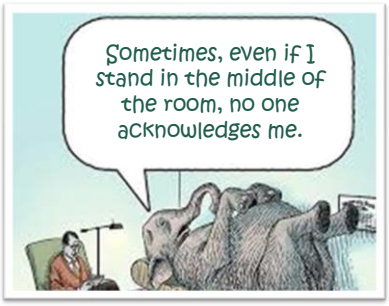
# *Equitable Identification of Gifted Students in the Era of BLM*

**Jack A. Naglieri, Ph.D.**
University of Virginia




**Mystery Number is 848,400**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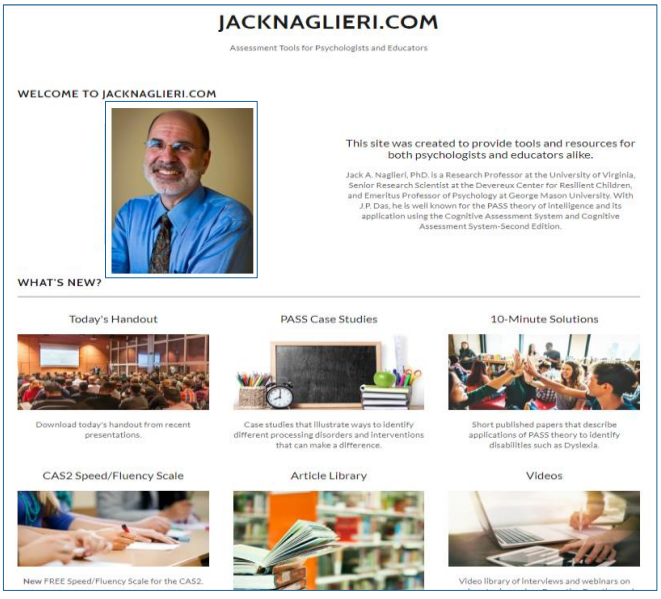


FOR MORE INFORMATION
PLEASE GO TO MY WEB PAGE

2

2

# How Are You Feeling?


3

3

## Feeling Overwhelmed?

## Mindful Breathing


4

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One of the great challenges in this world is to know enough about a subject to think your right; but not enough about the subject to know your wrong!

# Neil deGrasse Tyson

5

5

# Traditional IQ and Achievement Tests

- Working as a school psychologist in 1975 I noticed that items on the WISC we were VERY similar to parts of the achievement tests
  - In fact the *Peabody Individual Achievement Test* (1970) had a General Information and Arithmetic subtests JUST LIKE THE WISC!
  - THAT DID NOT MAKE SENSE
  - In 1977 → UGA for Ph.D. w A. S. Kaufman who said VIQ=achievement
  - THAT made sense!

1975 Charles Champagne Elementary, Bethpage, NY

6

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# How and Why…

- First year as assistant professor at NAU - 1982
  - Lecture on Navajo Indians
  - Testing on the Havasupai Indian Reservation
- First Research Article
  - Naglieri, J. A. (1982). Does the W non-English speaking children? *P*
- First Test - 1985
  - Matrix Analogies Tests Individual
- First Books
  - Essentials of CAS Assessment (Na
  - Helping All Gifted Students Learn

7

7

# Tests Created with Equity as a Goal


1. Naglieri, J. A. (1985). Matrix *Analogies Test - Expanded Form*. San Antonio: The Psychological Corporation.
2. Naglieri, J. A. (1985). Matrix *Analogies Test - Short Form*. San Antonio: The Psychological Corporation.
3. Naglieri, J. A. (1997). Naglieri *Nonverbal Ability Test.* San Antonio, TX: The Psychological Corporation.
4. Naglieri, J. A., & Bardos, A. N. (1997). General *Ability Scale for Adults (GAMA* San Antonio, TX: Pearson.
5. Naglieri, J. A., & Das, J. P. (1997). Cognitive *Assessment System*. *Austin: ProEd*.
6. Naglieri, J. A. (2003). Naglieri *Nonverbal Ability Test - Individual Form.* San Antonio, TX: Pearson.
7. Wechsler, D., & Naglieri, J. A. (2006). *Wechsler Nonverbal Scale of Ability*. San Antonio, TX: Pearson.
8. Naglieri, J. A. (2008). *Naglieri Nonverbal Ability Test – 2nd Edition.* San Antonio, TX: Pearson.
9. Naglieri, J. A., Das, J. P., & Goldstein, S. (2014). *Cognitive Assessment System Second Edition*. Austin, TX: ProEd.
10. Naglieri, J. A. (2016). *Naglieri Nonverbal Ability Test – Third Edition*. San Antonio, TX: Pearson.
11. Naglieri, J. A., Moreno, M. A., & Otero, T. M. (2017). *Cognitive Assessment System – Español*. Austin, TX: ProEd.
12. Kaufman, J. C., Naglieri, J. A., & Reynolds, C. R. (2020). *Kaufman Multidimensional Assessment of Creativity*. Markham, Canada: Multi-Health Systems.
13. Naglieri, J. A. (2021). *Naglieri General Ability Test: Nonverbal*. Markham, CA: Multi-Health Systems.
14. Naglieri, J. A. & Brulles, D. (2021). *Naglieri General Ability Test: Verbal*. Markham, CA: Multi-Health Systems.
15. Naglieri, J. A. & Lansdowne, K. (2021). *Naglieri General Ability Test: Quantitative*. Markham, CA: Multi-Health Systems.


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## Equitable Identification of Gifted Students

- **CONCLUSIONS**
- Tests typically used to identify gifted/talented students require too much language and information:
  - language used in the **directions** (V, NV, Q)
  - Verbal and math knowledge required in the **questions** (V & Q)
  - Verbal expression to **answer** verbal questions(V)
- Students who come from low income families, are culturally different, or limited English skills are at disadvantage
- Many Hispanic and Black students are denied entry to gifted education and therefore they don't reach their potential
- BUT…WE CAN and **MUST** DO BETTER especially **NOW**!

9

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## Ideas to Consider


Gifted Identification

Ability Tests' Content

New General Ability Tests

Twice Exceptional Gifted Students

10

# Identification Methods Vary

- Parent and Teacher recommendation
- High scores on intelligence tests (CogAT, WISC, Binet, etc)
- High grades in school
- Universal testing
- National and local norms
- Rating scales of gifted behaviors
- Creativity measures
- A matrix of some of these methods

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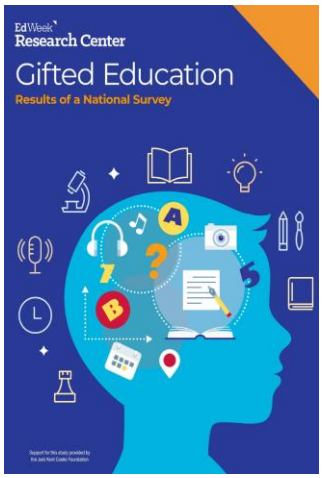
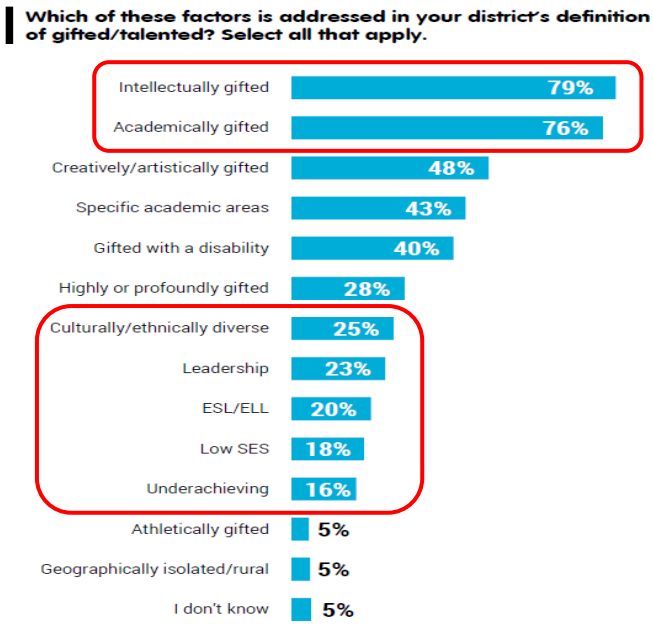
# National Survey

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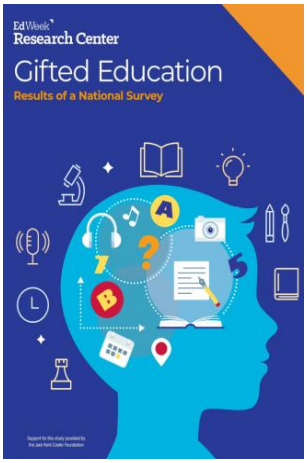
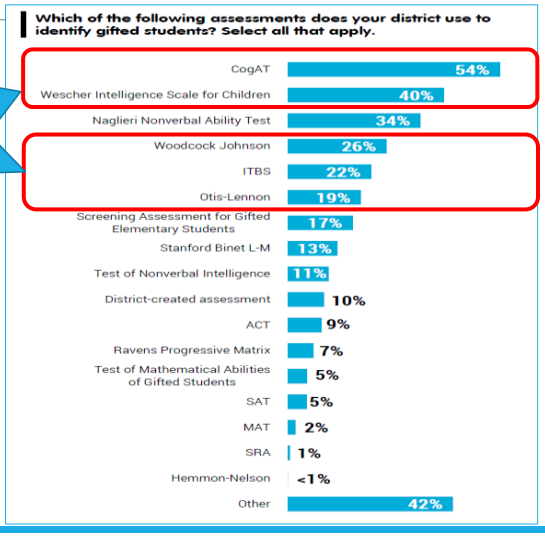
# National Survey of Gifted Education




These tests have verbal and quantitative questions



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# Obstacle to Equitable Identification

- Clarification of terms…
  - Gifted = very smart
  - Talented = very accomplished
- Identification procedures
  - Gifted/Talented students are often identified with traditional IQ tests comprised of subtests like Vocabulary, Similarities, Arithmetic, Comprehension which demand knowledge
  - Using a test of ability that demands knowledge of English and understanding verbal directions is not reasonable



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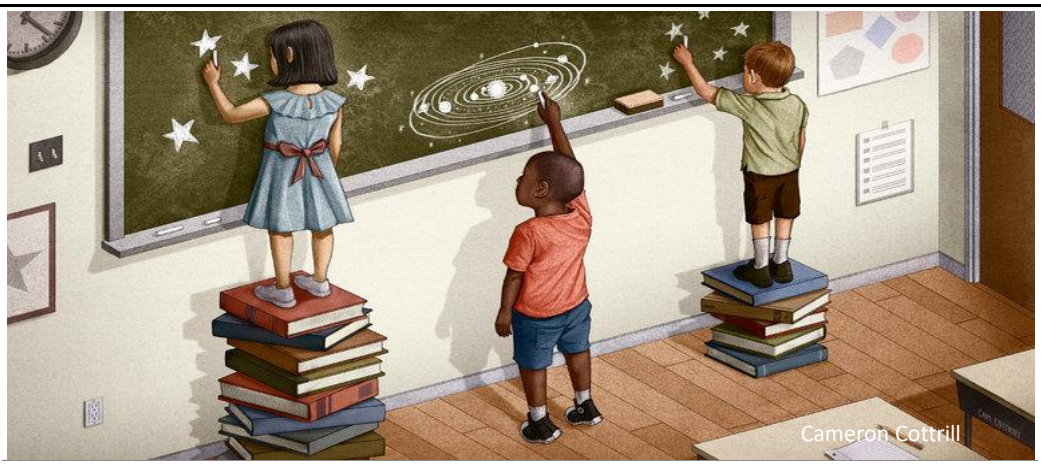


Why Talented Black and Hispanic Students Can Go Undiscovered
By SUSAN DYNARSKI APRIL 8, 2016

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# Devion

- Devion lived with his mother and father and two siblings in Springfield, Illinois
- The family has an annual income of $12,000
- At home, Devion often reads or does word puzzles while his friends play outside.
- He is writing a book of several chapters using the family's 10-year-old computer, which was bought second-hand for $100. It has a broken mouse.
- "I like to read books all day long,"
- He says. "I'm the only one I know that writes stories. It's a special secret I keep."

THE WALL STREET JOURNAL.

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*Brain Drain*

Initiative to Leave No Child Behind Leaves Out Gifted

Educators Divert Resources From Classes for Smartest To Focus on Basic Literacy

Blow to Bright Minority Kids

By Daniel Golden

SPRINGFIELD, Ill.—To make sure even the most disadvantaged students learn the three R's, Congress two years ago passed a law known as No Child Left Behind. National test scores suggest it is indeed helping the weakest students.

There's just one problem: It may be leaving behind some of the strongest.

The 2001 law, championed by the Bush administration, calls for all public-school students to be proficient in reading and math by 2014. Schools must make steady progress toward these goals. They face penalties if they don't continually raise their proportion of proficient students, both overall and within various racial and other categories. Schools that miss milestones can be required to pay for outside tutors and let parents transfer children elsewhere.

Devion Ross

But a school faces no penalty if top students fall off as long as they remain profi-

What's News—

*Business and Finance*

THE PARMALAT SCANDAL widened, with prosecutors saying company founder Calisto Tanzi is under investigation for misappropriating about $600 million. An Italian court Saturday declared the dairy company insolvent. Prosecutors believe Parmalat's complex global financial structure was the means by which the firm was able to mask the alleged fraud for years.

■ **Two Grant Thornton employees** are under scrutiny in connection with fraudulent documents related to their audits of a Cayman Islands-based Parmalat unit.

(Articles In Column 5 and on Page A2)

■ **The U.S. Holstein** infected with mad-cow disease might have originated in Canada. Meat companies and retailers are trying to recall beef from the cow.

■ **Some experts say** the risk of eating meat made from sick cattle remains unknown. Japan and other trading partners are unlikely to lift their bans on U.S. beef.

(Articles on Pages A3, A8, B1 and C6)

■ **Retail spending grew** a healthy 6.5% during the holiday shopping season, according to data showing MasterCard use.

(Article on Page B1)

■ **Corporate related-party deals** are attracting increased attention,

*World-Wide*

■ **U.S. AND OTHER AID POURED** into Bam, Iran's quake-blasted city. Death-toll estimates passed 22,000 after the 6.6-magnitude temblor hit the region of mud-brick structures Friday and aftershocks tumbled much of what initially survived. As many as 30,000 are injured and 100,000 are homeless. Despite policy divisions, the Bush administration dispatched seven planeloads of rescue workers and supplies. Such "earthquake diplomacy" can heal enmity. (Page A9)

*Lost to humanity is the Bam citadel, a maze of crenelated walls, towers, mosques and caravanserai that lay along the ancient Silk Road. Parts of the complex dated back 2,000 years.*

■ **Roadside bombs** killed two U.S. soldiers and two Iraqi children in and near Baghdad. On Saturday, a series of coordinated suicide attacks in Karbala left five Bulgarian and two Thai troops dead, as well as 12 Iraqis, including policemen. Four Americans died Friday. Japan said it would forgive most of what Iraq owes it if other Paris Club nations do likewise.

■ **North Korea confirmed** it is willing to hold a fresh round of nuclear-crisis talks with the U.S. and four other nations early in 2004. The announcement came in a weekend visit by a high-level Chinese diplomat.

■ **The chief U.N. atomic inspector** led teams in searching four Libyan nuclear-related sites, first fruits of Tripoli's renunciation of banned arms.

■ **Pakistan will go ahead** with next week's regional summit in Islamabad

*Project at Mint Draws Complaints From Many Quarters*

Commemorative State Coins, Meant to Spur Collecting, Inspire Free-for-Alls

By Brooks Barnes

Heads, it's George Washington. Tails, it's trouble.

These days, a growing number of two-bit battles are rattling the sleepy U.S. Mint. The federal agency's commemorative quarters program, a pocket-change salute to the 50 states, has pitted politicians, tourism officials and artists against each other in bruising battles. Launched in 1999 as a benign patriotic



**The Wisconsin quarter** *(above) that the Mint will issue next year. The design selected by a state panel (right) was nixed at the 11th hour, prompting controversy.*



gambit to revive coin-collecting, it's instead spurring peevish spats over custody of American icons and how states define themselves.

The question in Texas: Remember the Alamo—or the nine-banded armadillo to Illinois, a subcontinental compact

*Business Ties*

Many Companies Transactions W

'Related Party' Deals Disclosed By 300 Large Corporations; Potential for Conflict

Legacy of Family Ownership

By John R. Emshwiller

Before the misdeeds that would shatter Enron Corp. came fully into focus, then-Chief Executive Kenneth Lay was asked in August 2001 about a suspicious-looking arrangement: two partnerships run and partly owned by then-Chief Financial Officer Andrew Fastow that did significant business with Enron itself.

Wasn't there a glaring conflict of interest in Mr. Fastow acting on behalf of the huge energy concern and his own partnership in business deals totalling hundreds of millions of dollars?

"Almost all big companies have related-party transactions," Mr. Lay said.

He was right about that. Consider:

■ At Lear Corp., a large Southfield, Mich.-based auto-parts supplier, 17 relatives of senior officials are employed by or have business ties to the company, a group of family ties that the company failed to report until late last year de-Mich.-based auto-parts supplier, 17 relatives of senior officials are employed by or have business ties to the company, a group of family ties that the company failed to report until late last year de-Mich.-based auto-parts supplier, 17 relatives of senior officials are employed by or have business ties to the company, a group of family ties that the company

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# Wall Street Journal

- He scored **141** out of a possible 150 on the *Naglieri Nonverbal Ability Test*
- Devion's high *Naglieri* score brought him an invitation to attend the magnet school last year
- He was the only African-American at his elementary school to qualify for gifted services
- But there were problems
- Devion is NOT getting good grades in school
- He is uncooperative
  - Devion's teacher recently told the class to write to Mickey Mouse, congratulating the cartoon character on his 75th birthday. "Second-graders have to learn how to write a friendly letter," she said.
  - Devion said the assignment bored him. He said: "I could write 100 pages about Pokemon. A whole book."
- His teacher did not think he should be in the gifted program

What happened to Devion?

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# Devion Graduates High School

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# Devion Graduates High School


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# Gifted Identification

- This presentation is about children who may not have the academic skills or command of the English language to do well in school, yet they are very smart – **gifted**
- These children can become very **talented** given the opportunity to learn
- There are many children like this in our country, and their numbers are growing
- **TESTS used for Gifted and Talented identification?**

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# Testing Gifted Students

- Quantitative tests are often contaminated with English
  - Math word problems require reading and understanding the language used as well as comprehension
- Verbal tests are contaminated with knowledge of English
  - Vocabulary, Similarities, Word Analogies, etc.
- Nonverbal tests get around these problems
- Measure ability using tests that do not demand English and have minimal requirement of formal learning – But using what concept of ability????

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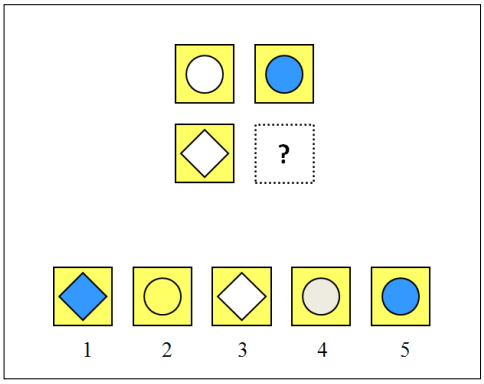
# These questions require General Ability!




Which word is different:
girl dog chair fish ?

3 is to 6 as 5 is to _____?

$C^7$ is to F as $E^7$ is to____?

Despite the differences in content, each of these questions requires understanding the relationships among parts.

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## General Ability

- Even though the tasks were different in content (shapes, words, numbers) they all rely on **general ability (*g*)** as described by Spearman, Wechsler and many others
- The reason is that they all require understanding relationships among things or ideas

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## Measure Thinking not Knowledge

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


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


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# Conclusion: Test content does not define a type of ability

## Questions or thoughts

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## Ideas to Consider:

## Who conceived the content of our IQ tests

"The hardest part of learning something new is not embracing new ideas, but letting go of old ones."

- Todd Rose, *The End of Average*

Gifted Identification

Ability Tests' Content –

WHERE DID IT COME FROM?

New General Ability Tests

Twice Exceptional Gifted Students

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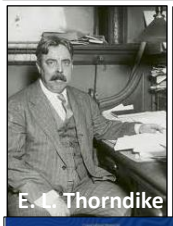
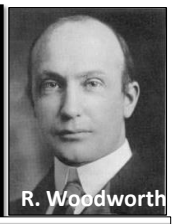
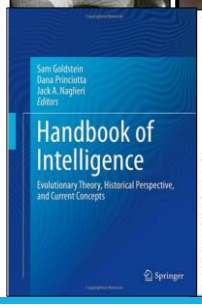
# Army Mental Testing (Yoakum & Yerkes)
## http://www.jacknaglieri.com/cas2.html









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

Jack A. Naglieri

Context

- 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

# Take this IQ Test

From: Psychological Examining in the United States Army (Yerkes, 1921, p. 213)

1. Bull Durham is the name of
2. The Mackintosh Red is a kind of
3. The Oliver is a
4. A passenger locomotive type is the
5. Stone & Webster are well know
6. The Brooklyn Nationals are called
7. Pongee is a
8. Country Gentleman is a kind of
9. The President during the Spanish War was
10. Fatima is a make of

1. **tobacco**
2. **fruit**
3. **typewriter**
4. **Mogul**
5. **engineers**
6. **Superbas**
7. **fabric**
8. **corn**
9. **Mckinley**
10. **cigarette**

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# Our Tests Demand Knowledge

| Stanford-Binet 5 | WISC-V | WJ-IV and Batería-IV (including Cross Battery) | K-ABC-II |
|---|---|---|---|
| • Verbal<br>• Knowledge<br>• Quantitative Reasoning<br>• Vocabulary<br>• Verbal Analogies | • Verbal Comprehension: Vocabulary, Similarities, Information & Comprehension<br>• Fluid Reasoning: Figure Weights, Arithmetic | • Comprehension Knowledge: Vocabulary & General Information<br>• Fluid Reasoning: Number Series & Concept Formation<br>• Auditory Processing: Phonological Processing | • Knowledge / GC: Riddles, Expressive Vocabulary, Verbal Knowledge |

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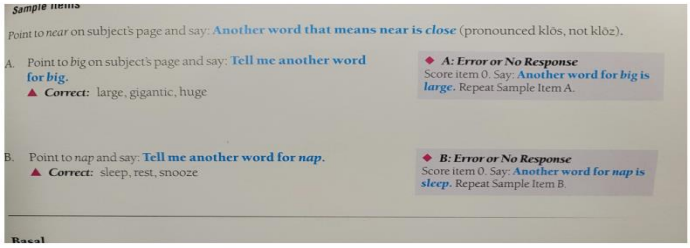
**WJ-IV Items from Cognitive and Achievement Tests:**

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

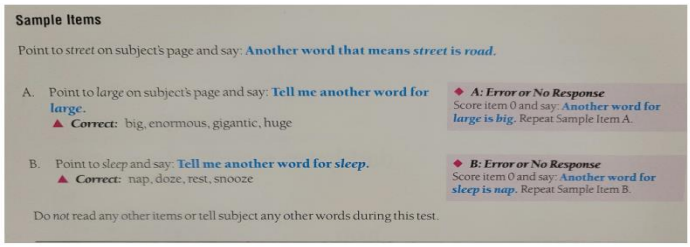
◆ ***A: Error or No Response***
Score item 0. Say: **Another word for *big* is *large*.** Repeat Sample Item A.

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





# 1920 Army Testing (Yoakum & Yerkes)

Note there is no mention of measuring verbal and nonverbal intelligences – **they saw a social justice issue…and today in the era a BLM the need is even more urgent**



Why Beta?

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.

# 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?

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

**WHY are so many of these students missed?**

## Number of Students Missed = 848,402

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 |

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** |

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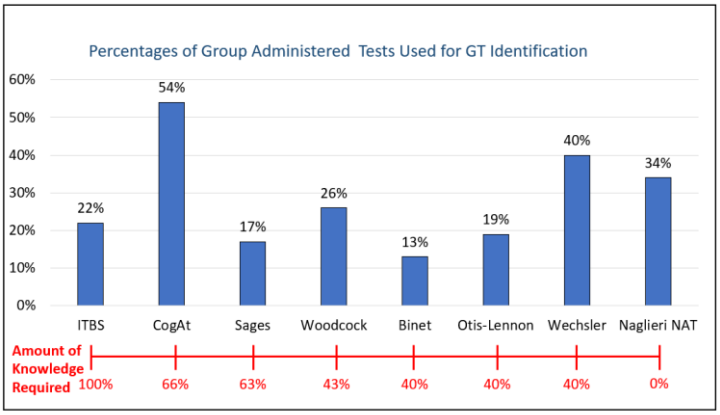


Usage data from: Kurtz, H., Harwin, A., Chen, V. & Furuya, Y. (2019). *Gifted education: Results of a national survey*. Bethesda, MD: Education Week Research Center.

# Thinking and Knowing Continuum

Race and ethnic differences on these ability tests…

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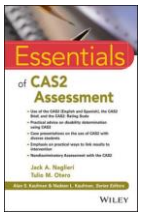
# Race & IQ (Naglieri & Otero, 2017)

- Even though these tests do not show psychometric bias (Worrell, 2019) they do yield large mean score differences by race




| | |
|---|---|
| **Traditional IQ tests** | |
| 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 |

Note: The data for these results are reported for the Stanford-Binet IV from Wasserman (2000); Woodcock-Johnson III from Edwards & Oakland (2006); Wechsler Intelligence Scale for Children – IV (WISC-IV) from O'Donnell (2009), WISC-V from Kaufman, Raiford & Coalson (2016).

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## Test Bias is present if there are group differences in ...

Researchers have defined psychometric bias using analysis of:

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

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

Crocker & Algina (1986). *Introduction to Classical & Modern Test Theory* (Hold, Rinehart & Winston)
Nunnally & Bernstein (1994). *Psychometric Theory* (McGraw-Hill)
Jensen (1980). *Bias in Mental Testing* (Free Press)
Brody (1992). *Intelligence* (Academic Press)



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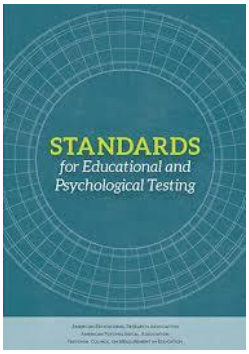
## Opportunity to learn and Equity

- *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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# Hispanic Children

Psychological Assessment
2004, Vol. 16, No. 1, 81–84


1040-3590/04/$12.00 DOI: 10.1037/1040-3590.16.1.81

BRIEF REPORTS

## Comparison of Hispanic Children With and Without Limited English Proficiency on the Naglieri Nonverbal Ability Test

Jack A. Naglieri
George Mason University

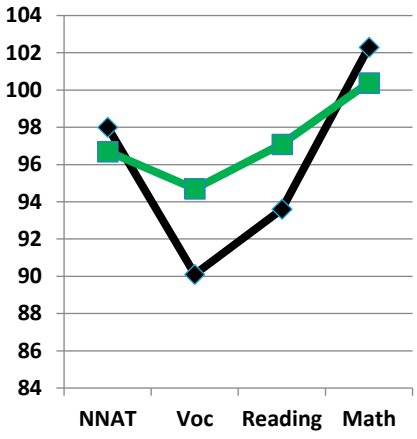
Ashley L. Booth
University of Virginia

Adam Winsler
George Mason University

Hispanic children with ($n$ = 148) and without ($n$ = 148) limited English proficiency were given the Naglieri Nonverbal Ability Test (NNAT; J. A. Naglieri, 1997a) and the Stanford Achievement Test—9th edition (SAT–9; 1995). The groups were selected from the NNAT standardization sample ($N$ = 22,620) and matched on geographic region, gender, socioeconomic status, urbanicity, and ethnicity. There was a very small difference ($d$ ratio = 0.1) between the NNAT standard scores for the children with limited English proficiency ($M$ = 98.0) and those without limited English proficiency ($M$ = 96.7). The NNAT correlated moderately and similarly with achievement for the 2 groups. The sample of children with limited English proficiency earned considerably lower scores on SAT–9 Reading and Verbal subtests. Results suggest that the NNAT may be useful for the assessment of Hispanic children with and without limited English proficiency.

Assessment of intelligence for persons with limited English language skills has been an important issue since the familiar verbal–nonverbal organization of tests was initially made popular in the Army Alpha and Beta tests (Yoakum & Yerkes, 1920). The value of a nonverbal test for evaluation of diverse populations was noted by Yoakum and Yerkes more than 80 years ago: "Men who fail in alpha [the verbal tests] are sent to beta [the nonverbal tests] in order that injustice by reason of relative unfamiliarity with English may be avoided" (p. 19). The Beta tests and other similar nonverbal tests have, therefore, served an important role in effective assessment of diverse populations because their content is

Recent research on the nonverbal approach to measuring general ability has shown that the Naglieri Nonverbal Ability Test (NNAT; Naglieri, 1997a) can be an effective way to assess general ability, yields small race and ethnic group differences, and shows good prediction of achievement. Naglieri and Ronning (2000a) provided a detailed study of mean score differences between matched samples of White ($n$ = 2,306) and Black ($n$ = 2,306), White ($n$ = 1,176) and Hispanic ($n$ = 1,176), and White ($n$ = 466) and Asian ($n$ = 466) children on the NNAT. Only small differences were found between the NNAT scores for the White and Black samples (Cohen's $d$








# NNAT's Small Race & Ethnic Differences

| | N | Mean | Diff |
|---|---|---|---|
| White | 2,306 | 99.3 | |
| Black | 2,306 | 95.1 | 4.2 |
| White | 1,176 | 101.4 | |
| Hispanic | 1,176 | 98.6 | 2.8 |
| White | 466 | 103.6 | |
| Asian | 446 | 103.0 | 0.3 |

Psychological Assessment
2000, Vol. 12, No. 3, 328–334


1040-3590/00/$5.00 DOI: 10.1037//1040-3590.12.3.328

## Comparison of White, African American, Hispanic, and Asian Children on the Naglieri Nonverbal Ability Test

Jack A. Naglieri and Margaret E. Ronning
Ohio State University

This study examined differences between 3 matched samples of White ($n$ = 2,306) and African American ($n$ = 2,306), White ($n$ = 1,176) and Hispanic ($n$ = 1,176), and White ($n$ = 466) and Asian ($n$ = 466) children on the Naglieri Nonverbal Ability Test (NNAT; J. A. Naglieri, 1997a). The groups were selected from 22,620 children included in the NNAT standardization sample and matched on geographic region, socioeconomic status, ethnicity, and type of school setting (public or private). There was only a small difference between the NNAT scores for the White and African American samples ($d$ ratio = .25) and minimal differences between the White and Hispanic ($d$ ratio = .17) and between the White and Asian ($d$ ratio = .02) groups. The NNAT was moderately correlated with achievement for the total sample and correlated similarly with achievement for the White and ethnic minority groups. The median correlation of NNAT with reading was .52 and NNAT with math was .63 across the samples. Results suggest that the NNAT scores have use for fair assessment of White and minority children.

# 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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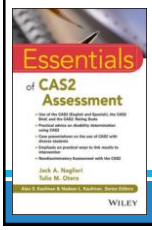
# Race & IQ

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




| 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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# Wechsler vs CAS for Students with ID

- ***White*** children earned the same mean scores on WISC-III and CAS
- ***Black*** children earned lower VIQ than PIQ scores due to language / achievement tasks → low Full Scale
- ***Black*** children earned ***higher*** scores on CAS than whites
- ***Fewer*** Black children would be identified as having intellectual disability based on Full Scale scores using CAS than WISC-III
- *THIS IS A SOCIAL JUSTICE ISSUE*.

*American Journal on Mental Retardation, 2001, Vol. 106, No. 4, 359–367*

**Intellectual Classification of Black and White Children in Special Education Programs Using the WISC-III and the Cognitive Assessment System**

**Jack A. Naglieri**
George Mason University

**Johannes Rojahn**
The Ohio State University






# Conclusion: Taking the knowledge out of ability tests improves equity

Questions?
Reactions?

## Ideas to Consider


Gifted Identification

Ability Tests' Content

New General Ability Tests

Twice Exceptional Gifted Students

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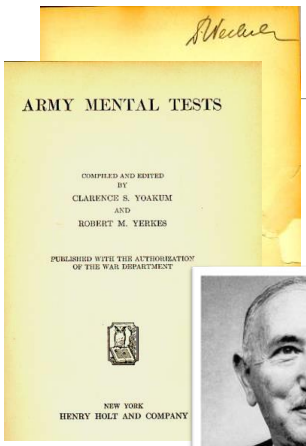


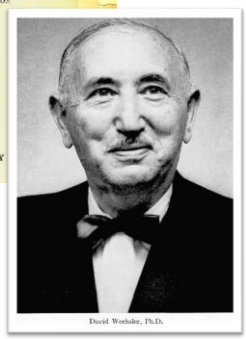


## Wechsler (1939)

- Built his IQ test on the Army Alpha and Beta
- His definition of intelligence was
  - "The aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment (1939)"
- but his test yielded a Verbal IQ and Performance IQ suggesting two types of intelligence

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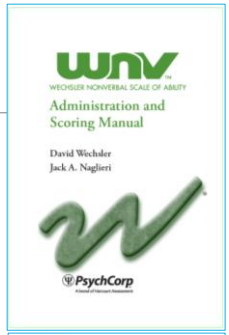
# Wechsler & Spearman's *g*

of nonverbal assessment many paces forward. In addition, the emphasis in the *WNV Manual* that the Full Scale measures *general ability nonverbally*—and *not* nonverbal ability—is an important distinction that further ties the WNV to Dr. Wechsler. Although his intelligence tests in the 1930s and 1940s departed from the one-score *Stanford-Binet* by offering separate Verbal and Performance IQs as well as a profile of scaled scores, Dr. Wechsler remained a firm believer in Spearman's *g* theory throughout his lifetime. He believed that his Verbal and Performance Scales represented different ways to access *g*, but he never believed in 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 hearing impairments, language disorders, or limited proficiency in English. And that is precisely what the WNV is intended to do.

Alan S. Kaufman, PhD
Clinical Professor of Psychology
Yale Child Study Center
Yale University School of Medicine





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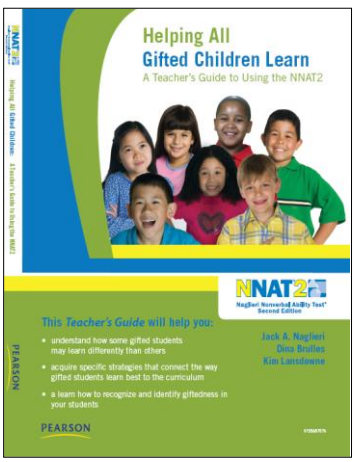
# General ability (Naglieri, Brulles & Lansdowne, 2009)

- General ability (i.e. '*g*')is what allows us to solve many 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.
- Verbal or Nonverbal describes the content of the test NOT a type of intelligence

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

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**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

The factor structure of the Wechsler Intelligence Scale for Children-Fifth Edition (WISC-V; Wechsler, 2014a) standardization sample (N = 2,200) was examined using confirmatory factor analyses (CFA) with maximum likelihood estimation for all reported models from the WISC-V *Technical and Interpretation Manual* (Wechsler, 2014b). Additionally, alternative bifactor models were examined and variance estimates and model-based reliability estimates (ω coefficients) were provided. Results from analyses of the 16 primary and secondary WISC-V subtests found that all higher-order CFA models with 5 group factors (VC, VS, FR, WM, and PS) produced model specification errors where the Fluid Reasoning factor produced negative variance and were thus judged inadequate. Of the 16 models tested, the bifactor model containing 4 group factors (VC, PR, WM, and PS) produced the best fit. Results from analyses of the 10 primary WISC-V subtests also found the bifactor model with 4 group factors (VC, PR, WM, and PS) produced the best fit. Variance estimates from both 16 and 10 subtest based bifactor models found dominance of general intelligence (g) in accounting for subtest variance (except for PS subtests) and large ω-hierarchical coefficients supporting general intelligence interpretation. The small portions of variance uniquely captured by the 4 group factors and low ω-hierarchical subscale coefficients likely render the group factors of questionable interpretive value independent of g (except perhaps for PS). Present CFA results confirm the EFA results reported by Canivez, Watkins, and Dombrowski (2015); Dombrowski, Canivez, Watkins, and Beaujean (2015); and Canivez, Dombrowski, and Watkins (2015).


# Support for 'g'

- The small portions of variance uniquely captured by [subtests]… render the group factors [scales]of questionable and support the value of general ability
- Present CFA results confirm the EFA results (Canivez, Watkins, & Dombrowski, 2015); Dombrowski, Canivez, Watkins, & Beaujean (2015); and Canivez, Dombrowski, & Watkins (2015).

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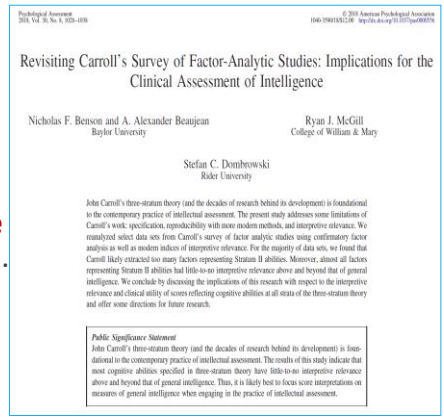
# Support for 'g': Research on CHC

- John Carroll's three-stratum theory … is foundational to the contemporary practice of intellectual assessment.
- **The results of this study indicate that most cognitive abilities specified in three-stratum theory have little-to-no interpretive relevance above and beyond that of general intelligence.**
- Thus, it is likely **best to focus score interpretations on measures of *general intelligence* when engaging in the practice of intellectual assessment.**



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

John Carroll's three-stratum theory (and the decades of research behind its development) is foundational to the contemporary practice of intellectual assessment. The present study addresses some limitations of Carroll's work: specification, reproducibility with more modern methods, and interpretive relevance. We reanalyzed select data sets from Carroll's survey of factor analytic studies using confirmatory factor analysis as well as modern indices of interpretive relevance. For the majority of data sets, we found that Carroll likely extracted too many factors representing Stratum II abilities. Moreover, almost all factors representing Stratum II abilities had little-to-no interpretive relevance above and beyond that of general intelligence. We conclude by discussing the implications of this research with respect to the interpretive relevance and clinical utility of scores reflecting cognitive abilities at all strata of the three-stratum theory and offer some directions for future research.

*Public Significance Statement*
John Carroll's three-stratum theory (and the decades of research behind its development) is foundational to the contemporary practice of intellectual assessment. The results of this study indicate that most cognitive abilities specified in three-stratum theory have little-to-no interpretive relevance above and beyond that of general intelligence. Thus, it is likely best to focus score interpretations on measures of general intelligence when engaging in the practice of intellectual assessment.

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# Research Supports General Ability


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

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

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

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

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

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

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Watkins, M. W., Dombrowski, S. C., & **Canivez, G. L.** (2017, October). Reliability and factorial validity of the **Canadian Wechsler Intelligence Scale for Children–Fifth Edition**. *International Journal of School and Educational Psychology*.






# Test Directions ALSO Matter

- *California Achievement Test & Iowa Test of Basic Skills* instructions include many basic concepts that students may not have mastered at the ages for which the tests were intended (Cummings & Nelson, 1980)
- Students' ability to recall directions presented orally was related to their working memory capacity. (Randall, Engle, Carullo, & Collins, 2015)
- CogAT *nonverbal* scale demands comprehension of *verbal* directions
  - The instructions for 5 and 6-year-olds contain approximately 400 words and many verbal concepts and complex verbal statements like: **The small circle goes with the large circle in the same way that the small square goes with the large square.**
- The inclusion of verbal concepts and strain on working memory are an obstacle for any student with limited verbal skills


## General Ability Revised

- Can we measure general ability using the V, NV, Q content with reduced verbal knowledge requirement?

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## Measuring Ability Equitably Using Verbal, Nonverbal and Quantitative Content

Naglieri General Ability Tests — Verbal Nonverbal Quantitative

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

The tests measure general ability using three types of content: Verbal (Naglieri & Brulles, 2021), Nonverbal (Naglieri, 2021) and Quantitative (Naglieri & Lansdowne, 2021)

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# *Naglieri General Ability Tests*

MHS
Beyond Assessments

- The *General Ability Tests* are group or individually administered using online or paper formats ages 4 to 18 published by Multi-Health System.
- Test items are presented using diagrams and pictures.
- The questions demand reasoning while requiring little to no academic content and can be solved regardless of the language(s) spoken by the student.
- Intended for identification of all students including those from diverse cultural, linguistic, or socioeconomic backgrounds, or those who have had limited educational experiences.


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# Description of the Verbal Measure of General Ability

Naglieri & Brulles (in preparation)

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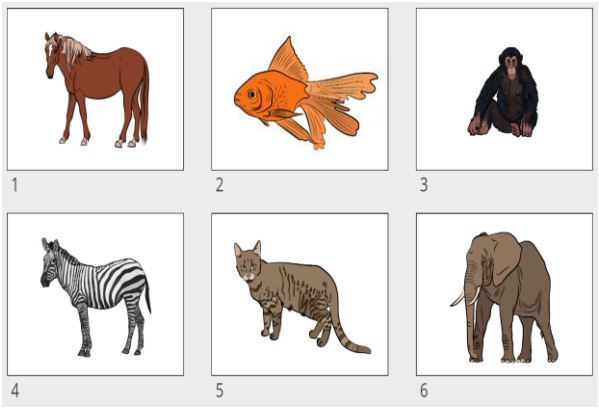
# Pictorial Instructions for All Students

- The instructions for the **online tests are presented in a video**
- Additional explanation is permitted as needed in all versions of the tests (as done in CAS2)
  - Naglieri Verbal (Naglieri & Brulles, 2021)
  - Naglieri Nonverbal (Naglieri, 2021)
  - Naglieri Quantitative: (Naglieri & Lansdowne, 2021)
- A LOOK at the three measures and their validity



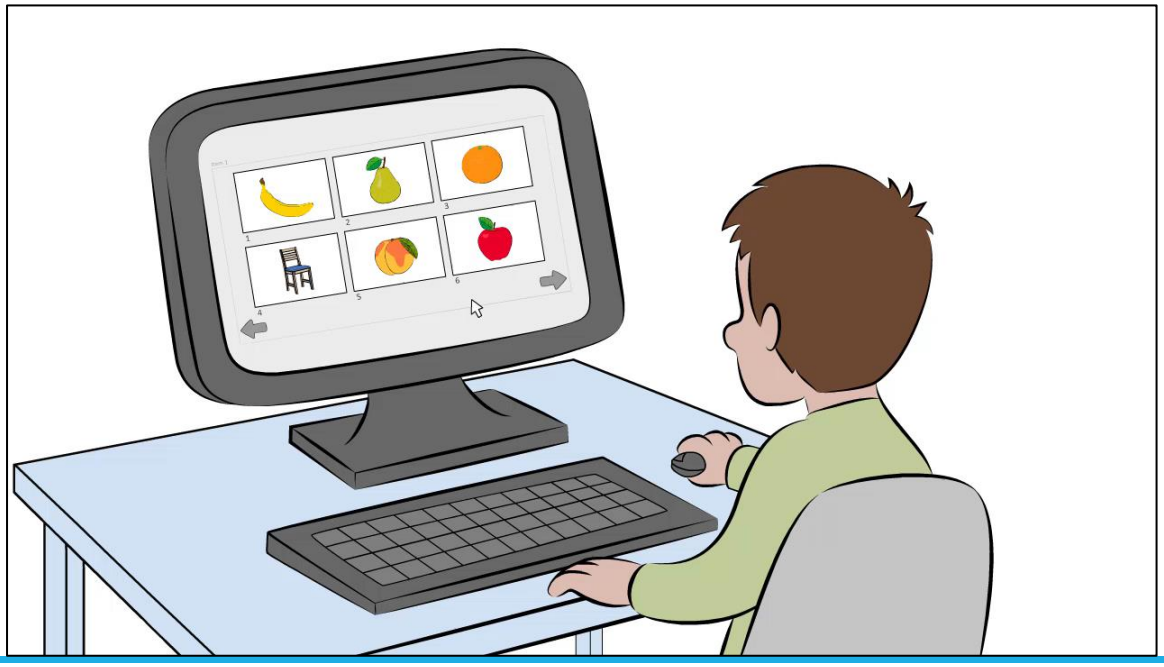


# Naglieri Ability Test - Verbal




- 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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# Verbal Pilot Study Results (2019)

- **SAMPLE**
  - 2,482 That closely matches the US population on key demographics
- **GENDER**
  - No difference 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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# Description Of The Nonverbal Measure Of General Ability

Naglieri (2021)



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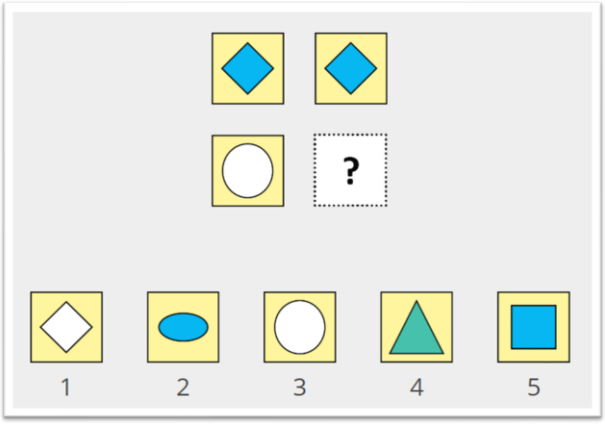
## Naglieri Ability Test - Non-verbal




- 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



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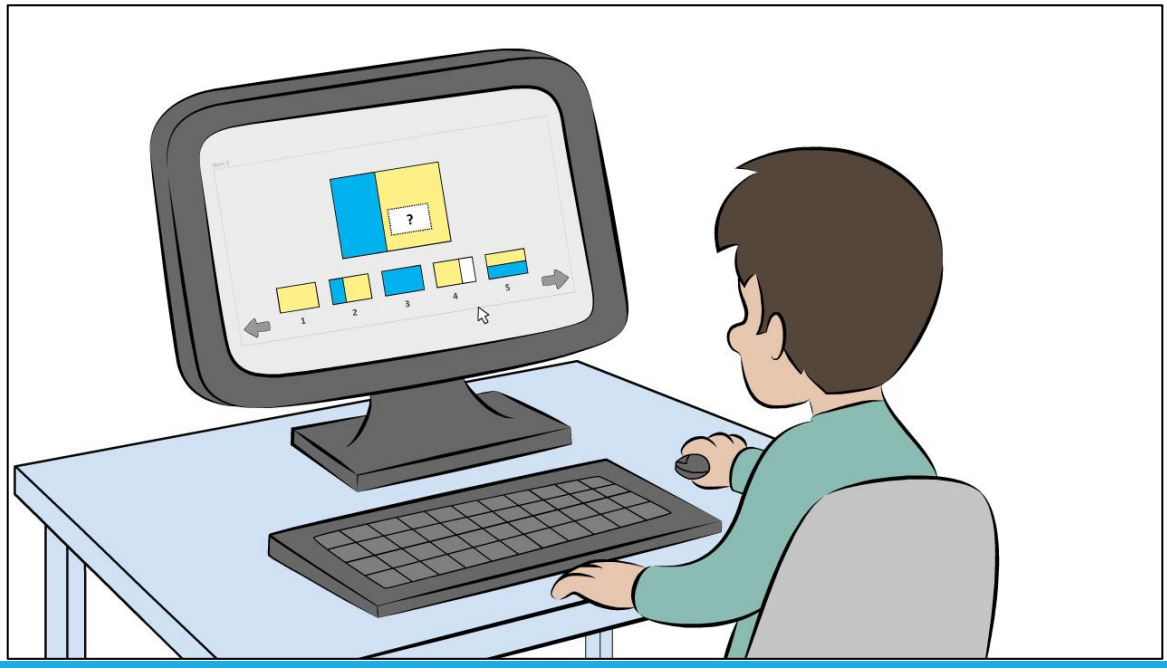

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63

# Nonverbal Pilot Study Results (2019)

- **SAMPLE**
  - 3,630 That closely matches the US population on key demographics
- **GENDER**
  - No difference 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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# Description of the Quantitative Measure of General Ability



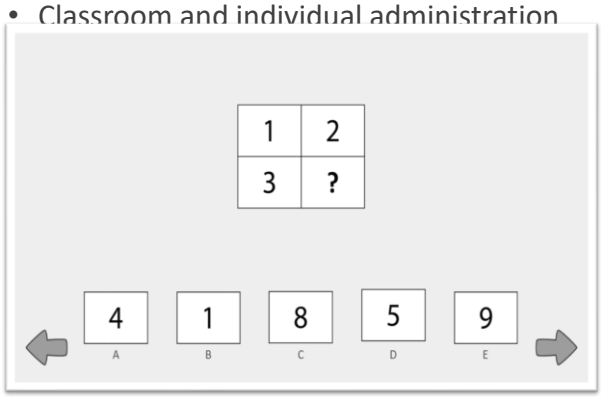


## Naglieri Ability Test - Quantitative

- 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





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# Quantitative Pilot Study Results (2019)

- **SAMPLE**
  - 2,841 That closely matches the US population on key demographics
- **GENDER**
  - No difference 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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# Naglieri General Ability Tests Release

- The three tests will be released in 2021 for application using local norms
- Data collection for generation of national reference group will resume as soon as it is possible
- We know we have highly reliable measures that work well across ages

Naglieri Verbal Nonverbal Quantitative
General Ability Tests

**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** |

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# How to Equitably Identify Gifted

- Do **universal screening** with ability tests that do not require knowledge of English
- Use the Verbal, Nonverbal and Quantitative test scores to help ensure that every student had the opportunity to demonstrate their ability.
- These tests will help increase participation of under-served populations if they are used properly…

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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

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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# Local Norming Procedure for V, NV, & Q

- 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
- Rank order the students' raw scores on the V, NV & Q tests
  - Raw scores can be converted to percentile or standard scores as desired
- Determine a cut-score based on the number of students the GT program can accommodate
- Evaluate the outcome

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# Gifted Identification using Traditional IQ

- WE CAN devise Verbal and Quantitative tests that can be solved regardless of the language a student speaks with nonverbal directions and no verbal expression required…AND they provide an equitable approach to assessment.

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Questions or thoughts ?

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## Ideas to Consider


- Gifted Identification
- Ability Tests' Content
- New General Ability Tests
- Twice Exceptional Gifted Students

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## Twice Exceptional

- Tests of general ability are **not** sufficient for assessment of students who may be gifted and have a specific learning disability (SLD), autism, ADHD, etc.
- Most defensible way to assess for a SLD, for example, is to use the *Cognitive Assessment System-Second Edition (CAS2)* for the following reasons
  - CAS2 measures 'basic psychological processes' – the key to uniting the definition of SLD with the method of detecting it, it yields the smallest race difference, yields profiles for special populations, predicts achievement better than any other tests and has implications for instruction

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School Psychology Quarterly
2011, Vol. 26, No. 4, 305–317


1045-3830/11/$12.00 DOI: 10.1037/a0025973

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

Gary L. Canivez
Eastern Illinois University

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

*Keywords:* CAS, construct validity, hierarchical exploratory factor analysis, Schmid–Leiman higher-order analysis, structural validity

# Support for PASS Scales

- "…compared to the WISC–IV, WAIS–IV, SB–5, RIAS, WASI, and WRIT, the CAS subtests had less variance apportioned to the higher-order general factor (g) and *greater proportions of variance apportioned to first-order (PASS…) factors*.
- This is consistent with the subtest selection and construction in an attempt to measure PASS dimensions linked to PASS theory … and neuropsychological theory (Luria)." (p. 311)

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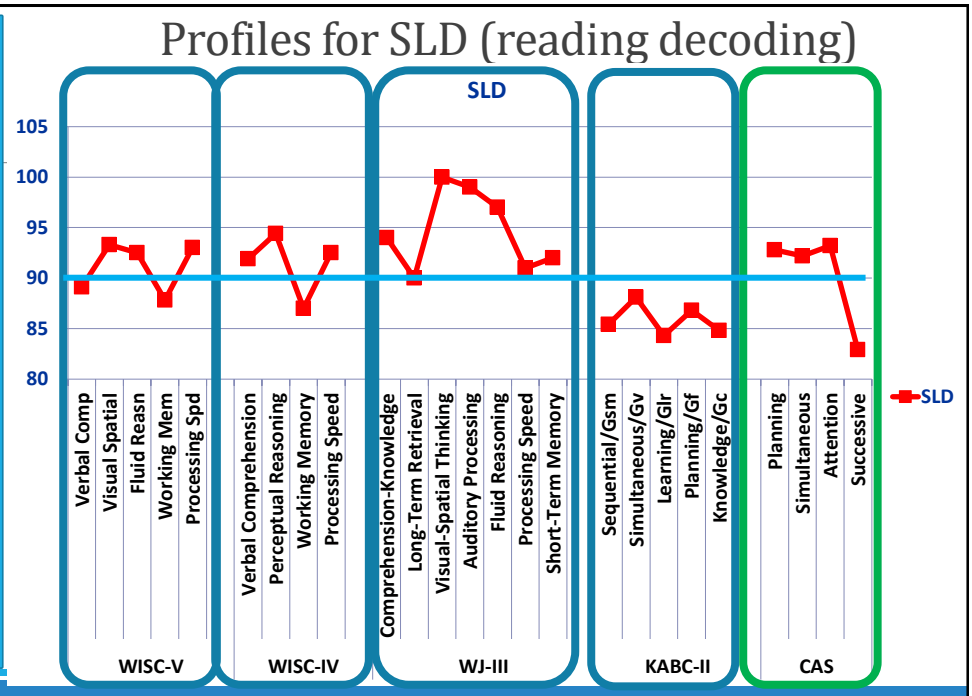
Profiles on all these widely used ability tests show that PASS scores from the CAS are sensitive to the cognitive component that underlies READING DECODING failure (Successive Processing)

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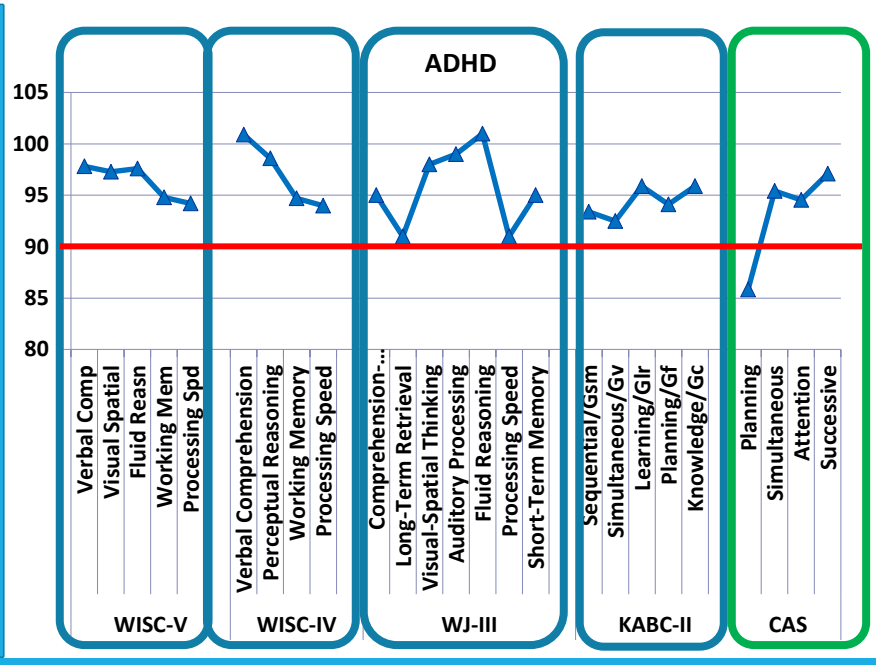
Profiles on all these widely used ability tests show that PASS scores from the CAS are sensitive to the cognitive component of ADHD Hyperactive / Combined Type (Planning)

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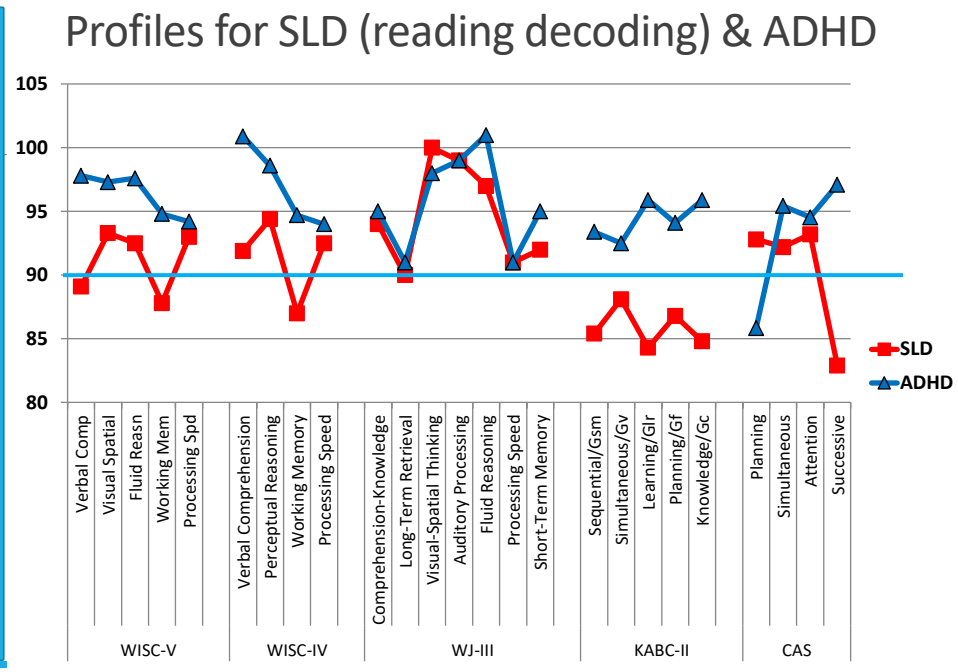
Looking at SLD and ADHD profiles on all these tests is very revealing…PASS works

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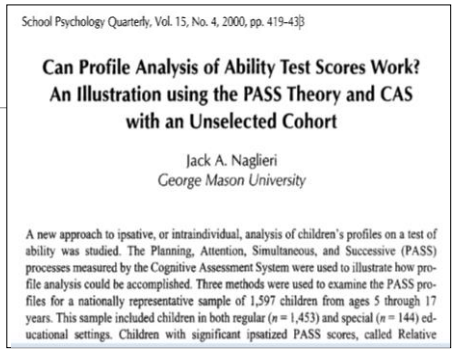
# Research on PASS Profiles

Students receiving special education were more than four times as likely to have at least one PASS weakness and a comparable academic weakness than those in regular education

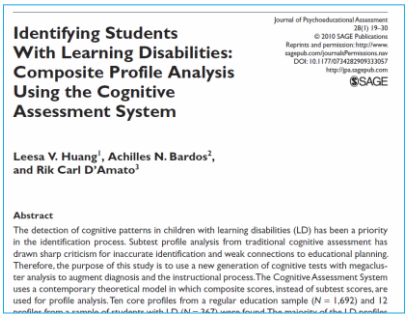


School Psychology Quarterly, Vol. 15, No. 4, 2000, pp. 419–433

**Can Profile Analysis of Ability Test Scores Work? An Illustration using the PASS Theory and CAS with an Unselected Cohort**

Jack A. Naglieri
*George Mason University*

A new approach to ipsative, or intraindividual, analysis of children's profiles on a test of ability was studied. The Planning, Attention, Simultaneous, and Successive (PASS) processes measured by the Cognitive Assessment System were used to illustrate how profile analysis could be accomplished. Three methods were used to examine the PASS profiles for a nationally representative sample of 1,597 children from ages 5 through 17 years. This sample included children in both regular ($n$ = 1,453) and special ($n$ = 144) educational settings. Children with significant ipsatized PASS scores, called Relative



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DOI: 10.1177/0734282909333057
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**Identifying Students With Learning Disabilities: Composite Profile Analysis Using the Cognitive Assessment System**

Leesa V. Huang[1], Achilles N. Bardos[2], and Rik Carl D'Amato[3]

**Abstract**

The detection of cognitive patterns in children with learning disabilities (LD) has been a priority in the identification process. Subtest profile analysis from traditional cognitive assessment has drawn sharp criticism for inaccurate identification and weak connections to educational planning. Therefore, the purpose of this study is to use a new generation of cognitive tests with megacluster analysis to augment diagnosis and the instructional process. The Cognitive Assessment System uses a contemporary theoretical model in which composite scores, instead of subtest scores, are used for profile analysis. Ten core profiles from a regular education sample ($N$ = 1,692) and 12 profiles from a sample of students with LD ($N$ = 367) were found. The majority of the LD profiles

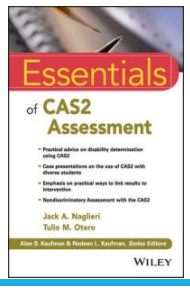
"Ten core profiles from a regular education sample (N = 1,692) and 12 profiles from a sample of students with LD (N = 367) were found.





# Correlations: We can do better!

Average correlations between IQ Scales with total achievement scores from *Essentials of CAS2 Assessment* Naglieri & Otero (2017)



Essentials of CAS2 Assessment

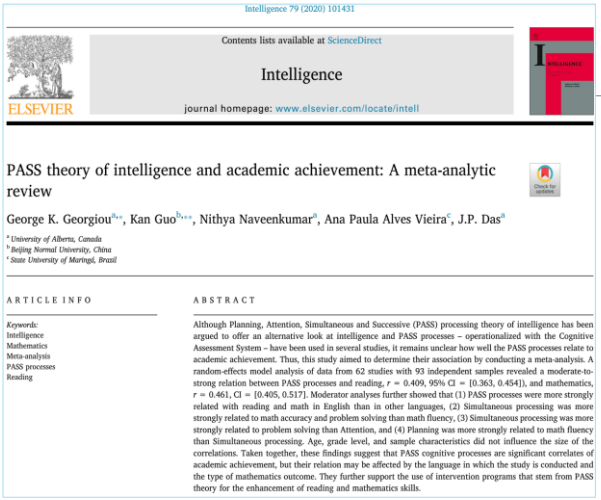
Jack A. Naglieri
Tulio M. Otero

WILEY

| Correlations Between Ability and Achievement Test Scores | | | Average Correlation: All Scales | Average Correlation: Scales without achievement |
|---|---|---|---|---|
| WISC-V | Verbal Comprehension | .74 | | |
| WIAT-III | Visual Spatial | .46 | | |
| N = 201 | Fluid Reasoning | .40 | | |
| | Working Memory | .63 | | |
| | Processing Speed | .34 | .53 | .47 |
| WJ-IV COG | Comprehension Knowledge | .50 | | |
| WJ-IV ACH | Fluid Reasoning | .71 | | |
| N = 825 | Auditory Processing | .52 | | |
| | Short Term Working Memory | .55 | | |
| | Cognitive Processing Speed | .55 | | |
| | Long-Term Retrieval | .43 | | |
| | Visual Processing | .45 | .54 | .50 |
| KABC | Sequential/Gsm | .43 | | |
| WJ-III ACH | Simultaneous/Gv | .41 | | |
| N = 167 | Learning/Glr | .50 | | |
| | Planning/Gf | .59 | | .48 |
| | Knowledge/GC | .70 | .53 | |
| CAS | Planning | .57 | | |
| WJ-III ACH | Simultaneous | .67 | | |
| N=1,600 | Attention | .50 | | |
| | Successive | .60 | | .59 |

Note: WJ-IV Scales Comp-Know= Vocabulary and General Information; Fluid Reasoning = Number Series and Concept Formation; Auditory Processing = Phonological processing.

Note: All correlations are reported in the ability tests' manuals. Values were averaged within each ability test using Fisher z transformations.



Intelligence 79 (2020) 101431

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journal homepage: www.elsevier.com/locate/intell

PASS theory of intelligence and academic achievement: A meta-analytic review

George K. Georgiou[a,*], Kan Guo[b,**], Nithya Naveenkumar[a], Ana Paula Alves Vieira[c], J.P. Das[a]

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[c] State University of Maringá, Brasil

ARTICLE INFO

*Keywords:*
Intelligence
Mathematics
Meta-analysis
PASS processes
Reading

ABSTRACT

Although Planning, Attention, Simultaneous and Successive (PASS) processing theory of intelligence has been argued to offer an alternative look at intelligence and PASS processes – operationalized with the Cognitive Assessment System – have been used in several studies, it remains unclear how well the PASS processes relate to academic achievement. Thus, this study aimed to determine their association by conducting a meta-analysis. A random-effects model analysis of data from 62 studies with 93 independent samples revealed a moderate-to-strong relation between PASS processes and reading, $r = 0.409$, 95% CI = [0.363, 0.454]), and mathematics, $r = 0.461$, CI = [0.405, 0.517]. Moderator analyses further showed that (1) PASS processes were more strongly related with reading and math in English than in other languages, (2) Simultaneous processing was more strongly related to math accuracy and problem solving than math fluency, (3) Simultaneous processing was more strongly related to problem solving than Attention, and (4) Planning was more strongly related to math fluency than Simultaneous processing. Age, grade level, and sample characteristics did not influence the size of the correlations. Taken together, these findings suggest that PASS cognitive processes are significant correlates of academic achievement, but their relation may be affected by the language in which the study is conducted and the type of mathematics outcome. They further support the use of intervention programs that stem from PASS theory for the enhancement of reading and mathematics skills.

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

# PASS Research

- "The results clearly show that when CAS Full Scale is used it correlates **.60 with reading** and **.61 with mathematics**."
- "**These correlations are significantly stronger … than the correlations reported in previous meta-analysis for other measures of intelligence** (e.g., Peng et al., 2019; Roth et al., 2015)…(e.g., WISC) that include tasks (e.g., Arithmetic, Vocabulary)…"
- "if we **conceptualize intelligence as … cognitive processes that are linked to the functional organization of the brain**" it leads to significantly higher relations with academic achievement."
  - "and these processes have direct implications for instruction and intervention…"





# A Study of Gifted Students

- N = 142
  - Similar numbers of girls and boys in Grade 4, 5 and 6.
  - all native speakers of English
  - came from families of middle to upper-middle socioeconomic background
- Identified according to this definition:
  - "Giftedness is exceptional potential and/or performance across a wide range of abilities in one or more of the following areas: general intellectual, specific academic, creative thinking, social, musical, artistic and kinesthetic" (Alberta Education, 2012, p. 6).

# A Study of Gifted Students

- Tests given
  - WASI –II (Vocabulary and Matrix Reasoning)
  - Woodcock-Johnson III (WJ-III; Woodcock, McGrew, & Mathers, 2001) Broad Reading score from: Letter-Word Identification, Reading Fluency, and Passage Comprehension
  - Cognitive Assessment System (CAS; Naglieri & Das, 1997) to measure PASS neurocognitive processes

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# A Study of Gifted Students

WASI-II FSIQ slightly higher than CAS FS - but CAS shows more variability

- Average WASI-III Full Scale and CAS Full scale were similar but CAS standard deviation and range was higher

Table 1
Descriptive Statistics for WASI-II, WJ-III Achievement, and Cognitive Assessment System (CAS) Scores ($N$ = 142)

| Variable | *Mean* | *SD* | *Min* | *Max* |
|---|---|---|---|---|
| **WJ-III Achievement** | | | | |
| **Broad Reading** | **125** | 14 | 97 | 166 |
| **Broad Math** | **116** | 13 | 91 | 162 |
| **Mean WJ** | **117** | 10 | 94 | 152 |
| **WASI-II FSIQ** | **123** | 8 | 105 | 145 |
| **CAS Full Scale** | **118** | 12 | 91 | 148 |
| **Planning** | **110** | 12 | 77 | 146 |
| **Simultaneous** | **121** | 16 | 88 | 152 |
| **Attention** | **113** | 13 | 79 | 141 |
| **Successive** | **111** | 11 | 81 | 137 |

86

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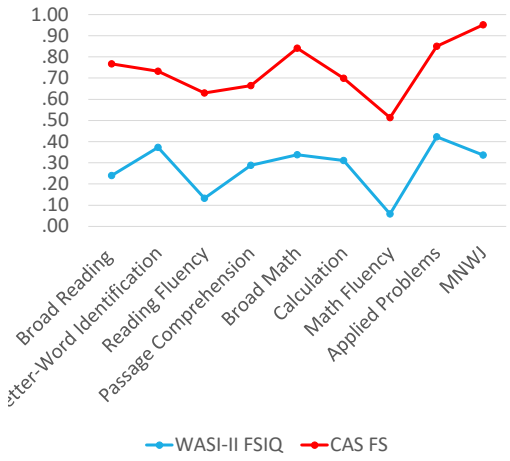
# A Study of Gifted Students

**CAS Full Scale scores correlated significantly higher with WJ-III achievement scores than the WASI-II**

Table 2
Pearson Correlations of WASI-II FSIQ, Cognitive As

| | WASI-II FSIQ | CAS FS |
|---|---|---|
| **Broad Reading** | **.24** | **.53** |
| **Broad Math** | **.34** | **.50** |
| **Mean WJ-III** | **.34** | **.62** |

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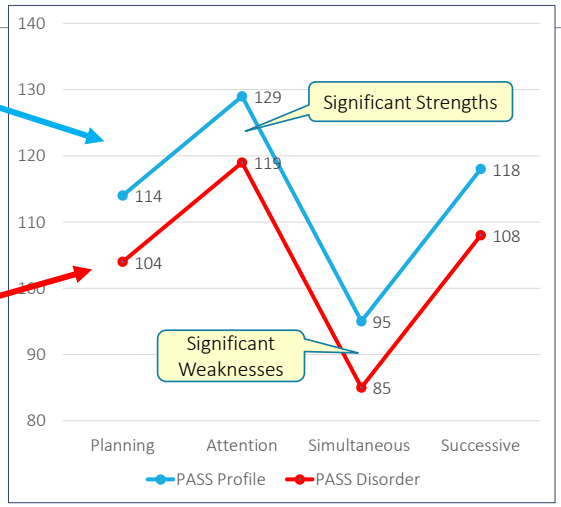
# Two Types of PASS Profiles

- Two sets of PASS scores were studied
  - Significant variation in relation to student's average has instructional relevance
  - Significant variation in relation to student's average AND a standard score less than 90 (< 25th %tile) supports designation as SLD

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# A Study of Gifted Students

- 54% of gifted students had a PASS score that was significantly different from that student's average PASS score
  - That means the students has a specific neurocognitive processing strength or weakness (i.e., learning profile)

Table 3.

Percentages of Gifted Students with Significant Variability in PASS Standard Scores (N = 142).

| | | Planning | Simultaneous | Attention | Successive | PASS |
|---|---|---|---|---|---|---|
| PASS Weakness | n | 25 | 6 | 18 | 28 | 77 |
| | % | 18% | 4% | 13% | 20% | 54% |
| PASS Strength | n | 7 | 58 | 13 | 12 | 90 |
| | % | 5% | 41% | 9% | 8% | 63% |

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# A Study of Gifted Students

- The number of gifted students who have a PASS score that is significantly different from that student's average PASS score AND the score is < 90; and with low achievement score.

These students have a specific PASS processing weakness less than 90; suggesting instructional modifications

Percentages of Gifted Students with Significant Variability in PASS and Achievement Test Scores (N = 142).

| | | Planning | Simultaneous | Attention | Successive | PASS |
|---|---|---|---|---|---|---|
| PASS <90 | n | 4 | 0 | 4 | 4 | 12 |
| | % | 3% | 0% | 3% | 3% | 8% |
| PASS & Skills <90 | n | 3 | 0 | 2 | 1 | 6 |
| | % | 2% | 0% | 1% | 1% | 4% |

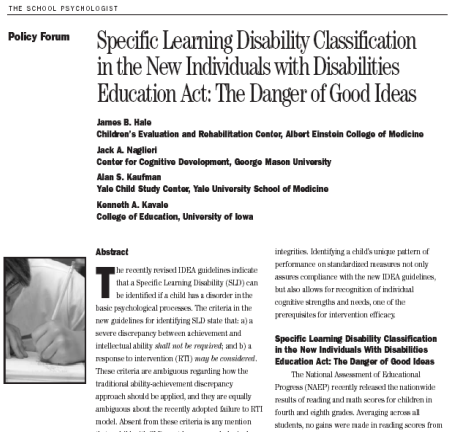
These students with low PASS scores AND low WJ-III achievement indicates a Specific Learning Disability

90

90

## Hale, Naglieri, Kaufman, & Kavale (2004)

- The IDEA definition of SLD is
  - "… a disorder in 1 or more of the basic psychological processes … [that results] in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations."
- "Establishing a disorder in the basic psychology processes is *essential* for determining SLD"



THE SCHOOL PSYCHOLOGIST

Policy Forum

**Specific Learning Disability Classification in the New Individuals with Disabilities Education Act: The Danger of Good Ideas**

**James B. Hale**
**Children's Evaluation and Rehabilitation Center, Albert Einstein College of Medicine**
**Jack A. Naglieri**
**Center for Cognitive Development, George Mason University**
**Alan S. Kaufman**
**Yale Child Study Center, Yale University School of Medicine**
**Kenneth A. Kavale**
**College of Education, University of Iowa**

**Abstract**

The recently revised IDEA guidelines indicate that a Specific Learning Disability (SLD) can be identified if a child has a disorder in the basic psychological processes. The criteria in the new guidelines for identifying SLD state that: a) a severe discrepancy between achievement and intellectual ability *shall not be required*, and b) a response to intervention (RTI) *may be considered*. These criteria are ambiguous regarding how the traditional ability-achievement discrepancy approach should be applied, and they are equally ambiguous about the recently adopted failure to RTI model. Absent from these criteria is any mention integrities. Identifying a child's unique pattern of performance on standardized measures not only assures compliance with the new IDEA guidelines, but also allows for recognition of individual cognitive strengths and needs, one of the prerequisites for intervention efficacy.

**Specific Learning Disability Classification in the New Individuals With Disabilities Education Act: The Danger of Good Ideas**

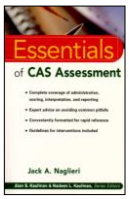
The National Assessment of Educational Progress (NAEP) recently released the nationwide results of reading and math scores for children in fourth and eighth grades. Averaging across all students, no gains were made in reading scores from

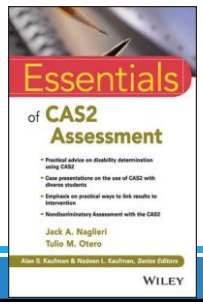




## Discrepancy Consistency Method (DCM)

- The Discrepancy Consistency Method (DCM) was first introduced in 1999 (most recently in 2017)




***Pattern of Strengths and Weaknesses Using the Discrepancy/Consistency Method for SLD Determination***

Three methods for detecting a pattern of strengths and weaknesses (PSW) that can be used as part of the process of identifying a student with a specific learning disability (SLD) have been suggested by Naglieri in 1999, Hale and Fiorello in 2004, and by Flanagan, Ortiz, and Alfonso in 2007. These authors share the same goal: to present a procedure to detect a PSW in scores that can be used to identify an SLD (sometimes referred to as a third option; Zirkel & Thomas, 2010). Despite differences in the composition of the scores used and the definitions of what constitutes a basic psychological process, these methods all rely on finding a combination of differences as well as similarities in scores across academic and cognitive tests. Our approach to operationalizing a PSW is called the Discrepancy/Consistency Method (DCM) for the identification of SLD. Determining SLD is essentially based on the combination of PASS and achievement test scores. The method involves a systematic examination of variability of PASS and academic

**DON'T FORGET 3.5**

The essence of the Discrepancy/Consistency Method is two discrepancies and one consistency.

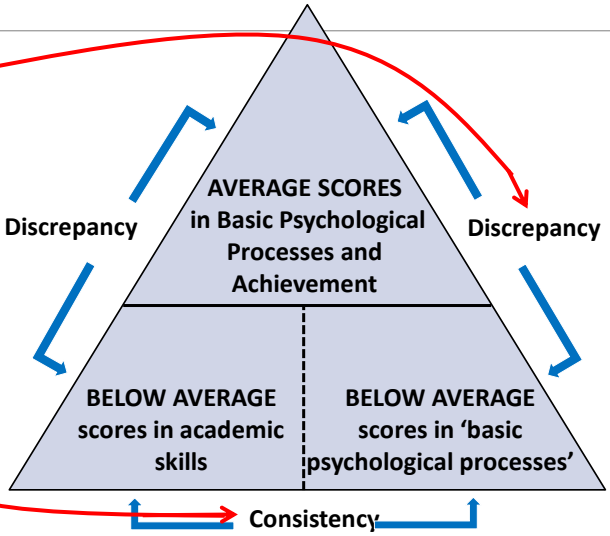
**Discrepancy 1:**
Significant variability among the PASS scores indicating a weakness in one or more of the basic psychological processes

**Discrepancy 2:**
Significant difference between high PASS scores and low achievement test scores

**Consistency:**
No significant difference between low PASS scores and low achievement

## Discrepancy Consistency Method (DCM)

- **Discrepancy** between high and low processing scores
- **Discrepancy** between high processing and low achievement
- **Consistency** between low processing and low achievement

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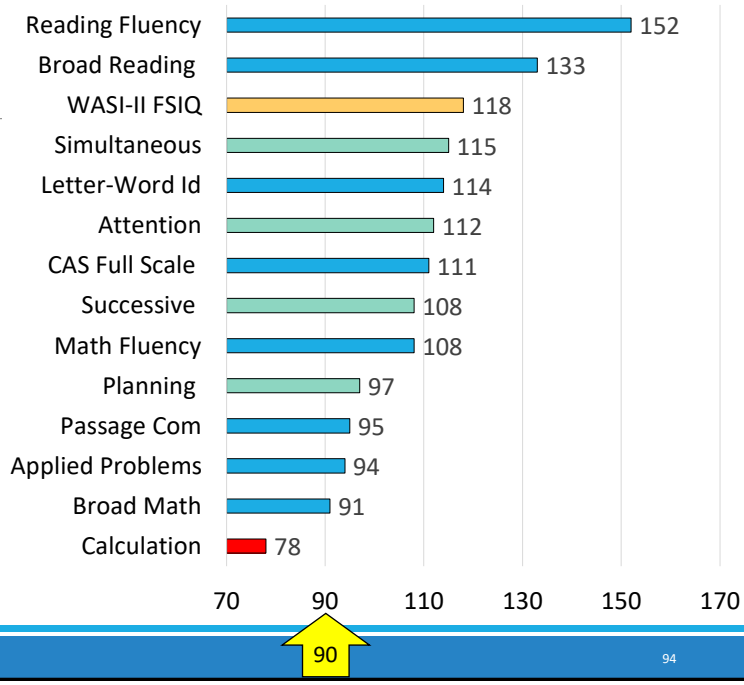
## Case Study #1

- Planning is significantly below the PASS average score but still Average
- Calculation is below 90 (25th %tile rank)
- NOT SLD but PASS does inform instruction

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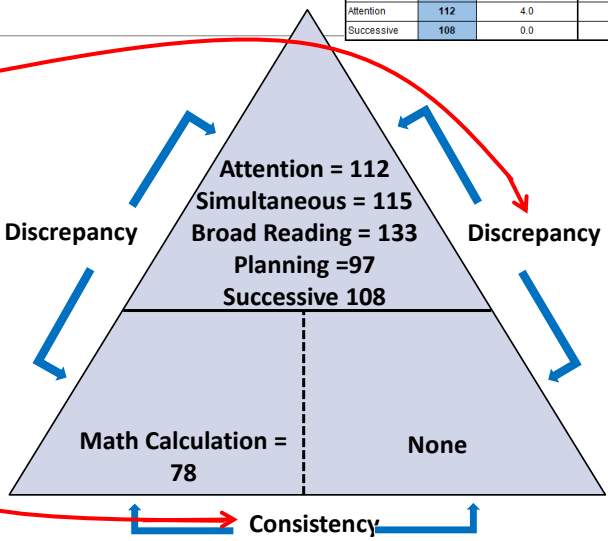
## Discrepancy Consistency Method (DCM)

- **Discrepancy** between high and low processing scores
- **Discrepancy** between high processing and low achievement
- **Consistency** between low processing and low achievement

Differences Between PASS Scale Standard Scores and the Student's Average PASS Score (p = .05) for the CAS2 12-Subtest EXTENDED battery.

| Cognitive Assessment System-2 | | PASS Mean & Differences: | Significantly Different (at p = .05) from PASS Mean? | Strength or Weakness |
|---|---|---|---|---|
| PASS Scales | Standard Score | 108.0 | | |
| Planning | 97 | -11.0 | yes | |
| Simultaneous | 115 | 7.0 | no | |
| Attention | 112 | 4.0 | no | |
| Successive | 108 | 0.0 | no | |

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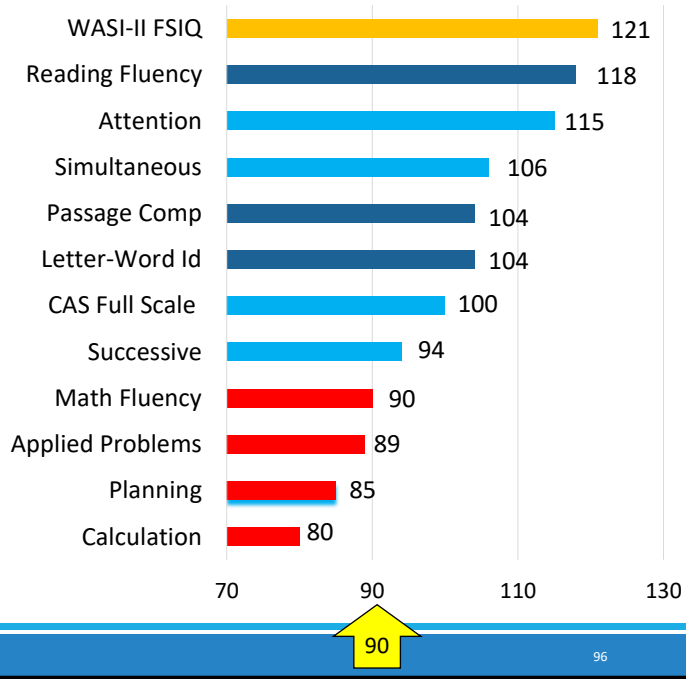
## Case Study #2

- This illustrates a studen with scores <90 (25%til in basic psychological processing and academ achievement
- This is an example of a *Specific Learning Disability and gifted based on WASI-II FSIQ*

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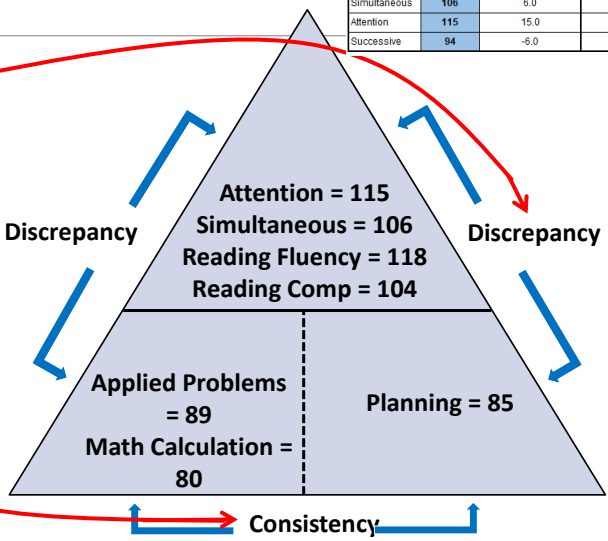
## Discrepancy Consistency Method (DCM)

- **Discrepancy** between high and low processing scores
- **Discrepancy** between high processing and low achievement
- **Consistency** between low processing and low achievement

**Differences Between PASS Scale Standard Scores and the Student's Average PASS Score (p = .05) for the CAS2 12-Subtest EXTENDED battery.**

| Cognitive Assessment System-2 | | PASS Mean & Differences: | Significantly Different (at p = .05) from PASS Mean? | Strength or Weakness |
|---|---|---|---|---|
| PASS Scales | Standard Score | 100.0 | | |
| Planning | 85 | -15.0 | yes | Weakness |
| Simultaneous | 106 | 6.0 | no | |
| Attention | 115 | 15.0 | yes | Strength |
| Successive | 94 | -6.0 | no | |

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## Intervention Protocol (Kryza & Naglieri, 2017)

- Help the child understand his/her PASS strengths and areas of challenges (be clear)

➢ Encourage Motivation & Persistence
- Adjusting the student's mindset to "I can't do it …yet"
- Failure is an opportunity to learn, just keep trying

➢ Teach/encourage strategies for approaching tasks to build on strengths and remediate challenges?
- Encourage independence and self efficacy (Metacognition/Self Assessment)
  - Ask questions such as: "How will you know if these strategies and ideas are helping you?" What can you do if they are not working?

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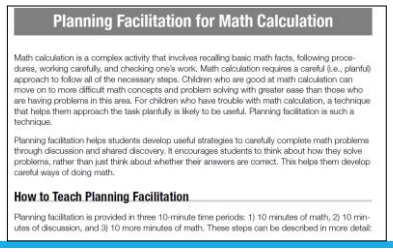
# Planning

- Intervention Step 1
  - TALK to the student and explain PASS scores
  - ***Encourage*** the student to "think smart and use a plan"
  - See Planning Facilitation handout in *Helping Children Learn (Naglieri & Pickering)*



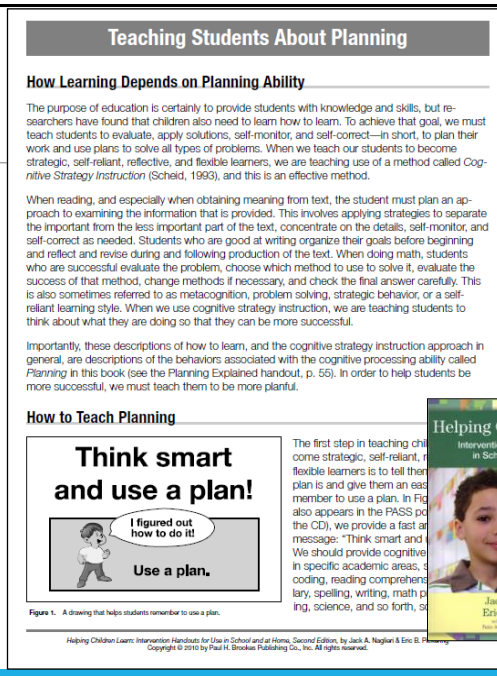
**Planning Facilitation for Math Calculation**

Math calculation is a complex activity that involves recalling basic math facts, following procedures, working carefully, and checking one's work. Math calculation requires a careful (i.e., planful) approach to follow all of the necessary steps. Children who are good at math calculation can move on to more difficult math concepts and problem solving with greater ease than those who are having problems in this area. For children who have trouble with math calculation, a technique that helps them approach the task planfully is likely to be useful. Planning facilitation is such a technique.

Planning facilitation helps students develop useful strategies to carefully complete math problems through discussion and shared discovery. It encourages students to think about how they solve problems, rather than just think about whether their answers are correct. This helps them develop careful ways of doing math.

**How to Teach Planning Facilitation**

Planning facilitation is provided in three 10-minute time periods: 1) 10 minutes of math, 2) 10 minutes of discussion, and 3) 10 more minutes of math. These steps can be described in more detail:



**Teaching Students About Planning**

**How Learning Depends on Planning Ability**

The purpose of education is certainly to provide students with knowledge and skills, but researchers have found that children also need to learn how to learn. To achieve that goal, we must teach students to evaluate, apply solutions, self-monitor, and self-correct—in short, to plan their work and use plans to solve all types of problems. When we teach our students to become strategic, self-reliant, reflective, and flexible learners, we are teaching use of a method called *Cognitive Strategy Instruction* (Scheid, 1993), and this is an effective method.

When reading, and especially when obtaining meaning from text, the student must plan an approach to examining the information that is provided. This involves applying strategies to separate the important from the less important part of the text, concentrate on the details, self-monitor, and self-correct as needed. Students who are good at writing organize their goals before beginning and reflect and revise during and following production of the text. When doing math, students who are successful evaluate the problem, choose which method to use to solve it, evaluate the success of that method, change methods if necessary, and check the final answer carefully. This is also sometimes referred to as metacognition, problem solving, strategic behavior, or a self-reliant learning style. When we use cognitive strategy instruction, we are teaching students to think about what they are doing so that they can be more successful.

Importantly, these descriptions of how to learn, and the cognitive strategy instruction approach in general, are descriptions of the behaviors associated with the cognitive processing ability called *Planning* in this book (see the Planning Explained handout, p. 55). In order to help students be more successful, we must teach them to be more planful.

**How to Teach Planning**




Figure 1. A drawing that helps students remember to use a plan.

The first step in teaching chi
come strategic, self-reliant,
flexible learners is to tell ther
plan is and give them an eas
member to use a plan. In Fig
also appears in the PASS pc
the CD), we provide a fast ar
message: "Think smart and
We should provide cognitive
in specific academic areas,
coding, reading comprehens
lary, spelling, writing, math p
ing, science, and so forth, s

*Helping Children Learn: Intervention Handouts for Use in School and at Home, Second Edition*, by Jack A. Naglieri & Eric B. Pickering
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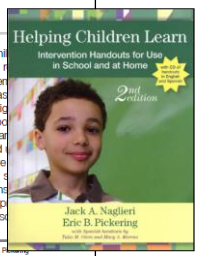


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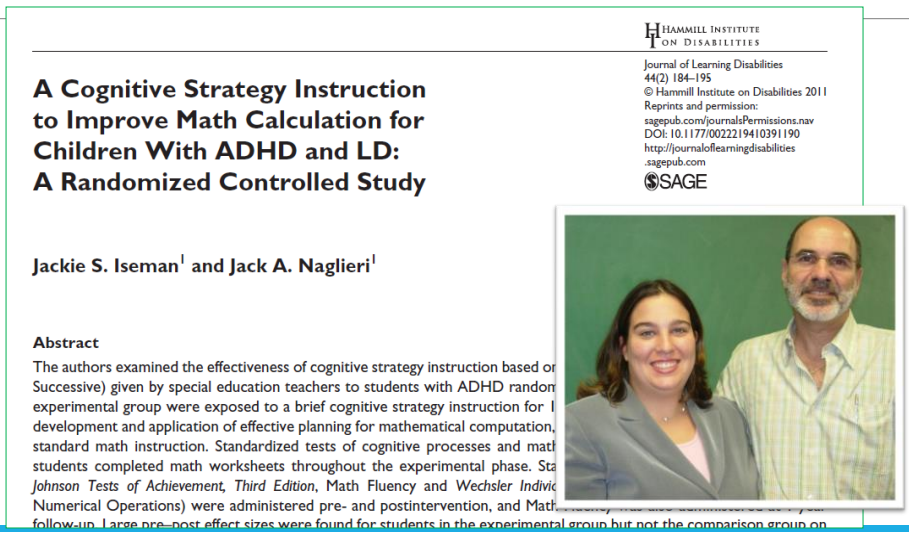
# Iseman & Naglieri (2010)

http://www.jacknaglieri.com/cas2.html



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SAGE

**A Cognitive Strategy Instruction to Improve Math Calculation for Children With ADHD and LD: A Randomized Controlled Study**

Jackie S. Iseman[1] and Jack A. Naglieri[1]

**Abstract**

The authors examined the effectiveness of cognitive strategy instruction based on
Successive) given by special education teachers to students with ADHD random
experimental group were exposed to a brief cognitive strategy instruction for
development and application of effective planning for mathematical computation,
standard math instruction. Standardized tests of cognitive processes and math
students completed math worksheets throughout the experimental phase. Sta
*Johnson Tests of Achievement, Third Edition*, Math Fluency and *Wechsler Individ*
Numerical Operations) were administered pre- and postintervention, and Math
follow-up. Large pre–post effect sizes were found for students in the experimental group but not the comparison group on

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# Design of the Study

**Experimental and Comparison Groups**

7 worksheets with Normal Instruction

**Experimental Group**

19 worksheets with Planning Facilitation

**Comparison Group**

19 worksheets with Normal Instruction

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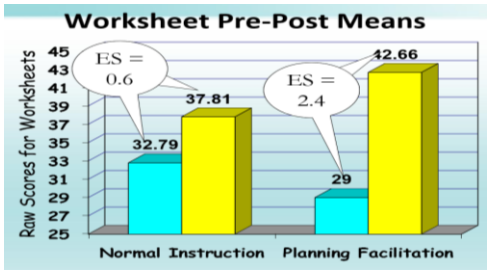
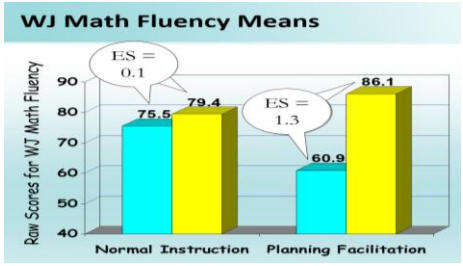
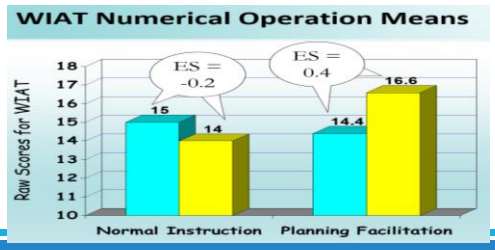
# Pre-Post Means and Effect Sizes for the Students with LD and ADHD




At 1-year follow-up, 27 of the students were retested on the WJ-III ACH Math Fluency subtest as part of the school's typical yearly evaluation of students. This group included 14 students from the comparison group and 13 students from the experimental group. The results indicated that the improvement of students in the experimental group ($M = 16.08$, $SD = 19$, $d = 0.85$) was significantly greater than the improvement of students in the comparison group ($M = 3.21$, $SD = 18.21$, $d = 0.09$).

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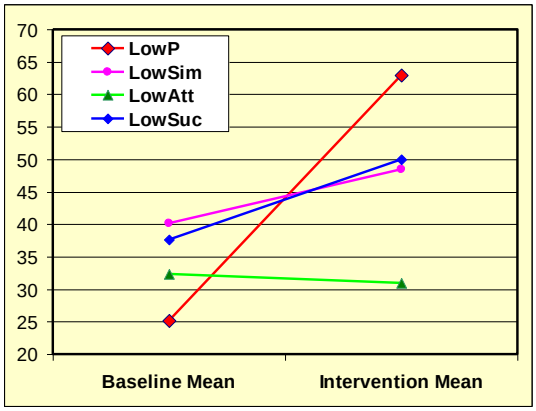
# Iseman (2005)

- Baseline Intervention means by PASS profile
- Different response to the same intervention



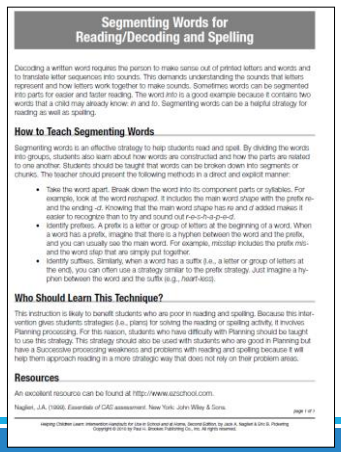





# Interventions related to PASS

- Helping Children Learn

  Intervention Handouts for Use in School and at Home, *Second Edition (*Naglieri, & Pickering 2011)



**Segmenting Words for Reading/Decoding and Spelling**

Decoding a written word requires the person to make sense out of printed letters and words and to translate letter sequences into sounds. This demands understanding the sounds that letters represent and how letters work together to make sounds. Sometimes words can be segmented into parts for easier and faster reading. The word *into* is a good example because it contains two words that a child may already know: *in* and *to*. Segmenting words can be a helpful strategy for reading as well as spelling.

**How to Teach Segmenting Words**

Segmenting words is an effective strategy to help students read and spell. By dividing the words into groups, students also learn about how words are constructed and how the parts are related to one another. Students should be taught that words can be broken down into segments or chunks). The teacher should present the following methods in a direct and explicit manner:

- Take the word apart. Break down the word into its component parts or syllables. For example, look at the word *reshaped*. It includes the main word *shape* with the prefix *re-* and the ending *-d*. Knowing that the main word *shape* has *re* and *d* added makes it easier to recognize than to try and sound out *r-e-s-h-a-p-e-d*.
- Identify prefixes. A prefix is a letter or group of letters at the beginning of a word. When a word has a prefix, imagine that there is a hyphen between the word and the prefix, and you can usually see the main word. For example, *mislap* includes the prefix *mis-* and the word *slap* that are simply put together.
- Identify suffixes. Similarly, when a word has a suffix (i.e., a letter or group of letters at the end), you can often use a strategy similar to the prefix strategy. Just imagine a hyphen between the word and the suffix (e.g., *heart-less*).

**Who Should Learn This Technique?**

This instruction is likely to benefit students who are poor in reading and spelling. Because this intervention gives students strategies (i.e., plans) for solving the reading or spelling activity, it involves Planning processing. For this reason, students who have difficulty with Planning should be taught to use this strategy. This strategy should also be used with students who are good in Planning but have a Successive processing weakness and problems with reading and spelling because it will help them approach reading in a more strategic way that does not rely on their problem areas.

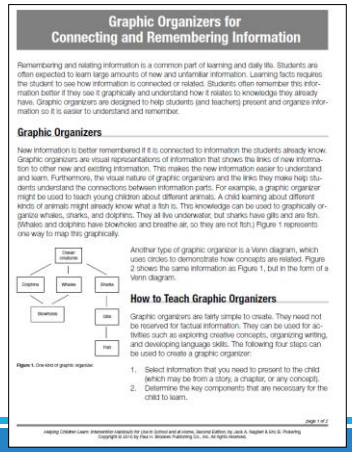
**Resources**

An excellent resource can be found at http://www.ezschool.com.

Naglieri, J.A. (1988). *Essentials of CAS assessment*. New York: John Wiley & Sons.







**Graphic Organizers for Connecting and Remembering Information**

Remembering and relating information is a common part of learning and daily life. Students are often expected to learn large amounts of new and unfamiliar information. Learning facts requires the student to see how information is connected or related. Students often remember this information better if they see it graphically and understand how it relates to knowledge they already have. Graphic organizers are designed to help students (and teachers) present and organize information so it is easier to understand and remember.

**Graphic Organizers**

New information is better remembered if it is connected to information the students already know. Graphic organizers are visual representations of information that shows the links of new information to other new and existing information. This makes the new information easier to understand and learn. Furthermore, the visual nature of graphic organizers and the links they make help students understand the connections between information parts. For example, a graphic organizer might be used to teach young children about different animals. A child learning about different kinds of animals might already know what a fish is. This knowledge can be used to graphically organize whales, sharks, and dolphins. They all live underwater, but sharks have gills and are fish. (Whales and dolphins have blowholes and breathe air, so they are not fish.) Figure 1 represents one way to map this graphically.




Another type of graphic organizer is a Venn diagram, which uses circles to demonstrate how concepts are related. Figure 2 shows the same information as Figure 1, but in the form of a Venn diagram.

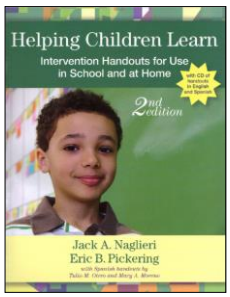
**How to Teach Graphic Organizers**

Graphic organizers are fairly simple to create. They need not be reserved for factual information. They can be used for activities such as exploring creative concepts, organizing writing, and developing language skills. The following four steps can be used to create a graphic organizer.

1. Select information that you need to present to the child (which may be from a story, a chapter, or any concept).
2. Determine the key components that are necessary for the child to learn.







# Section Summary

- This presentation only included a small portion of research evidence about the PASS neuroscience approach to redefining intelligence but what we have seen is that PASS…
  - is much more informative than traditional IQ
  - is much more relevant to instruction
  - Is more fair to diverse students (i.e. more socially just)
  - is helpful for identification of Specific Learning Disabilities
- Even students in Gifted programs can have learning challenges, related to varying PASS neurocognitive abilities which warrant instructional modifications and in some cases SLD designation

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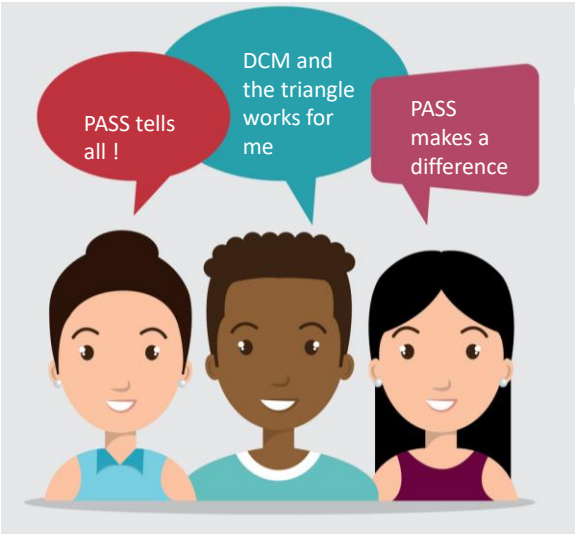


# Conclusion: To find twice exceptional students, use Discrepancy Consistency Method and PASS theory

# Questions or thoughts

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# Final Thoughts

- The evaluation of students for gifted based on group and individually administered ability tests should take into consideration the content of the tests' **directions, items and responses**
  - We can improve the traditional approach to ability testing by reducing the language and knowledge demand
- Assessment of Twice-Exceptional students such as those with a specific learning disability requires a different approach
  - Measure basic psychological processes to be consistent with the definition of SLD in Federal and many State laws
  - PASS theory as measured by CAS2 yields the most equitable and valid way of finding students with a specific learning disability

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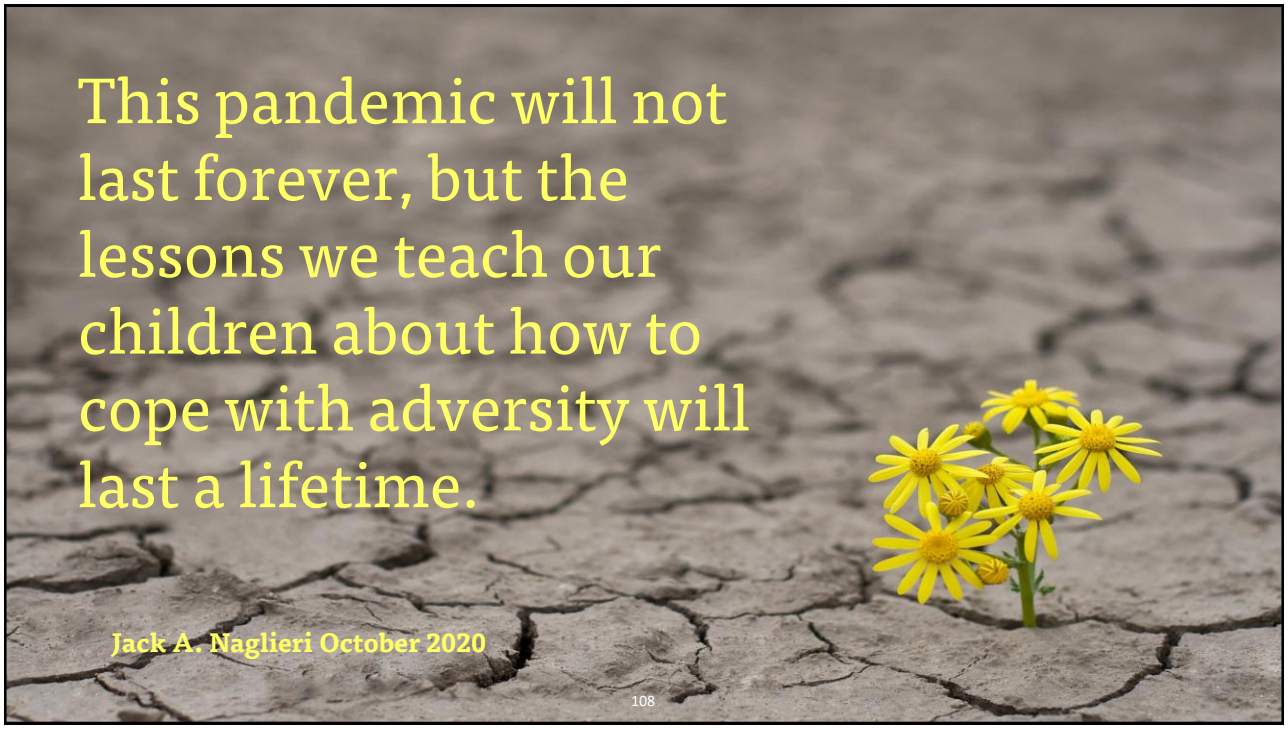


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## *Equitable Identification of Gifted Students*