

Comprehensive Assessment of Executive Function: From Theory to Practice

Jack A. Naglieri, Ph.D.

Emeritus Professor, George Mason University
Senior Research Scientist, Devereux Center for Resilient Children

jnaglieri@gmail.com
www.jacknaglieri.com



THE PSYCHOLOGY ASSOCIATION OF SASKATCHEWAN INVITES YOU TO ATTEND THE SPRING 2022 CONFERENCE

How Are You Feeling Today ?



Mindful Breathing

Ready?

Let's Get Ready to Learn



Jack A. Naglieri, Ph.D.

3

3

Disclosures

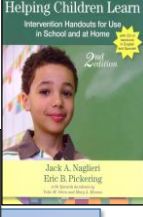
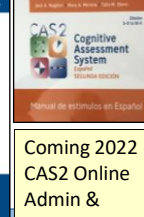
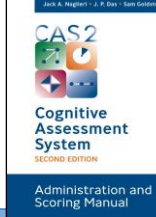
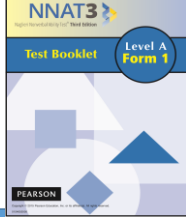
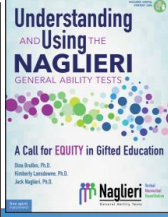
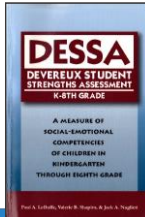
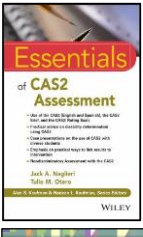
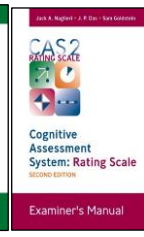
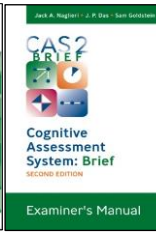
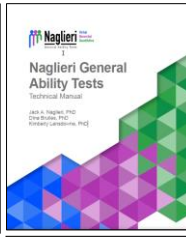
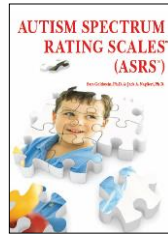
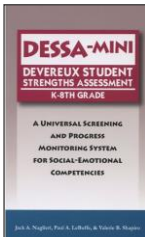
Executive Function

Social Emotional

Autism

Gifted Identification

PASS Neurocognitive Theory: Assessment & Intervention Handouts



Coming 2022
CAS2 Online
Admin &
Scoring

Jack A. Naglieri, Ph.D.

4

4

FOR MORE [INFORMATION](#) PLEASE GO TO MY WEB PAGES

The screenshot shows two views of the Naglieri website. The left view is the homepage, featuring the Naglieri logo (Verbal, Nonverbal, Quantitative General Ability Tests) and a navigation menu. A prominent banner reads 'EQUITABLE ASSESSMENT OF GIFTED STUDENTS USING THE Naglieri General Ability Tests Now Available'. Below this, there are sections for 'WHY WE DO WHAT WE DO' with sub-sections 'Inequity in Gifted Testing' and 'Achieving Equity'. The right view is a detailed page for the 'NAGLIERI GENERAL ABILITY TESTS: VERBAL, NONVERBAL AND QUANTITATIVE'. It includes a 'WELCOME TO JACKNAGLIERI.COM' message, a photo of Jack A. Naglieri, and a description of the site's purpose: 'This site was created to provide tools and resources for both psychologists and educators alike.' It also lists various resources like 'HANDOUTS', 'WEBINARS', 'EQUITY', 'EXECUTIVE FUNCTION', and 'HELPING CHILDREN LEARN' with corresponding images.

5

Introduction

- Interest in why people learn differently given the same instruction
- Led me to school psychology and decades later to intervention research
- Experiences as a school Psychologist



Jack A. Naglieri, Ph.D.

6

6

Traditional IQ and Achievement Tests

- When I started working as a school psychologist in 1975...I realized the impact the tests we use have on our ultimate decisions about a student.
- Intelligence tests that required knowledge posed an equity problem
- Rating scales with limited norms could be misleading
- Our interpretation of test scores can change the course of a person's life
- The concept of EF is a good example



1975 Charles Champagne Elementary, Bethpage, NY

Jack A. Naglieri, Ph.D.

7

7

Why this session on EF?

- Executive Function (EF) is the most important ability we have, because it provides us a way to decide ***how to do what we choose to do to achieve a goal***
- The best news is that EF **can be taught**
- Instruction that improves EF will affect a person's ability to learn, their behavior, and their social skills.
- Improving EF will change an individual's life

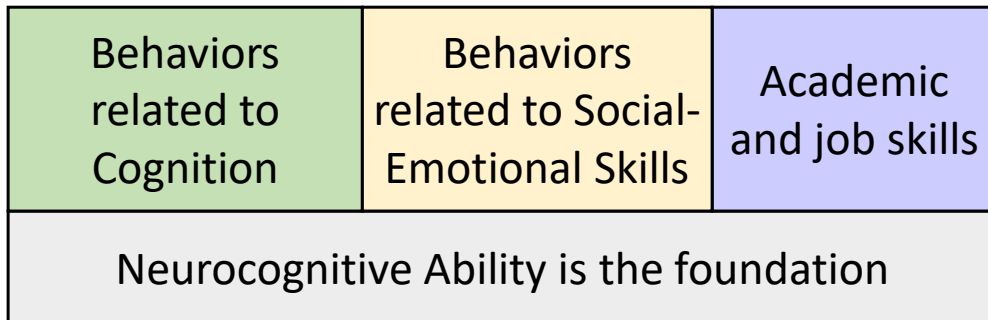
Jack A. Naglieri, Ph.D.

8

8

Goal of this presentation

Describe a comprehensive approach to understanding and assessing EF



Jack A. Naglieri, Ph.D.

9

9

Core Group Discussion → Deeper Learning

- **Organizer** – Guide the discussion
- **Recorder** – Keep notes and speak for the group



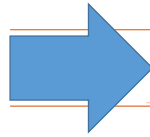
10

Jack A. Naglieri, Ph.D.

10

10

Presentation Outline



Introduction to Executive Function (EF)

EF Behaviors

EF and Cognition (intelligence)

EF and Social Emotional Skills

EF and Academic/Job Performance

Research about EF as ability, behavior, and SE

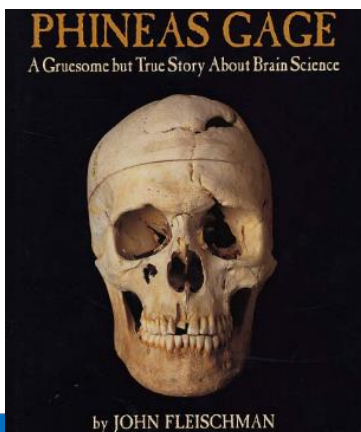
Conclusions

Jack A. Naglieri, Ph.D.

11

11

The Curious Story of Phineas Gage



- September 13, 1848 26 year old Phineas Gage was in charge of a railroad track construction crew blasting granite bedrock near Cavendish, Vermont
- The job Phineas has is to use a “tamping iron” to set explosives
- The tamping iron is a rod about 3 ½ feet long weighing 13 ½ lbs pointed at one end

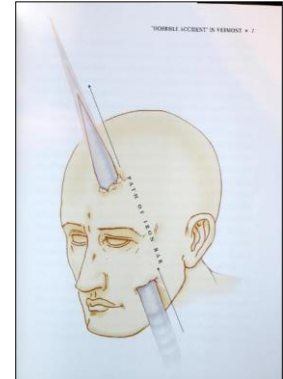
Jack A. Naglieri, Ph.D.

12

12

Fleishman (2002, p 70)

- From Damasio (1994) article in *Science*
- The rod passed through the left frontal lobe
- The damage was to the front of the frontal cortex more than the back, and the underside more than the top
- This diminished his planning and decision making, self monitoring, self correction, especially in novel settings



Fleishman (2002)

Before . . . & . . . After

Before the accident 'he possessed a well-balanced mind, was seen as a shrewd, smart business man, very energetic and persistent in executing all his plans of operation' (p 59)

After the accident his ability to direct others was gone, he had considerable trouble with:

- Thinking
- Behaviors
- Work
- Social-emotional

Frontal Lobes and Executive Function(s)

What do we mean by the term Executive Function(s)?



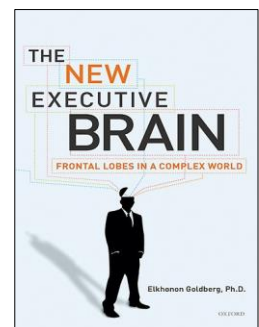
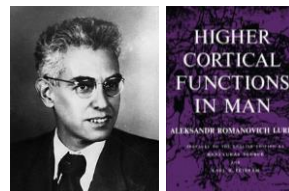
Jack A. Naglieri, Ph.D.

15

15

Executive Functions

- In 1966 Luria first wrote and defined the concept of Executive Function (EF) and described the frontal lobes as “the organ of civilization”
- Luria’s student, Nick Goldberg states that the frontal lobes are about ...”leadership, motivation, drive, vision, self-awareness, and awareness of others, success, creativity, sex differences, social maturity, cognitive development and learning...”



Jack A. Naglieri, Ph.D.

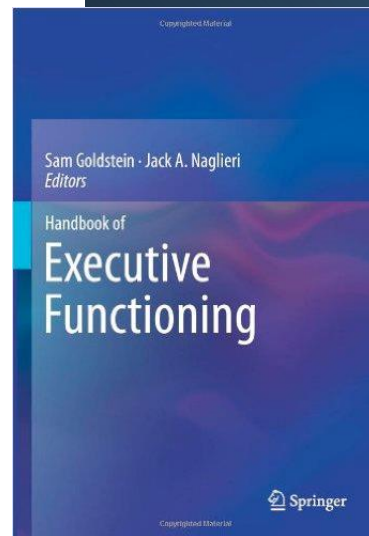
16

16

What is Executive Function(s)

There is no formal accepted definition of EF

- We typically find a vague general statement of EF (e.g., goal-directed action, cognitive control, top-down inhibition, effortful processing, etc.).
- Or a listing of the constructs such as
 - Inhibition, Working Memory,
 - Planning, Problem-Solving,
 - Goal-Directed Activity, Strategy Development and Execution,
 - Emotional Self-Regulation, Self-Motivation
- Goldstein, Naglieri, Princiotta, & Otero (2013)
- Found more than 30 definitions of EF!



17

Executive Function(s)

- Given all the definitions of EF(s) we wanted to address the question...
Executive Function^s ... or
Executive Function?
- One way to answer the question is to research the factor structure of EF behaviors
- Factor structure of the Comprehensive Executive Function Inventory (CEFI), and the Comprehensive Executive Function Inventory Adult (CEFI Adult)

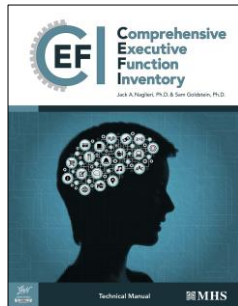
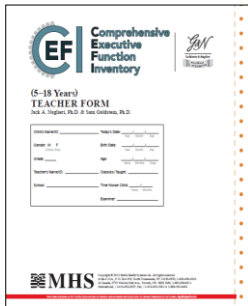
Jack A. Naglieri, Ph.D.

18

18

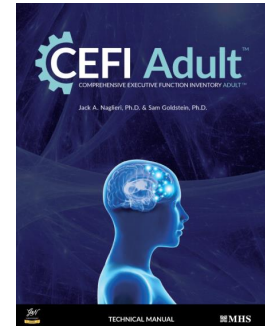
CEFI

(Naglieri & Goldstein, 2012)



CEFI Adult

(Naglieri & Goldstein, 2017)



Jack A. Naglieri, Ph.D.

19

19

CEFI Exploratory Factor Analysis

- The normative samples for CEFI and CEFI Adult included ratings by parents, teachers, observers, and self ratings were randomly split into two samples and EFA conducted

Conclusions

- Nationally representative samples aged 5 to 80 years (N = 6,700) indicates that EF behaviors are best seen as **one construct**



Jack A. Naglieri, Ph.D.

20

20

CEFI Factor Analysis

Item Level Analysis

- For the **first half** of the normative sample (Parent, Teacher and Self ratings') **item scores** (90 items) used in factor analysis

Scale Level Analysis

- Using the **second half** of the normative sample EFA was conducted using raw scores for the following scales:
 - Attention
 - Emotion Regulation
 - Flexibility
 - Inhibitory Control
 - Initiation
 - Organization
 - Planning
 - Self-Monitoring
 - Working Memory

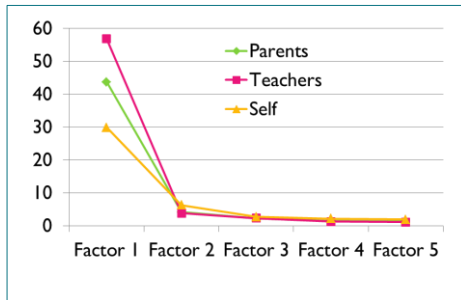
Jack A. Naglieri, Ph.D.

21

21

CEFI Factor Analysis

Item Factor Analyses

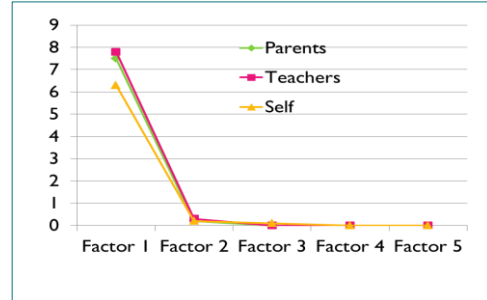


Eigenvalues from the Inter-Item Correlations

Form	Factor						
	1	2	3	4	5	6	7
Parent	43.7	4.1	2.3	1.5	1.3	1.3	1.0
Teacher	56.8	3.8	2.3	1.3	1.1	1.1	0.8
Self-Report	29.9	6.3	2.7	2.1	1.9	1.8	1.5

Note. Extraction method: Principal Axis Factoring. Only the first 10 eigenvalues are presented.

Scale Factor Analyses



Eigenvalues of the CEFI Scales Correlations

Form	Factor						
	1	2	3	4	5	6	7
Parent	7.5	0.2	0.0	0.0	0.0	0.0	0.0
Teacher	7.8	0.3	0.0	0.0	0.0	0.0	0.0
Self-Report	6.3	0.2	0.1	0.0	0.0	0.0	-0.1

Note. Extraction method: Principal Axis Factoring.

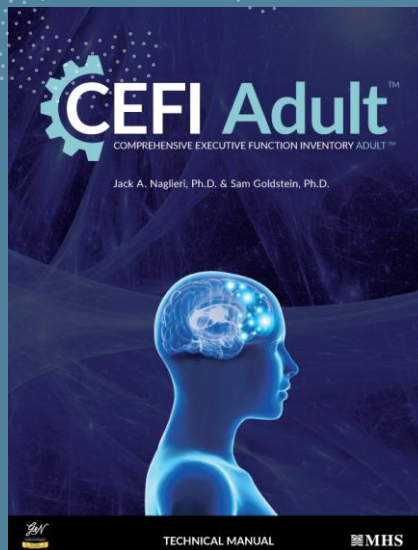
Jack A. Naglieri, Ph.D.

22

22

Factor Analysis of the CEFI Adult

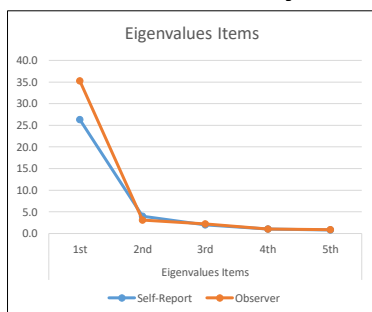
- Same scale structure as CEFI
- Full Scale
 - Attention
 - Emotion Regulation
 - Flexibility
 - Inhibitory Control
 - Initiation
 - Organization
 - Planning
 - Self-Monitoring
 - Working Memory



23

CEFI Adult Self (N = 1,600) & Observer (N = 1,600)

Item Factor Analyses

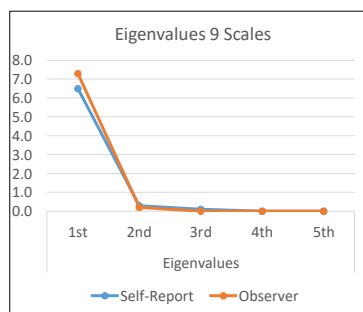


Eigenvalues from the Inter-Item Correlations

Form	Factor									
	1 st :2 nd	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th
Self-Report	6.7	26.3	4.0	2.0	1.0	0.8	0.7	0.6	0.5	0.5
Observer	11.3	35.3	3.1	2.2	1.0	0.9	0.8	0.7	0.5	0.5

Note. Extraction method: Principal Axis Factoring. Only the first 9 eigenvalues are presented.

Scale Factor Analyses



Eigenvalues from the CEFI Adult Scales Correlations

Form	Factor									
	1 st :2 nd	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th
Self-Report	21.7	6.5	0.3	0.1	0.0	0.0	0.0	-0.1	-0.1	-0.1
Observer	32.7	7.3	0.2	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1

Note. Extraction method: Principal Axis Factoring.

Jack A. Naglieri, Ph.D.

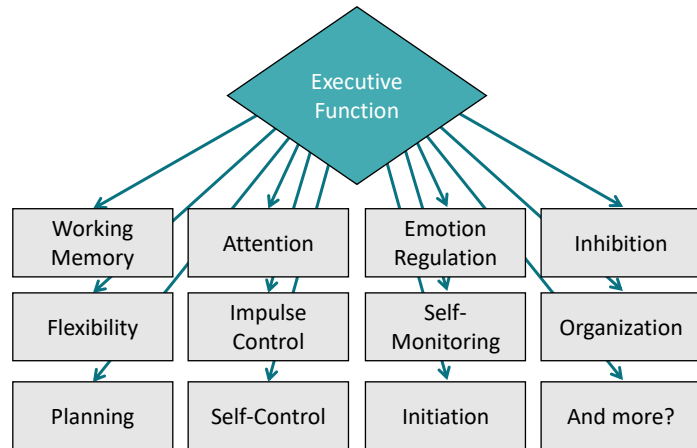
24

24

Exploratory Factor Analysis

Conclusions

- Nationally representative samples aged 5 to 80 years (N = 6,700) indicates that EF behaviors are best seen as **one construct**



Jack A. Naglieri, Ph.D.

25

25

Executive Function Involves

“How you do what you decide to do” demands...

- Initiation** to achieve a goal, **planning** and **organizing** parts of a task, **attending** to details to notice success of the solution, keeping information in **memory**, having **flexibility** to modify the solution as information from **self-monitoring** is received and demonstrating **emotion regulation** (which also demands **inhibitory control**) to ensure clear thinking so that the task is completed successfully.

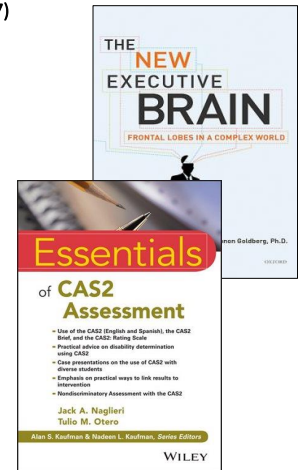
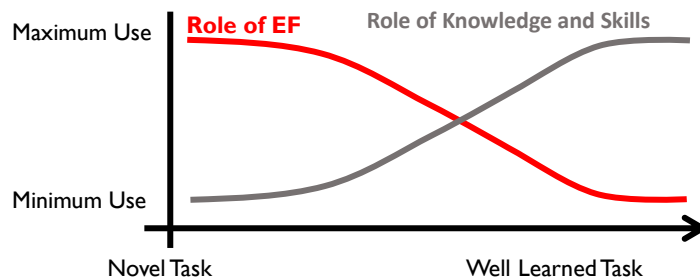
Jack A. Naglieri, Ph.D.

26

26

EF's Learning Curves (Naglieri & Otero, 2017)

- Learning depends upon instruction and EF
- At first, EF plays a major role in learning (see Goldberg, 2009, p. 90)
- When a new task is learned and practiced it becomes a skill and execution requires less EF (see Naglieri & Otero, 2017, p. 117)



Over time and with experience

Jack A. Naglieri, Ph.D.

27

27

Executive Function and Skills

- What does the term **SKILLS** refer to?
 - A well practiced activity that can be executed automatically and with ease
 - This means there is fluency and little thinking involved
- What does the term **Executive Function** refer to?
 - Thinking About How You Do What You Decide To Do
 - Therefore EF can NOT be described as a skill



Jack A. Naglieri, Ph.D.

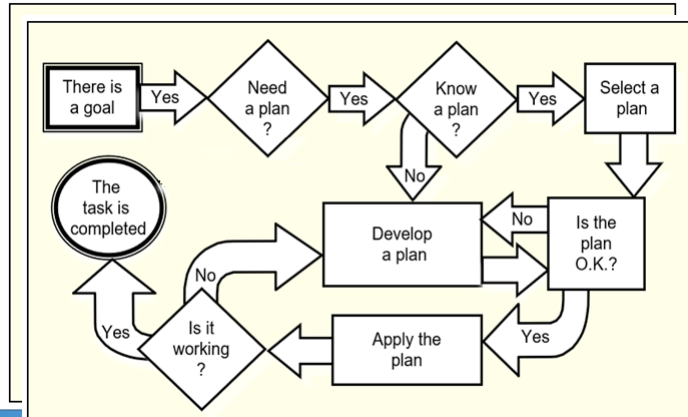
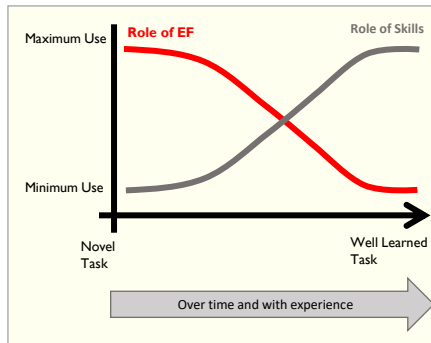
28

28

A Deeper View of Executive Function

EF STRATEGY: Graphic Organizers help us make sense of big ideas.

How you do what you decide to do which demands...Especially in NOVEL situations



Jack A. Naglieri, Ph.D.

29

29



EF's Learning Curves (Goldberg, 2009; Naglieri & Otero, 2017)

- Because **MAKING DECISIONS** about how to do what you decide to do is particularly demanded in novel situations, we need to fully engage our frontal lobes (EF) to be successful in our world today.

Jack A. Naglieri, Ph.D.

30

30

Coping with COVID Pandemic and Trauma

- Our world has dramatically changed
- We have to figure out HOW to do just about everything
- This means EF is more important now than ever
- The cognitive demands of COVID make life much harder

Jack A. Naglieri, Ph.D.

31

31



Conclusion: EF is a unitary concept

Questions or thoughts

Jack A. Naglieri, Ph.D.

32

32

Presentation Outline

- Introduction to Executive Function (EF)
- EF Behaviors
- EF and Cognition (intelligence)
- EF and Social Emotional Skills
- EF and Academic/Job Performance
- Research about EF as ability, behavior, and SE
- Conclusions

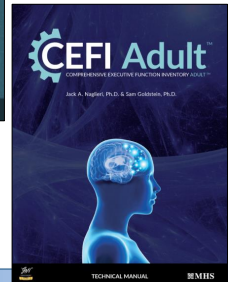
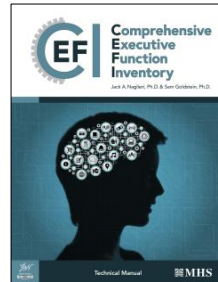
Psychometrics of EF Rating Scales

Some published rating scales



CEFI and the CEFI Adult

- **Strength based** EF measures
- Items are **positively** worded
- Higher scores = **good** behaviors related to EF
- Scores set at mean of **100**, SD of **15**
- CEFI: Ages 5-18 years rated by a parent, teacher, or the child/youth
- CEFI Adult: Ages 18+ years rated by the adult or an observer



Jack A. Naglieri, Ph.D.

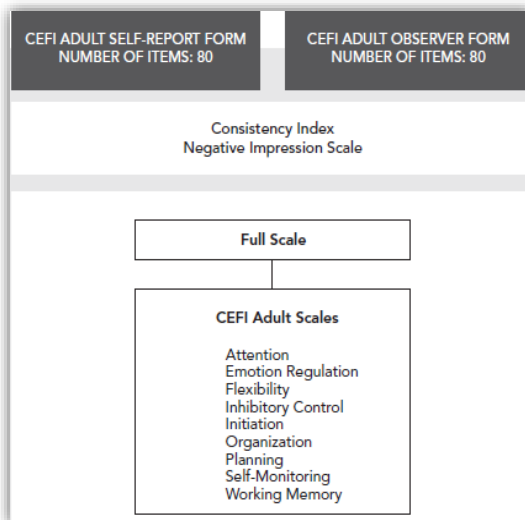
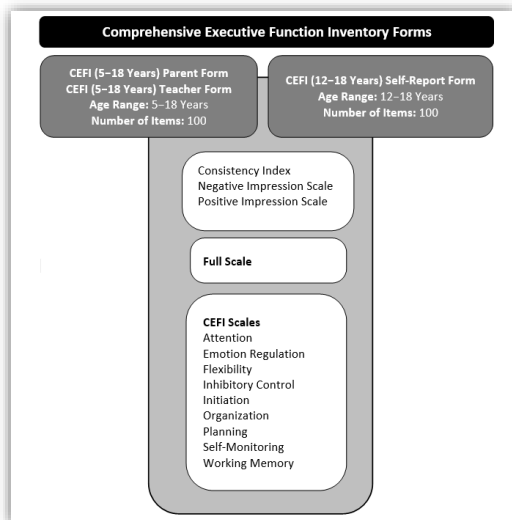
35

35

CEFI Child

&

CEFI-Adult Scales



Jack A. Naglieri, Ph.D.

36

36

One Factor and 9 Scales?

- EF is a unidimensional concept
- Use the Full Scale to answer the question “Is the individual poor in EF or not?”
- Use the 9 scales to identify the specific groups of items that represent 9 different types of behaviors that can be addressed by Intervention

CEFI Scales

Attention
 Emotion Regulation
 Flexibility
 Inhibitory Control
 Initiation
 Organization
 Planning
 Self-Monitoring
 Working Memory

CEFI Adult Scales


Attention
 Emotion Regulation
 Flexibility
 Inhibitory Control
 Initiation
 Organization
 Planning
 Self-Monitoring
 Working Memory

Jack A. Naglieri, Ph.D.

37

37

CEFI and CEFI Adult Interpretive Reports



(5–18 Years)
Parent Form
 Jack A. Naglieri, Ph.D. & Sam Goldstein, Ph.D.

Interpretive Report

Youth's Name/ID: **Brittany Ambers**

Age:	12 years
Gender:	Female
Birth Date:	November 18, 1999
Grade:	6
School:	K. H. S.
Parent's Name/ID:	Mrs. Z
Relationship to Youth:	Mother
Administration Date:	May 19, 2012
Examiner:	DH
Data Entered By:	MT



Jack A. Naglieri, Ph.D. & Sam Goldstein, Ph.D.

Observer Form
Interpretive Report

Client's Name/ID:	Jodie Weather
Age:	20
Gender:	Female
Birth Date:	February 14, 1997
Observer's Name/ID:	Megan
Relationship to Client:	Roommate
Time Known Client:	4 years, 2 months
Administration Date:	January 26, 2017
Examiner:	
Data Entered By:	

Jack A. Naglieri, Ph.D.

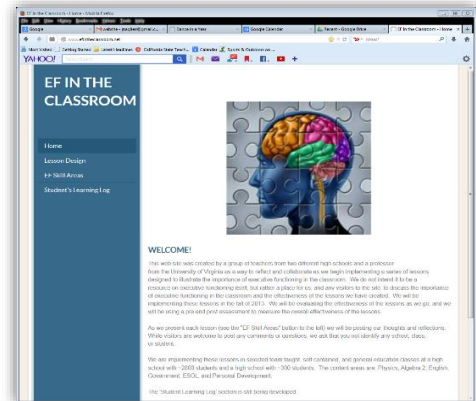
38

38

www.efintheclassroom.net

Interventions for EF Behaviors

- | | |
|--|---|
| <ul style="list-style-type: none"> • CEFI Scales • Emotion Regulation • Inhibitory Control • Organization • Self-Monitoring • Working Memory | <p>Efintheclassroom.net</p> <ul style="list-style-type: none"> • Sustained Attention • Emotional Control • Cognitive Flexibility • Response Inhibition • Task Initiation • Organization • Planning • Response Inhibition • Working Memory |
|--|---|



Jack A. Naglieri, Ph.D.

39

39

Core Group Discussion → Deeper Learning

- Discuss: what stands out as the most important message from what we have discussed so far



Jack A. Naglieri, Ph.D.

40

40

Presentation Outline

Introduction to Executive Function (EF)

EF Behaviors

EF and Cognition (intelligence)

EF and Social Emotional Skills

EF and Academic/Job Performance

Research about EF as ability, behavior, and SE

Conclusions

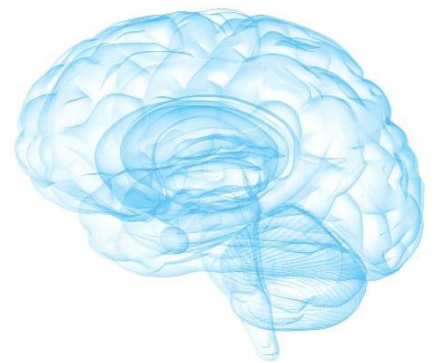
Jack A. Naglieri, Ph.D.

41

41

EF is a Brain-Based Ability

- If we define intelligence from a neurocognitive perspective
- EF is an ability (type of intelligence) by virtue of its relationship to the brain
- But note that EF is not measured by traditional IQ tests



42

PASS Neurocognitive Theory of Intelligence

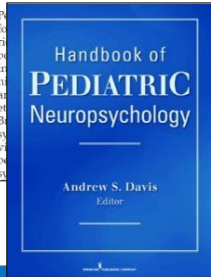
28

Cognitive Assessment System: Redefining Intelligence From a Neuropsychological Perspective

Jack A. Naglieri and Tulio M. Otero

INTRODUCTION

Important field of clinical psychology. By addressing factors intrinsic to the individual, clinicians can better understand and treat individuals with a variety of mental disorders. This book is a comprehensive and up-to-date review of the field, edited by a leading expert in the field. It is an essential resource for all those involved in the diagnosis and treatment of mental disorders.



Such tools should not only evaluate the underlying processes necessary for efficient thinking and behavior but also provide for the development of effective interventions and address the question of prognosis.

FROM NEUROPSYCHOLOGY THEORY TO ASSESSMENT

Luria's theoretical account of dynamic brain function is perhaps one of the most complete (Lewandowski & Scott, 2008). Luria conceptualized four interconnected levels of brain-behavior relationships and neurocognitive disorders that the clinician needs to know: the structure of the brain, the functional organization based on structure,

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

20

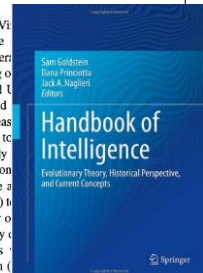
Jack A. Naglieri

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

Context

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

Training School in Vietnam. The committee group tests and were developed when working on the Terman at Stanford University. The tests found that a variety of men, be they of different social classes, had some education and were able to read the newspaper or the Beta tests (today known as the Alpha tests). The Alpha tests were a general information



Jack A. Naglieri, Ph.D.

43

43

A Neurocognitive Test Measures Thinking not Knowing

What does the examinee have to **know** to complete a task?

- This is dependent on *instruction*

How does the examinee have to **think** to complete a task?

- This is dependent on the *brain* – 'basic psychological processes'
- Some thinking involves executive function and some does not



Jack A. Naglieri, Ph.D.

44

44

PASS Theory Based on Luria's Concept of Functional Units

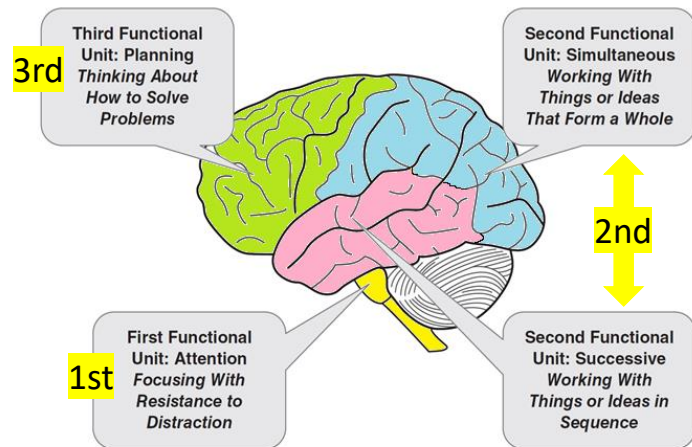


Figure 1.2 Three Functional Units and Associated Brain Structures

From: *Essentials of CAS2 Assessment*. Naglieri & Otero, 2017

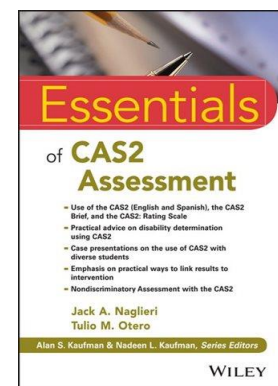
Jack A. Naglieri, Ph.D.

45

45

IQ defined by BRAIN function

- **P**ASS theory is a modern way to define 'ability' (AKA – intelligence)
- **P**lanning = THINKING ABOUT THINKING
- **A**ttention = BEING ALERT
- **S**imultaneous = GETTING THE BIG PICTURE
- **S**uccessive = FOLLOWING A SEQUENCE



Jack A. Naglieri, Ph.D.

46

46

PASS Comprehensive System

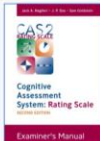
(Naglieri, Das, & Goldstein, 2014)

Ways to Measure PASS

CAS2 Core & Extended English & Spanish for comprehensive Assessment
CAS2 Brief for re-evaluations, instructional planning, gifted screening
CAS2 Rating Scale for teacher ratings

CAS2 Rating Scale
(4 subtests)

Total Score
Planning
Simultaneous
Attention
Successive



CAS2 Brief
(4 subtests
20 minutes)

Total Score
Planning
Simultaneous
Attention
Successive



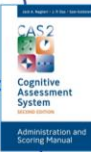
CAS2 Core
(8 subtests
40 minutes)

Full Scale
Planning
Simultaneous
Attention
Successive



CAS2 Extended
(12 subtests
60 minutes)

Full Scale
Planning
Simultaneous
Attention
Successive
Supplemental Scales
Executive Function
Working Memory
Verbal / Nonverbal
Visual / Auditory
Speed / Fluency



CAS2
Digital
(English &
Spanish)
coming in
2022

Jack A. Naglieri, Ph.D.

47

47

CAS2 Online Score & Report

<http://www.proedinc.com/customer/ProductView.aspx?ID=7277>

- ▶ Enter data at the subtest level or enter subtest raw scores
- ▶ Online program converts raw scores to standard scores, percentiles, etc. for all scales.
- ▶ A narrative report with graphs and scores is provided

This product requires a check of customer qualifications. Click [here](#) to download qualifications form. TO ORDER, CALL: 800-897-3202.

Price: \$199.00



NOW AVAILABLE!

Ages: 5 through 18 years
Testing Time: 40 to 60 minutes
Administration: Individual

The new PC, Mac™, and iPad™ compatible CAS2 Online Scoring and Report System program is an efficient and easy way to obtain CAS2 scores and corresponding narrative.

Use CAS2 Online Scoring and Report System for:

- converting CAS2 subtest raw scores into standard scores, percentile ranks, descriptive terms, and age equivalents;
- generating PASS and Full Scale composite scores;
- comparing CAS2 subtest and PASS scale scores to identify significant intra-individual differences;
- providing a pdf report of CAS2 performance; and
 - Sample Interpretive Report
 - Sample Score Summary
- providing intervention options.

Ordering options:

- CAS2 Online Scoring and Report System first-time base subscription provides one-year unlimited online scoring and report access for up to 5 users.
- Annual base subscription renewal provides one-year unlimited online scoring and report access for up to 5 users.




ORDERING OPTIONS:

- CAS2 Online Scoring and Report System (Add-on 5-User License) \$69.00
- CAS2 Online Scoring and Report System (Annual Renewal) \$69.00

Jack A. Naglieri, Ph.D.

48

48



Cognitive Assessment System: Brief

SECOND EDITION

Examiner Record Form
Jack A. Naglieri J. P. Das Sam Goldstein

Section 1. Identifying Information

Student's Name: Tommy

Sex: Female Male Grade: 1st

School: Parkview Elementary

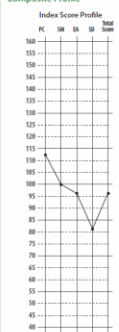
Examiner: R. Durham, PhD

Date Tested	Year: 2014	Month: 11	Day: 22
Date of Birth	Year: 2008	Month: 11	Day: 22
Age	Year: 6	Month: 6	Day: 9

Section 2. Subtest and Composite Performance

Subtest	Raw Score	Index Score				
		PC	SM	EA	SD	Total
Planned Codes (PC)	16	112				
Simultaneous Matrices (SM)	7		100			
Expressive Attention (EA)	7			96		
Successive Digits (SD)	7				82	
Sum of Subtest Index Scores		112	100	96	82	390
Composite Index Score						97.5
Percentile Rank		71	50	40	12	40
Upper 90% Confidence Interval		118	111	107	96	104
Lower		105	84	86	72	88

Section 3. Subtest and Composite Profile



The graph shows index scores for PC (112), SM (100), EA (96), and SD (82). The Total Score is 390. The Y-axis ranges from 40 to 160.

Section 4. Subtest Comparisons


Subtest	Index Score	d-value	z-score	Strength	Weakness	Non-sample
Planned Codes (PC)	112	14.5	3.19	SI	WK	15.1
Simultaneous Matrices (SM)	100	2.5	0.50	SI	WK	82.8
Expressive Attention (EA)	96	-1.5	-0.30	SI	WK	87.8
Successive Digits (SD)	82	-15.5	-3.40	SI	WK	16.2
Subtest mean	97.5					

Section 5. Descriptive Terms

Index Scores	<70	70-79	80-89	90-109	110-119	120-129	≥130
Descriptive Terms	Very Poor	Poor	Below Average	Average	Above Average	Superior	Very Superior

CAS2: Brief


- Yields PASS and Total standard scores (Mn 100, SD 15)
- Directions for administration are in the Record Form
- For Re-evaluations and Screening
- All items are different from CAS2
 - Planned Codes
 - Simultaneous Matrices
 - Expressive Attention
 - Successive Digits



Cognitive Assessment System: Brief

SECOND EDITION

Examiner's Manual



Cognitive Assessment System: Brief

SECOND EDITION

Stimulus Book


Figure 3.1. Example of page 1 of the CAS2: Brief Examiner Record Form, completed for Tommy.

49

CAS2 Rating Scale

(Ages 4-18 yrs.)

- The CAS2: Rating Scale measures behaviors associated with PASS constructs
- Completed by teachers and can be used by psychologists, special educators and regular educators



Cognitive Assessment System: Rating Scale

SECOND EDITION

Section 1. Identifying Information

Student Name: Jack A. Naglieri J. P. Das Sam Goldstein

Sex: Female Male Grade: _____

School: _____

Examiner: _____

Date of Rating	Year: _____	Month: _____	Day: _____
Date of Birth	Year: _____	Month: _____	Day: _____
Age	Year: _____	Month: _____	Day: _____

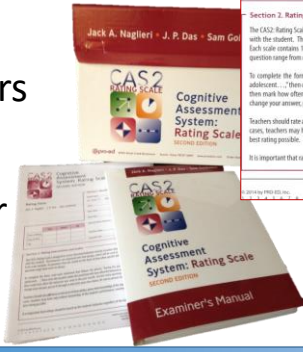
Section 2. Rating Instructions and Scales

The CAS2 Rating Scale is designed to assess classroom behaviors seen by a teacher who has had at least 4 weeks of experience with the student. The behaviors are organized into four groups, which will be used to obtain scores for four different scales. Each scale contains 18 questions that are scored on the basis of how often specific behaviors were seen. The scores for each question range from never to always.

To complete the form, read each statement that follows the phrase, "During the past month, how often did the child or adolescent..." Then circle the number under the word that tells how often the behavior was seen. Read each question carefully, then mark how often the behavior was seen in the past month. Answer every question without skipping any. If you want to change your answer, put an X through it and circle your new choice. Be sure to answer every question.

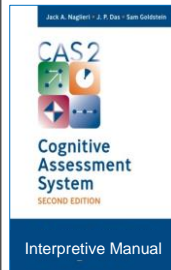
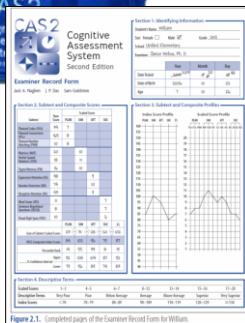
Teachers should rate all items to the best of their ability, given their knowledge of the student and the student's peers. In some cases, teachers may have only indirect knowledge of the student's performance; nonetheless, the teacher should provide the best rating possible.

It is important that ratings should be based on the student's behavior regardless of the language or medium used.



50

CAS2 for (Ages 5-18 yrs.)



CAS2 Yields PASS and Full Scale scores but ALSO

Executive Function which is the combination of Planning and Attention subtests
Also: Working Memory, Verbal, Nonverbal, Speed/Fluency and a Visual and Auditory comparison

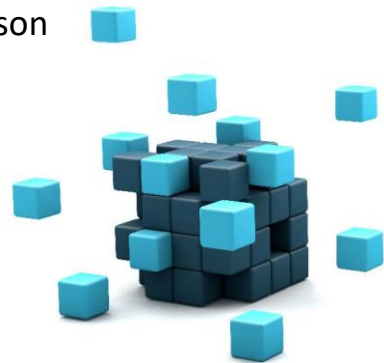
Jack A. Naglieri, Ph.D.

51

51

PASS Theory: Planning

- **Planning** is a neurocognitive ability that a person uses to determine, select, and use efficient solutions to problems
 - problem solving
 - developing plans and using strategies
 - retrieval of knowledge
 - impulse control and self-control
 - control of processing
- Planning tests measure Executive Function



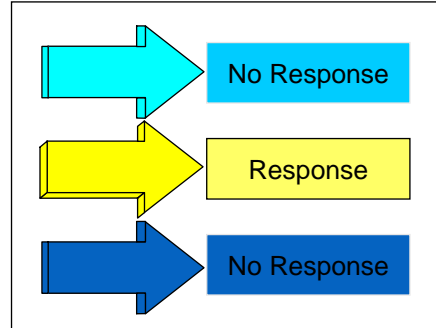
Jack A. Naglieri, Ph.D.

52

52

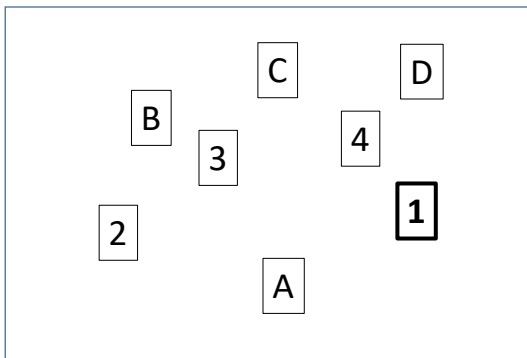
PASS Theory

- **Attention** is a neurocognitive ability that a person uses to selectively attend to some stimuli and ignore others
 - selective attention
 - focused cognitive activity over time
 - resistance to distraction



Planning & Attention Examples

Planned Connections (Trails)



RED	BLUE	GREEN	YELLOW
YELLOW	GREEN	RED	BLUE
RED	YELLOW	YELLOW	GREEN
BLUE	GREEN	RED	BLUE
GREEN	YELLOW	RED	YELLOW

PASS Theory: Successive

- ▶ **Successive** processing is a basic psychological process we use to manage stimuli in a specific serial order
 - Stimuli form a chain-like progression
 - Recall a series of words
 - Decoding words
 - Letter-sound correspondence
 - Phonological tasks
 - Understanding the syntax of sentences
 - Comprehension of written instructions

Recall of Numbers in Order
Successive Processing



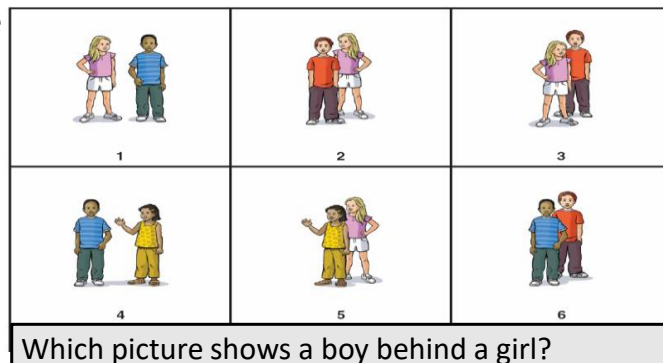
Jack A. Naglieri, Ph.D.

55

55

PASS Theory: Simultaneous

- **Simultaneous** processing is used to integrate stimuli into groups
 - Each piece must be related to the other
 - Stimuli are seen as a whole
- Academics:
 - Reading comprehension
 - geometry
 - math word problems
 - whole language
 - verbal concepts



Jack A. Naglieri, Ph.D.

56

56



TIME TO STRETCH

Jack A. Naglieri, Ph.D.

57

57

www.efintheclassroom.net

All Lessons
Available for
Free at

EF IN THE CLASSROOM

Home
Lesson Design
EF Skill Areas
Student's Learning Log

WELCOME!

This web site was created by a group of teachers from two different high schools and a professor from the University of Virginia as a way to reflect and collaborate as we begin implementing a series of lessons designed to illustrate the importance of executive functioning in the classroom. We do not intend it to be a resource on executive functioning itself, but rather a place for us, and any visitors to the site, to discuss the importance of executive functioning in the classroom and the effectiveness of the lessons we have created. We will be implementing these lessons in the fall of 2013. We will be evaluating the effectiveness of the lessons as we go, and we will be using a pre and post assessment to measure the overall effectiveness of the lessons.

As we present each lesson (see the "EF Skill Areas" button to the left) we will be posting our thoughts and reflections. While visitors are welcome to post any comments or questions, we ask that you not identify any school, class, or student.

We are implementing these lessons in selected team taught, self contained, and general education classes at a high school with ~2000 students and a high school with ~500 students. The content areas are: Physics, Algebra 2, English, Government, LSJL, and Personal Development.

The "Student Learning Log" section is still being developed.

58

Interventions for EF Behaviors

CEFI Scales

- Attention
- Emotion Regulation
- Flexibility
- Inhibitory Control
- Initiation
- Organization
- Planning
- Self-Monitoring
- Working Memory

Efintheclassroom.net

- Sustained Attention
- Emotional Control
- Cognitive Flexibility
- Response Inhibition
- Task Initiation
- Organization
- Planning
- Response Inhibition
- Working Memory

Jack A. Naglieri, Ph.D.

59

59

Antwerp train Station (2009)



Jack A. Naglieri, Ph.D.

60

60

Planning Lesson Student Responses

Q 1: What would you have to plan out?

- They had to learn the dance steps (knowledge)
- Someone had to start dancing (initiation)

Q2: What are the parts of a good plan?

- Think of possible problems (strategy generation)
- Organize the dance (organization)



Jack A. Naglieri, Ph.D.

61

61

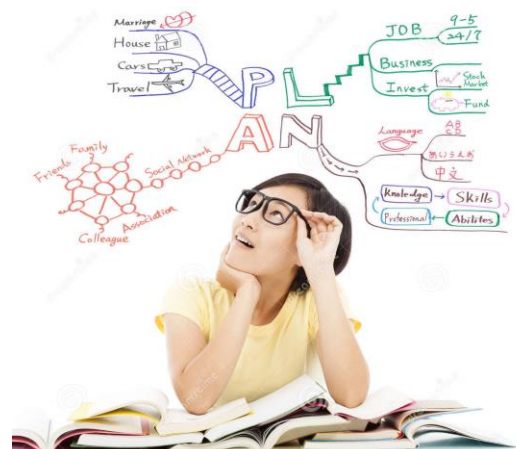
Planning Lesson Student Responses

Q3: How do you know if a plan is any good?

- Put the plan in action and see if it works (self-monitoring)
- Give it a try (perhaps learn by failing)

Q4: What should you do if a plan isn't working?

1. Fix it. (self-correction)
2. Go home! (a bad plan)



Jack A. Naglieri, Ph.D.

62

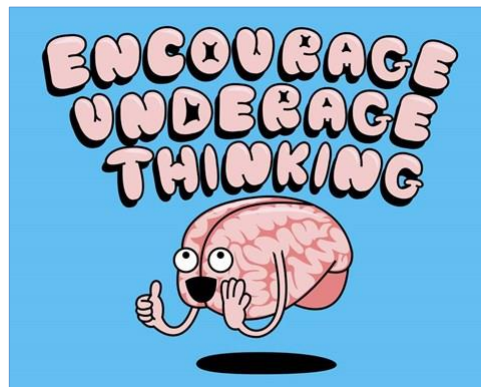
62

Planning Lesson Student Responses

Q5: How do you use planning in this class?

1. We don't plan in this class
2. Mrs. X does all the planning in this class so you don't have to think about planning

To encourage EF we have to stress thinking about *how to do what you chose to do*



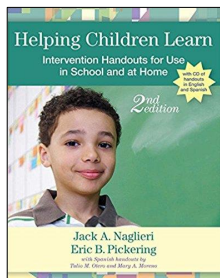
Jack A. Naglieri, Ph.D.

63

63

Encourage Planning

- Helping Children Learn Intervention Handouts for Use in School and at Home, *Second Edition* By Jack A. Naglieri & Eric Pickering
- Spanish handouts by Tulio Otero & Mary Moreno



Step 1 – Talk with Students

How Can You Be Smarter?

You can be smarter if you PLAN before doing things. Sometimes people say, "Look before you leap," "Plan your work and work your plan," or "Stop and think." These sayings are about using the ability to plan. When you stop and think about *how* to study, you are using your ability to plan.

You will be able to do more if you remember to use a plan. An easy way to remember to use a plan is to look at the picture "Think smart and use a plan!" (Figure 1). You should always use a plan for reading, vocabulary, spelling, writing, math problem solving, and science.

Do you have a favorite plan for learning spelling words? Do you use flashcards or go on the Internet to learn? Do you ask the teacher or another student for help? You can learn more by using a plan for studying that works best for you.

Think smart and use a plan!



It is smart to have a plan for doing all schoolwork. When you read, you should have a plan. One plan is to look at the questions you have to answer about the story first. Then read the story to find the answers. Another plan is to make a picture of what you read so that you can see all the parts of the story. When you write you should also have a plan. Students who are good at writing plan and organize their thoughts first. Then they think about what they are doing as they write. Using a plan is a good way to be smarter about your work!

Jack A. Naglieri, Ph.D.

64

64

Planning Facilitation for Math Calculation

Math calculation is a complex activity that involves recalling basic math facts, procedures, working carefully, and checking one's work. Math calculation requires a careful approach to follow all of the necessary steps. Children who are good at math can move on to more difficult math concepts and problem solving with greater ease. Children who are having problems in this area. For children who have trouble with math calculation, an approach that helps them approach the task planfully is likely to be useful. Planning facilitation is 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 their strategies, rather than just think about whether their answers are correct. This helps them learn careful ways of doing math.

How to Teach Planning Facilitation

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

Step 1: The teacher should provide math worksheets for the students to complete during the 10-minute session. This gives the children exposure to the problems and ways to solve them. The teacher gives each child a worksheet and says, "Here is a math worksheet for you to try to get as many of the problems correct as you can. You will have 10 minutes on this instruction are okay, but do not give any additional information."

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

HAMMILL INSTITUTE
ON DISABILITIES
Journal of Learning Disabilities
44(2) 184-195
© Hammill Institute on Disabilities 2011
Reprints and permission:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/0022219410391190
http://jld.sagepub.com
SAGE

Jackie S. Iseman¹ and Jack A. Naglieri¹

Abstract

The authors examined the effectiveness of cognitive strategy instruction based on PASS (Planning, Attention, Simultaneous, Successive) given by special education teachers to students with ADHD randomly assigned by classroom. Students in the experimental group were exposed to a brief cognitive strategy instruction for 10 minutes during each math lesson. The control group received standard math instruction. Standardized tests of cognitive processes and math skills were administered pre- and postintervention, and math worksheets completed throughout the experimental phase. Standardized tests of cognitive processes and math skills (Wechsler Individualized Achievement Tests, Third Edition, Math Fluency and Wechsler Individualized Achievement Tests, Numerical Operations) were administered pre- and postintervention, and Math Fluency and Numerical Operations were administered at 1 year follow-up. Large pre-post effect sizes were found for students in the experimental group on math worksheets (0.85 and 0.26), Math Fluency (1.17 and 0.09), and Numerical Operations (0.85 and 0.26). At 1 year follow-up, the experimental group continued to outperform the comparison group on math worksheets, far more than the comparison group (which measured the skill of generalizing learned strategies to other similar tasks). Students with ADHD evidenced greater improvement in math worksheets, far more than the comparison group (which measured the skill of generalizing learned strategies to other similar tasks) when provided the PASS-based cognitive strategy instruction.



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

Jack A. Naglieri, Ph.D.

Strategy Instruction

- Teachers facilitated discussions to help students become more self-reflective about use of strategies
- Teachers asked questions like:
 - What was your goal?
 - Where did you start the worksheet?
 - What strategies did you use?
 - How did the strategy help you reach your goal?
 - What will you do again next time?
 - What other strategies will you use next time?



eri, Ph.D.

67

67

Iseman and Naglieri

Table 3. Students' Comments During Planning Facilitation Sessions

Goals
<ul style="list-style-type: none"> • "My goal was to do all of the easy problems on every page first, then do the others." • "To get as many correct as I can." • "To get as many right as quickly as possible." • "To take time and make sure I get them correct."
Starting place
<ul style="list-style-type: none"> • "I started on the first one." • "I skipped around." • "I do the easy ones first." • "I look at the type of problem and the number of steps and decide which problems to do first."
Overall plan
<ul style="list-style-type: none"> • "I did all the easy problems on a page and went onto the next one." • "I do all the addition first, then the easy minus, and then I move onto the harder ones." • "I do the problems I know, then I check my work."
Specific strategies
<ul style="list-style-type: none"> • "I simplify fractions first." • "Skip the longer multiplication questions." • "The problems that have lots of steps take more time, so I skip them." • "I do them [the algebra] by figuring out what I can put in for X to make the problem work." • "I draw lines so I don't get my columns confused [on the multiplication]." • "I stopped drawing lines because it slowed me down." • "If a problem is taking a long time I skip it and come back to it if I have time." • "I did the ones that take the least time." • "Remember that anything times 0 is 0."
Noticing patterns in the worksheets
<ul style="list-style-type: none"> • "I did all the problems in the brain-dead zone first." • "I started in the middle of the page, the problems on top take longer." • "Next time I'll skip the hard multiplication at the top of the first page."

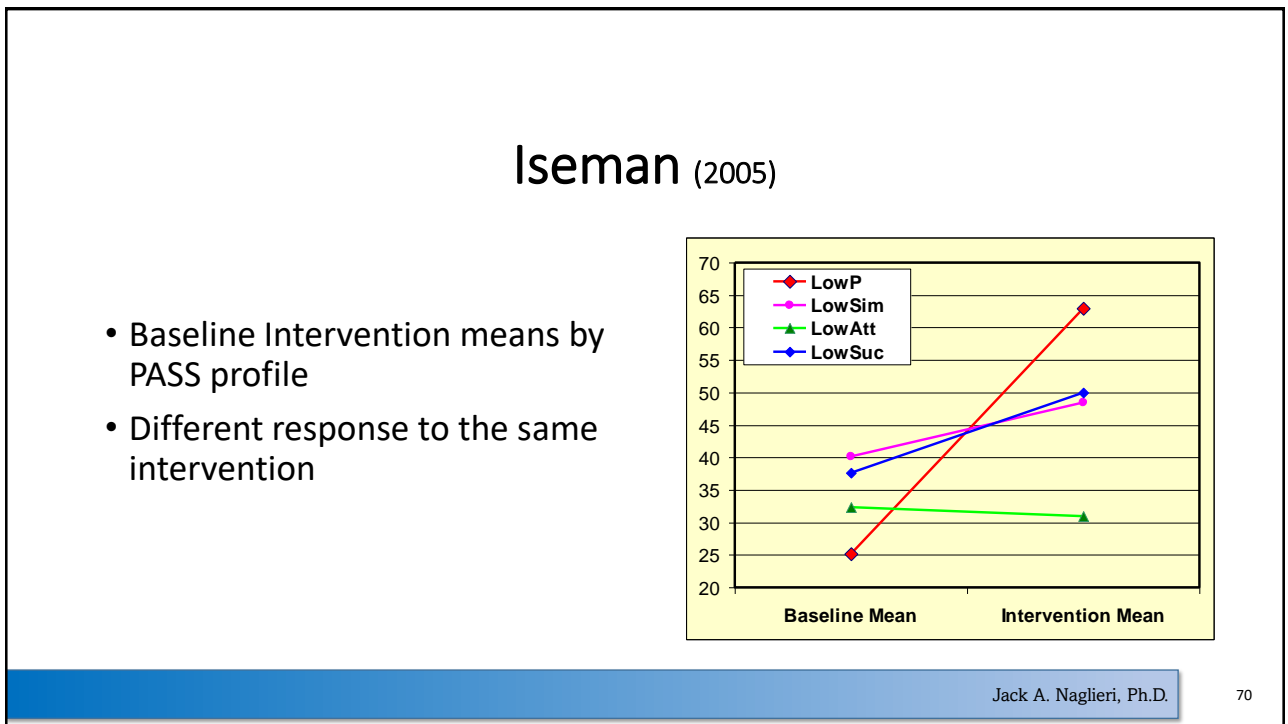
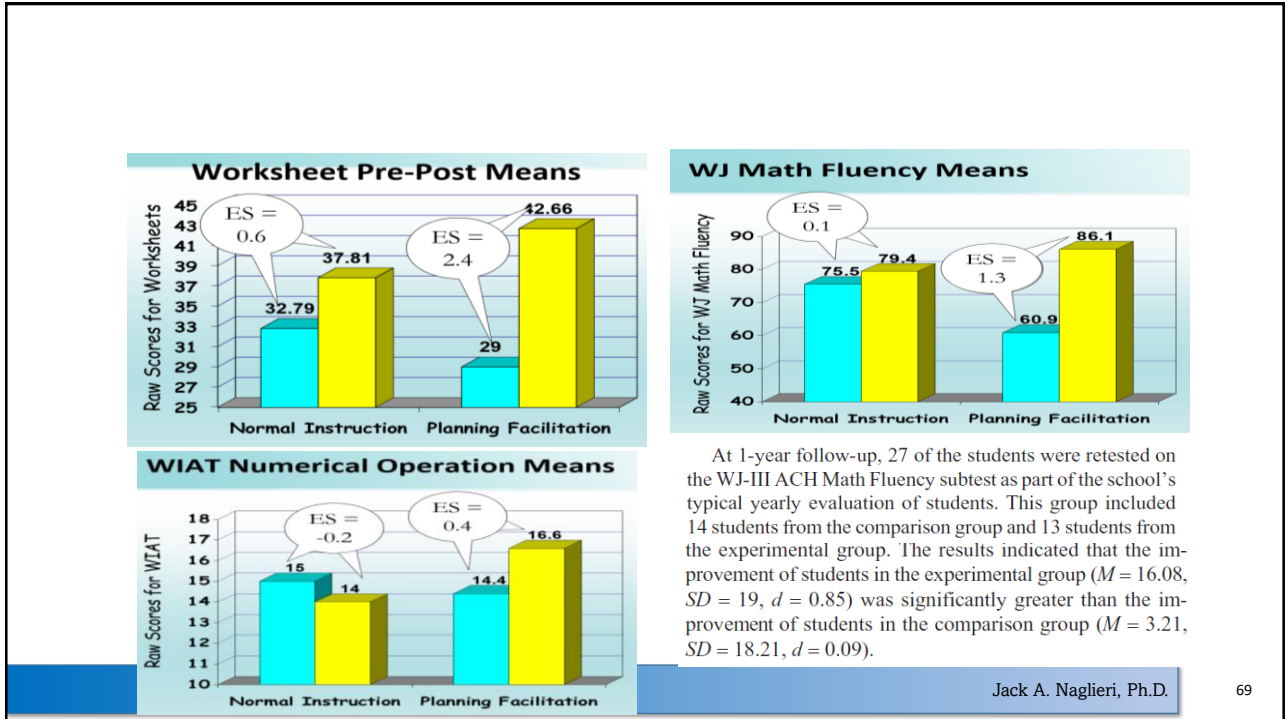
- "My goal was to do all of the easy problems on every page first, then do the others."
- "I do the problems I know, then I check my work."
- "I did all the problems in the brain-dead zone first."

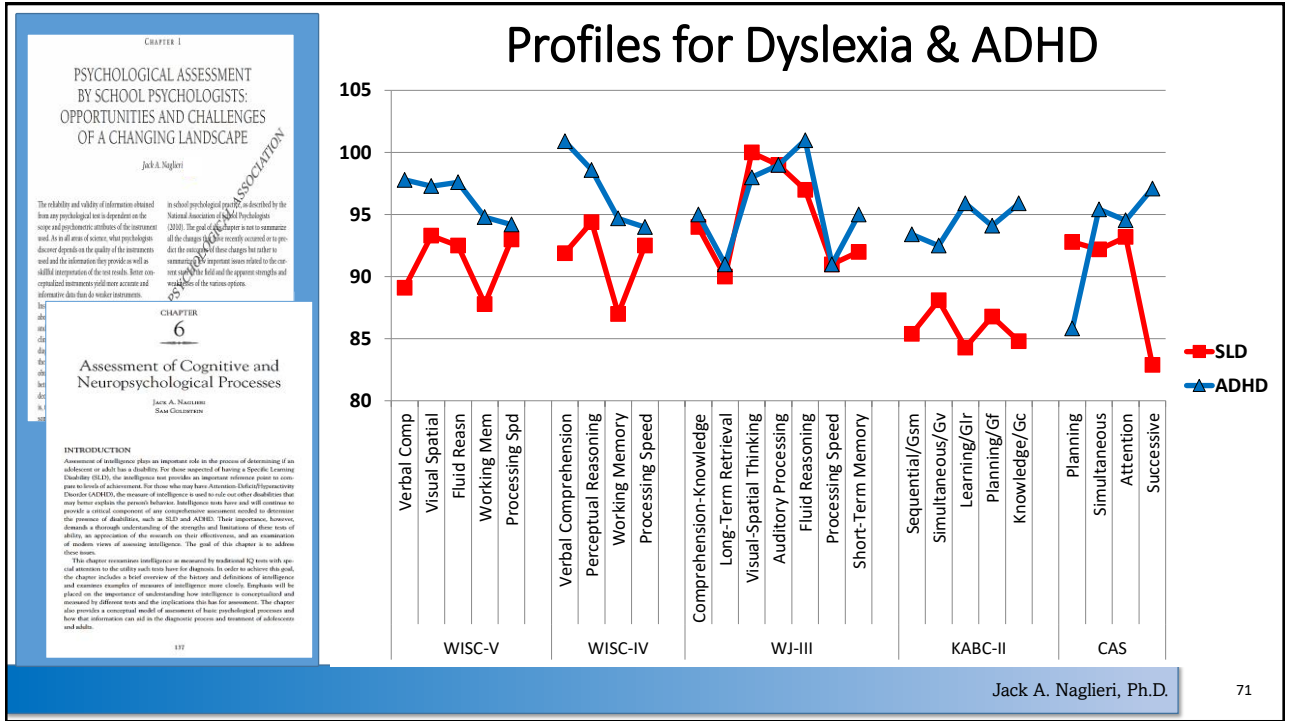


"I try not to fall asleep."

68

68





Effectiveness of a Cognitive Strategy Intervention in Improving Arithmetic Computation Based on the PASS Theory

Jack A. Naglieri and Deanne Johnson

Abstract
The purpose of this study was to determine if an instruction designed to facilitate planning, given to teachers in their class as a group, would have differential effects depending on the specific Planning, Attention, Simultaneous, Successive (PASS) cognitive characteristics of each child. A cognitive strategy instruction that encouraged planning was provided to the group of 19 students with learning disabilities and mild mental impairments. All students completed math worksheets during 7 booster and 14 intervention sessions. During the intervention phase, students engaged in self-reflection and verbalization of strategies about how the arithmetic computation worksheets should be completed. The sample was sorted into four experimental and four control groups after the experiment. Each group was given a cognitive worksheet in each PASS scale from the Cognitive Assessment System and one worksheet control to use at the end of the children in the plan.

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

Jackie S. Iseman¹ and Jack A. Naglieri¹

Abstract
The authors examined the effectiveness of cognitive strategy instruction based on PASS (Planning, Attention, Simultaneous, Successive) given to students with ADHD randomly assigned experimental group were exposed to a brief cognitive strategy instruction for 10 days, with development and application of effective planning for mathematical computation, whereas the standard math instruction. Standardized tests of cognitive processes and math achievement students completed math worksheets throughout the experimental phase. Standardized Johnson Tests of Achievement, Third Edition, Math Fluency and Wordstar Individualized Achievement Numerical Operations were administered pre- and post-intervention, and Math Fluency was also administered at 1 year follow-up. Large pre-post effect sizes were found for students in the experimental group but not the comparison group on math worksheets (0.85 and 0.26), Math Fluency (1.17 and 0.09), and Numerical Operations (0.40 and -0.14, respectively). At 1 year follow-up, the experimental group continued to outperform the comparison group. These findings suggest that students with ADHD evidenced greater improvement in math worksheets, for transfer to standardized tests of math (which measured the skill of generalizing learned strategies to other similar tasks), and continued advantage 1 year later when provided the PASS-based cognitive strategy instruction.

Mathematics Instruction and PASS Cognitive Processes: An Intervention Study

Jack A. Naglieri and Suzanne H. Gotting

Abstract
The purpose of this study was to determine if an instruction designed to facilitate planning, given to a group, would have differential effects depending on the specific cognitive characteristics of the individual instruction that facilitated planning was provided to a group of 12 students with learning disabilities. All work sheets during 7 sessions of booster and 21 sessions of intervention (when the instruction designed provided). During the intervention phase, students engaged in self-reflection and verbalization of strategy problems were completed. The class was sorted according to planning scores, obtained using the Cognitive Assessment System, into four experimental and four control groups after the experiment. Each group was given a cognitive worksheet in each PASS scale from the Cognitive Assessment System and one worksheet control to use at the end of the children in the plan.

Planning Facilitation and Reading Comprehension: Instructional Relevance of the PASS Theory

Frederick A. Haddad
Kyrene School District, Tempe, Arizona
Y. Evie Garcia
Northern Arizona University
George Mason University
Michelle Grindich, Ashley McAndrews, Jane Eubanks
Kyrene School District, Tempe, Arizona

Abstract
The purpose of this study was to evaluate whether instructional level was determined, a cognitive strategy instruction designed to facilitate planning would have differential benefits on reading comprehension depending on the specific Planning, Attention, Simultaneous, and Successive (PASS) cognitive characteristics of each child. A sample of 45 struggling general education children was sorted into three groups based on each PASS scale possible from the Cognitive Assessment System (CAS). The groups did not differ by CAS Full Scale standard score, chronological age, gender, or pretest reading comprehension scores. After each child's pretest reading comprehension instructional level was determined, a cognitive strategy instruction designed to facilitate planning was considered. The children completed a reading comprehension posttest at their respective instructional levels after the intervention. Results showed that children with a Planning weakness (n = 15) benefited substantially (effect size of 1.52) from the instruction designed to facilitate planning. Children with no weakness (n = 7), other low (n = 52) or a Successive weakness (n = 11; effect size of .06) did not benefit as much. These results support previous research suggesting that PASS profiles are relevant to instruction.

Jack A. Naglieri, Ph.D. 72



QUESTIONS
about
Interventions?

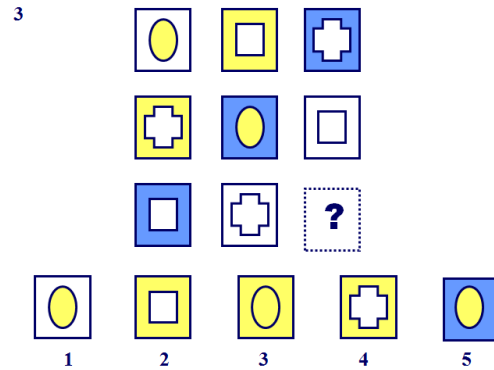
Jack A. Naglieri, Ph.D.

73

PASS Neurocognitive Abilities that are
NOT EF

PASS Theory

- **Simultaneous** is a neurocognitive ability a person uses to integrate stimuli into groups
 - Parts are seen as a whole
 - Each piece of information is related to others
 - Visual spatial tasks like blocks and puzzles on the Wechsler Nonverbal Scale
 - KABC Simultaneous Scale
 - Subtests like Block Design, Object Assembly, etc.



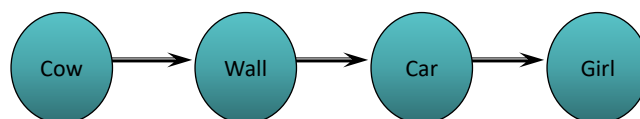
75

PASS Theory

Successive Processing

Successive processing is a basic cognitive ability which we use to manage stimuli in a specific serial order

- Stimuli form a chain-like progression
- Stimuli are not inter-related



76

Using good EF to overcome a neurocognitive processing disorder

32

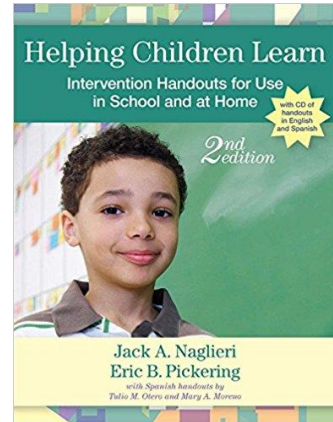
Helping Children Learn

Ben's Problem with Successive Processing



Ben was an energetic but frustrated third-grade student who liked his teachers, was popular with his peers, and fit in well socially at school. However, Ben said he did not like school at all, particularly schoolwork. Ben was good at turning in all of his work on time, and he worked hard, but he earned poor grades. He appeared to be getting more and more frustrated at school.

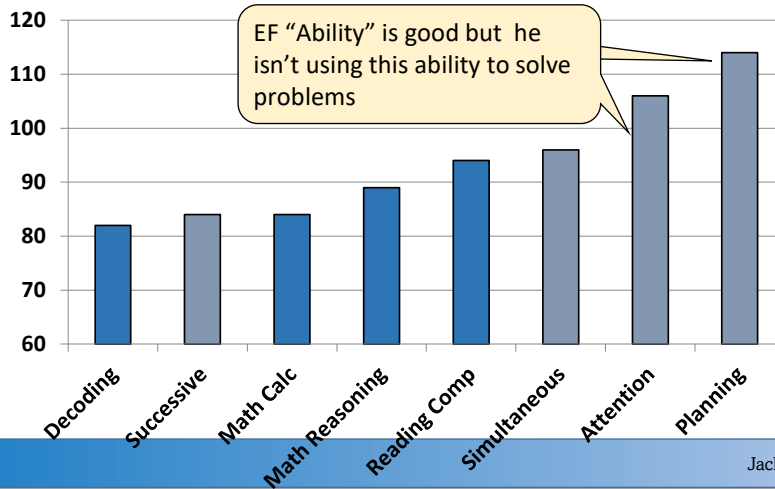
In general, Ben struggled to perform well because he had a lot of trouble following directions that were not written down, his writing often did not make sense, and he did not appear to comprehend what he read. Ben's teachers noticed that when directions for assignments and projects were given orally in class, he often only finished part of the task. Ben's teacher described an assignment in which students had to collect insects, label them, organize them into a collection, and then give a brief presentation about each insect. Unlike any other student, Ben chose to make the labels for the insects first and then go look for the insects. He found only a few of the insects he had made labels for, and when he put them in the collection, they were not in the order that had been specified. He also had trouble with the spelling of the scientific names of the insects and made many errors in the sequence of letters in the words.



77

Ben's Problem with Successive processing Ability

Scores (M = 100, SD = 15)



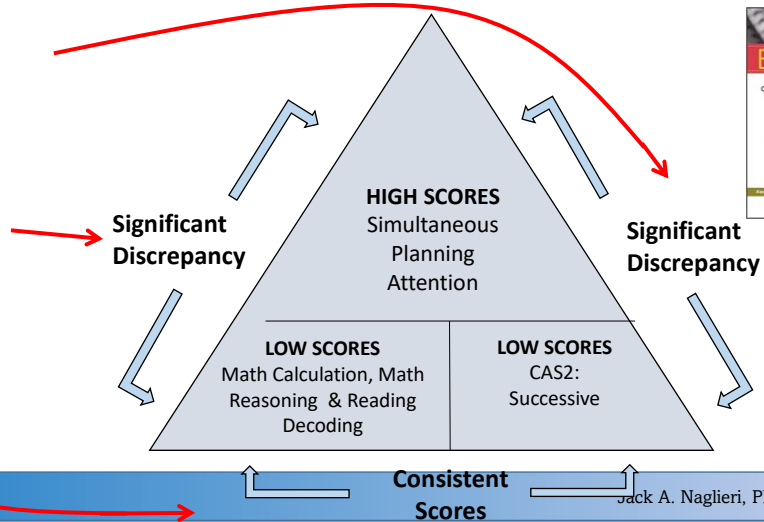
Jack A. Naglieri, Ph.D.

78

78

Ben's SLD: Discrepancy Consistency Method

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



79

Ben's Problem with Successive Processing

- Ben has difficulty whenever ANY task requires sequencing
 - Academic or ability tests
 - Visual or auditory tests
 - Math or spelling or reading
 - Tasks that require memory of sequence
- How do we help him learn better?

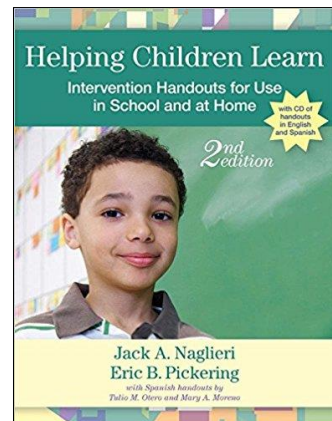


80

80

Teach Children about their Abilities

- Helping Children Learn Intervention Handouts for Use in School and at Home, *Second Edition* (Naglieri, & Pickering, 2011)
- Spanish handouts by Tulio Otero & Mary Moreno



Jack A. Naglieri, Ph.D.

81

81

Ben's Problem with Successive Ability

Teach him to use his strength in EF (Planning)

How Can You Be Smarter?

You can be smarter if you PLAN before doing things. Sometimes people say, "Look before you leap," "Plan your work and work your plan," or "Stop and think." These sayings are about using the ability to plan. When you stop and think about *how* to study, you are using your ability to plan.

You will be able to do more if you remember to use a plan. An easy way to remember to use a plan is to look at the picture "Think smart and use a plan" (Figure 1). You should always use a plan for reading, vocabulary, spelling, writing, math problem solving, and science.

Do you have a favorite plan for learning spelling words? Do you use flashcards or go on the Internet to learn? Do you ask the teacher or another student for help? You can learn more by using a plan for studying that works best for you.

Think smart and use a plan!



It is smart to have a plan for doing all schoolwork. When you read, you should have a plan. One plan is to look at the questions you have to answer about the story first. Then read the story to find the answers. Another plan is to make a picture of what you read so that you can see all the parts of the story. When you write you should also have a plan. Students who are good at writing plan and organize their thoughts first. Then they think about what they are doing as they write. Using a plan is a good way to be smarter about your work!

How to Be Smart: Planning

When we say people are smart, we usually mean that they know a lot of information. But being smart also means that someone has a lot of ability to learn new things. Being smart at learning new things includes knowing and using your *thinking abilities*. There are ways you can use your abilities *better* when you are learning.

What Does Being Smart Mean?

One ability that is very important is called *Planning*. The ability to *plan* helps you figure out *how to do things*. When you don't know how to solve a problem, using Planning ability will help you figure out how to do it. This ability also helps you control what you think and do. It helps you to stop before doing something you shouldn't do. Planning ability is what helps you wait until the time is right to act. It also helps you make good decisions about what to say and what to do.

Jack A. Naglieri, Ph.D.

82

82

Ben's Problem with Successive Ability

Teach him to recognize sequences

How to Teach Successive Processing Ability

The first step in teaching children about their own abilities is to explain what Successive processing ability is. In Figure 1 (which is included in the PASS poster on the CD), we provide a fast and

1. Teach children that most information is presented in a specific sequence so that it makes sense.
2. Encourage children by asking, "Can you see the sequence of events here?" or "Did you see how all of this is organized into a sequence that must be followed?"
3. Remind the students to think of how information is sequenced in different content areas, such as reading, spelling, and arithmetic, as well as in sports, playing an instrument, driving a car, and so forth.
4. Teach children that the sequence of information is critical for success.
5. Remind students that seeing the sequence requires careful examination of the serial relationships among the parts.

Jack A. Naglieri, Ph.D.

83

83

Solutions for Ben- Use EF

Teach him to use strategies

Chunking for Reading/Decoding

Reading/decoding requires the student to look at the sequence of the letters in words and understand the organization of specific sounds in order. Some students have difficulty with long sequences of letters and may benefit from instruction that helps them break the word into smaller, more manageable units, called *chunks*. Sometimes the order of the sounds in a word is more easily organized if the entire word is broken into these units. These chunks can be combined into units for accurate decoding. Chunking for reading/decoding is a strategy designed to do that.

How to Teach Chunking for Reading/Decoding

Teachers should first teach the children what it means to chunk or group information so that it can be remembered more easily. Use number sequences and letters for illustration (e.g., how telephone numbers are grouped). Then introduce

Plan	Action
Look at the word.	"I see the word beginning."
Find the chunk.	"I see the chunk given in the middle."
Sound out the chunk.	"I see...uhm..."

words to be read and break the words into units, such as *re-mem-ber* for *remember* or *car-pet* for *carpet*. Try to organize the groups of letters in the word in units that are natural

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

Jack A. Naglieri, Ph.D.

84

84

Core Group Discussion → Deeper Learning

- Discuss: what do you think about conceptualizing EF as a part of intelligence



Jack A. Naglieri, Ph.D.

85

85

Presentation Outline

Introduction to Executive Function (EF)

EF Behaviors

EF and Cognition (intelligence)

EF and Social Emotional Skills

EF and Academic/Job Performance

Research about EF as ability, behavior, and SE

Conclusions

Jack A. Naglieri, Ph.D.

86

86

Phineas had Social Emotional Deficit

- Phineas had profound social emotional problems after his injury to the frontal lobes
- Phineas was
 - Insulting
 - impulsively says things
 - uses vulgar language
 - can't manage his emotions
 - inconsistent in social situations
 - doesn't recognize he is offensive
 - loses control in interactions with others

Jack A. Naglieri, Ph.D.

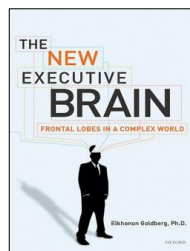
87

87

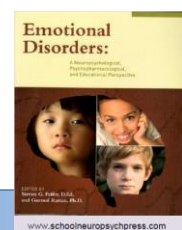
Frontal Lobes and Emotion

Goldberg (2011, p 116-117)

- the “emphasis in the classic studies of frontal lobe syndromes was on cognition [intelligence] rather than on affect [social emotional]”
- ‘very few researchers have attempted to merge cognitive and emotional aspects of frontal lobe dysfunction’



- Feifer's Emotional Disorders book contains a collection of papers on the relationship between EF and Emotional Disorders
- See Feifer@comcast.net



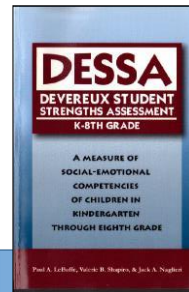
h.D.

88

88

Measures

- CogAT is based on traditional IQ (Army Alpha and Beta) containing Verbal, Quantitative, Nonverbal
- DESSA is a 72-item rating scale of social-emotional skills such as Self Awareness, Relationship Skills, etc. related to resilience
- SAT is norm-referenced achievement test

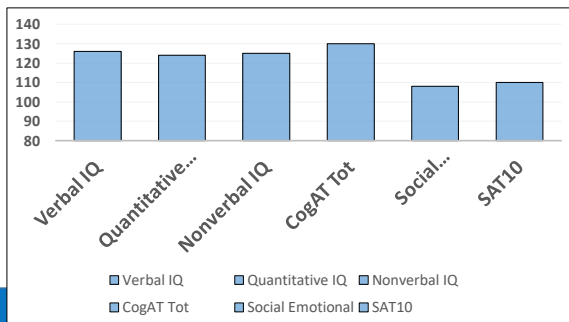


Jack A. Naglieri, Ph.D.

89

89

- DESSA Total correlated .44 with Achievement (reading, math, language)
- CogAT Total correlated .36
- Hierarchical regression analysis showed that
 - CogAT did not add to the predication of achievement after DESSA scores were entered



DESSA predicted reading, language and math scores over IQ (CogAt) scores

Jack A. Naglieri, Ph.D.

90

90

Take Away Messages

- Social Emotional Skills are the result of EF and what the person has learned in all aspects of the environment
- Individuals CAN BE TAUGHT good, or bad, social emotional skills
- Your Comments? Questions?

91

Presentation Outline

Introduction to Executive Function (EF)

EF Behaviors

EF and Cognition (intelligence)

EF and Social Emotional Skills

EF and Academic/Job Performance

Research about EF as ability, behavior, and SE

Conclusions

Jack A. Naglieri, Ph.D.

92

92

- See www.jacknaglieri.com for papers on CAS2, Feifer Assessments of Reading, Math, and Writing

Correspondence of FAR and PASS	Planning	Attention	Correspondence of FAM and PASS	Planning	Attention
Phonemic Awareness - measures rhyming, blending, segmenting, and manipulating sounds.			Phonemic Awareness - measures rhyming, blending, segmenting, and manipulating sounds.		
Positioning Sounds - a phonemic localization task determining sound positions.			Positioning Sounds - a phonemic localization task determining sound positions.		
Nonsense Word Decoding - the student decodes a series of nonsense words.			Nonsense Word Decoding - the student decodes a series of nonsense words.		
Isolated Word Reading Fluency - the student reads a list of words in 60 seconds.			Isolated Word Reading Fluency - the student reads a list of words in 60 seconds.		
Oral Reading Fluency - the student reads a passage composed of the same words as the Isolated Word Reading Fluency task.			Oral Reading Fluency - the student reads a passage composed of the same words as the Isolated Word Reading Fluency task.		
Rapid Automatic Naming - the student names either objects, letters, or stencils.			Rapid Automatic Naming - the student names either objects, letters, or stencils.		
Visual Perception - the student identifies letters or words printed backwards from an array.		X	Visual Perception - the student identifies letters or words printed backwards from an array.		X
Verbal Fluency - the student retrieves words from a category, or items that start with a letter.	X	X	Verbal Fluency - the student retrieves words from a category, or items that start with a letter.	X	X
Orthographic Processing - the student recalls a letter, or group of letters, from a target word.		X	Orthographic Processing - the student recalls a letter, or group of letters, from a target word.		X
Irregular Word Reading Fluency - the student reads a list of phonologically irregular words.			Irregular Word Reading Fluency - the student reads a list of phonologically irregular words.		
Semantic Concepts - the student identifies the correct antonym or synonym of a target word.	X		Semantic Concepts - the student identifies the correct antonym or synonym of a target word.	X	
Word Recall - the student repeats back a list of words over two trials.	X	X	Word Recall - the student repeats back a list of words over two trials.	X	X
Morphological Processing - the student selects the correct prefix, suffix, or stem that completes a target word.			Morphological Processing - the student selects the correct prefix, suffix, or stem that completes a target word.		
Silent Reading Fluency - the student answers questions after reading a passage silently.	X	X	Silent Reading Fluency - the student answers questions after reading a passage silently.	X	X

Note: The correspondence of PASS with FAR and FAM needs to be carefully examined for each student.

93

Presentation Outline

Introduction to Executive Function (EF)

EF Behaviors

EF and Cognition (intelligence)

EF and Social Emotional Skills

EF and Academic/Job Performance

Research about EF as ability, behavior, and SE

Conclusions

Jack A. Naglieri, Ph.D. 94

94

Executive Function Behaviors, Intelligence, and Achievement test scores

Jack A. Naglieri, Ph.D.

95

95

EF, WISC-IV, CAS, Achievement

- Data from Sam Goldstein’s evaluation center in Salt Lake City, UT
- Children given the WISC-IV (N = 43), CAS (N = 62), and the WJIII achievement (N = 58) as part of the typical test battery

Demographic Characteristics of the CAS, WISC-IV, and WJ III ACH Validity Samples

Demographic	CAS		WISC-IV		WJ III ACH		
	N	%	N	%	N	%	
Gender	Male	38	61.3	29	67.4	36	62.1
	Female	24	38.7	14	32.6	22	37.9
Race/Ethnic Group	Hispanic	1	1.6	1	2.3	1	1.7
	Asian	2	3.2	2	4.7	2	3.4
	White	55	88.7	38	88.4	52	89.7
	Other	4	6.5	2	4.7	3	5.2
Parental Education Level	High school diploma or less	1	1.6	0	0.0	1	1.7
	Some college or associate's degree	21	33.9	12	27.9	18	31.0
	Bachelor's degree or higher	36	58.1	26	60.5	34	58.7
	Missing information	4	6.5	5	11.6	5	8.6
Diagnostic or Educational Group	ADHD	24	38.7	15	34.9	20	34.5
	Anxiety	15	24.2	9	20.9	14	24.1
	ASD	7	11.3	5	11.6	7	12.1
	LD	3	4.8	3	7.0	3	5.2
	Mood	4	6.5	3	7.0	5	8.6
	Other	0	0.0	0	0.0	0	0.0
Total	62	100.0	43	100.0	58	100.0	
Age M (SD)	10.4 (2.9)		10.7 (2.6)		10.5 (2.7)		

Note. ADHD = Attention-Deficit Hyperactivity Disorder; Anxiety = Anxiety Disorder; ASD = Autism Spectrum Disorder; LD = Learning Disorder; Mood = Mood Disorder.

	CAS				
	FS	Plan	Sim	Att	Suc
CEFI					
Full Scale	.45	.49	.43	.37	.32

	WISC-IV				
	FS	VC	PR	WM	PS
CEFI					
Full Scale	.39	.44	.27	.30	.34

	WJ-III Achievement Tests				
	Total	Broad Reading	Broad Math	Broad Written Language	Median
CEFI Scales					
Full Scale	.51	.48	.49	.47	.49

Jack A. Naglieri, Ph.D.

96

96

EF and Achievement (Naglieri & Rojahn, 2004)

- Correlation between Executive Function (Planning + Attention) with achievement = **.51** (N = 1,559) is stable across 5–17-year range
- EF scores added significantly to the prediction of achievement after Simultaneous and Successive scores



Relations between executive function and academic achievement from ages 5 to 17 in a large, representative national sample

John R. Best^{a,b}, Patricia H. Miller^b, Jack A. Naglieri^c

^a Department of Psychology, University of Georgia, Athens, GA, 30602-2013, USA
^b Department of Psychology, San Francisco State University, San Francisco, CA, 94132, USA
^c Department of Psychology, George Mason University, Fairfax, VA, 22030, USA

ARTICLE INFO

Article history:
 Received 25 May 2010
 Received in revised form 20 January 2011
 Accepted 21 January 2011
 Available online xxxx

Keywords:

Executive function
 Academic achievement
 Childhood
 Adolescence

ABSTRACT

This study examined age-related changes in complex executive function (EF) in a large, representative sample (N = 2046), aged 5 to 17 using the Cognitive Assessment System (CAS; Naglieri & Das, 1997a). Relations between complex EF and academic achievement were examined on a sub-sample (N = 1395) given the Woodcock-Johnson Tests of Achievement-Revised (Woodcock & Johnson, 1989). Performance on the three complex EF tasks improved until at least age 13, although improvement slowed with increasing age and varied across tasks. Moreover, the different developmental patterns in the correlations between completion time and accuracy provide clues to developmental processes. Examination of individual achievement subjects clarified the specific aspects of academic performance most related to complex EF. Finally, the correlation between complex EF and academic achievement varied across ages, but the developmental pattern of the strength of these correlations was remarkably similar for overall math and reading achievement, suggesting a domain-general relation between complex EF and academic achievement. © 2011 Elsevier Inc. All rights reserved.

Journal of Educational Psychology
 2004, Vol. 96, No. 1, 17–28

Copyright 2004 by the American Psychological Association, Inc.
 0022-0618/04/\$12.00 DOI: 10.1037/0022-0618.96.1.17

Construct Validity of the PASS Theory and CAS: Correlations With Achievement

Jack A. Naglieri and Johannes Rojahn
 George Mason University

The relationship among Planning, Attention, Simultaneous, and Successive (PASS) processing scores of the Cognitive Assessment System (CAS) and the Woodcock-Johnson Revised Tests of Achievement (WJ-R) were examined with a sample of 1,559 students aged 5–17 years. Participants were part of the CAS standardized sample and closely represented the U.S. population on a number of important demographic variables. Pearson product-moment correlations between CAS Full Scale and the WJ-R Skills cluster was .71 for the Standard and .70 for the Basic CAS Battery scores, providing evidence for the construct validity of the CAS. The CAS correlated with achievement as well if we better than tests of general intelligence. The amount of variance in the WJ-R scores the CAS accounted for increased with age between 5- to 13-year-olds. The 4 PASS scale scores cumulatively accounted for slightly more of the WJ-R variance than the CAS Full Scale score.

There are many ways in which the validity of a theory of cognitive ability may be evaluated. Psychologists often attempt to relate information about a child's cognitive characteristics to that

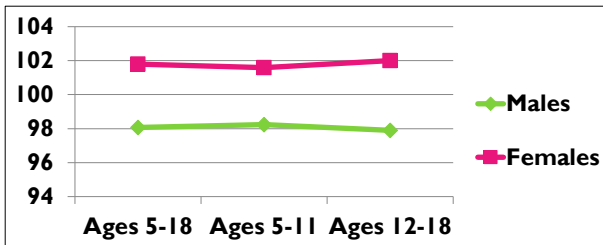
achievement. For instance, subtests like General Information are also included on individual achievement tests (e.g., the Peabody Individual Achievement Test—Revised; Markwardt, 1997). Some

97

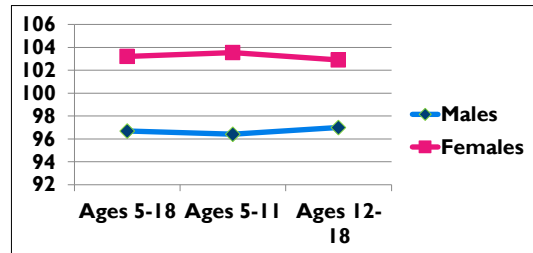
Sex Differences in Executive Function

98

CEFI Sex Differences: Parent Raters



CEFI Sex Differences: Teacher Raters

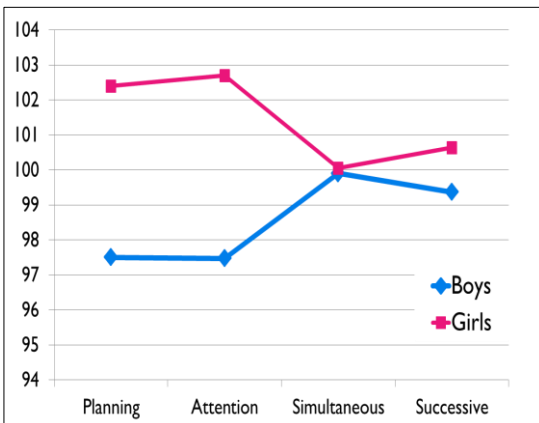


Jack A. Naglieri, Ph.D.

99

99

Sex Differences: Ability



Journal of Educational Psychology
2001, Vol. 93, No. 2, 436-437

Copyright 2001 by the American Psychological Association, Inc.
0022-0661/01/\$5.00 DOI: 10.1037/0022-0663.93.2.436

Gender Differences in Planning, Attention, Simultaneous, and Successive (PASS) Cognitive Processes and Achievement

Jack A. Naglieri
George Mason University

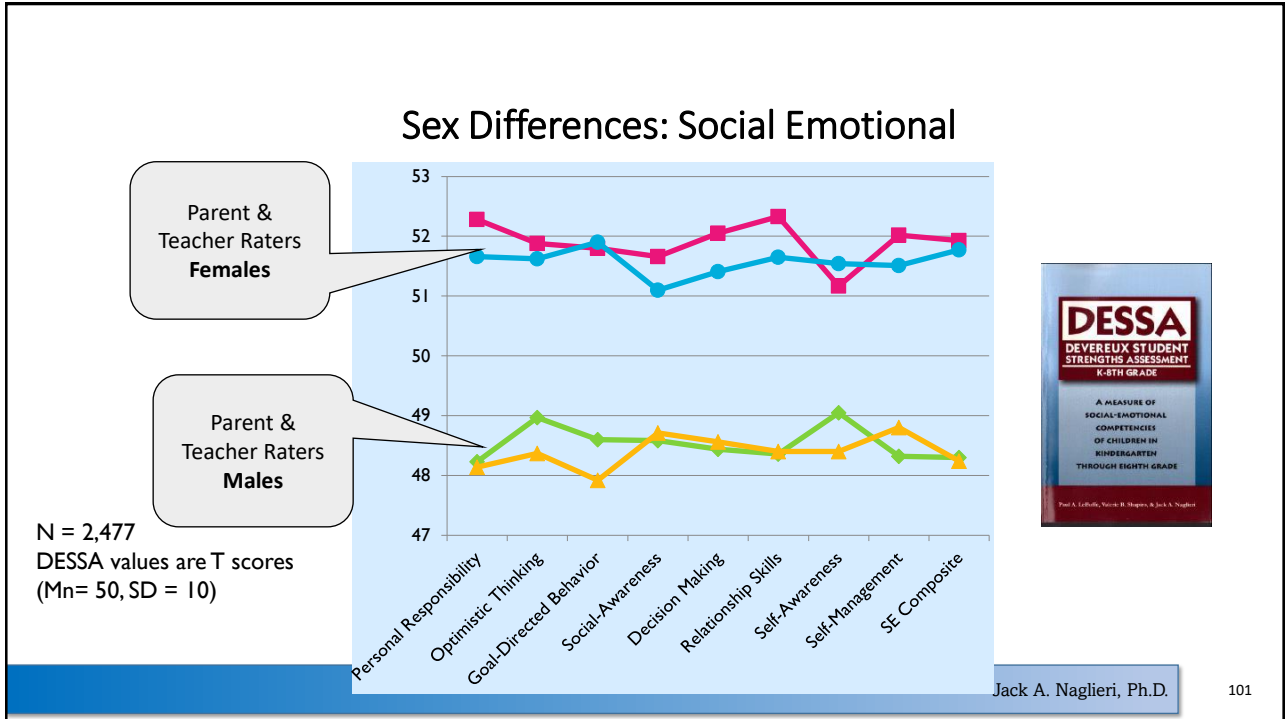
Johannes Rojahn
Ohio State University

Gender differences in ability and achievement have been studied for some time and have been conceptualized along verbal, quantitative, and visual-spatial dimensions. Researchers recently have called for a theory-based approach to studying these differences. This study examined 1,100 boys and 1,100 girls who matched the U.S. population using the Planning, Attention, Simultaneous, Successive (PASS) cognitive-processing theory, built on the neuropsychological work of A. R. Luria (1973). Girls outperformed boys on the Planning and Attention scales of the Cognitive Assessment System by about 5 points ($d = .30$ and $.35$, respectively). Gender differences were also found for a subsample of 1,266 children on the Woodcock-Johnson Revised Tests of Achievement Proofing ($d = .33$), Letter-Word Identification ($d = .22$), and Dictation ($d = .22$). The results illustrate that the PASS theory offers a useful way to examine gender differences in cognitive performance.

Jack A. Naglieri, Ph.D.

100
100

100



	CEFI	Males	Females	Difference
EF	Parent Raters	98	102	4
EF	Teacher Raters	97	103	6
	DESSA	Males	Females	Difference
SEL	Parent Raters	97	103	6
SEL	Teacher Raters	97	103	5
	PASS from CAS	Males	Females	Difference
EF	Planning	98	103	5
EF	Attention	98	103	5
	Simultaneous	100	100	0
	Successive	99	101	1

Females have higher EF scores than Males

Jack A. Naglieri, Ph.D.

Presentation Outline

- Introduction to Executive Function (EF)
- EF Behaviors
- EF and Cognition (intelligence)
- EF and Social Emotional Skills
- EF and Academic/Job Performance
- Research about EF as ability, behavior, and SE
- ➔
Conclusions

Jack A. Naglieri, Ph.D.

103

103

Conclusions

Assessment of EF should be comprehensive and include cognition, behavior and academic skills

We can encourage the use of EF

This is the gift of smarter thinking

This is a gift of optimism

This is a gift for life success

Jack A. Naglieri, Ph.D.

104

104




FINAL
QUESTIONS
?

Jack A. Naglieri, Ph.D. 105

105

The COVID has had a big influence on our world, but the lessons we teach our children about how to cope when their Executive Function is not functioning will last a lifetime.

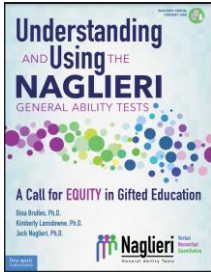
Jack A. Naglieri April 2020



106

106

Race and Ethnic Differences for Traditional and Second-Generation Ability Tests



Note: Even though traditional intelligence tests may not show psychometric bias (Worrell, 2019) the large mean score differences suggest they are unfair (Brulles, et al., 2022).

Race and Ethnic Standard Score Differences Across Intelligence Tests	By Race	By Ethnicity
Tests that require knowledge	Mn = 11.5	Mn = 9.2
Otis-Lennon School Ability Test (distric wide)	13.6	
Stanford-Binet IV (normative sample)	12.6	
WISC-V (normative sample)	11.6	
WJ- III (normative sample)	10.9	10.7
CogAT7 (Nonverbal scale)	11.8	7.6
WISC-V (statistical controls normative sample)	8.7	
Tests that require minimal knowledge	Mn = 4.1	Mn = 2.6
K-ABC (normative sample)	7.0	
K-ABC (matched samples)	6.1	
CAS-2 (normative sample)	6.3	4.5
CAS (statistical controls normative sample)	4.8	4.8
CAS-2 (statistical controls normative sample)	4.3	1.8
CAS-2 Brief (normative samples)	2.0	2.8
NNAT (matched samples)	4.2	2.8
Naglieri General Ability Test-Verbal	2.2	1.6
Naglieri General Ability Test-Nonverbal	1.0	1.1
Naglieri General Ability Test-Quantitative	3.2	1.3

Notes: The results summarized here were reported for the Otis-Lennon School Ability Test by Avant and O'Neal (1986); Stanford-Binet IV by Wasserman (2000); Woodcock-Johnson III race differences by Edwards & Oakland (2006) and ethnic differences by Sotelo- Dynega, Ortiz, Flanagan & Chaplin (2013); CogAT7 by Carman, Walther and Bartsch (2018); WISC-V by Kaufman, Raiford & Coatsen (2016); Kaufman Assessment Battery for Children-II by Lichenberger, Sotelo- Dynega and Kaufman (2009); CAS by Naglieri, Rojahn, Matto & Aquilino (2005); CAS-2 and CAS2: Brief by Naglieri, Das & Goldstein, 2014; Naglieri Nonverbal Ability Test by Naglieri and Ronning (2000), and Naglieri General Ability Tests by Naglieri, Brulles and Lansdowne (2021).