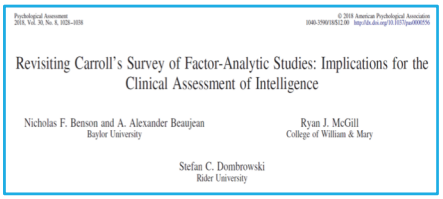
© Request Permissions

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 general ability

- …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).



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

Nicholas F. Benson and A. Alexander Beaujean
Baylor University

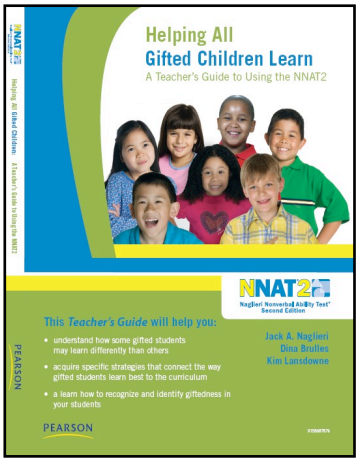
Ryan J. McGill
College of William & Mary

Stefan C. Dombrowski
Rider University

- **The 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**.

General ability (Naglieri, Brulles & Lansdowne, 2009)

- General ability is what allows us to solve many different kinds of problems
- The problems may involve
  - reasoning, memory, sequencing, verbal and math skills, patterning, connecting ideas across content areas, insights, making connections, drawing inferences, analyzing simple and complex ideas.



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Introducing Three Tests for Measuring General Ability Equitably

Naglieri Verbal Nonverbal Quantitative General Ability Tests

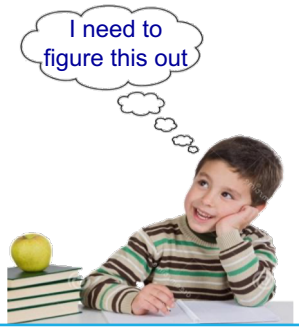
- Dina Brulles, Kim Lansdowne and I have constructed three new tests that will be used for identification of gifted students
- The focus of these tests is EQUITABLE ASSESSMENT of all students
- Three measures of general ability with three Verbal, Nonverbal and Quantitative content
  - Naglieri **Nonverbal** (Naglieri, 2021)
  - Naglieri **Verbal** (Naglieri & Brulles, 2021)
  - Naglieri **Quantitative** (Naglieri & Lansdowne, 2021)

Goals in Making the General Ability Test Battery

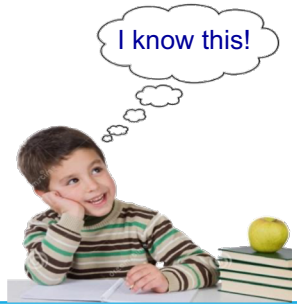
- Take language out of test INSTRUCTIONS and student RESPONSE and take formal KNOWLEDGE out of the items
- Create a Verbal test that can be solved using any language
  - The test is based on a neuropsychological concept from A. R. Luria which demand identification of verbal concepts
- Create a new version of nonverbal matrices
  - New ways of constructing progressive matrices have been developed which demand understanding the relationships among graphical stimuli
- Create a Quantitative test that does not require language
  - Several types of items are used to evaluate how well a student understands quantitative relationships

Measure Thinking not Knowledge

- How does the student have to think to complete a task?
  - This is dependent on the brain



- What does the student have to know to complete a task?
  - This is dependent upon educational opportunity



Description of the Verbal, Nonverbal and Quantitative Measures of General Ability

Naglieri Verbal: Naglieri & Brulles (2021)

Naglieri Nonverbal: Naglieri (2021)

Naglieri Quantitative: Naglieri & Lansdowne (2021)

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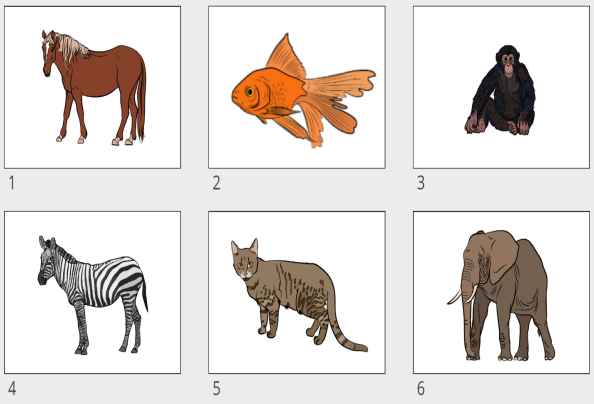
Verbal Measure of General Ability



- Online and paper version
- Classroom and individual administration
- Animated instructional video
- Minimal verbal directions by administrator
- Interactive practice questions
- 3 different test forms:
  - Kindergarten – Grade 2, Grade 3-6, Grade 7-12

Authors: Jack Naglieri & Dina Brulles

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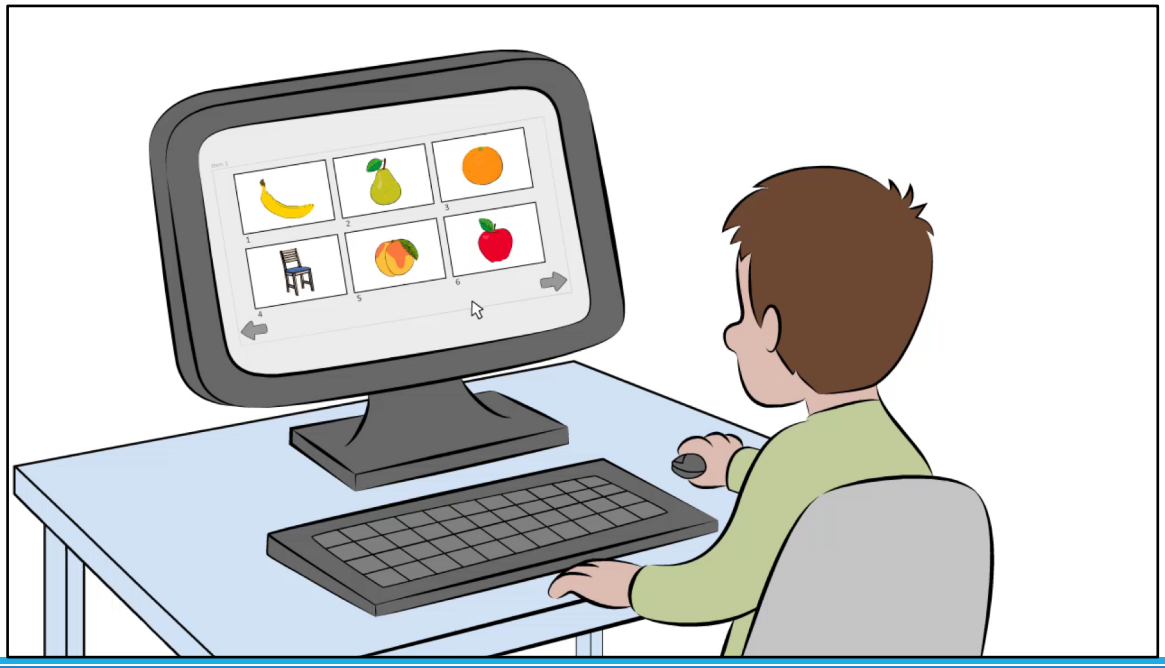
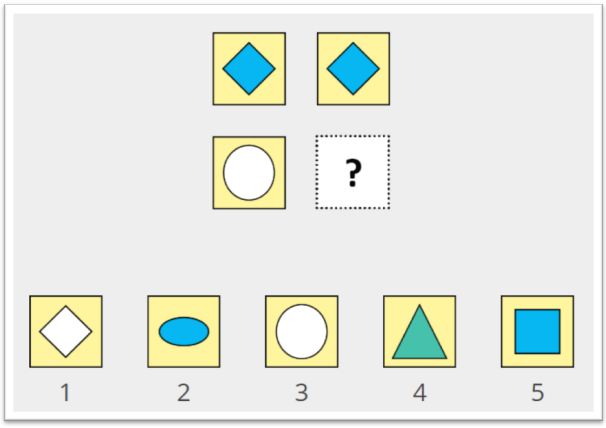
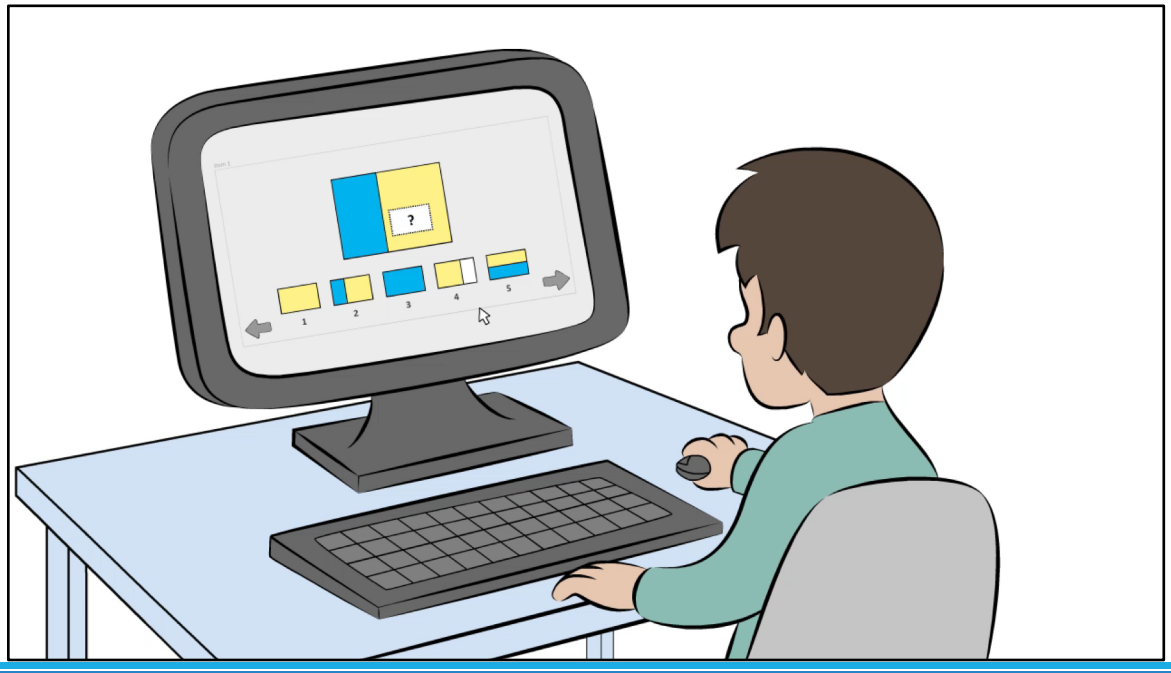


Nonverbal Measure of General Ability



- Online and paper versions
- Group or individual administration
- Several NEW types of items have been developed
- Animated instructional video
- Interactive practice questions
- Minimal verbal directions
- Pre-K, Kindergarten, Grade 1, Grade 2, Grade 3/4, Grade 5/6, Grade 7-9, Grade 10-12

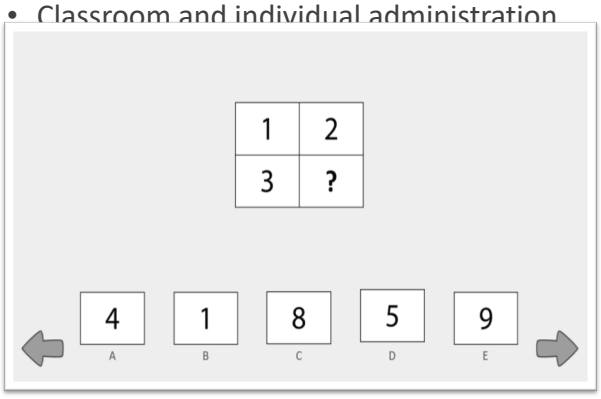


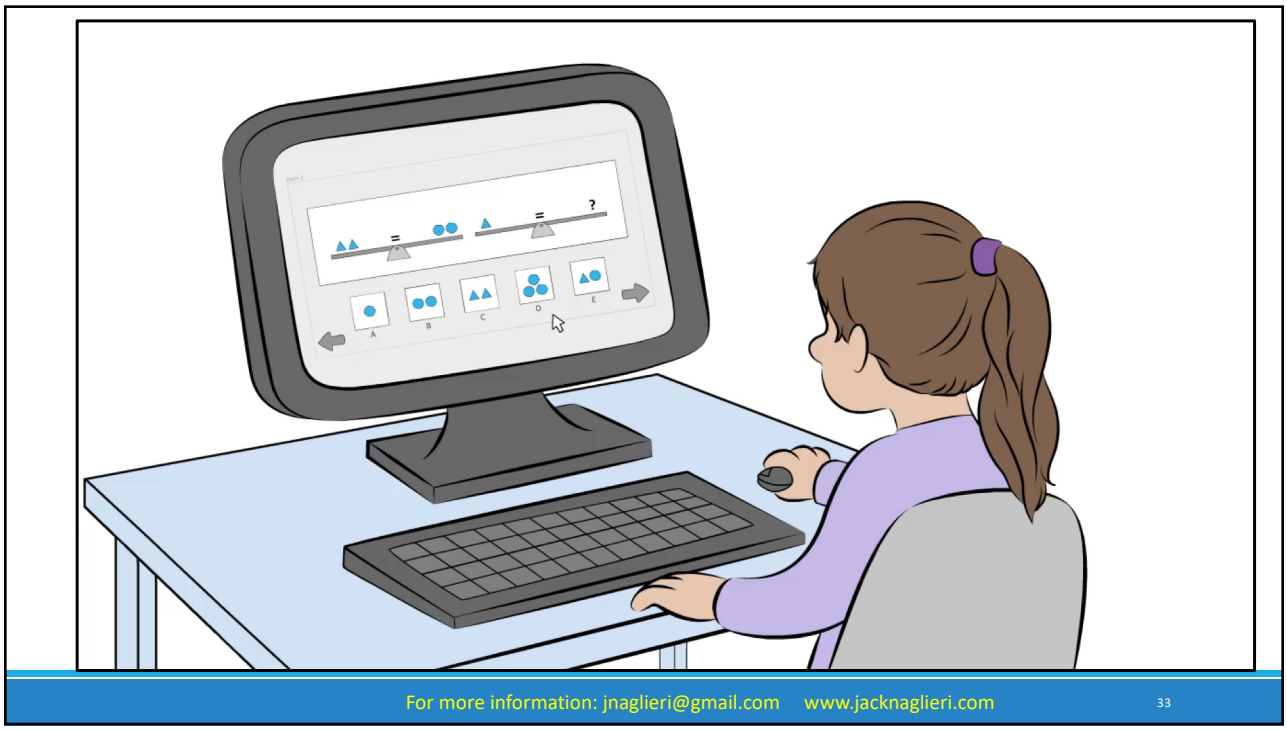
Quantitative Measure of General Ability

- These items demand analysis of sequences of numbers or relationships among a group of numbers. For example, 1 is to 2 (a difference of 1) as 3 is to … 4. Alternatively, the items can be solved by simply recognizing that the when analyzed vertically, 1 becomes 3, so 2 should become 4.
- These items test a person's ability to understand relationships and patterns involving numbers, just as understanding relationships among shapes in the NAT-Nonverbal or verbal categories in the NAT-Verbal.

Authors: Jack Naglieri & Kim Lansdowne

- Online and paper version
- Classroom and individual administration





Research Results

- Verbal (N = 2,482)
- Nonverbal (N = 3,630)
- Quantitative (N = 2,841)
- Three replications with the same results
- 'Little to no differences … across race, ethnicity, gender, & parental education level'

Achieving Equity: Race, Ethnic, Gender, and Parental Education Level Differences on Verbal, Nonverbal, and Quantitative Naglieri General Ability Tests

Mathangi Selvamenan[1], Angelina Paolozza[1], Joanna Solomon[1], Jack A. Naglieri[2], and Matthew T. Schmidt[1]

Abstract

Equitable identification of gifted students, from diverse cultural, racial, ethnic, linguistic, and socioeconomic backgrounds, or from those who have had limited or different educational experiences, has been an ongoing concern. Researchers have suggested that the inclusion of test questions that demand knowledge and language in ability tests can be problematic for traditionally underrepresented groups who have had limited or early opportunities to learn. The present study (N=8410) was conducted to examine the utility of three tests with verbal, nonverbal, and quantitative content that were specifically created to measure general ability in the most equitable manner possible. Little to no differences were found across race, ethnicity, gender, and parental education level on all three measures. Our results suggest that the confounding impact of knowledge and language, particularly in the instructions, test content, and response format, can be minimized to achieve a more equitable method of assessing diverse populations for gifted programs.

Naglieri General Ability Tests: Verbal, Nonverbal & Quantitative

- The three tests will be released in 2021 for application using local norms
- Data collection for generation of national norms will resume as soon as it is possible
- The three tests are highly reliable measures and work well across ages

Reliability Coefficients of Naglieri General Ability Tests (July 2020)

Quantitative	Kindergarten	.89
	Grade 1	.90
	Grade 2	.92
	Grades 3 and 4	.94
	Grades 5 and 6	.94
	Grades 7 - 9	.95
	Grade 10 - 12	.93
	Median	**.93**
Nonverbal	PreK	.92
	Kindergarten	.87
	Grade 1	.90
	Grade 2	.86
	Grades 3 and 4	.92
	Grades 5 and 6	.93
	Grades 7 - 9	.95
	Grade 10 - 12	.94
	Median	**.92**
Verbal	K - grade 2	.92
	Grades 3 - 6	.90
	Grades 7 - 12	.89
	Median	**.90**

Naglieri
General Ability Tests
Verbal
Nonverbal
Quantitative

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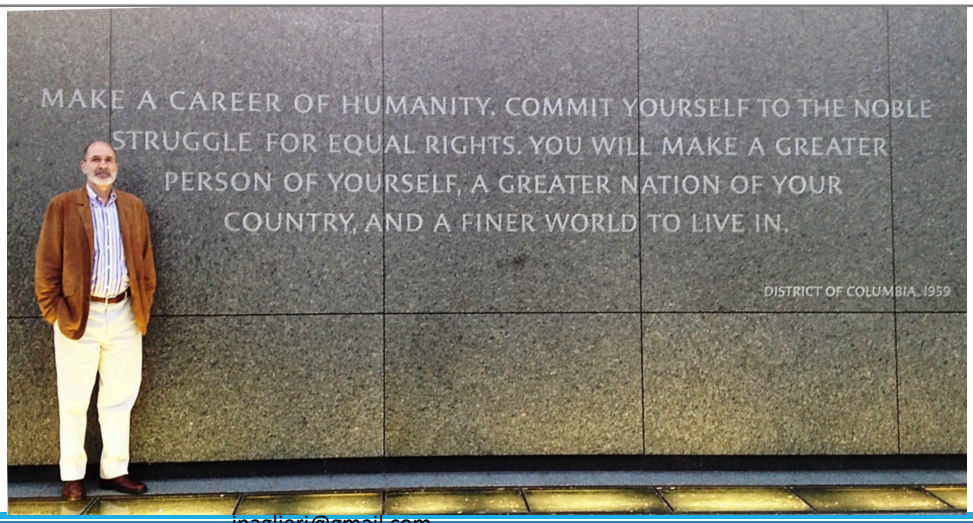
Gifted Identification is a Social Justice Issue



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