

Fair Gifted Identification by Selecting Equitable Tests and Using Local as well as National Norms

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The BIG picture

- Equitable Identification of gifted students is a critical issue
- Intelligence tests have played an important role in gifted identification and led to exclusion of students of color
- Understanding WHY we measure intelligence the way we do helps us understand what makes a test equitable
- It is important to differentiate test BIAS from test EQUITY
- Test EQUITY is about the CONTENT of the test questions (e.g., Vocabulary et al.,)
- Tests can be evaluated based on EQUITY
- The most equitable tests measure how well a student can THINK in a way that is not influenced by EXPOSURE; what they KNOW

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The Topics for Today

- Measure Thinking not Knowing
- Historical Context
- Naglieri General Ability Tests: Verbal, Nonverbal and Quantitative
- Utility of the Naglieri General Ability Tests
- Closing remarks

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Traditional IQ and Achievement Tests

- Working as a school psychologist in 1975 noticed that some of the questions on the Wechsler intelligence tests were VERY similar to questions on the achievement tests (e.g., Vocabulary et al.,)
- It seemed wrong to measure 'intelligence' using questions that clearly demanded knowledge
- Shouldn't an intelligence test measure thinking rather than knowing?



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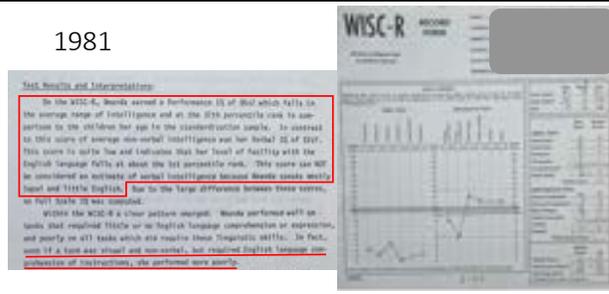
How and Why...

- First job as assistant professor at Northern Arizona University - 1979



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1981



Naglieri, J. A. (1982). Does the WISC-R measure verbal intelligence for non-English speaking children? *Psychology in the Schools*, 19, 478-479. THE ANSWER IS NO !

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 ____?

Naglieri's Nonverbal Tests: 1985 to Present

- **First and Second Versions**

- The goal was to provide efficient ways to evaluate *general ability* for ALL students and especially "intellectually gifted children from disadvantaged backgrounds (Naglieri, 1985, p. 3)."
- Two options: The MAT: Expanded Form for individual and the MAT: Short Form for group administration.

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)

Naglieri's Nonverbal Tests : 1985 to Present

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

- The MAT was rebranded as the Naglieri Nonverbal Ability Test Multilevel (NNAT) and released as a group administered test.
- **Initial Research Findings:**
- Naglieri, J. A., & Ronning, M. E. (2000). The Relationships between General Ability Using the NNAT and SAT Reading Achievement. *Journal of Psychoeducational Assessment, 18*, 230-239. **STRONG CORRELATION WITH ACHIEVEMENT**
- Naglieri, J. A., & Ronning, M. E. (2000). Comparison of White, African-American, Hispanic, and Asian Children on the Naglieri Nonverbal Ability Test. *Psychological Assessment, 12*, 328-334. **TRIVIAL DIFFERENCES BY RACE AND ETHNICITY**
- Naglieri, J., & Ford, D. Y. (2003). Addressing Under-representation of Gifted Minority Children Using the Naglieri Nonverbal Ability Test (NNAT). *Gifted Child Quarterly, 47*, 155-160. **SIMILAR % OF BLACK, WHITE & HISPANICS FOUND USING THE NNAT**

Naglieri's Nonverbal Tests : 1985 to Present

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

NNAT –individual (2003) for one-on-one testing and two forms

The NNAT individual Validity:

- Similar scores by race, ethnicity and ELL status and students with hearing impairment
- Strong correlation with the Ravens Progressive Matrices (.78), TONI-3 (.63), WISC-IV Matrix Reasoning (r = .62)

Naglieri's Nonverbal Tests : 1985 to Present

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

The NNAT2 Validity:

- Strong correlation with OLSAT8 (r = .67, N = 592)
- Strong correlation with Reading & Math (SAT10) (r = .65, N = 2,552)
- Small differences between race/ethnicity and ELL and matched samples)
- Strong correlation with the Wechsler Nonverbal Scale (r = .74) for gifted students.

Naglieri's Nonverbal Tests: 1985 to Present

- **Research on Six Versions of the Naglieri Nonverbal Tests**

Each of these versions of the NNAT showed similar scores by RACE, ETHNICITY, & SEX and had strong correlation with achievement

This research convinced me that measuring intelligence using test questions that measured how well a student can think was a valid and equitable way to measure general intelligence 'g'.

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., & Bardsos, 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.

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Two Questions:

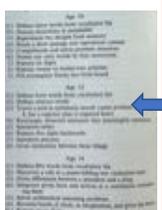
1. Why do we measure ability the way we do?
2. Do the tests measure thinking or knowing?

The early history of IQ tests provides the answers



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Stanford-Binet → Army Mental Tests → Today

- Binet scales: in 1905, 1908 and the 1911
- Binet: "a number of items in the 1908 scale were omitted...because they seemed to depend too much on school learning" (Freeman, 1955, p. 110)
- Terman added items dependent upon school learning in his 1916 Stanford-Binet:
 - Vocabulary
 - Ability to read and comprehend text
 - Similarities between words
 - Arithmetic word problems
- Terman's scale was criticized - too heavily weighted with verbal...penalizing [those] who had been handicapped in developing...the English language (Freeman, p. 127)
- Terman's response: "intelligence at the verbal and abstract levels is the highest form of mental ability" (Freeman, p. 127)
- Terman's student ARTHUR OTIS drove US ARMY tests

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Alpha & Beta → Wechsler Included Knowledge



- Army Alpha**
 - Synonym-Antonym
 - Disarranged Sentences
 - Number Series
 - Arithmetic Problems
 - Analogies
 - Information
- Army Beta**
 - Maze
 - Cube Imitation
 - Cube Construction
 - Digit Symbol
 - Pictorial Completion
 - Geometrical Construction

Verbal & Quant IQ (Knowledge)

Nonverbal IQ (Thinking)

WISC, WJ CogAT & Otis-Lennon

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Very Similar Items on "Different" Tests



Woodcock-Johnson Cognitive & Achievement Tests (CHC)

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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 & Comprehension 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

Pintner
(Intelligence Testing, 1923)

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

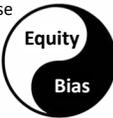


A question on Wechsler's Information subtest

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

Test	White	Black	Hispanic	Asian	Other
Stanford-Binet-5	115.0	105.0	108.0	112.0	110.0
WISC-V	110.0	100.0	105.0	110.0	108.0
WJ-IV	112.0	102.0	107.0	111.0	109.0
KABC-II	113.0	103.0	108.0	112.0	110.0
OLSAT	114.0	104.0	109.0	113.0	111.0
CogAT	115.0	105.0	110.0	114.0	112.0

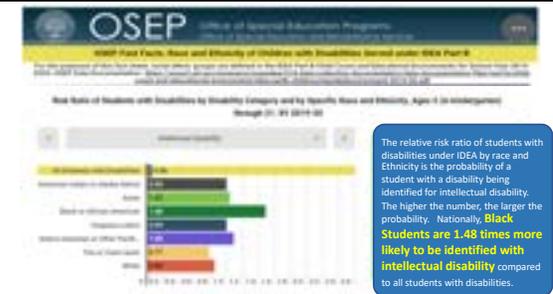
See Brulle, D., Lansdowne, K. & Nagleri, J. A. (2022). *Understanding and Using the Nagleri General Ability Tests: A Call to Equity in Gifted Education*. Minneapolis, MN: Free Spirit Publishing for more details.

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**

Race and Ethnicity	N in Public Schools (N=20,000)	% Potentially Gifted (20%)	N Potentially Gifted	% Identified	N Identified	Difference
White	10,000,000	20%	2,000,000	10%	200,000	1,800,000
Black	2,000,000	20%	400,000	5%	20,000	380,000
Hispanic	3,000,000	20%	600,000	3%	30,000	570,000
Native American	1,000,000	20%	200,000	1%	10,000	190,000
Alaska Native	500,000	20%	100,000	0.5%	5,000	95,000
Pacific Islander	500,000	20%	100,000	0.5%	5,000	95,000
Other	2,000,000	20%	400,000	1%	40,000	360,000
Total	20,000,000	20%	4,000,000	7%	362,305	3,637,695

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



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/

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-n>

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

That is the Practical Impact of flawed intelligence tests

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The Topics for Today

- Measure Thinking not Knowing
- Historical Context
- Naglieri General Ability Tests: Verbal, Nonverbal and Quantitative
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- Closing remarks

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



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Learn More NaglieriGATests.com

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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)

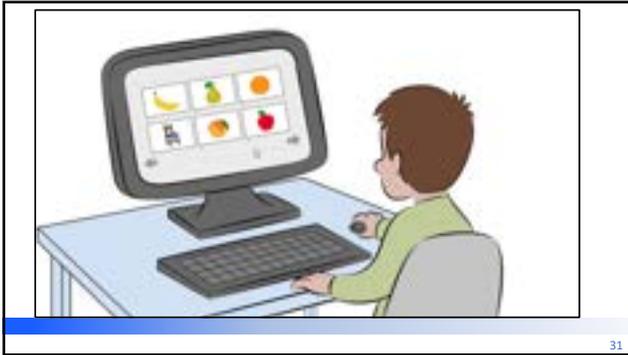
The Naglieri-V measures general ability using pictures of objects representing verbal concepts. The items are comprised of universally recognized pictures that do not rely on knowledge acquired in academic settings.

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.



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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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Naglieri General Ability Test - Nonverbal

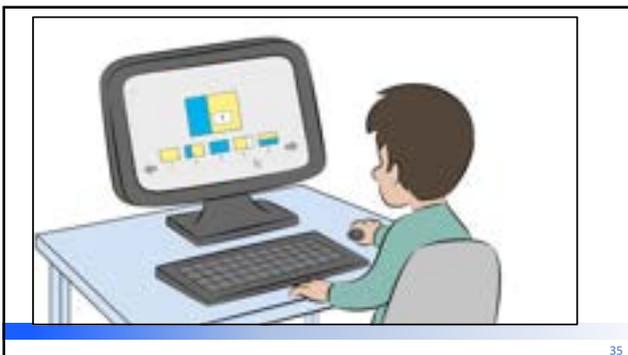
The Naglieri-NV measures general ability using questions that require a student to recognize the relationships among the shapes.

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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General Ability Tests, *Not* Multiple Abilities



"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 (Pintner, 1923 p. 53)".

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

General Ability **not** verbal or nonverbal intelligences !



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Three Research Studies (2022)

Salvamanan, M., Paolozza, A., Solomon, J., Naglieri, J. A., & Schmidt, M. T. (submitted for publication, 2022). Race, Ethnic, Gender, and Parental Education Level Differences on Verbal, Nonverbal, and Quantitative Naglieri General Ability Tests: Achieving Equity.

<p>• VERBAL SAMPLE</p> <ul style="list-style-type: none"> • 2,482 That closely matches the US population on key demographics <p>• GENDER</p> <ul style="list-style-type: none"> • No differences between males and females for raw score across all forms <p>• RACE/ETHNICITY</p> <ul style="list-style-type: none"> • No differences among White, Black, & Hispanic for raw score across all forms <p>• PARENTAL EDUCATION LEVEL</p> <ul style="list-style-type: none"> • 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 	<p>• NONVERBAL SAMPLE</p> <ul style="list-style-type: none"> • 3,630 That closely matches the US population on key demographics <p>• GENDER</p> <ul style="list-style-type: none"> • No differences between males and females for raw score across all forms <p>• RACE/ETHNICITY</p> <ul style="list-style-type: none"> • No differences among White, Black, & Hispanic for raw score across all forms <p>• PARENTAL EDUCATION LEVEL</p> <ul style="list-style-type: none"> • 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 	<p>• QUANTITATIVE SAMPLE</p> <ul style="list-style-type: none"> • 2,841 That closely matches the US population on key demographics <p>• GENDER</p> <ul style="list-style-type: none"> • No differences between males and females for raw score across all forms <p>• RACE/ETHNICITY</p> <ul style="list-style-type: none"> • No differences among White, Black, & Hispanic for raw score across all forms <p>• PARENTAL EDUCATION LEVEL</p> <ul style="list-style-type: none"> • 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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Race and Ethnic Differences by Ability Test

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 bias with academic content that show large mean score differences are not equitable and are unfair.

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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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The Topics for Today

- The Fundamental Weakness
- Historical Context
- Naglieri General Ability Tests: Verbal, Nonverbal and Quantitative
- Utility of the Naglieri General Ability Tests
- Closing remarks

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Naglieri General Ability Tests: V, NV, Q

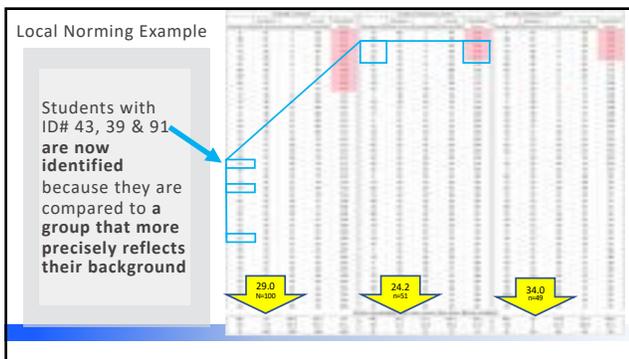
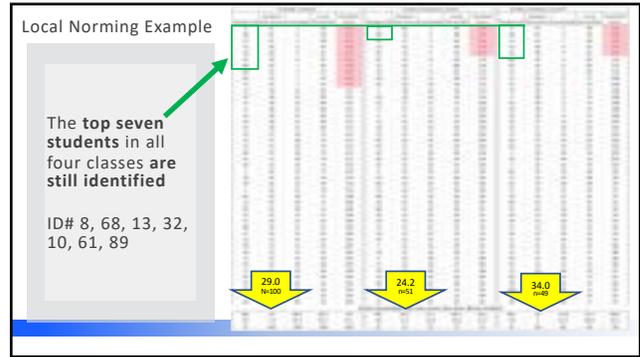
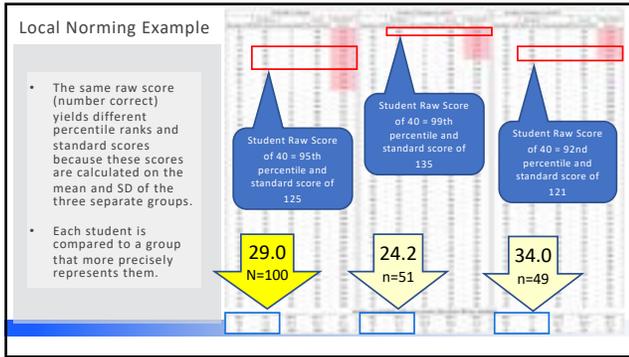
- Initial release (mid 2022) was for those using LOCAL NORMS
- NOTE: All tests that require knowledge which were normed before COVID are likely impacted by the learning loss that has occurred
- These three tests are the ONLY measures of general ability that were normed on a post covid population
- It is best to do universal *testing of all students*
- Local norms are currently available and national norms have been made and now are being integrated into the online portal
 - Both types of norms have value

Local Norming Example

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.

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What is the Practical Impact?

Focus on General Ability because Verbal, Nonverbal, Quantitative and other scales on intelligence tests are NOT different types of intelligence

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The Topics for Today

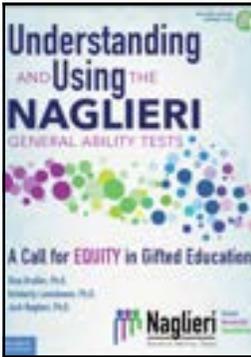
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Summary: Equitable Assessment of Intelligence

- 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



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

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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