Equitable Identification Using the Naglieri General Ability Tests: Verbal, Nonverbal & Quantitative

Presented at the 60th CAG Conference

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Traditional IQ and Achievement Tests

- Working as a school psychologist in 1975 I noticed that items on the WISC we were VERY similar to items on the achievement tests

- First job as assistant professor at Northern Arizona University - 1979
  - Assessing Native Americans
  - Vocabulary, Information, Similarities, Arithmetic subtests measure knowledge

CAG 2022

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Slide 3

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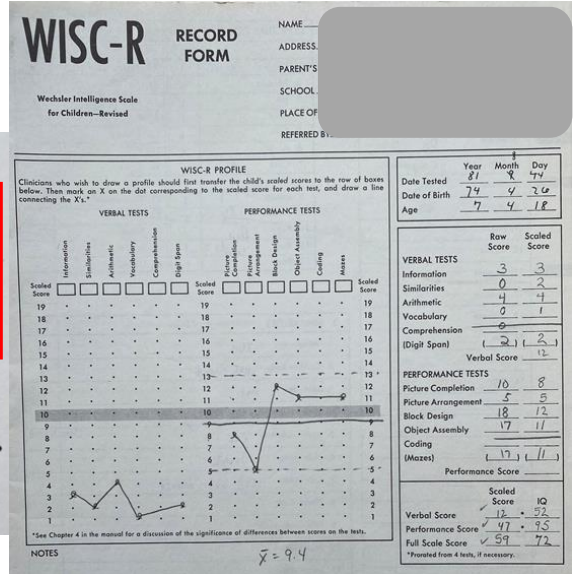
Naglieri, J. A. (1982). Does the WISC-R measure verbal intelligence for non-English speaking children? *Psychology in the Schools, 19*, 478-479.

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

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Slide 4

Solution: Measure Thinking not Knowledge

- What does the student have to know to answer the test question?
  - This is dependent upon educational opportunity

  I know this!

- ➤ How does the student have to think to answer the test question?
  - This is dependent on the brain

  I need to see relationships

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Naglieri's Nonverbal Tests : 1985 to Present

- **Seventh Version of the Naglieri Nonverbal Tests**

MAT Short & Expanded Forms 1985

Naglieri Nonverbal Ability Test 1997

NNAT – Individual, 2003

NNAT -2 2008

NNAT3 2016

BUT… there was a lingering question: What about adding Verbal and Quantitative tests of general ability to compliment the Naglieri Nonverbal Ability Test?

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Measuring General Ability Equitably Using the Naglieri General Ability Tests: Verbal, Nonverbal and Quantitative

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Naglieri General Ability Tests
Administration Manual
Jack A. Naglieri, PhD
Dina Brulles, PhD
Kimberly Lansdowne, PhD

Naglieri General Ability Tests
Technical Manual
Jack A. Naglieri, PhD
Dina Brulles, PhD
Kimberly Lansdowne, PhD

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Naglieri General Ability Tests

- We **explicitly made tests for equitable identification** of students from diverse cultural, linguistic, or socioeconomic backgrounds who are very **smart (gifted)** and may or may not be talented
- We created Verbal, Nonverbal and Quantitative tests that **measure general ability** and to ensure equity we used:
  - Test questions that do not require academic knowledge,
  - Verbal and Quantitative test questions that can be solved using any language,
  - Animated instructions remove the need for comprehension of directions,
  - A multiple-choice response removes the need for verbal expression.
  - Universal assessment using local norms

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Naglieri General Ability Test – Verbal
(Naglieri & Brulles)

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.
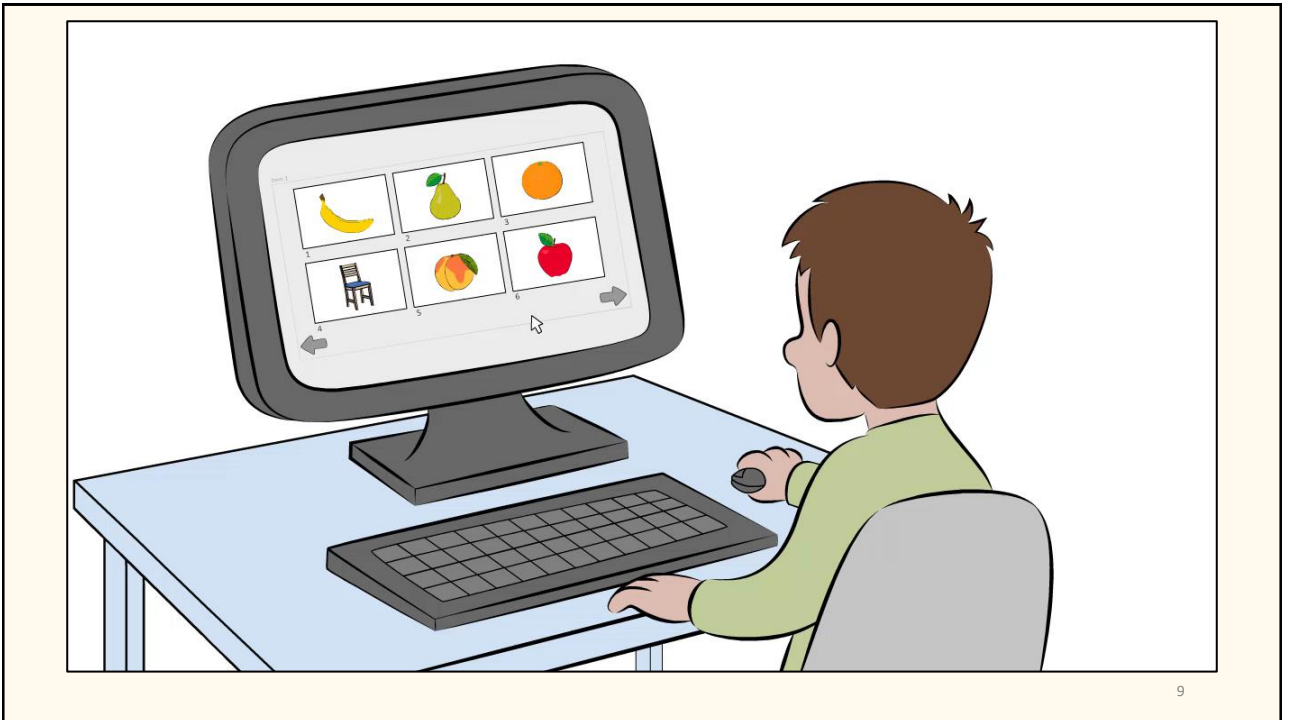
The test items require close examination of *the relationships among the pictures*.

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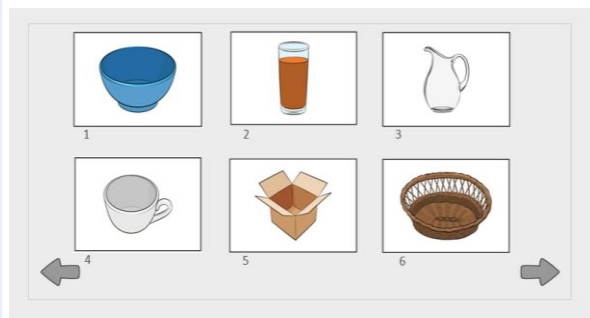
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Naglieri General Ability Test - Nonverbal

The **Naglieri–NV measures general ability** using questions that require a student to recognize the relationships among the shapes.
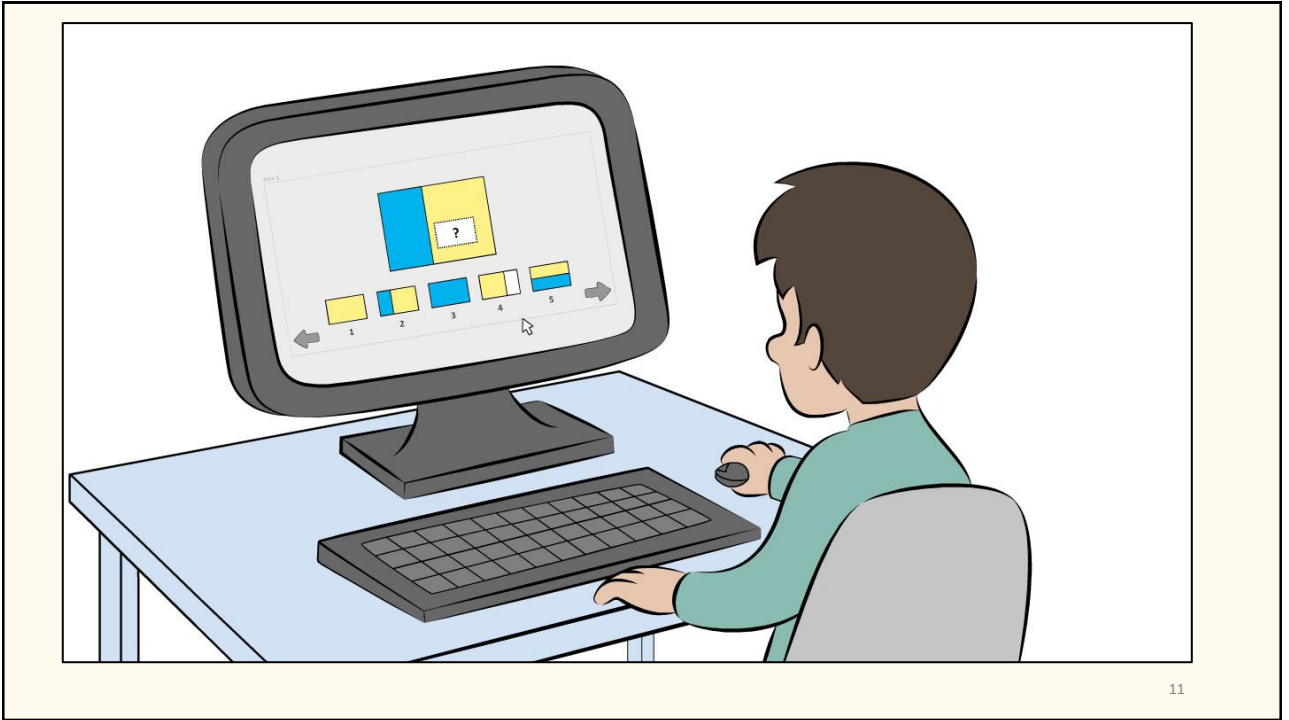
The structure of the items varies, but all items require that the student decipher the logic behind *the relationships among the shapes*, sequences, spatial orientations, patterns, and other distinguishing characteristics.

This nonverbal test is conceptually similar to the NNAT3 but it contains many NEW kinds of items not included before.
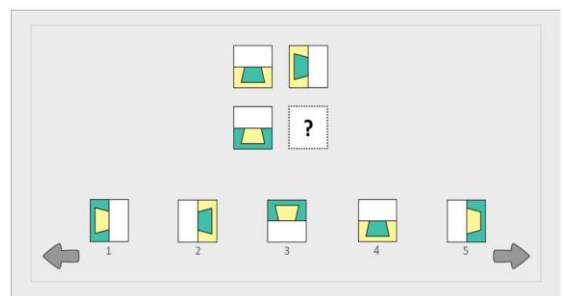
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Naglieri General Ability Test – Quantitative
(Naglieri & Lansdowne)

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.

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

— Maya Angelou —

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These tests Measure General Ability

- Even though the Verbal, Quantitative and Nonverbal tests have different content they all measure **general ability ('g')** as described by Wechsler and others but not verbal, nonverbal or quantitative intelligences.
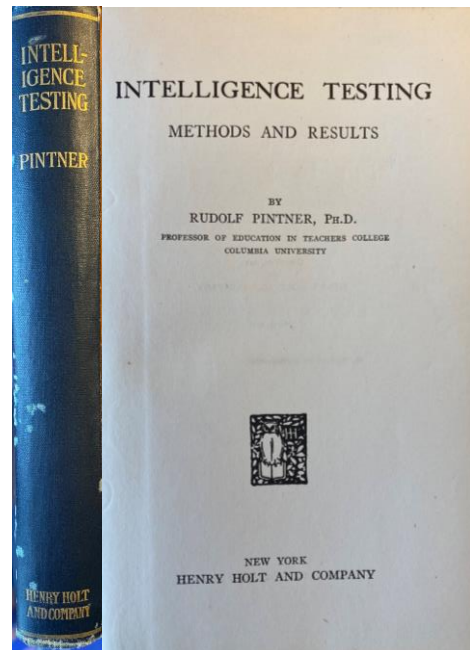
Different **content to measure General Ability**

- Wechsler "believed that his Verbal and Performance Scales represented different ways to access *g* (general ability)", but he **never believed [in verbal and] nonverbal intelligence** as being separate from g. (Kaufman, 2008)
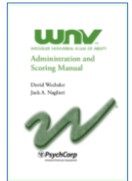
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General Ability Definitions

- "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)".

INTELLIGENCE TESTING
METHODS AND RESULTS

BY
RUDOLF PINTNER, Ph.D.
PROFESSOR OF EDUCATION IN TEACHERS COLLEGE
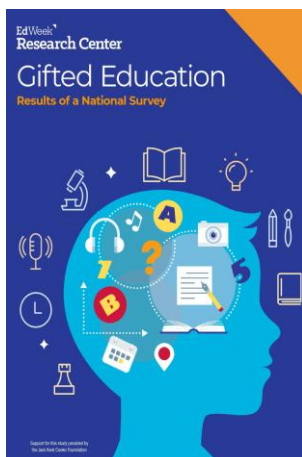COLUMBIA UNIVERSITY

NEW YORK
HENRY HOLT AND COMPANY

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General ability (Naglieri, Brulles & Lansdowne, 2009)

- General ability is what allows us to solve many different kinds of problems which may involve
  - reasoning, memory, sequencing, patterning, connecting ideas across content areas, insights, making connections, drawing inferences, analyzing simple and complex ideas.
- The <mark>key is to measure general ability in a way that is not confounded by knowledge</mark>
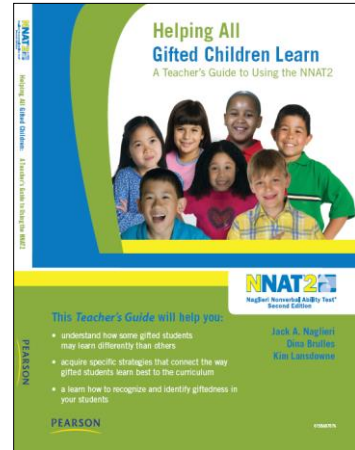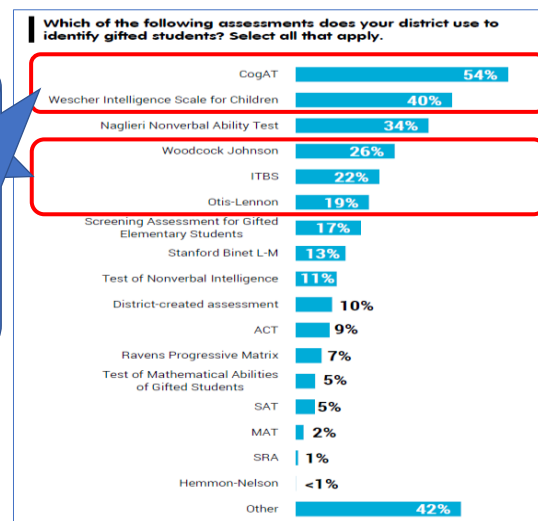

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National Survey of Gifted Education

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.

Assessment	Percent
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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WJ-IV Items from Cognitive and Achievement Tests:

Cognitive: Oral Vocabulary Subtest 1

Sample Items

Point to *near* on subject's page and say: **Another word that means near is *close*** (pronounced klōs, not klōz).

A. Point to *big* on subject's page and say: **Tell me another word for *big*.**
   ▲ *Correct:* large, gigantic, huge

   ◆ *A: Error or No Response*
   Score item 0. Say: **Another word for *big* is *large*.** Repeat Sample Item A.

B. Point to *nap* and say: **Tell me another word for *nap*.**
   ▲ *Correct:* sleep, rest, snooze

   ◆ *B: Error or No Response*
   Score item 0. Say: **Another word for *nap* is *sleep*.** Repeat Sample Item B.

Basal

Achievement: Reading Vocabulary-Synonyms Subtest 17

Sample Items

Point to *street* on subject's page and say: **Another word that means *street* is *road*.**

A. Point to *large* on subject's page and say: **Tell me another word for *large*.**
   ▲ *Correct:* big, enormous, gigantic, huge

   ◆ *A: Error or No Response*
   Score item 0 and say: **Another word for *large* is *big*.** Repeat Sample Item A.

B. Point to *sleep* and say: **Tell me another word for *sleep*.**
   ▲ *Correct:* nap, doze, rest, snooze

   ◆ *B: Error or No Response*
   Score item 0 and say: **Another word for *sleep* is *nap*.** Repeat Sample Item B.

Do *not* read any other items or tell subject any other words during this test.

Very Similar Items on "Different" Tests

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Knowledge is Included in "Ability" Tests

| 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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Differences in Mean Scores = Impact

According to the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014)
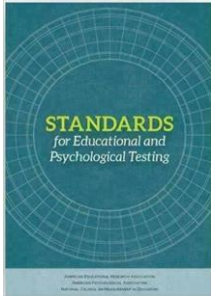
- … **if a person has had limited opportunities to learn the content in a test of intelligence,** *that test may be considered unfair* (because it penalizes students for not knowing the answers) **even if the norming data do not demonstrate test bias.**

Equity

Bias

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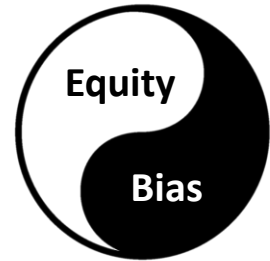
Race and Ethnic Differences for *Traditional* and *Second-Generation* Ability Tests
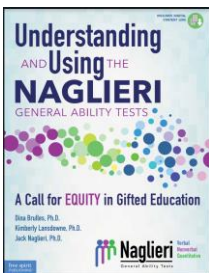
Note: Even though traditional intelligence tests may not show psychometric bias (Worrell, 2019) the large mean score differences suggest they are unfair (Brulles, et al., 2022).

Race and Ethnic Standard Score Differences Across Intelligence Tests	By Race	By Ethnicity
Tests that require knowledge	**Mn = 11.5**	**Mn = 9.2**
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
WISC-V (statistical controls normative sample)	8.7	
Tests that require minimal knowledge	**Mn = 4.1**	**Mn = 2.6**
K-ABC (normative sample)	7.0	
K-ABC (matched samples)	6.1	
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

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Notes: 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 & Oakland (2006) and ethnic differences by Sotelo- Dynega, Ortiz, Flanagan & Chaplin (2013); CogAT7 by Carman, Walther and Bartsch (2018); WISC-V by Kaufman, Raiford & Coalson (2016); Kaufman Assessment Battery for Children-II by Lichenberger, Sotelo- Dynega and Kaufman (2009); CAS by Naglieri, Rojahn, Matto & Aquilino (2005); CAS-2 and CAS2:Brief by Naglieri, Das & Goldstein, 2014; Naglieri Nonverbal Ability Test by Naglieri and Ronning (2000), and Naglieri General Ability Tests by Naglieri, Brulles and Lansdowne (2021).

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Initial Research Results (2019)

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.

- **VERBAL SAMPLE**
  - 2,482 That closely matches the US population on key demographics
- **GENDER**
  - No differences between **males** and **females** for raw score across all forms
- **RACE/ETHNICITY**
  - No differences among **White, Black, & Hispanic** for raw score across all forms
- **PARENTAL EDUCATION LEVEL**
  - No 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
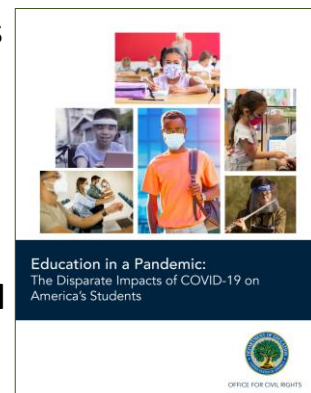
- **NONVERBAL SAMPLE**
  - 3,630 That closely matches the US population on key demographics
- **GENDER**
  - No differences between **males** and **females** for raw score across all forms
- **RACE/ETHNICITY**
  - No differences among **White, Black, & Hispanic** for raw score across all forms
- **PARENTAL EDUCATION LEVEL**
  - No 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

- **QUANTITATIVE SAMPLE**
  - 2,841 That closely matches the US population on key demographics
- **GENDER**
  - No differences between **males** and **females** for raw score across all forms
- **RACE/ETHNICITY**
  - No differences among **White, Black, & Hispanic** for raw score across all forms
- **PARENTAL EDUCATION LEVEL**
  - No 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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Academic Learning Loss & COVID
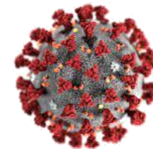
- COVID-19 has deepened the impact of disparities in access and opportunity for students of color
- Students of color are even further behind than they were before the pandemic
- ELL students had the dual challenge of learning content and English.
- These students' **intellectual scores on traditional tests** will reflect that larger learning gap related to COVID

Education in a Pandemic:
The Disparate Impacts of COVID-19 on America's Students

OFFICE FOR CIVIL RIGHTS

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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Comments?
Questions?

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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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Gifted Identification

- This presentation is about children who may not have good grades, or the academic skills or command of English, which LOWERS their ability test scores so they do NOT look as smart as they are

- These children can become very **talented** given the opportunity to learn

- How many children like this are in our country?

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Numbers of Students Missed

Total Enrollments by Race and Ethnicity as of 2020.			
	N in Public Education K-12 in 2020	N Potentially Gifted (8%; 92 %tile)	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 American/ Alaska Native	484,766	38,781	27,712	-11,069
Two or More Races	1,641,817	131,345	105,371	-25,974
Total Non-Whites	24,218,556	1,937,484	1,064,355	-873,129

English language learner (ELL) students enrolled in public elementary and secondary schools in 2015 by Race and Ethnicity

	N of ELL in Public Ed	N Potentially Gifted (8%)	N students Identified	N Missed (% Missed)
White	294,763	23,581	8,548	15,033 (64%)
Black	178,141	14,251	5,166	9,085 (64%)
Hispanic	3,772,633	301,811	109,406	192,404 (64%)
Asian	511,703	40,936	14,839	26,097 (64%)
Pacific Islander	26,992	2,159	783	1,377 (64%)
Native Am./ Alaska Native	38,792	3,103	1,125	1,978 (64%)
Two or More Races	31,136	2,491	903	1,588 (64%)
Total	4,854,160	388,333	140,771	247,562

Understanding AND Using THE NAGLIERI GENERAL ABILITY TESTS

A Call for EQUITY in Gifted Education
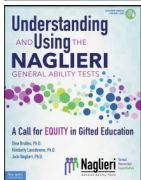
Percent of Schools that Identify	58.5%
Percent of Schools that do not Identify	41.5%
Additional non-white gifted students = 41.5% of 873,129	N = 362,305
Total non-white gifted students missed	**N = 1,235,434**

Gifted Education in the United States

SYSTEM FAILURE ACCESS DENIED

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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

Weighted matrix favored achievement and CogAT

Too little reliance on NNAT

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

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Using Local Norms- a strategy to increase underrepresented populations in gifted services

- **National norms-** Compare a student's performance to peers from the same age or grade across the country

- **Local norms-** Compare a student's performance to grade level peers in the same district, school or specific grade
  - district level norms
  - school building level norms
  - group norms (ie. if 30% of the students are (demographic), compare scores across that group)

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What makes sense for your situation?

- Rank order?
  - The student's score is ranked compared to other students tested. The lower the score, the better the student's performance on the test. For example, a score of 3 indicates that the student earned a score ranked 3rd in the local comparison sample.

- Percentile?
  - The percentage of students who obtained scores that were less than or equal to the student's score. The higher the score, the better the student's performance on the test. For example, a score of 90 indicates that the student earned a score that was equal to or greater than 90% of students in the local comparison sample.

- Total Score?
  - The student's performance on all of the tests. The higher the score, the better the student's performance on the test. For example, a score of 100 is considered average and scores above 115 are above average.

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Things to consider when using local norms

| | Students who move to other schools/districts | Local norms is a local comparison |

| | Identification for what? | Program to fit student's needs |

| | Scenarios | |

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Naglieri General Ability Tests International Use

- Use a Local Norming Procedure
- Obtain scores for **ALL** students (not only referred students) in the grades for which the GT decisions is needed
- Decide how the information obtained for each student is to be evaluated (i.e., average, and or logic) and if it is to be weighted
- Evaluate the outcome vis-à-vis equity

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Goals of Education Equity:

- *How do these goals impact gifted programming?*
- High achievement and positive outcomes for *all* students
- Equitable access and inclusion
- Equitable treatment
- Equitable resource distribution
- Equitable opportunity to learn
- Shared accountability

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Showing Growth in Gifted

Measure and record:
- Ethnic representation of identified gifted students
- Academic achievement of gifted students
- Gifted population identified and served by year
- Professional development for teachers

* Provide data to principals and school district admin.

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Equitable Gifted Identification

- WE CAN devise Verbal and Quantitative tests to combine with a Nonverbal test with
  - questions that can be solved using any language
  - without verbal directions
  - and no verbal response required.
- This is a way to *achieve equitable assessment*

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Publisher Information: MHS.COM

The Naglieri General Ability Tests: Verbal, Nonverbal & Quantitative are published by MHS who also publish many measures used in the schools including the *Conners Rating Scales, Autism Spectrum Rating Scale* (ASRS; Goldstein & Naglieri) and the *Comprehensive Executive Function Inventory* (CEFI; Naglieri & Goldstein).

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Website: NaglieriGiftedTests.com

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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 gifted students requires self-reflection and self-correction in response to the current research.

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