

Introducing the Naglieri General Ability Tests: Verbal, Nonverbal and Quantitative

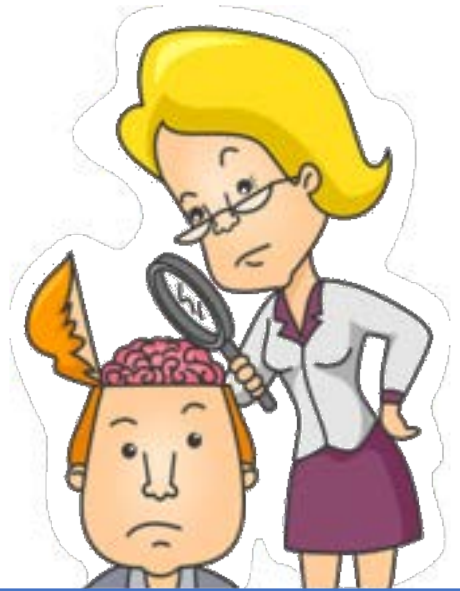
Kim Lansdowne Dina Brulles Jack A. Naglieri

NaglieriGiftedTests.com

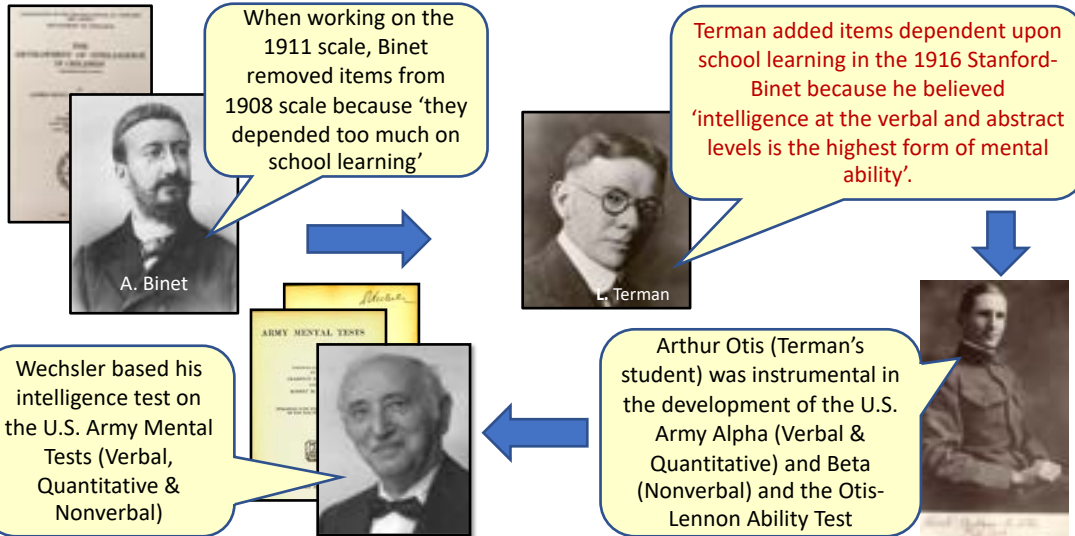
Two Questions:

1. Why do we measure ability the way we do?
2. Do the tests measure thinking or knowing?

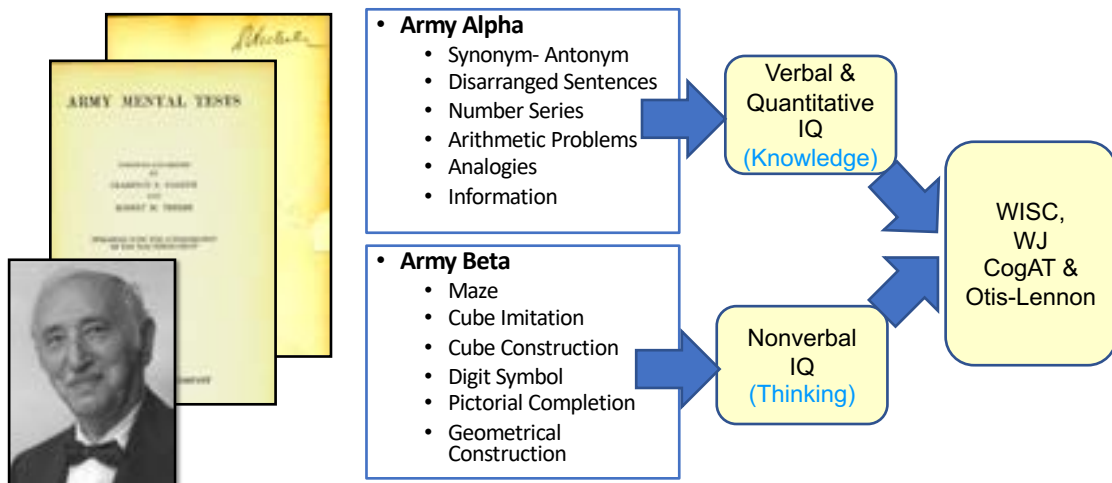
The early history of IQ tests provides the answers



Stanford-Binet → Army Mental Tests → Today



Alpha & Beta → Wechsler



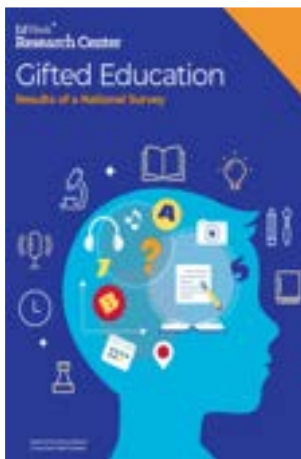
Wechsler's View of General ability

- 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*. 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)

“The aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment (1939)”



National Survey of Gifted Education



These tests have verbal and quantitative questions and lengthy verbal directions



Including *Knowledge* in “Ability” Tests & Equity

Stanford-Binet-5	WISC-V	WJ-IV	KABC-II	OLSAT	CogAT
<ul style="list-style-type: none"> • Verbal • Knowledge • Quantitative Reasoning • Vocabulary • Verbal Analogies 	<ul style="list-style-type: none"> • Verbal Comprehension • Vocabulary, Similarities, Information • Fluid Reasoning • Figure Weights, Arithmetic 	<ul style="list-style-type: none"> • Comprehension Knowledge: Vocabulary & General Information • Fluid Reasoning: Number Series & Concept Formation • Auditory Processing: Phonological Processing 	<ul style="list-style-type: none"> • Knowledge / GC • Riddles, Expressive Vocabulary, Verbal Knowledge 	<ul style="list-style-type: none"> • Verbal • Following directions • Verbal Reasoning • Quantitative • Verbal Arithmetic Reasoning 	<ul style="list-style-type: none"> • Verbal Scale • Analogies • Sentence Completion • Verbal Classification • Quantitative • 44 pages of oral instructions

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 ask the question, "Who discovered America?" would be indicative of the school progress or general cultural environment of the child rather than of his general intelligence. Failure to answer might indeed be a lack of intelligence in the case of school children who have reached a certain grade in which this had been a matter of instruction, but on the other hand a very intelligent child might fail to answer owing to the fact of his not having reached the grade in which this was taught.

Pintner (Intelligence Testing, 1923)

- This is a social justice issue for those from disadvantaged communities and those with limited education



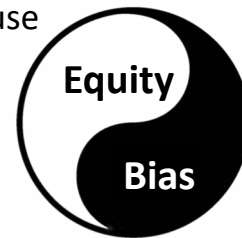
A question on Wechsler's Information subtest

Test Content, Test Bias and Test Equity

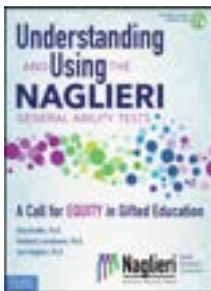
According to the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014) Psychometric TEST BIAS and EQUITY are two different ways of measuring test fairness.



- ... if a person has had limited opportunities to learn the content in a test of intelligence, **that test may be considered unfair** (because it penalizes students for not knowing the answers) **even if the norming data do not demonstrate test bias.**
- Evidence of EQUITY is examined by test content and mean score differences



Race and Ethnic Average Score Differences by Ability Test



Traditional tests that include knowledge and 2nd-Generation Ability Tests that minimize knowing

	By Race	By Ethnicity
Tests that require knowledge	Mn = 9.5	Mn = 9.2
Otis-Lennon School Ability Test (ethnic wide)	13.6	
Stanford-Binet IV (normative sample)	12.6	
WISC-V (normative sample)	11.6	
WI-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, G & 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
NHAT (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

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.

Numbers of Gifted Students Missed = 1,235,434

	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

873,129 +



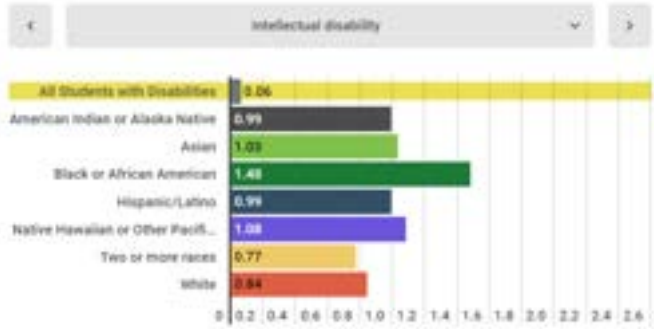
Percent of Schools that do not Identify	41.5%
Additional non-white gifted students = 41.5% of 873,129	N = 362,305
Total non-white gifted students missed	N = 1,235,434

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/sites/idea/2020/08/13/data/collection/documentation/data-documentation-files/part-b-child-count-and-educational-environments/idea-part-b-childcountandedenvironment-2019-20.pdf>

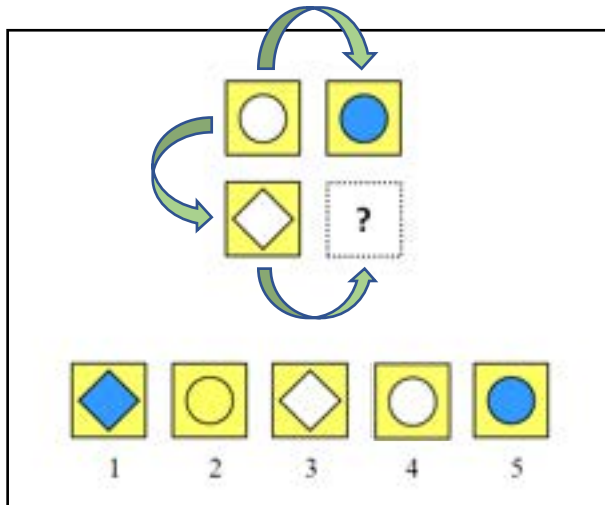
Risk Ratio of Students with Disabilities by Disability Category and by Specific Race and Ethnicity, Ages 5 (in kindergarten) through 21: SY 2019-20



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://idaamerica.org/Ida_today/disproportionate-identification-of-students-of-color-in-special-education/

Tests that Measure Thinking or Knowing?



Girl is woman as
boy is to _____?

3 is to 6 as
4 is to _____?

C⁷ is to F as
E⁷ is to _____?

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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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Psychologists who studied race and ethnic differences attributed IQ test results to the **people** instead of the **tests**

YOUR QUESTIONS PLEASE

The Naglieri General Ability Tests: Verbal, Nonverbal and Quantitative

Jack A. Naglieri, Ph.D. jnaglieri@gmail.com
 Dina Brulles, Ph.D. dbrulles@gmail.com
 Kim Lansdowne, Ph.D. kimberly.lansdowne@asu.edu

Publisher: MHS
 Contact: Debbie.Roby@MHS.com
 Phone: 214.908.7769



Learn More
NaglieriGiftedTests.com



Naglieri General Ability Tests

- We **explicitly made tests for equitable identification** of students from diverse cultural, linguistic, or socioeconomic backgrounds
- We used the traditional Verbal, Nonverbal and Quantitative formats to **measure general ability** using:
 - 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.
 - Online (and paper) administration for group or individual assessment
 - Universal assessment using local and national 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*.

 **Naglieri** | Verbal
General Ability Test



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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.

 **Naglieri** | Quantitative
General Ability Test



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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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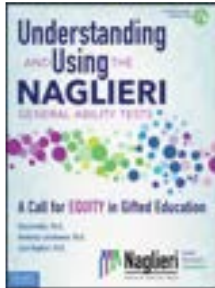


Research Evidence of Equity

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 
<ul style="list-style-type: none"> N= 3,630 Sample closely matches the US population on key demographics 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 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 	<ul style="list-style-type: none"> N= 2,482 Sample closely matches the US population on key demographics 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 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 	<ul style="list-style-type: none"> 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 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

Race and Ethnic Differences by Ability Test



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Note: The results summarized here were reported for the Otis-Lennon School Ability Test by Frank and O'Neal (1989), Stanford-Binet IV by Williamson (1988), Woodcock-Johnson III race differences by Edwards and Gardner (1988) and other differences by Smith-Snyder, Ellis, Flanagan, and Chaplin (2015); CogAT7 by German, Whitley and Barwick (2008), and Lutzini (2016), WI-III by Kaufman, Kaufman, and Coatsworth (1994); Kaufman Assessment Battery for Children II by Kaufman, Kaufman, & Kaufman (2005); CAS by Naglieri, Nelson-White, and Naglieri (2005); CAS-2 and CAS-2 Brief by Naglieri, Ellis, and Kaufman (2016) and (2014); Naglieri Nonverbal Ability Test by Naglieri and Bruning (2005); and Naglieri General Ability Tests by Naglieri, Brulles, and Lansdowne (2022).



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

Naglieri General Ability Tests: V, NV, Q

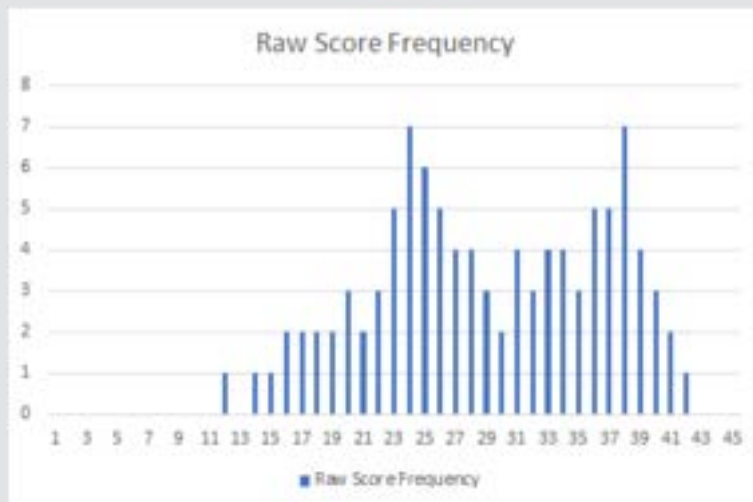
- Initially released using LOCAL NORMS, now NATIONAL NORMS
 - CAUTION: All tests that require knowledge which were normed before COVID are likely impacted by the learning loss that has occurred
- These three tests are the ONLY measures of general ability that were normed on a post covid population
- It is best to do universal *testing of all students*
- Local norms and national norms both have value
- For example...

Local Norming Example

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Raw scores for all student across four grade 3 classrooms

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.



Local Norming Example

- The same raw score (number correct) yields different percentile ranks and standard scores because these scores are calculated on the mean and SD of the three separate groups.
- Each student is compared to a group that more precisely represents them.

Student Raw Score of 40 = 95th percentile and standard score of 125

Student Raw Score of 40 = 99th percentile and standard score of 135

Student Raw Score of 40 = 92nd percentile and standard score of 121

29.0 N=100

24.2 n=51

34.0 n=49

Local Norming Example

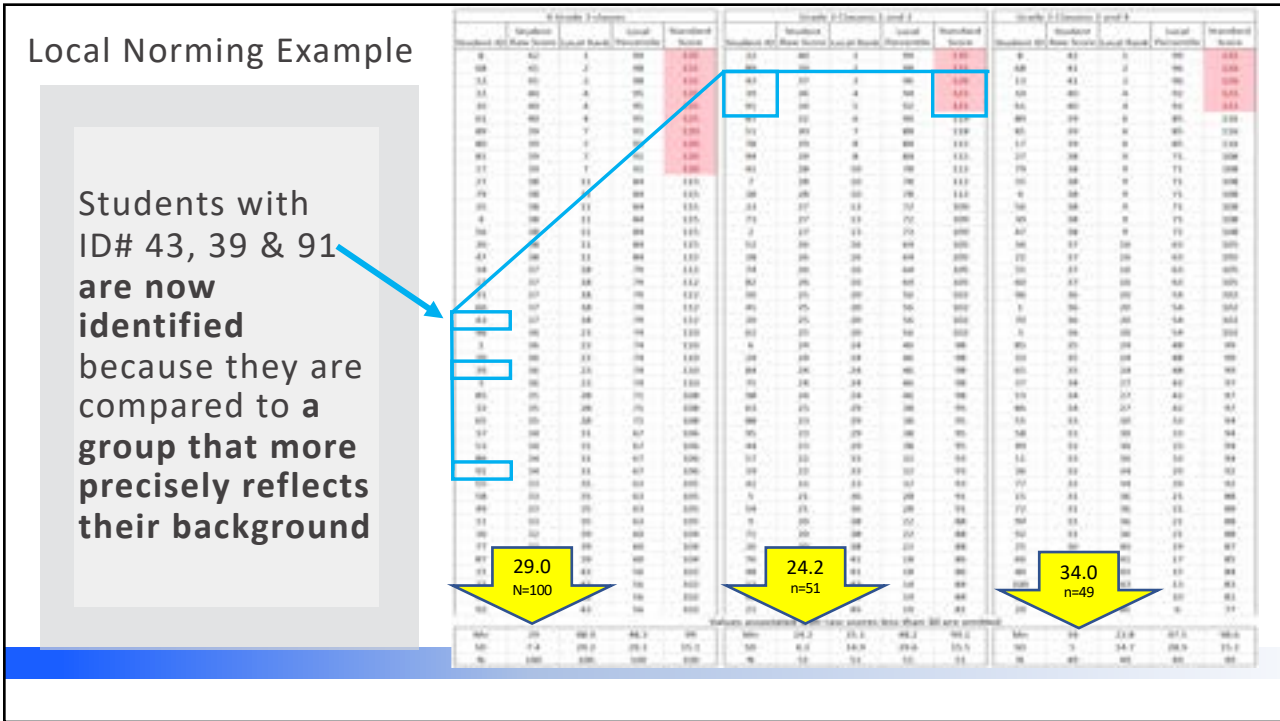
The **top seven students** in all four classes are still identified

ID# 8, 68, 13, 32, 10, 61, 89

29.0 N=100

24.2 n=51

34.0 n=49



What is the Practical Impact?

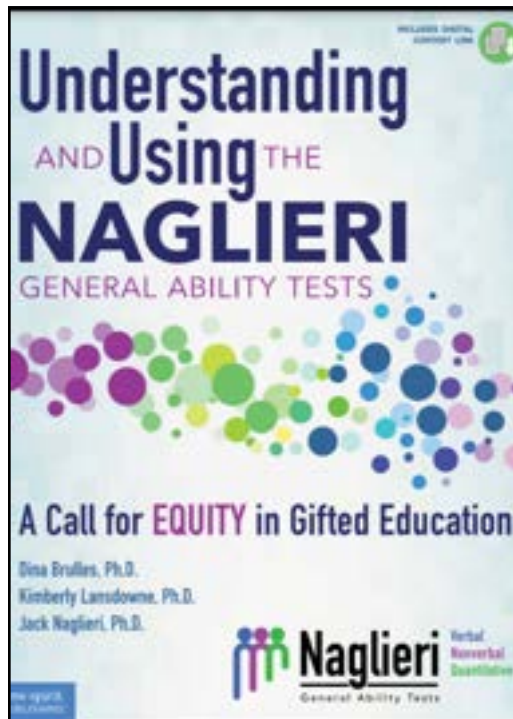
Services can be provided for those who otherwise would not have been identified

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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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For Additional Information See:

- www.NaglieriGiftedTests.com
- Brulles, Lansdowne and Naglieri (2022) book covering these and other topics:
 - Logistical Considerations
 - Understanding and Using Test Scores
 - Achieving Equity in Gifted Programming
 - Culturally Responsive Approaches for Reaching and Teaching All Gifted Learners





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

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Questions ?

SHARE YOUR *thoughts*



FINAL THOUGHTS!
dreamstime.com

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Helpful Links



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Understanding
Using
NAGLIERI

What to Look for After Scoring

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