Multidimensional Assessment of Executive Function: Cognition, Behavior Academics, & Impairment
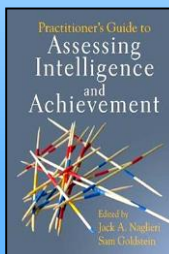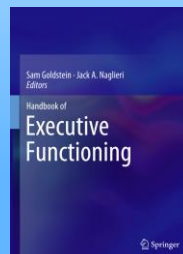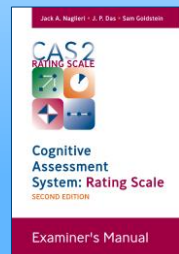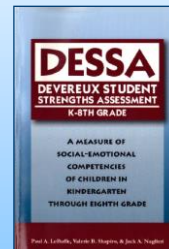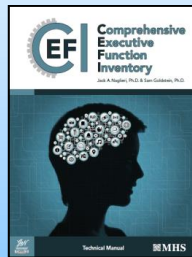
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Senior Research Scientist, Devereux Center for Resilient Children
jnaglieri@gmail.com
www.jacknaglieri.com

conclusions

1

Resources and Disclosures
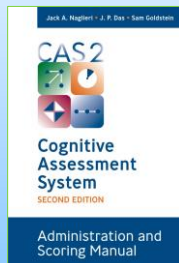
conclusions

2

www.jacknaglieri.com

- General information
- Copies of presentations, research and book chapters
- To ask a question

3

My Background

➢ Interest in intelligence and instruction
➢ Experiences at UGA
➢ Test development
➢ Need for science to support practice
➢ Psychometrics
➢ My personal perspective on being a researcher and test developer
➢ Evidence based interpretation
➢ My experience being tested…

conclusions   4

Today's Session

➢Introduce yourself to your neighbors
- We will be discussing various topics today and you need to know who your talking to
  - Name (write it down so you remember)
  - What they do
  - Share a something about yourself relative to EF

➢Group Members
- Spokesperson
- Timer
- Organizer

conclusions   5

Presentation Outline

➡ Comprehensive Model of EF
- Historical Perspective
- Definitions of Executive Function

➢EF as Behavior
➢EF as an Ability (an intelligence)
➢EF as Social Emotional Skills
➢Impairment and EF
➢Research about EF as ability, behavior, and SE
➢**Think Smart!** -- EF Skills in the Classroom or Clinic
- More lesson plans for improving components of EF
➢Conclusions

conclusions   6

EF Lesson on Saturday Night Live

➢ We will begin by learning about how EF can be taught to students, using one of the lessons in the project I'm working on

➢ The lessons teach aspects of EF and are structured as follows:

- STEP 1 – View the video
- STEP 2 – Discuss the video with the person sitting next to you.
- STEP 3 – Share your ideas with everyone

conclusions   7

EF Lesson on Saturday Night Live

conclusions   8

EF Lesson on Saturday Night Live

➢ STEP 1 – View the video

➢ STEP 2 – Discussion of the video with someone sitting next to you.

➢ STEP 3 – Share your ideas with everyone

conclusions

9

Time to Think and Talk

4 minutes left

➢ **Task:**

START

➢ Talk with your partner(s)

➢ What was the main point ?

➢ Was the goal achieved ?

➢ Why was it so hard to get the students to think?

➢ Your own questions and thoughts..

conclusions

All Lessons available at: www.efintheclassroom.net
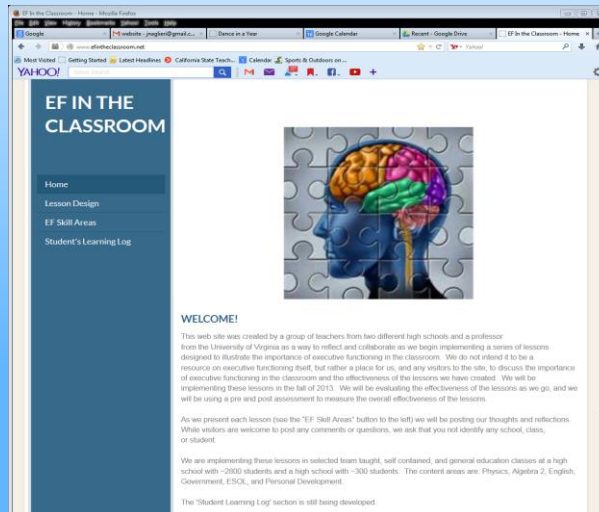
11

History Class: Saturday Night Live

➤ STEP 1 – View the video

➤ STEP 2 – Discussion of the video with someone sitting next to you.

- Consider:
  - What was the main point ?
  - Was the goal achieved ?
  - What did the teacher do wrong ?
  - Your own questions and thoughts..

➤ STEP 3 – Share your ideas with everyone

conclusions 12

History Class: SNL

Metacognition
The ability to think about your thinking

Phrase of the week: Are you thinking about thinking?

Watch Seinfeld History Lesson Video:
http://www.schooltube.com/video/30747e2e060f4e4efc5b/

1. Why was the teacher frustrated in the video?
2. What could the students in the video have done differently?
3. Why was it so hard for the students to think about history?
4. Do you think about how you're doing your work *while* you are actually doing it?

Wrap-Up:

This week whenever you are stuck, you must describe to the teacher what you did. How you got to where you are? This is an example of being aware of what you're thinking, sometimes called "self-monitoring". Write in your notebook how you think this could benefit you.

conclusions   13

History Class: Student Comments

➢ 'The teacher was frustrated because the students weren't thinking about what he was saying'

➢ 'They should have paused before responding so that they could think'

➢ 'When you feel pressure you'll say anything if you don't know the answer'

conclusions   14

History Class: Student Comments

➢ 'The way teachers run the class stops you from thinking because they tell you there is only one way to do something – but it's a fact that there is more than one way to solve a problem'

➢ 'That's what I like about this class, there are different ways to solve the problems'

➢ 'We need to know why the teacher is getting us to learn history'

conclusions   15

History Class: Saturday Night Live

➢ Teach students to think not just remember

➢ How to learn is just as important as what to learn

➢ This is what Executive Function is all about

➢ This is the theme of today's workshop

conclusions   16

Meltzer (2010)

➢'Classroom instruction generally focuses on content (or the *what to know)*, rather than on the *how to do or learn…*and does not address metacognitive strategies that teach students to think about *how* they think and learn'.
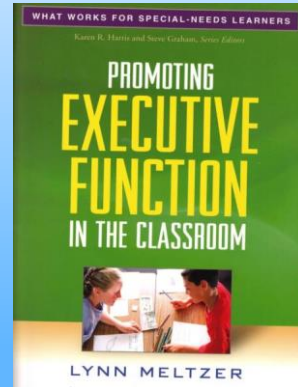
conclusions   17

Why this Workshop 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 children's ability to learn, their behavior, and their social skills.

➢Improving EF will change a student's life
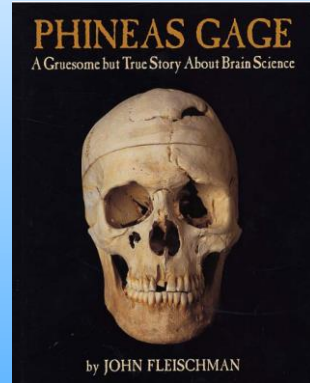
conclusions   18

Executive Function Goals

➤Today we will be *thinking about thinking*

➤I will be teaching you *how* to help people learn to do the things they want to do

➤The goal is to help students learn more by *encouraging them consider how they do what they decide to do*

➤The goal is to engage the frontal lobes

conclusions   19

Presentation Outline

➡ Comprehensive Model of EF
  • Historical Perspective
  • Definitions of Executive Function
➤EF as Behavior
➤EF as an Ability (an intelligence)
➤EF as Social Emotional Skills
➤Impairment and EF
➤Research about EF as ability, behavior, and SE
➤**Think Smart!** -- EF Skills in the Classroom or Clinic
  • More lesson plans for improving components of EF
➤ Conclusions

conclusions   20

The Curious Story of Phineas Gage

John Fleischman's book "Phineas Gage: A Gruesome but True Story About Brain Science" is an excellent source of information about this person, his life, and how this event impacted our understanding of how the brain works; and particularly the frontal lobes.
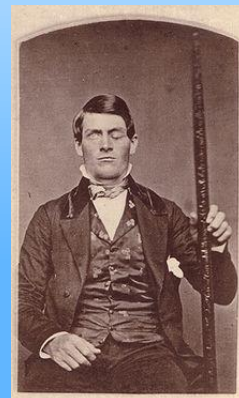

conclusions

21

The Curious Story of Phineas Gage

➢ September 13, 1848 26 year old Phineas Gag 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

22

Fleishman (2002, p 70)

➢ From Damaiso (1994) article in *Science*

➢ The rod passed through the left frontal lobe, between the two hemispheres, then to left hemisphere

➢ The damage was to the front of the frontal cortex more than the back, and the underside more than the top

Fleishman (2002)
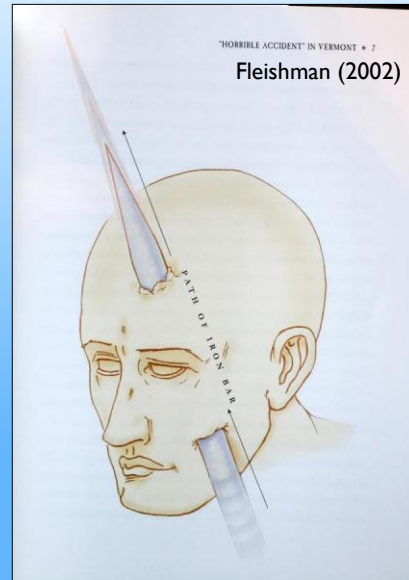
A Bit of EF Neuroanatomy

➢ The case of Phineas Gage led to a better understanding of the frontal lobes; in particular the pre-frontal cortex.

➢ Rich cortical, sub-cortical and brain stem connections.

conclusions 24

More Specifically

Dorsolateral prefrontal cortex

➤ The dorsolateral prefrontal cortex is involved with the ability to plan, shift set, organize remember and solve novel problems.

➤ That is: planning and decision making, self monitoring, self correction, especially when responses are not well-rehearsed or contain novel sequences of actions.
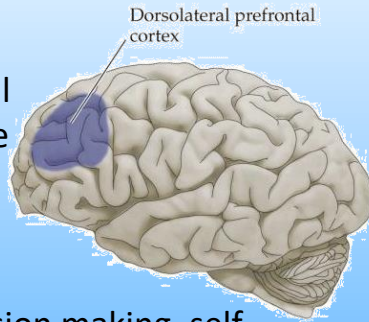
conclusions   25

The Curious Story of Phineas Gage

The Skull of Phineas Gage is at Harvard's Warren Anatomical Museum

The skull of Phineas Gage

The skull of Phineas Gage, along with the tamping iron which did the damage. On display at Harvard's Warren Anatomical Museum.

Frontal Lobes and Executive Function(s)

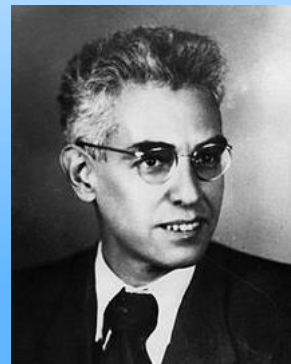What do we mean by the term Executive Function(s)?

conclusions   27

Executive Function (s)

➢In 1966 Luria first wrote and defined the concept of Executive Function (EF)

➢He credited Bianchi (1895) and Bekhterev (1905) with the initial definition of the process

1902 - 1977

conclusions   28

Executive Functions

➤ Elkhonon Goldberg provides a valuable review of what the frontal lobes do

➤ Describes EF as the orchestra leader

http://www.elkhonongoldberg.com/
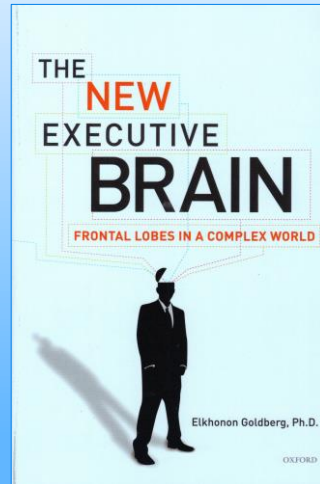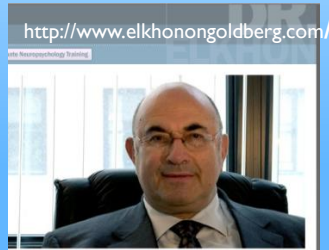
conclusions 29

Goldberg (2009, p. 4)

➤ "The frontal lobes … are liked to intentionality, purposefulness, and complex decision making."

➤ They make us human, and as Luria stated, are "the organ of civilization"

➤ Frontal lobes are about …"leadership, motivation, drive, vision, self-awareness, and awareness of others, success, creativity, sex differences, social maturity, cognitive development and learning…"
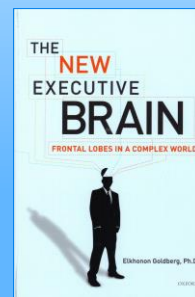
conclusions 30

What is Executive Function(s)

There is no formal excepted 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

conclusions   31

Goldstein, Naglieri, Princiotta, & Otero (2013)

➢ Executive function(s) has come to be an umbrella term used for many different "abilities"-- planning, working memory, attention, inhibition, self-monitoring, self-regulation and initiation -- carried out by pre-frontal lobes.

➢ We found more than 30 definitions of EF(s)

Sam Goldstein · Jack A. Naglieri
Editors

Handbook of
Executive
Functioning

Springer

conclusions   32

Executive Function

Executive Functions

- ➢ EF has is a **unitary** construct (Duncan & Miller, 2002; Duncan & Owen, 2000).
- ➢ EF is **unidimensional** in early childhood not adulthood.
- ➢ Both views are supported by some research (Miyake et al., 2000) EF is a **unitary construct … but with partially different components**.

- ➢ EF has **three components**: *inhibitory control, set shifting (flexibility), and working memory* (e.g., Davidson, et al., 2006).
- ➢ Executive Function**s** is a **multidimensional** model (Friedman et al., 2006) with independent **abilities** (Wiebe, Espy, & Charak, 2008).

conclusions   33

Executive Function(s)

- ➢Given all these 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)

conclusions   34

CEFI (Naglieri & Goldstein, 2012)

CEFI Parent Rating Scale (Ages 5-18)	CEFI Teacher Rating Scale (Ages 5-18)	CEFI Self-Rating Scale (Ages 12-18)

CEFI Full Scale (100 items)

1. Attention
2. Emotion Regulation
3. Flexibility
4. Inhibitory Control
5. Initiation
6. Organization
7. Planning
8. Self-Monitoring
9. Working Memory

1. Consistency Index
2. Negative Impression
3. Positive Impression

EXPLORATORY FACTOR ANALYSES

➤ The normative samples for parents, teacher, and self ratings were randomly split into two samples and EFA conducted using

- the item raw scores
- nine scales' raw scores

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

➤ The sample ...

conclusions   37

CEFI Standardization Samples

➤ Sample was stratified by

- Sex, age, race/ethnicity, parental education level (PEL; for cases rated by parents), geographic region
- Race/ethnicity of the child (Asian/Pacific Islander, Black/African American/African Canadian, Hispanic, White/Caucasian, Multi-racial by the rater
- Parent (N=1,400), Teacher (N=1,400) and Self (N=700) ratings were obtained

conclusions   38

EXPLORATORY FACTOR ANALYSES

90 Items: factor analysis clearly indicted that *one factor* was the best solution

Nine item groups: Attention, Emotion Regulation, Flexibility, Inhibitory Control, Initiation, Organization, Planning, Self-Monitoring, and Working Memory scales form *one factor*
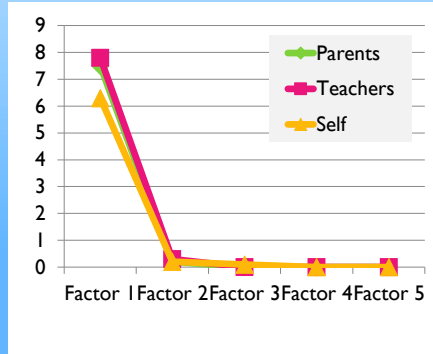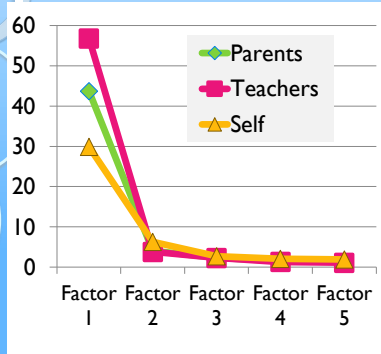
conclusions

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EXPLORATORY FACTOR ANALYSES

Table 8.6. Consistency of Factor Loadings Across Groups

Grouping Factor	CEFI Form	Coefficient of Congruence
Gender	Parent	.999
	Teacher	.999
	Self-Report	.992
Race/ Ethnic Group	Parent	.996
	Teacher	.999
	Self-Report	.995
Age	Parent	.999
	Teacher	.999
	Self-Report	.995
Clinical/ Educational	Parent	.993
	Teacher	.994
	Self-Report	.976

Nearly identical factor solutions (ALL ONE FACTOR) by Gender, Race/Ethnic, Age and Clinical/typical status

conclusions

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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
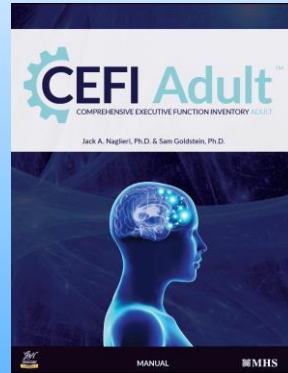
conclusions 41

Adult CEFI Samples

➢ Self (N = 1,600), Observer (N = 1,600) results: 1 factor
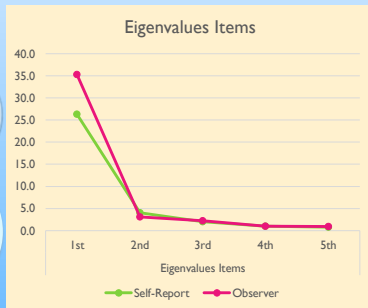
Table 8.2. Eigenvalues from the Inter-Item Correlations

Form	1st:2nd	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
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.
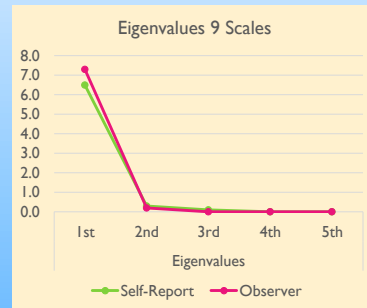
Table 8.4. Eigenvalues from the CEFI Adult Scales Correlations

Form	1st:2nd	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
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.

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CEFI Adult Consistency of Loadings

Consistency of Factor Loadings Across Groups

Exploratory factor analysis (EFA) was used to examine the replicability of the unidimensional factor structure of the CEFI Adult across several demographic groups (gender, age, race/ethnicity, and clinical status). The EFA procedure was conducted for each demographic group to determine if the factor structure was consistent across genders (males vs. females), ages (below vs. at or above the normative mean of 50), race/ethnicity (broken down into White vs. non-White to allow large enough sample sizes to detect differences), and clinical status (non-clinical vs. clinical). The factor loadings of the items were correlated across groups to compute the coefficient of congruence (Abdi, 2010); results revealed a very high degree of consistency across all groups (see Table 8.6), indicating that the unidimensionality of the CEFI Adult generalized across the demographic groups.

Table 8.6. Consistency of Factor Loadings Across Groups

Grouping Factor	Form	Coefficient of Congruence	Group 1		Group 2	
			Level	N	Level	N
Gender	Self-Report Form	.998	Male	795	Female	865
	Observer Form	.999	Male	795	Female	865
Race/Ethnicity	Self-Report Form	.997	White	1,153	Non-white	507
	Observer Form	.999	White	1,154	Non-white	506
Age	Self-Report Form	.997	Under 50 years	840	50+ years	820
	Observer Form	.999	Under 50 years	840	50+ years	820
Clinical Status	Self-Report Form	.993	Non-clinical	1,501	Clinical	159
	Observer Form	.996	Non-clinical	1,497	Clinical	163

conclusions

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EXPLORATORY FACTOR ANALYSES

➢ Conclusions
- CEFI: Parent (N=1,400), Teacher (N=1,400) and Self (N=700),
- CEFI Adult: Self (N = 1,600) and Observer (N = 1,600) ratings
- From nationally representative samples aged 5 to 80 years (N = 6,700) indicates .. Executive Function best describes the concept

conclusions

44

EF and its components

➢ Abilities, cognitive processes, and behaviors

Executive Function

Working Memory	Attention	Emotion Regulation	Inhibition
Flexibility	Impulse Control	Self-Monitoring	Organization
Planning	Self-Control	Initiation	And more?
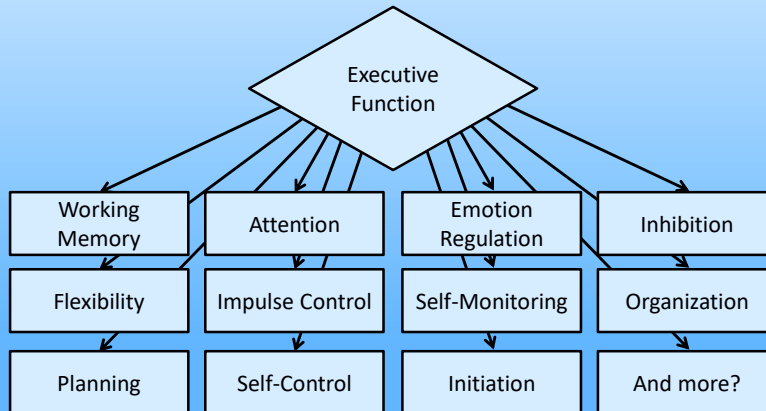
conclusions

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Naglieri & Goldstein, 2012

➢ Executive Function is: *how* you do what you decide to do.

Start with a Goal → Gather Information → Consider Solutions → Select a Plan → Apply the Plan → Monitor the Plan → Modify if Necessary → If Goal is Met → Problem Solved

conclusions

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23
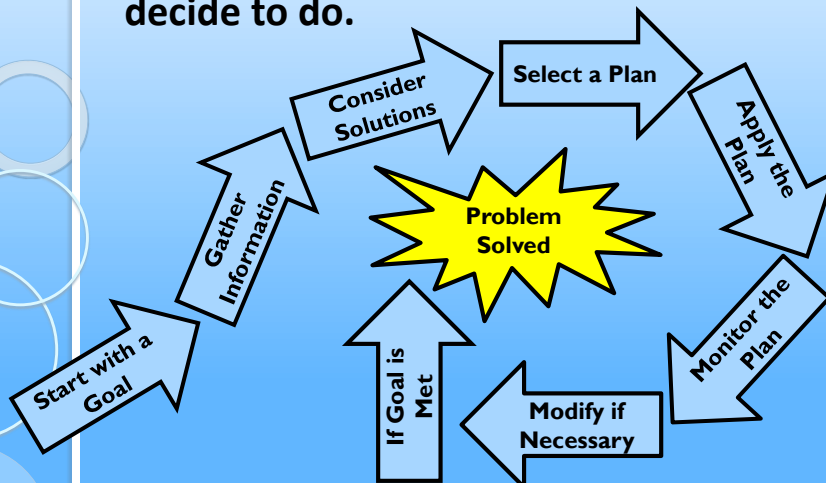
Does a13 month old have EF?

47

Age 19 months: Knowledge & EF

conclusions   48

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

➤ Learning depends upon instruction and EF

➤ At first, EF plays a major role in learning

➤ When a new task is learned and practiced it becomes a skill and execution requires less EF

Essentials of CAS2 Assessment
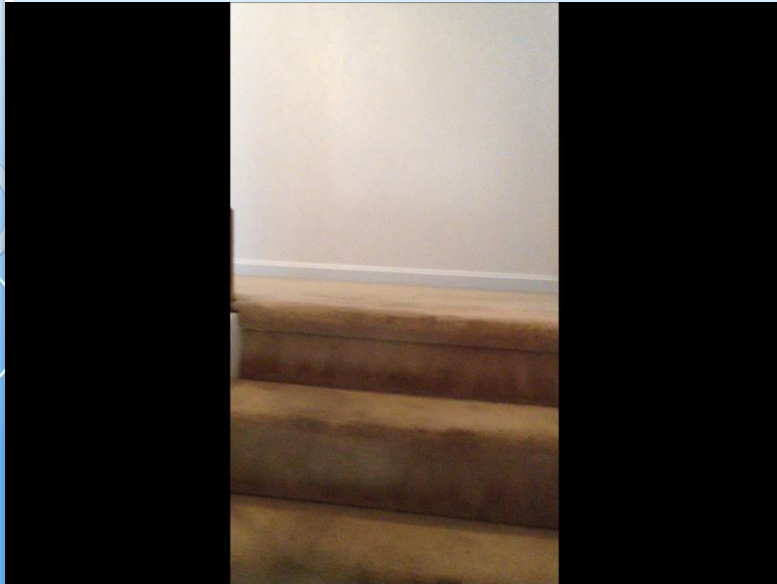Jack A. Naglieri
Tulio M. Otero
WILEY

Maximum Use — **Role of EF** — **Role of Knowledge and Skills**

Minimum Use

Novel Task — Well Learned Task

Over time and with experience
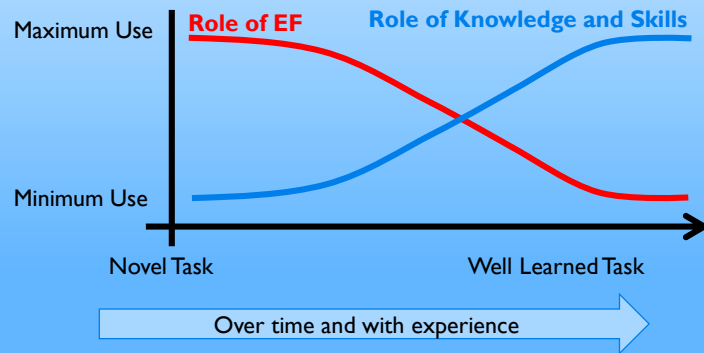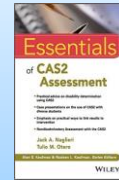
conclusions

Executive Function Involves

➤ *"How* you decide *what* 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.

conclusions

50

Which Lemming has good EF?

conclusions   51

EF: ability, behavior, social-emotional skill?

All are reflections of FRONTAL LOBE activity

conclusions   52

Brain, Cognition, & Behavior

➢ **EF ability** is provided by the Frontal Lobes of the brain (an intelligence)

➢ **EF behaviors** are the result of experiences that influence likelihood that a person is strategic when doing things

➢ **EF Emotions** are the result of learning

➢ It is very important to measure EF *Behaviors* and EF *Ability* and *Emotion* because they may be different

conclusions   53

Presentation Outline

➢ Comprehensive Model of EF
  • Historical Perspective
  • Definitions of Executive Function
➢ EF as Behavior
➢ EF as an Ability (an intelligence)
➢ EF as Social Emotional Skills
➢ Impairment and EF
➢ Research about EF as ability, behavior, and SE
➢ **Think Smart!** -- EF Skills in the Classroom
  • More lesson plans for improving components of EF
➢ Conclusions

conclusions   54

Comprehensive Executive Function Inventory (CEFI)
Jack A. Naglieri & Sam Goldstein

- CEFI is a **strength based** EF measure
- Items are **positively** worded
- Higher scores = **good** behaviors related to EF
- Scores set at mean of **100** SD of **15**
- Ages 5-18 years rated by a parent, teacher, or the child/youth.
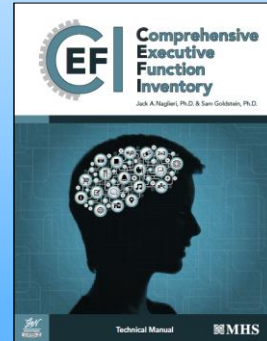
conclusions

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CEFI Normative Samples

➢ 1,400 ratings by Parents for children aged 5-18 years
➢ 1,400 ratings by Teachers for children aged 5-18 years
➢ 700 ratings from the self-report form for those aged 12-18 years
➢ There were equal numbers of ratings of or by males and females
➢ Stratified according to the 2009 US Census by race/ethnicity, parental education, region, age, and sex

conclusions

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CEFI Administration & Scoring

```
                    CEFI Administration
                    & Scoring Methods
                    ┌──────────┴──────────┐
          Paper and Pencil           Online
          Administration             Administration
        ┌────────┴────────┐              │
  Hand Scoring    Examiner enters   Examiner enters
  Using CEFI      responses in MHS  responses into CEFI
  Record Form     Online Assessment Scoring Software
                  Center:           Program:
                  Automated scoring  Automated scoring
                  and report         and report
```
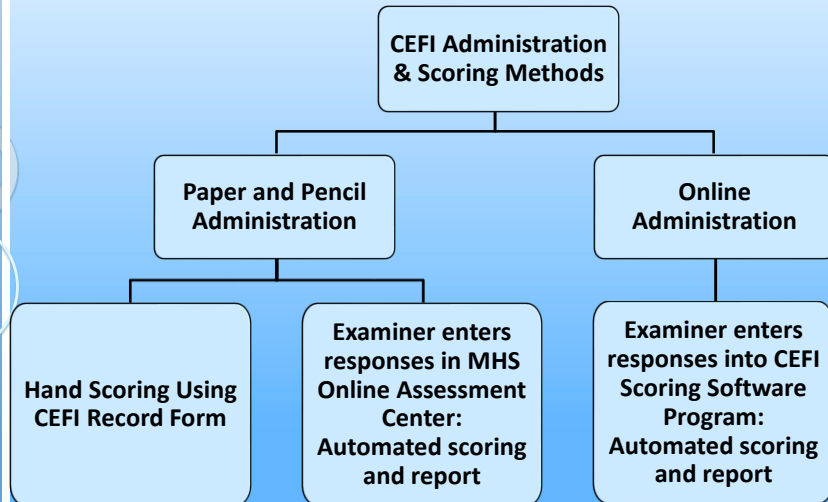
conclusions   57

CEFI Forms and Scales

CEFI Parent Rating Scale (Ages 5-18)

CEFI Teacher Rating Scale (Ages 5-18)

CEFI Self-Rating Scale (Ages 12-18)

CEFI Full Scale (100 items)

1. Attention
2. Emotion Regulation
3. Flexibility
4. Inhibitory Control
5. Initiation
6. Organization
7. Planning
8. Self-Monitoring
9. Working Memory

1. Consistency Index
2. Negative Impression
3. Positive Impression
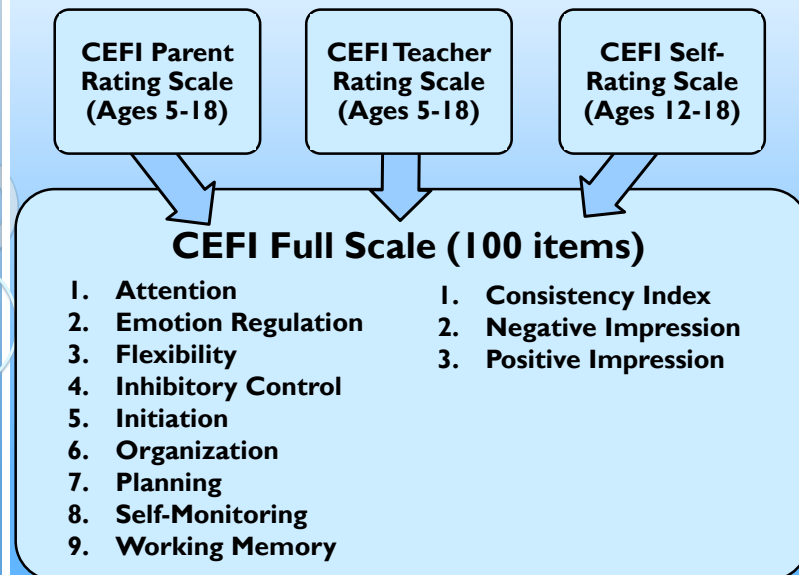
conclusions

CEFI Items by Scale

Table C.4. Attention (12 items)

Item #	Parent/Teacher Item *During the past 4 weeks, how often did the child...*	Self-Report Item *During the past 4 weeks, how often did you...*
3.	finish a boring task?	finish a boring task?
11.	work well in a noisy environment?	work well in a noisy environment?
21.	work well for a long time?	work well for a long time?

Table C.5. Emotion Regulation (9 items)

Item #	Parent/Teacher Item *During the past 4 weeks, how often did the child...*	Self-Report Item *During the past 4 weeks, how often did you...*
10.	control emotions when under stress?	control emotions when under stress?
12.	stay calm when handling small problems?	stay calm when handling small problems?
42.	find it hard to control his/her emotions? (R)	find it hard to control your emotions? (R)

Table C.6. Flexibility (7 items)

Item #	Parent/Teacher Item *During the past 4 weeks, how often did the child...*	Self-Report Item *During the past 4 weeks, how often did you...*
7.	come up with a new way to reach a goal?	come up with a new way to reach a goal?
41.	come up with different ways to solve problems?	come up with different ways to solve problems?
45.	have many ideas about how to do things?	have many ideas about how to do things?

conclusions

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CEFI Adult Consistency of Loadings

Consistency of Factor Loadings Across Groups

Exploratory factor analysis (EFA) was used to examine the replicability of the unidimensional factor structure of the CEFI Adult across several demographic groups (gender, age, race/ethnicity, and clinical status). The EFA procedure was conducted for each demographic group to determine if the factor structure was consistent across genders (males vs. females), ages (below vs. at or above the normative mean of 50), race/ethnicity (broken down into White vs. non-White to allow large enough sample sizes to detect differences), and clinical status (non-clinical vs. clinical). The factor loadings of the items were correlated across groups to compute the coefficient of congruence (Abdi, 2010); results revealed a very high degree of consistency across all groups (see Table 8.6), indicating that the unidimensionality of the CEFI Adult generalized across the demographic groups.

Table 8.6. Consistency of Factor Loadings Across Groups

Grouping Factor	Form	Coefficient of Congruence	Group 1		Group 2	
			Level	N	Level	N
Gender	Self-Report Form	.998	Male	795	Female	865
	Observer Form	.999	Male	795	Female	865
Race/Ethnicity	Self-Report Form	.997	White	1,153	Non-white	507
	Observer Form	.999	White	1,154	Non-white	506
Age	Self-Report Form	.997	Under 50 years	840	50+ years	820
	Observer Form	.999	Under 50 years	840	50+ years	820
Clinical Status	Self-Report Form	.993	Non-clinical	1,501	Clinical	159
	Observer Form	.996	Non-clinical	1,497	Clinical	163

conclusions

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CEFI Full Scale and Treatment Scores

Figure 4.1. Illustration of Executive Function Weakness and Strengths on the CEFI (5–18 Years) Teacher Form

CEFI Scales	Standard Score	Difference From Youth's Average	Statistically Significant? (Yes/No)	Executive Function Strength/Weakness	90%/95% (circle one) Confidence Interval	Percentile Rank	Classification
Attention (AT)	95	-6.7	Yes	—	90 to 100	37	Average
Emotion Regulation (ER)	82	-19.7	Yes	Weakness	77 to 90	12	Low Average
Flexibility (FX)	112	10.3	Yes	Strength	103 to 118	79	High Average
Inhibitory Control (IC)	99	-2.7	No		93 to 105	47	Average
Initiation (IT)	120	18.3	Yes	Strength	112 to 125	91	Superior
Organization (OG)	99	-2.7	No		93 to 105	47	Average
Planning (PL)	101	-0.7	No		96 to 106	53	Average
Self-Monitoring (SM)	102	0.3	No		95 to 109	55	Average
Working Memory (WM)	105	3.3	No		99 to 111	63	Average
Sum of Standard Scores	915	101.7		Youth's Average			

Note. Differences from the Child's/Youth's Average are significant at $p < .10$.

Free Use of CEFI: http://info.mhs.com/cefi

CEFI Interpretive Report

Comprehensive Executive Function Inventory

G&N Goldstein & Naglieri — Excellence in Assessments

(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

conclusions

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CEFI Interpretive Report

CEFI (5–18 Years) Parent Interpretive Report for Brittany Ambers   Admin Date: 05/19/2012

Overview of Results for Brittany Ambers
Scores in Relation to the Norm
Brittany Ambers's results are provided in the graph below.   ▼ Youth's Average
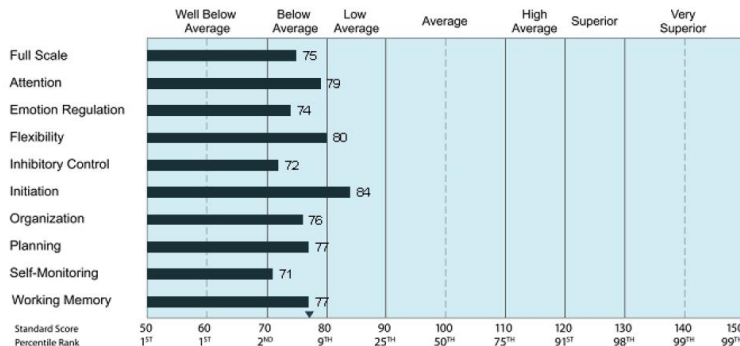
Scale	Score
Full Scale	75
Attention	79
Emotion Regulation	74
Flexibility	80
Inhibitory Control	72
Initiation	84
Organization	76
Planning	77
Self-Monitoring	71
Working Memory	77

Standard Score: 50 60 70 80 90 100 110 120 130 140 150
Percentile Rank: 1ST 1ST 2ND 9TH 25TH 50TH 75TH 91ST 98TH 99TH 99TH

conclusions

64

32

CEFI Interpretive Report

CEFI (5–18 Years) Parent Interpretive Report for Brittany Ambers   Admin Date: 05/19/2012

CEFI Results

Brittany Ambers's **Full Scale** standard score of 75 falls in the *Below Average* range and is ranked at the 5th percentile. This means that her score is equal to, or greater than, 5% of those obtained by youth her age in the standardization group. There is a 90% probability that Brittany Ambers's true Full Scale standard score is within the range of 73 to 78. The CEFI Full Scale score is made up of items that belong on separate scales called Attention, Emotion Regulation, Flexibility, Inhibitory Control, Initiation, Organization, Planning, Self-Monitoring, and Working Memory. There was no significant variation among the CEFI Scales. This indicates that Brittany Ambers obtained similar scores on the separate scales. This also means that the Full Scale is a good description of her executive function behaviors.

Brittany Ambers's **Initiation** scale score describes how she begins tasks or projects on her own, including starting tasks easily, being motivated, and taking the initiative when needed. Her standard score of 84 falls in the *Low Average* range and is ranked at the 14th percentile. There is a 90% probability that her true Initiation standard score is within the range of 78 to 93. Item score variability suggests that ratings for Brittany Ambers were low on, for example, initiating conversations and putting plans into action.

Brittany Ambers's **Flexibility** scale score describes how she adjusts her behavior to meet circumstances, including coming up with different ways to solve problems, having many ideas about how to do things, and being able to solve problems using different approaches. Her standard score of 80 falls in the *Low Average* range and is ranked at the 9th percentile. There is a 90% probability that her true Flexibility standard score is within the range of 74 to 92. Ratings for Brittany Ambers were low on, for example, using a different strategy when another doesn't work.

Brittany Ambers's **Attention** scale score reflects how well she can avoid distractions, concentrate on tasks, and sustain attention. Her standard score of 79 falls in the *Below Average* range and is ranked at the 8th percentile. There is a 90% probability that her true Attention standard score is within the range of 74 to 87. Variability in item scores indicates that ratings for Brittany Ambers were low on, for example, finishing a boring task, avoiding distraction and noticing details. (See the *CEFI Items by Scale* section of this report for additional low item scores.)

conclusions 65

Report

Intervention Strategies are provided for each of the 9 CEFI scales

CEFI (12–18 Years) Self-Report Interpretive Report for Random2   Admin Date: 01/07/2

Intervention Strategies for Attention

Helping a Child Overcome Problems with Inattention

First, help the child understand the nature of his or her attention problems, including:

- Concepts such as attention, resistance to distraction, and control of attention.
- Recognition of how attention affects daily functioning.
- Recognition that the deficit can be overcome.
- Basic elements of the control program.

Second, teachers and parents can help the child improve his or her motivation and persistence:

- Promote success via small steps.
- Ensure success at school and at home.
  - Allow for oral responses to tests.
  - Circumvent reading whenever possible.
- Teach rules for approaching tasks.
  - Help the child define tasks accurately.
  - Assess the child's knowledge of problems.
  - Encourage the child to consider all possible solutions.
  - Teach the child to use a correct test strategy.
- Discourage passivity and encourage independence.
  - Do not rely too heavily on teacher-oriented approaches.
  - Require the child to take responsibility for correcting his or her own work.
  - Help the child to become more self-reliant.
- Encourage the child to avoid:
  - Excessive talking.
  - Working fast with little accuracy.
  - Giving up too easily.
  - Turning in sloppy, disorganized papers.

Third, teachers and parents should give the child specific problem-solving strategies.

- Model and teach strategies that improve attention and concentration.
- Help the child to recognize when he or she is under- or over-attentive.

Naglieri, J. A., & Pickering, E. B., Helping Children Learn: Intervention Handouts for Use at School and at Home, Second Edition, 2010. Baltimore: Paul H. Brookes Publishing Co., Inc. www.brookespublishing.com. Used with the permission of the publisher.

conclusions 66

www.efintheclassroom.net
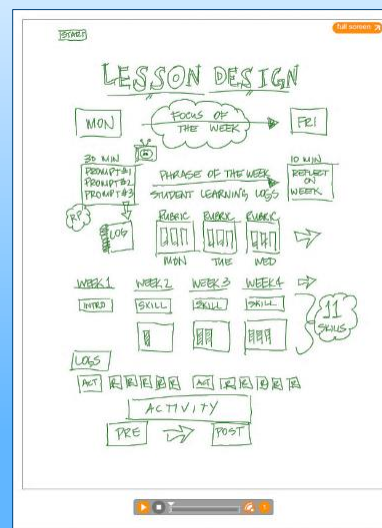
➢ **Start with Awareness of thinking about thinking**
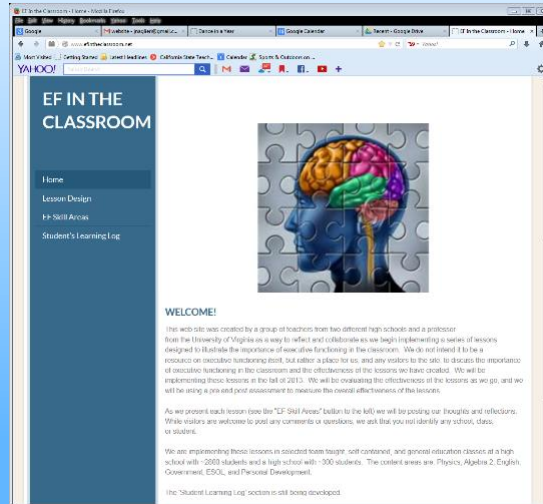
conclusions 67

Structure of the lessons

- Each topic is discussed for one week
- Monday – class lesson
- Tues-Thurs reminders
- Friday – class reflection

conclusions 68

EF Posters in the Class

Mountain View Alternative HS

conclusions   70

Interventions for EF Behaviors

➢ CEFI Scales	➢ Efintheclassroom.net
▪ Attention	▪ Sustained Attention
▪ Emotion Regulation	▪ Emotional Control
▪ Flexibility	▪ Cognitive Flexibility
▪ Inhibitory Control	▪ Response Inhibition
▪ Initiation	▪ Task Initiation
▪ Organization	▪ Organization
▪ Panning	▪ Planning
▪ Self-Monitoring	▪ Response Inhibition
▪ Working Memory	▪ Working Memory
	▪ Goal Directed Persistence

conclusions   71

Time to Think and Talk

4
minutes
left

➢**Task:**   START

➢Discuss in your groups
  • EF as a single concept
  • Other ideas
➢Your own questions and thoughts..
➢Report to the audience

conclusions

Presentation Outline

➢ Comprehensive Model of EF
  • Historical Perspective
  • Definitions of Executive Function
➢ EF as Behavior
➢ **EF as an Ability (an intelligence)**
➢ EF as Social Emotional Skills
➢ Impairment and EF
➢ Research about EF as ability, behavior, and SE
➢ **Think Smart!** -- EF Skills in the Classroom
  • More lesson plans for improving components of EF
➢ Conclusions

conclusions   73

EF is a Brain-Based Ability

➢ EF is an ability by virtue of its relationship to the brain

➢ Because there is a relationship between BRAIN FUNCTION and BEHAVIOR, behaviors tell us about the ABILITY (sometimes…)

➢ EF skills are the result of EF Ability *and* well practiced behaviors that reflect EF
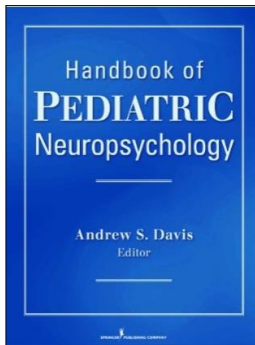 • Not all abilities and not all behaviors involve EF

conclusions   74

A Theory of Learning

28 Cognitive Assessment System: Redefining Intelligence From a Neuropsychological Perspective

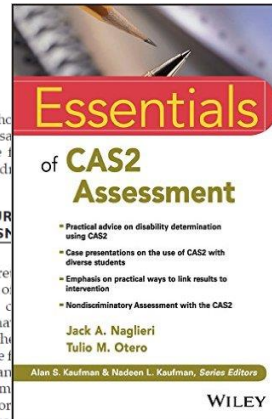*Jack A. Naglieri and Tulio M. Otero*

Handbook of **PEDIATRIC** Neuropsychology

Andrew S. Davis
Editor

Essentials of **CAS2** Assessment

- Practical advice on disability determination using CAS2
- Case presentations on the use of CAS2 with diverse students
- Emphasis on practical ways to link results to intervention
- Nondiscriminatory Assessment with the CAS2

Jack A. Naglieri
Tulio M. Otero

Alan S. Kaufman & Nadeen L. Kaufman, Series Editors

WILEY

Brain, Cognition, & Behavior

➢ The brain is the seat of abilities called PASS

➢ These abilities comprise what has been described as a modern view of intelligence (Naglieri & Otero, 2011)

Naglieri, J. A. & Otero, T. (2011). Cognitive Assessment System: Redefining Intelligence from A Neuropsychological Perspective. In A. Davis (Ed.). *Handbook of Pediatric Neuropsychology (320-333)*. New York: Springer Publishing.

Simultaneous processing Ability

Planning ability

Attention

Successive Processing Ability
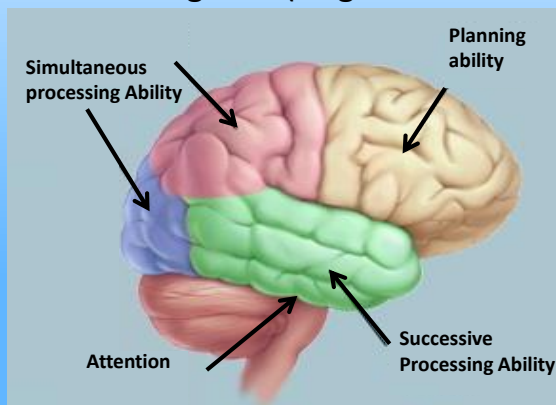
IQ defined by BRAIN function

➢ **PASS** 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

conclusions   77

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100 Years of Intelligence and IQ
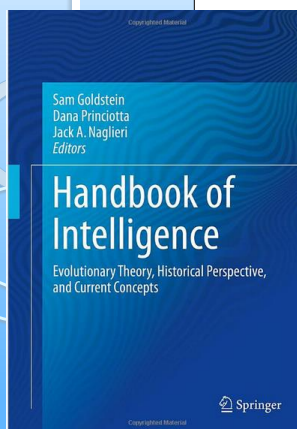## http://www.jacknaglieri.com/cas2.html

Sam Goldstein
Dana Princiotta
Jack A. Naglieri
Editors

Handbook of Intelligence

Evolutionary Theory, Historical Perspective, and Current Concepts

Springer

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

7, is remembered as the day the entered World War I. On that same of psychologists held a meeting in ersity's Emerson Hall to discuss the 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

Training School in Vineland, New Jersey, on May 28. The committee considered many types of group tests and several that Arthur S. Otis developed when working on his doctorate under Lewis Terman at Stanford University. The goal was to find tests that could efficiently evaluate a wide variety of men, be easy to administer in the group format, and be easy to score. By June 9, 1917, the materials were ready for an initial trial. Men who had some educational background and could speak English were administered the verbal and quantitative (Alpha) tests and those that could not read the newspaper or speak English were given the Beta tests (today described as nonverbal).

78

CAS2 (Ages 5-18 yrs.)

CAS2

➢ CAS2 Yields PASS and Full Scale score but ALSO

➢ Executive Function which is the combination of a Planning and Attention subtests

➢ Also: Working Memory, Verbal, Nonverbal and a Visual and Auditory comparison

Figure 2.1. Completed pages of the Examiner Record Form for William.

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

conclusions   81
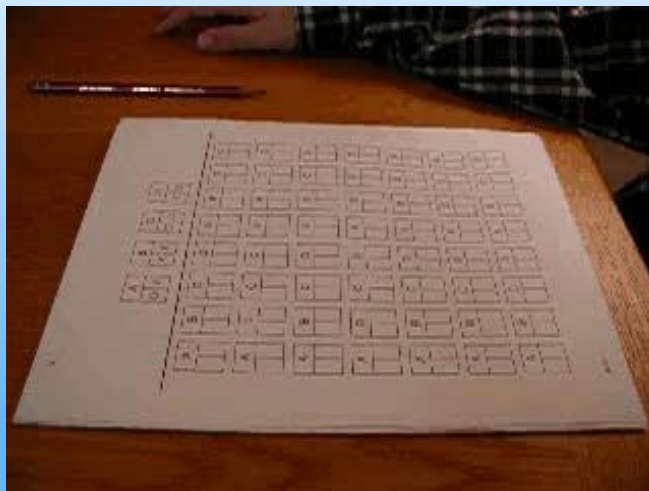
Planned Codes 1

conclusions   82

Planned Codes Page 2
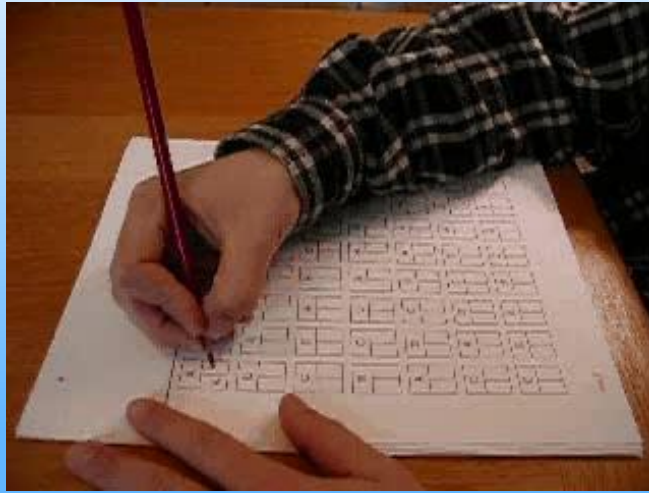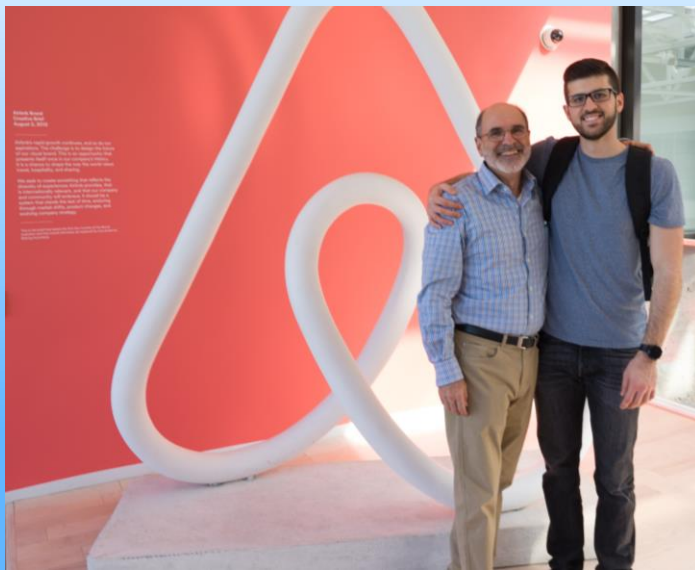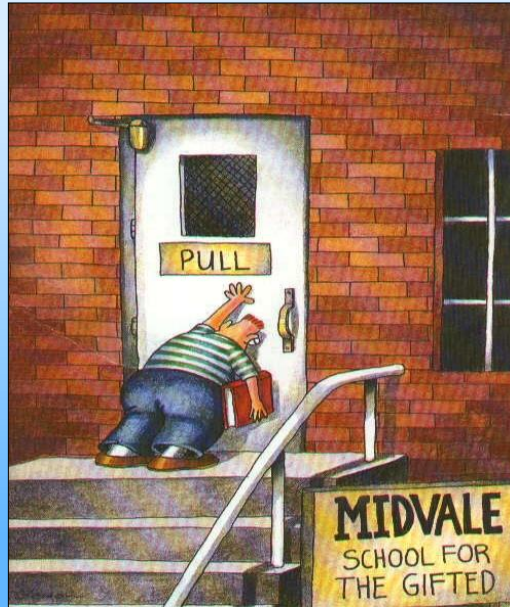
POOR PLANNING

conclusions   85

Efintheclassroom.net

Planning Lesson

Phrase of the week: What is your plan?

http://www.youtube.com/watch?v=bQLCZOG202k

1. What had to happen so that the people could dance together in this video?
2. What are the parts of a good plan?
3. How do you know if a plan is any good?
4. What should you do if a plan isn't working?
5. How do we use planning in this class?

Go to student learning log and create a plan for the week.

conclusions   86

10/19/2017

Antwerp train Station (2009)

conclusions 87

Planning Lesson **Student responses**

➢Q: What would you have to plan out?
- They had to learn the dance steps (knowledge)
- Someone had to start dancing (initiation)
- Permission from train station (planning)

➢Q: What are the parts of a good plan?
- Think of possible problems (strategy generation)
- Organize the dance (organization)
- Practice the dance steps (initiation)
- Have a good idea of what to do (knowledge)

conclusions 88

44

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)

1. Q4: What should you do if a plan isn't working?
   1. Fix it. (self-correction)
   2. Go home ! (a bad plan)

conclusions   89

Planning Lesson Student responses

Q5: How do you use planning in this class?
1. We don't plan in this class
2. Mrs. XXX does all the planning in this class so you don't have to think about planning

How might students react to being told that now they have to think and planning?

　　　Like the Seinfeld video

conclusions   90

This Planning Lesson

➢This lesson brings to light the important distinction between planning over a long time (what was just shown) and real time planning

conclusions   91

EF Instruction

➢We use posters like this one to remind the students of the importance of PLANNING
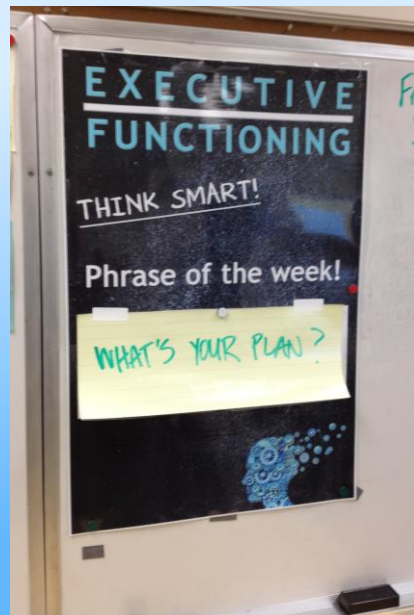
conclusions   92

Encourage Planning

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

➤ Spanish handouts by Tulio Otero, Ph.D., & Mary Moreno, Ph.D.
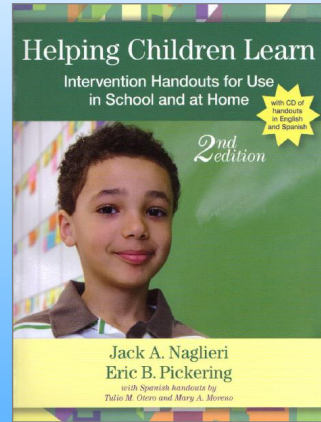
conclusions   93

Step 1 – Talk with Students

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.

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!

I figured out how to do it!

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!

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

No Response

Response

No Response
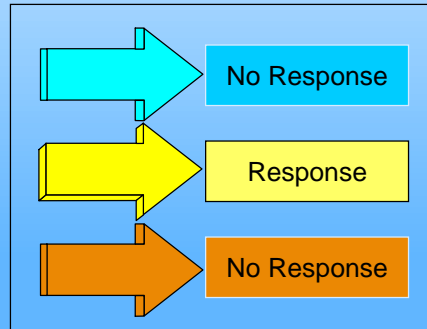
conclusions   97

Attention Test Instructions:
You will see words like

RED

Your task: say the COLOR (green) not the word (red)

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

READY ?

conclusions   98
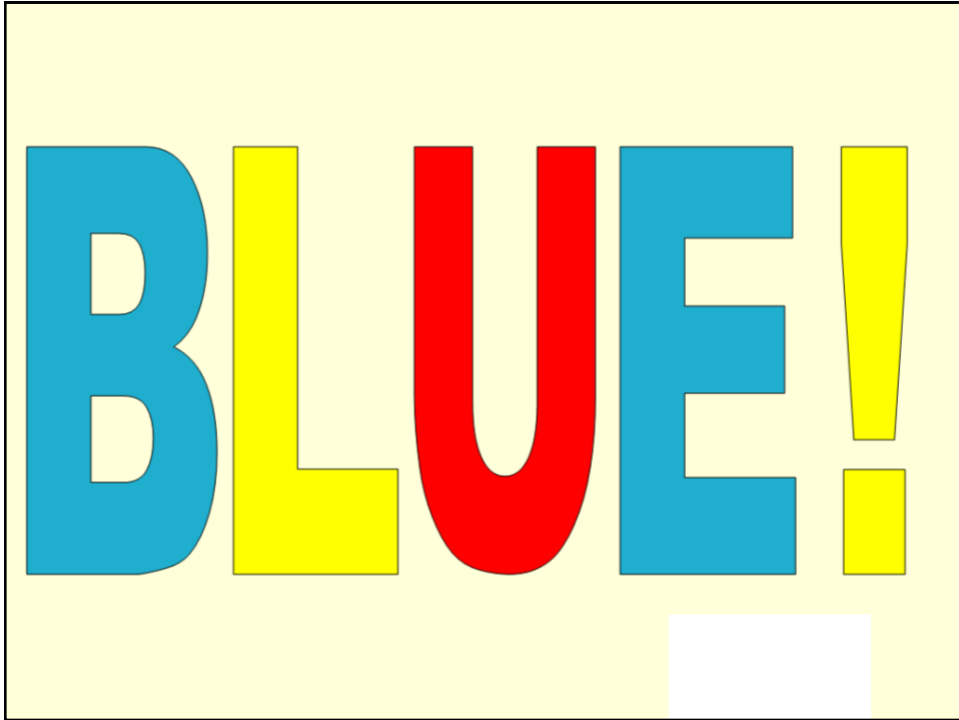
Expressive Attention - Italiano

ROSSO	BLU	VERDE	GIALLO
GIALLO	VERDE	ROSSO	BLU
ROSSO	GIALLO	GIALLO	VERDE
BLU	VERDE	ROSSO	ROSSO
VERDE	GIALLO	BLU	GIALLO

conclusions   100

Expressive Attention – Korean CAS

◻ The child says the color not the word

노랑	초록	빨강	파랑
빨강	노랑	노랑	초록
초록	파랑	초록	빨강
초록	노랑	빨강	노랑
빨강	파랑	빨강	초록

conclusions   101

Attention

This sheet has a strong Attention demands because of the similarity of the options

11. A 3:15 A.M.
B 3:30 P.M.
C 3:15 P.M.
D 3:15 A.M.

leave school

11. 3:15 p.m.

12. Trent began studying at 5:00 P.M. and finished 1 hour and 22 minutes later. What time did he finish?

A 6:22 A.M.   B 5:22 P.M.   C 6:10 P.M.   D 6:22 P.M.

12. 6:22 p.m.

13. Maura began basketball practice at 3:00 P.M. and finished 50 minutes later. What time did she finish?

A 3:50 P.M.   B 3:05 A.M.   C 4:05 P.M.   D 4:50 A.M.

13. 3:50 p.m.

14. Lance fished from 6:00 A.M. to 9:45 A.M. How long did he fish?

A 3 hours   B 3 hours and 15 minutes
C 3 hours and 45 minutes   D 4 hours and 45 minutes

14. 3 hours 45 min.

conclusions   102

Efintheclassroom.net
Attention Lesson

➤ Start by making students aware of what attention is …
➤ View Attention video from Apollo Robbins
➤ Then provide Discussion
  • What did you learn from this video?
  • How can you attend better?
  • How can you resist distractions better?
➤ Then an Assignment – Make a list of times when you did well, and not so well, paying attention, noticing details, and resisting distractions.

conclusions   103

Efintheclassroom.net
Attention Lesson

Sustained Attention Lesson

Phrase of the week: Where is your focus?

Video: http://www.youtube.com/watch?v=jKCT-simmBo&noredirect=1

Q1: Why do you think you were tricked by this video?

Q2: How do you decide what to pay attention to, and what not to, in this class?

Q3: What are you biggest distractions in class? What will you have the hardest time ignoring?

Hand out Learning Logs:

Students go to SA section and create a list they (or the class as a whole) will try to ignore this week.

conclusions   104

Attention Lesson

conclusions   105

Time to Think and Talk

4 minutes left

START

➤ **Task:**
➤ Why do you think you were tricked by this video?
➤ How do you decide what to pay attention to, and what not to, in this class?
➤ What are you biggest distractions in class?
➤ What will you have the hardest time ignoring?
➤ Your own questions and thoughts..

conclusions

EF ability and the brain

➢ Planning and Attention = Executive Function

➢ CAS2 yields an Executive Function Scale

➢ A low score on the CAS2 EF (or the Planning/Attention scales) would qualify as "a disorder in one or more basic psychological processes" which is the criteria for SLD eligibility determination

➢ That means EF can be viewed as a SLD

conclusions   107

SLD Definition

➢ "Specific learning disability" a disorder in one or more of the basic psychological processes which manifests as academic failure in specific areas...

➢ Executive function IS a basic psychological process and therefore a weakness on the CAS2 EF (or Planning Attention) scales could support SLD eligibility

conclusions   108

Discrepancy/Consistency Method

➢ An EF disorder can be used to identify a Pattern of Strengths and Weaknesses PSW using the Discrepancy/Consistency Method (Naglieri & Otero, 2017)

- Low EF (Planning Attention)
- High Scores (Simultaneous Successive)
- Low academic test scores
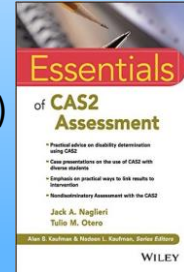
conclusions   109

Discrepancy Consistency Method

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

Significant Discrepancy

HIGH SCORES Simultaneous Successive

Significant Discrepancy

LOW SCORES Math Calculation Written Language Reading Comprehension

LOW SCORES CAS2: Planning, Attention or Executive Function

Consistent Scores

conclusions   110

EF as a Specific Learning Disability

➢ Once a student has been identified as having a disability in EF, then interventions that are designed to improve functioning are needed

- Direct instruction of strategies takes the EF out of learning
- Give responsibility for developing and selecting strategies to the student

conclusions

111

www.efintheclassroom.net

➢ **Start with Awareness of thinking about thinking**
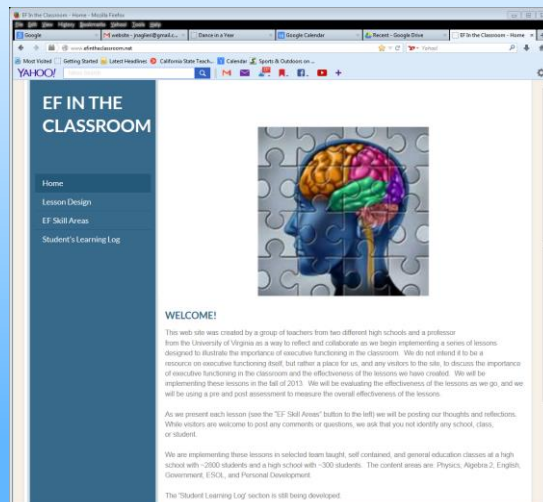
conclusions

112

Introductory Lesson: "Are you Aware"

- Ask for volunteers to NOT look at the video and report what word they hear

Introductory Lesson: "Are you Aware"

Other Lessons from www.efintheclassroom.net

www.Efintheclassroom.net

Research support?
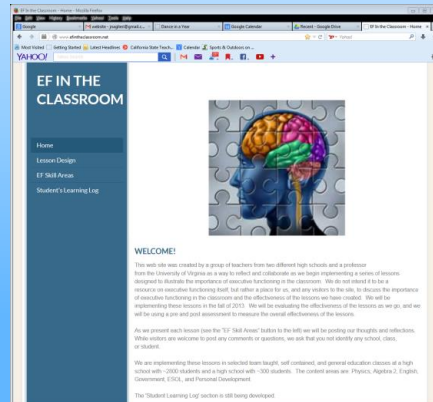
conclusions   115

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www.efintheclassroom.net

Planning Lesson

Phrase of the week: What is your plan?

http://www.youtube.com/watch?v=bQLCZOG202k

1. What had to happen so that the people could dance together in this video?
2. What are the parts of a good plan?
3. How do you know if a plan is any good?
4. What should you do if a plan isn't working?
5. How do we use planning in this class?

Go to student learning log and create a plan for the week.

conclusions   116

Planning

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 planful.

How to Teach Planning

Think smart and use a plan!

I figured out how to do it!

Use a plan.

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

The first step in teaching children to become strategic, self-reliant, reflective, and flexible learners is to tell them what a plan is and give them an easy way to remember to use a plan. In Figure 1 (which also appears in the PASS poster on the CD), we provide a fast and simple message: "Think smart and use a plan!" We should provide cognitive strategies in specific academic areas, such as decoding, reading comprehension, vocabulary, spelling, writing, math problem solving, science, and so forth, so that we

page 1 of 2

117

conclusions

Planning

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:

Step 1: The teacher should provide math worksheets for the students to complete in the first 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 do. Please try to get as many of the problems correct as you can. You will have 10 minutes." Slight variations on this instruction are okay, but do not give any additional information.

ns   118

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
Successive) given by special education teachers to students with ADHD
experimental group were exposed to a brief cognitive strategy instructi
development and application of effective planning for mathematical comp
standard math instruction. Standardized tests of cognitive processes a
students completed math worksheets throughout the experimental ph
Johnson Tests of Achievement, Third Edition, Math Fluency and *Wechsle*
Numerical Operations) were administered pre- and postintervention, a
follow-up. Large pre–post effect sizes were found for students in the exp
math worksheets (0.85 and 0.26), Math Fluency (1.17 and 0.09), and Nur
At 1 year follow-up, the experimental group continued to outperform t
students with ADHD evidenced greater improvement in math worksh
(which measured the skill of generalizing learned strategies to other sir
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

conclusions

120

Instructional Sessions

➢ Math lessons were organized into "instructional sessions" delivered over 13 consecutive days

➢ Each instructional session was 30-40 minutes

➢ Each instructional session was comprised of three segments as shown below

10 minutes	10-20 minutes	10 minutes
10 minute math worksheet	Planning Facilitation or Normal Instruction	10 minute math worksheet

conclusions 121

Normal Instruction and Planning Facilitation Sessions

▶ Normal Instruction
- 10 minute math worksheet
- 10 - 20 of <u>math instruction</u>
- 10 minute math worksheet

▶ Planning Facilitation
- 10 minute math worksheet
- 10 minutes of <u>planning facilitation</u>
- 10 minute math worksheet

conclusions 122

Planning 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?
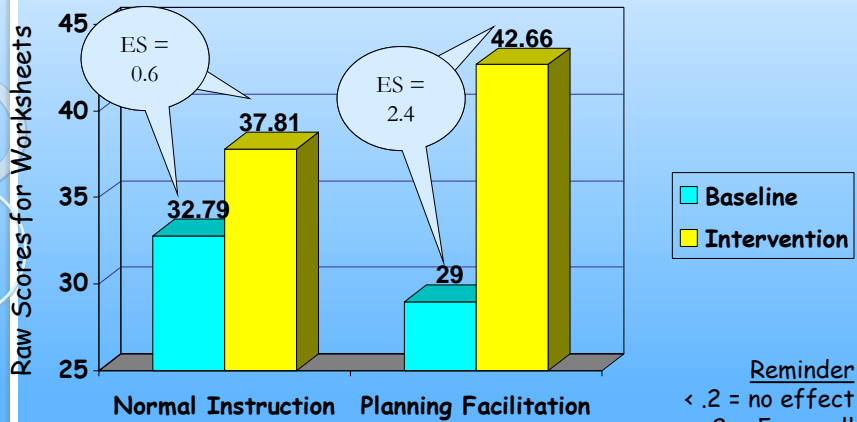
conclusions   123

Student Plans

➢ "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 do them (the algebra) by figuring out what I can put in for X to make the problem work."
➢ "I did all the problems in the brain-dead zone first."
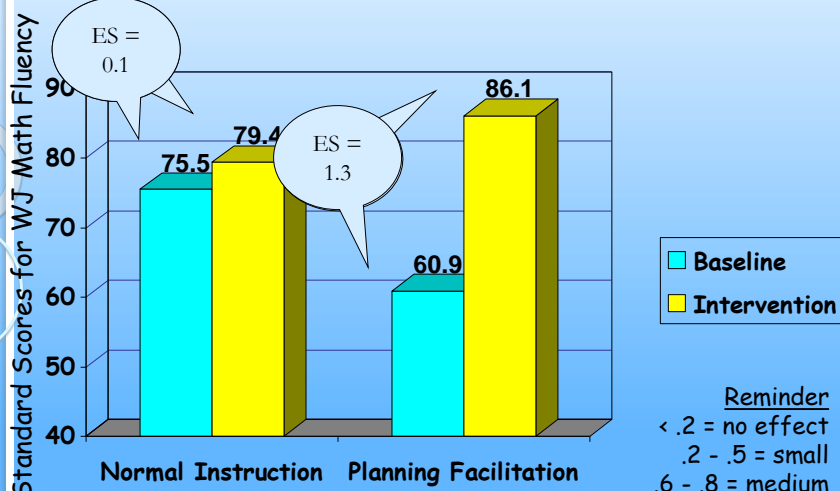➢ "I try not to fall asleep."

conclusions   124

Worksheet Means and Effect Sizes for the Students with ADHD

Raw Scores for Worksheets

ES = 0.6

ES = 2.4

32.79 37.81 29 42.66

Normal Instruction   Planning Facilitation

■ Baseline
■ Intervention

<u>Reminder</u>
< .2 = no effect
.2 - .5 = small
.6 - .8 = medium
> .8 = large

conclusions   125

WJ Math Fluency Means and Effect Sizes for the Students with ADHD

Standard Scores for WJ Math Fluency

ES = 0.1

ES = 1.3

75.5 79.4 60.9 86.1

Normal Instruction   Planning Facilitation

■ Baseline
■ Intervention

<u>Reminder</u>
< .2 = no effect
.2 - .5 = small
.6 - .8 = medium
> .8 = large

conclusions   126

WIAT Numerical Operation Means and Effect Sizes for Students with ADHD

Reminder
< .2 = no effect
.2 - .5 = small
.6 - .8 = medium
> .8 = large

conclusions   127
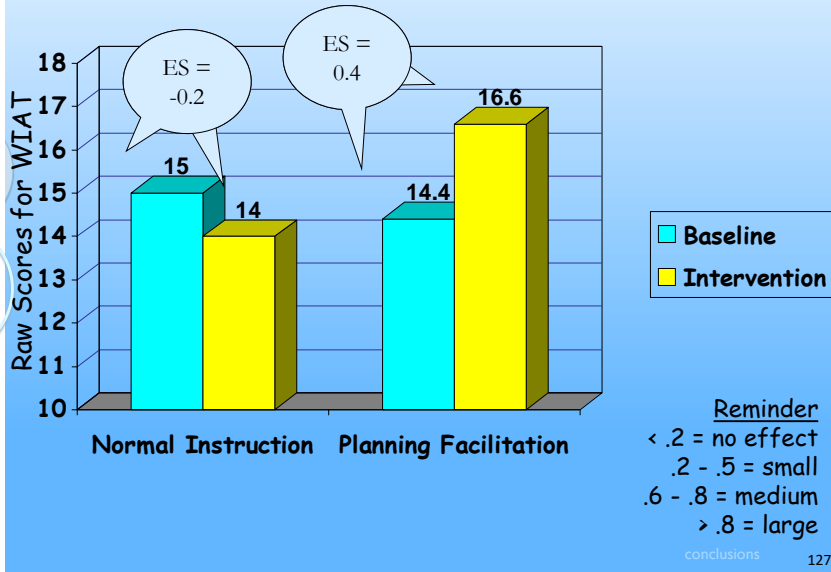
Iseman (2005)

➢ Baseline Intervention means by PASS profile

➢ Different response to the same intervention

conclusions   128
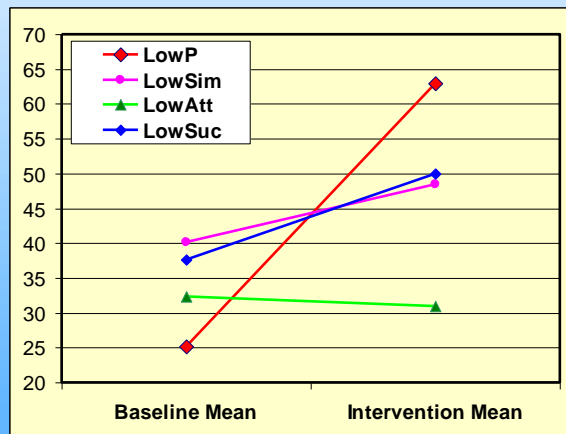
One Year Follow-up

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 ($M = 3.21$, $SD = 18.21$, $d = 0.09$).

conclusions   129

Instructional Implications

➤ Planning Strategy Instruction is easily implemented in the classroom and can be used to improve Executive Functioning

➤ The method yields substantial results within a minimal of time (10 half-hour sessions over 10 days)

➤ Planning Strategy Instruction can be applied in math as well as other content areas (e.g., reading comprehension)

conclusions   130

EF and Reading Comprehension

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

Jack A. Naglieri
George Mason University

Michelle Grimditch, Ashley McAndrews, Jane Eubanks
Kyrene School District, Tempe, Arizona

The purpose of this study was to evaluate whether instruction designed to facilitate planning would have differential benefit on reading comprehension depending on the specific Planning, Attention, Simultaneous, and Successive (PASS) cognitive characteristics of each child. A sample of 45 fourth-grade general education children was sorted into three groups based on each PASS scale profile from the Cognitive Assessment System instructional level was determined, a cognitive strategy instruction intervention was conducted. The children completed a reading comprehension posttest at their respective instructional levels after the intervention. Results showed that children with a Planning weakness ($n = 13$) benefited substantially (effect size of 1.52) from the instruction designed to facilitate planning. Children with no weakness ($n = 21$; effect size = .52) or a

conclusions

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EF ability and the brain

➤ Planning and Attention have been included in conceptualizations of Executive Function

➤ The next two abilities are **not** related to EF

- We will see what they are and …

- See how we can improve performance when these abilities are required by using EF (strategies) to improve performance

conclusions

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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
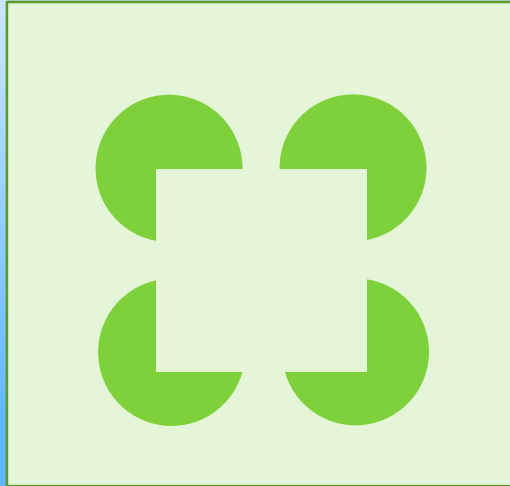
conclusions   133

Progressive Matrices
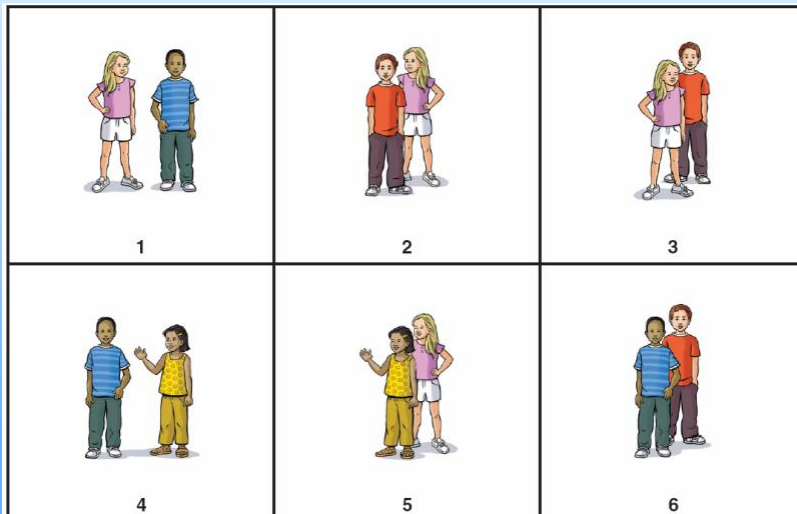

conclusions   134

PASS Theory

➤ **Simultaneous** processing is what Gestalt psychology was based on

➤ Seeing the whole

conclusions   135

Verbal-Spatial Relations

Which picture shows a boy behind a girl?

Use EF to manage low Simultaneous

➢ How do you help a child with low simultaneous ability?

➢ Teach students to USE STRATEGIES

➢ What kinds of strategies could you use for tasks that require seeing the whole?
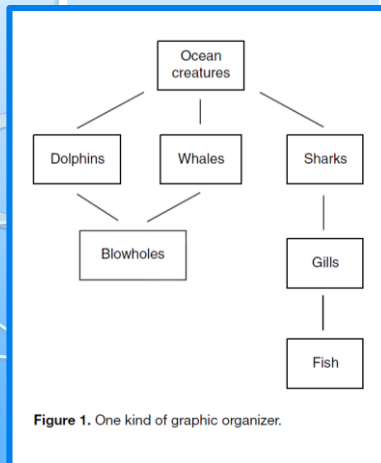
conclusions
137

Use EF

Figure 1. One kind of graphic organizer.

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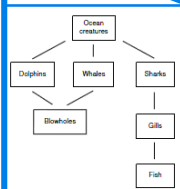
Another type of graphic organizer is a Venn diagram, which uses circles to demonstrate how concepts are related. Figure 2 shows the same information as Figure 1, but in the form of a Venn diagram.

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.

Figure 1. One kind of graphic organizer.

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Venn Diagram

Graphic Organizers for Connecting and Remembering Information *(continued)*

Ocean animals
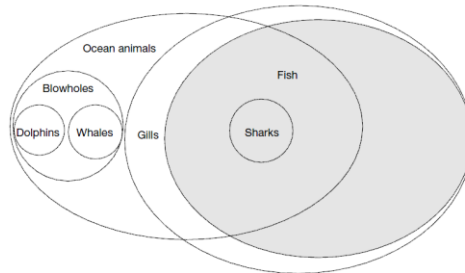
Blowholes

Fish

Dolphins Whales   Gills   Sharks

Figure 2. A Venn diagram used as a graphic organizer.

3. Create the graphic representation of the information. The illustration should include the key concepts, concepts the child already knows, and the linkages between the concepts.

4. Present the organizer to the child and discuss it to be sure he or she understands the information and sees the connections.

conclusions

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Successive Processing Ability

▶ **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

Cow → Wall → Car → Girl
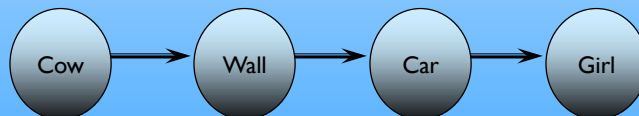
conclusions

140

Sentence Questions **(Ages 8-17)**

⬜ The child answers a question read by the examiner

1. The blue is yellow. Who is yellow?

10. The red greened the blue with a yellow. Who used the yellow?

20. The red blues a yellow green of pinks, that are brown in the purple, and then grays the tan. What does the red do first?

conclusions 141

Successive

The sequence of the sounds is emphasized in this work sheet
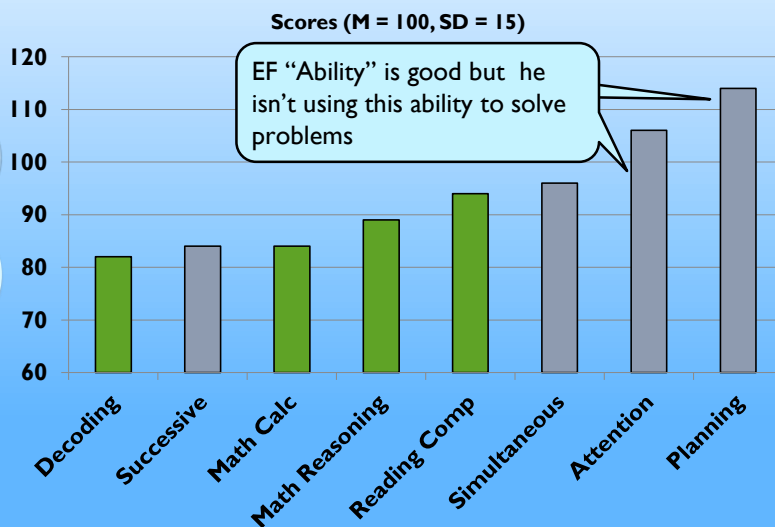

conclusions 142

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.

Ben's Problem with Successive processing Ability

Case of Ben

➢ Planning = Strength

➢ Successive = Weakness and it is < 85; so it can be considered a 'disorder in basic psychological processes'

		Diff
Planning	114	14
Attention	106	6
Simultaneous	96	-4
Successive	84	-16
PASS Mean	100	

conclusions   145
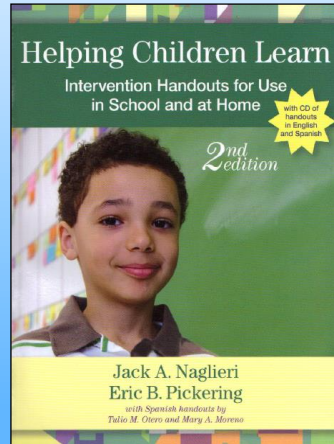
Ben's Problem with Successive Ability

➢ 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 sequences
➢ How do we help him learn better?

conclusions   146

Teach Children about their Abilities

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

➢ Spanish handouts by Tulio Otero, Ph.D., & Mary Moreno, Ph.D.

Helping Children Learn
Intervention Handouts for Use in School and at Home
with CD of handouts in English and Spanish
2nd edition

Jack A. Naglieri
Eric B. Pickering
with Spanish handouts by
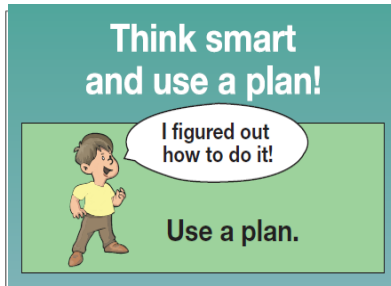Tulio M. Otero and Mary A. Moreno

conclusions 147

Use EF with Sequencing Tasks

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!

I figured out how to do it!

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!

Ben's Problem with Successive Ability
➢Teach him to use his strength in Planning

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.

Ben's Problem with Successive Ability
➢Teach him to recognize sequences

How to Teach Successive Processing Ability

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.

conclusions   150

Ben's Problem with Successive Ability

➢Teach him to use strategies

Chunking for Reading/Decoding

Readin
stand
quence
more
easily
units f

Segmenting Words for Reading/Decoding and Spelling

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

How

Teach
be rem

How to Teach Segmenting Words

Segmenting words is an effective strategy to help students read and spell. By divi

Plan

Look at
Find the
Sound

Take Away Messages

➢CAS Planning and Attention scores tell about Executive Function

• So CAS *includes* EF as a critical part of ability (aka intelligence)

➢Traditional IQ tests do not measure Executive Function

• So EF is the important ability missed when you look at an IQ score

conclusions   152

Presentation Outline

➢Comprehensive Model of EF
  • Historical Perspective
  • Definitions of Executive Function
➢EF as Behavior
➢EF as an Ability (an intelligence)
➢EF as Social Emotional Skills
➢Impairment and EF
➢Research about EF as ability, behavior, and SE
➢**Think Smart!** -- EF Skills in the Classroom
  • More lesson plans for improving components of EF
➢ Conclusions
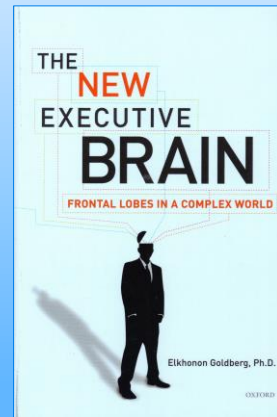
conclusions 153

Phineas had Social Emotional deficit

➢Phineas had profound social emotional problems after his injury to the frontal lobes
➢Phineas is
  • insulting
  • impulsively say things
  • uses vulgar language
  • can't manage his emotions
  • inconsistent in social situations
  • doesn't recognize he is offensive
  • looses control in interactions with others

conclusions 154

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]"
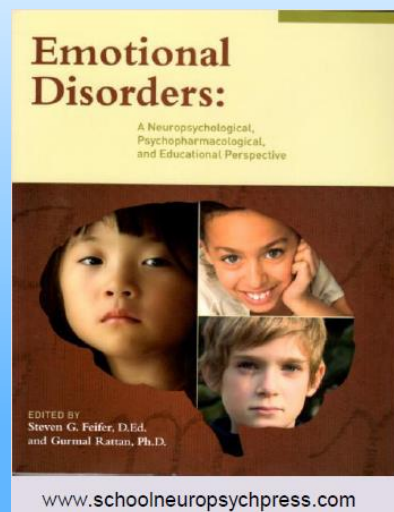- 'very few researchers have attempted to merge cognitive and emotional aspects of frontal lobe dysfunction'

conclusions

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Feiffer & Rattan (2009)

➢ Provide a collection of paper on the relationship between EF and Emotional Disorders

➢ See Feifer@comcast.net

www.schoolneuropsychpress.com

conclusions

156

Feiffer & Rattan (2009) on EF and Frontal Lobes

The Cerebral Orchestra of Emotions: Cortical Regions

(1) Orbitofrontal cortex - region of the brain responsible for ascribing an emotional valence or value judgment to another's feelings. Often triggers an automatic social skills response (Rolls, 2004).

- Has rich interconnections with the limbic system by way of the *uncinate fasciculus.*
- Responsible for *emotional executive functioning.*
- Self-regulation of behavior….. highest levels of emotional decision making dictated by this brain reg...

The Cerebral Orchestra of Emotions: Cortical Regions

(2) Ventrolateral prefrontal cortex – responsible for *response inhibition* and *emotional regulation.*

- Has rich interconnections with the limbic system.
- Also involved with *emotional executive functioning.*
- Situated adjacent to orbitofrontal cortex and involved in the ability to take another's perspective on an emotional event (*theory of mind*).

conclusions   157

Social Emotional Skills: From Conceptual to Assessment to Instruction

conclusions   158

www.casel.org

Skills for Social and Academic Success

Research Links SEL to Higher Success

- **23% gain in SE skills**
- **9% gain in attitudes about self/others/school**
- **9% gain in pro-social behavior**
- **11% gain on academic performance via standardized tests (math and reading)**

And Reduced Risks for Failure

- **9% difference in problem behaviors**
- **10% difference in emotional distress**

Source: Durlak, J.A., Weissberg, R.P., Dymnicki, A.B., Taylor, R.D., and Schellinger, K. (2011). The Impact of Enhancing Students' Social and Emotional Learning: A Meta-Analysis of School-Based Universal Interventions. *Child Development, 82,* 405-432.

CASEL   and   DESSA Scales

1 **Self-awareness**—being able to ac
and strengths; maintaining a well-

2 **Self-management**—being able to
control impulses, and persevere i
progress toward personal and ac

3 **Social awareness**—being able to
others; recognizing and appreciat
differences; recognizing and usin

4 **Relationship skills**—being able t
relationships based on cooperatio
preventing, managing, and resolv
needed

5 **Responsible decision-making**—b
consideration of reason, ethical
for self and others, and likely con
making skills to academic and so
one's school and community.[1]

Self Awareness

Self Management

Social Awareness

Relationship Skills

Decision Making

Goal Directed Behavior

Personal Responsibility

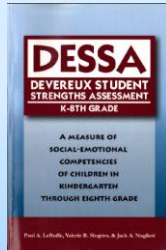**Optimistic Thinking**

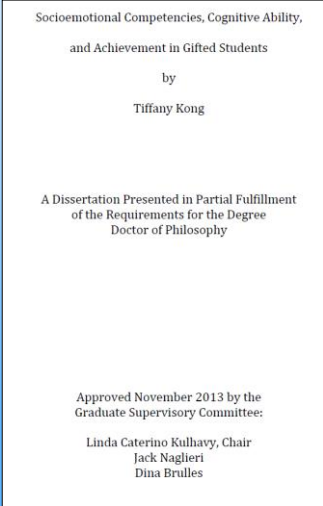**Social Emotional Composite**

conclusions   161

The DESSA

➢Based on resilience theory & SEL principles described by CASEL
- social-emotional strengths and needs for K-8th grade
- 72 items and 8 scales
- Completed by parents, teachers, and/or after-school / community program staff
- Takes 15 minutes to complete
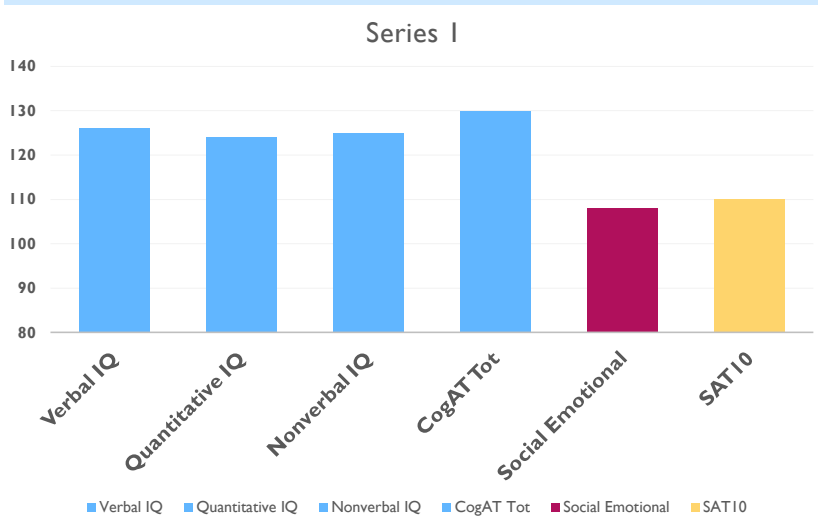- On-line administration, scoring and reporting available

conclusions   162

Kong (2013): IQ, SEL & Achievement

➢Tiffany Kong studied CogAT, DESSA, and achievement scores for 276 elementary students grades K-8

➢All gifted based on scores on verbal, quantitative, or nonverbal test scores at least 97th percentile

Socioemotional Competencies, Cognitive Ability, and Achievement in Gifted Students

by

Tiffany Kong

A Dissertation Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy

Approved November 2013 by the Graduate Supervisory Committee:

Linda Caterino Kulhavy, Chair
Jack Naglieri
Dina Brulles

conclusions

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Ability, Social Emotional & Skills

Series 1

Chart with bars:
- Verbal IQ: ~126
- Quantitative IQ: ~124
- Nonverbal IQ: ~125
- CogAT Tot: ~130
- Social Emotional: ~108
- SAT10: ~110

Legend: Verbal IQ, Quantitative IQ, Nonverbal IQ, CogAT Tot, Social Emotional, SAT10

conclusions

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Kong (2013): IQ, SEL & Achievement

➢ DESSA Total correlated .44 and CogAT Total

correlated .36 with Total Achievement

(reading, math, language)

• A clearer picture of the relationships between IQ

(CogAT) and SEL (DESSA) with achievement was

obtained from hierarchical regression analysis…

conclusions   165

Kong (2013) SEL Predicts Beyond IQ (p. 44)

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

Relations between Cognitive Ability, Socioemotional Competency, and

Achievement Variables

Hierarchical regression analyses were conducted to determine which scales

and subtests predicted the most variance in the dependent achievement variables.

Composite CogAT scores were not found to significantly predict composite

achievement, $R^2\Delta = .03$, $F(1, 121) = 3.27$, $p > .05$, reading, language, or math scores

over-and-above the DESSA Total scores (Table 11). On the other hand, the DESSA

Total scores significantly predicted composite achievement, $R^2\Delta = .05$, $F(1, 121) =$

6.99, $p < .05$; language scores, $R^2\Delta = .03$, $F(1, 121) = 4.26$, $p < .05$; and math scores,

$R^2\Delta = .05$, $F(1, 121) = 6.09$, $p < .05$, over-and-above the composite CogAT scores.
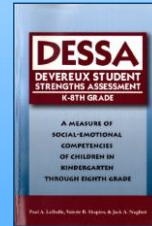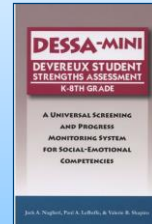
conclusions   166

The DESSA Comprehensive System

➢ Universal screening with an 8-item, strength-based behavior rating scale, the *DESSA-mini* for universal screening and ongoing progress monitoring

➢ 72-item *DESSA* to find specific areas of need

Paul LeBuffe & Valerie Shapiro

conclusions   167

http://www.centerforresilientchildren.org/

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Interventions for DESSA

conclusions 169

Take Away Messages

➢Social Emotional Skills are the result of EF and what the person has learned in all aspects of the environment

➢Children CAN BE TAUGHT good, or bad, social emotional skills

conclusions 170

Presentation Outline

➢ Comprehensive Model of EF
  • Historical Perspective
  • Definitions of Executive Function
➢ EF as Behavior
➢ EF as an Ability (an intelligence)
➢ EF as Social Emotional Skills
➢ Impairment and EF
➢ Research about EF as ability, behavior, and SE
➢ **Think Smart!** -- EF Skills in the Classroom
  • More lesson plans for improving components of EF
➢ Conclusions

conclusions   171

Rating Scale of Impairment & EF

➢ EF and Impairment …

conclusions   172

Definition of Impairment

➢ "Impairment is a reduced ability to meet the demands of life because of a psychological, physical, or cognitive condition" (Goldstein & Naglieri, 2016, p. 6).

➢ The American Psychiatric Association in the new DSM-5 (APA, 2013) emphasizes impairment over and above symptom presentation.

➢ World Health Organization's International Classification of Functioning, Disability and Health (WHO, 2001) also has guidelines for impairment.

conclusions

Standardization

➢ RSI Normative Sample:
  - **2800** ratings
    - **800** ratings for each of the RSI (5-12 Years) Parent and Teacher forms
    - **600** ratings for each of the RSI (13-18 Years) Parent and Teacher forms

➢ Within **1% the 2010 U.S. Census** targets on:
  - Race/ethnicity,
  - Region,
  - PEL

➢ Includes 11.6%-11.8% of clinical cases

conclusions

RSI Forms and Scores

RATING SCALE OF IMPAIRMENT (RSI)			
RSI (5–12 YEARS)		RSI (13–18 YEARS)	
PARENT FORM	TEACHER FORM	PARENT FORM	TEACHER FORM
Number of Items: 41 Reading Level: 5.8 Admin Time: 10 mins.	Number of Items: 29 Reading Level: 6.6 Admin Time: 5 mins.	Number of Items: 49 Reading Level: 5.9 Admin Time: 10 mins.	Number of Items: 29 Reading Level: 6.6 Admin Time: 5 mins.
RSI Scales School Social Mobility Domestic Family	**RSI Scales** School Social Mobility	**RSI Scales** School/Work Social Mobility Domestic Family Self-Care	**RSI Scales** School Social Mobility
TOTAL SCORE	TOTAL SCORE	TOTAL SCORE	TOTAL SCORE

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Factorial Support for RSI Scales

➢ Exploratory and confirmatory factor analyses confirm the RSI structure

- 5 factors: School, Social, Mobility, Domestic, and Family for the RSI (5–12 Years) Parent Form
- 6 factors: School/Work, Social, Mobility, Domestic, Family, and Self-Care) for the RSI (13–18 Years) Parent Form
- 3 factors: School, Social, and Mobility) for the RSI (5–12 Years) and RSI (13–18 Years) Teacher Forms.

conclusions   176

Presentation Outline

➢ Comprehensive Model of EF
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➢ EF as an Ability (an intelligence)
➢ EF as Social Emotional Skills
➢ Impairment and EF
➡ ➢ Research about EF as ability, behavior, and SE
➢ **Think Smart!** -- EF Skills in the Classroom
  • More lesson plans for improving components of EF
➢ Conclusions

conclusions   177

Executive Function Behaviors, Intelligence, and Achievement test scores

conclusions   178

EF and Achievement (Naglieri & Rojahn, 2004)

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 standardization sample and closely represented the U.S. population on a number of important demographic variables. Pearson product–moment correlation 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 not 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 child's academic performance. Because cognitive ability and academic achievement share a significant portion of the same con-

achievement. For instance, subtests like General Information are also included on individual achievement tests (e.g., the Peabody Individual Achievement Test—Revised; Markwardt, 1997). Similarly, the WISC-III Vocabulary and Similarities subtests require knowledge of words, which is also assessed by vocabulary or word

conclusions   179

EF and Achievement (Naglieri & Rojahn, 2004)

➢ Correlation between Executive Function (Planning + Attention) and overall achievement (Skills Cluster) = **.51** (N = 1,559; p < .001)

➢ P&A added significantly to the prediction of achievement after Simultaneous and Successive scores were used in the regression equation

Table 3
Pearson Product–Moment Correlations Between the CAS Basic Battery and Standard Battery Full Scale Scores and the WJ-R Subscale and Cluster Scores (N = 1,559)

Scale	CAS Standard Battery subtests			
	Planning	Simultaneous	Successive	Attention
WJ-R subtests				
Letter-Word Identification	.47	.53	.49	.42
Passage Comprehension	.43	.50	.47	.39
Calculation	.50	.47	.36	.43
Applied Problems	.49	.60	.47	.44
Dictation	.50	.53	.49	.44
Word Attack	.41	.48	.44	.37
Reading Vocabulary	.42	.53	.50	.35
Quantitative Concepts	.51	.59	.49	.44
Proofing	.44	.48	.44	.40
WJ-R clusters				
Broad Reading	.48	.55	.50	.43
Basic Reading	.47	.54	.49	.42
Reading Comprehension	.44	.54	.50	.39
Broad Math	.54	.58	.45	.47
Basic Math	.55	.58	.46	.47
Math Reasoning	.49	.60	.47	.44
Basic Writing	.51	.55	.48	.45
Skills Cluster	.54	.62	.53	.48

Note. CAS = Cognitive Assessment System; WJ-R = Woodcock–Johnson Revised Tests of Achievement.

conclusions   180

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

Table 8.26. Demographic Characteristics of the CAS, WISC-IV, and WJ III ACH Validity Samples

		Sample					
		CAS		WISC-IV		WJ III ACH	
Demographic		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	9	4.8	8	4.6	9	5.1
Total		62	100.0	43	100.0	58	100.0
Age M (SD)		10.4 (2.9)		10.2 (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.

conclusions 181

EF Behaviors (CEFI) & CAS

	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				
CEFI Scales	Total	Broad Reading	Broad Math	Broad Written Language	Median
Full Scale	.51	.48	.49	.47	.49

conclusions 182

Take Away Messages

➤ EF behaviors are significantly correlated with scores from a nationally normed test of academic skills (WJ-III)

➤ EF behaviors are significantly correlated with all four PASS scales

➤ EF behaviors are mostly correlated with WISC-IV Verbal scale which requires a lot of knowledge

conclusions 183
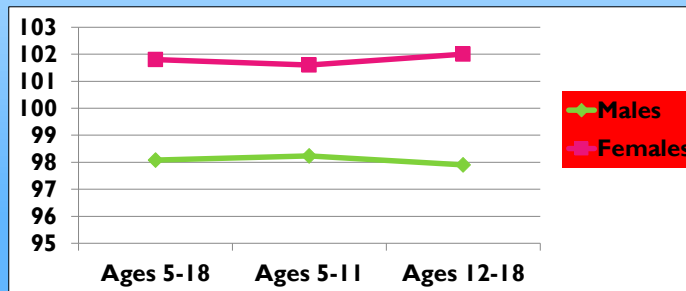
Sex Differences in Executive Function

conclusions 184

CEFI Sex Differences: Parent Raters

➢Girls are Smarter than Boys

Parents	N	Mn	SD	N	Mn	SD	ES
Ages 5-18	700	**98.1**	14.9	699	**101.8**	15.0	**-0.25**
Ages 5-11	350	**98.2**	14.3	349	**101.6**	15.6	**-0.22**
Ages 12-18	350	**97.9**	15.4	350	**102.0**	14.4	**-0.28**

conclusions

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CEFI Sex Differences: Teacher Raters

➢Girls are Smarter than Boys

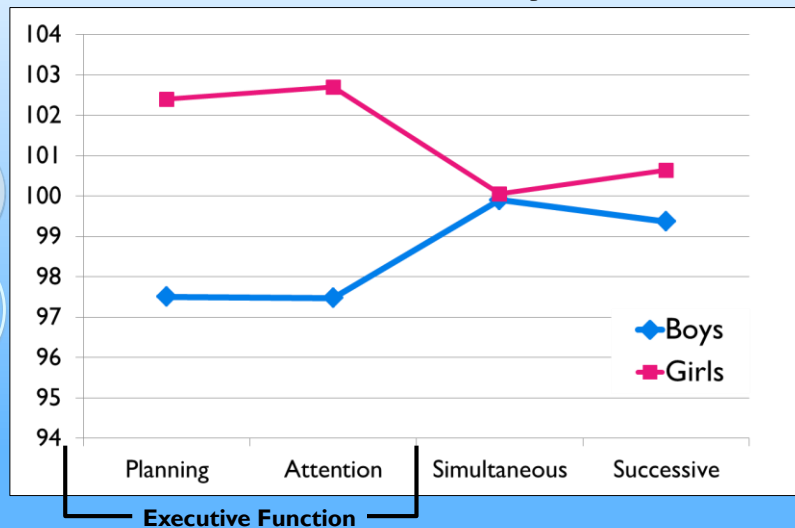| Teachers	N	Mn	SD	N	Mn	SD	ES
Ages 5-18	700	**96.7**	14.4	700	**103.2**	15.0	**-0.44**
Ages 5-11	350	**96.4**	14.5	350	**103.5**	14.9	**-0.49**
Ages 12-18	350	**97.0**	14.4	350	**102.9**	15.0	**-0.40**
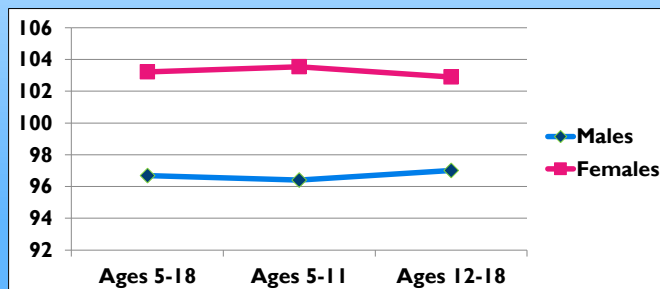
conclusions

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Sex Differences: Ability

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.
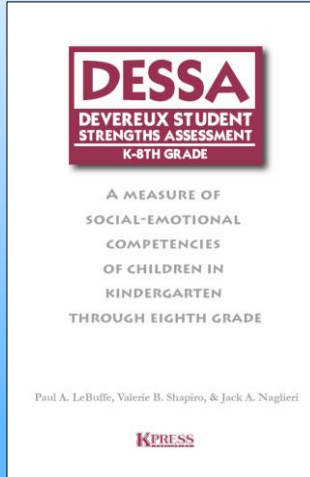
Sex Differences: Ability

Executive Function

Sex Differences: Social Emotional

A MEASURE OF SOCIAL-EMOTIONAL COMPETENCIES OF CHILDREN IN KINDERGARTEN THROUGH EIGHTH GRADE

Paul A. LeBuffe, Valerie B. Shapiro, & Jack A. Naglieri

TABLE 2.6

Means, SDs, Ns, **and** *d*-**ratios for DESSA** *T*-**Scores by Gender**

	Males			Male Female d-ratio	Females		
	Mean	SD	n		Mean	SD	n
TEACHER RATERS							
Personal Responsibility	48.23	9.98	631	-0.42	52.28	9.30	611
Optimistic Thinking	48.97	10.14	627	-0.30	51.88	9.47	612
Goal-Directed Behavior	48.60	10.05	631	-0.33	51.80	9.38	611
Social-Awareness	48.58	10.13	630	-0.31	51.66	9.64	612
Decision Making	48.44	10.08	631	-0.37	52.05	9.32	612
Relationship Skills	48.36	10.04	630	-0.41	52.33	9.30	612
Self-Awareness	49.05	10.28	631	-0.22	51.17	9.36	611
Self-Management	48.32	10.02	631	-0.39	52.02	9.18	612
Social-Emotional Composite	48.30	10.09	625	-0.38	51.93	9.02	609
PARENT RATERS							
Personal Responsibility	48.14	9.52	602	-0.36	51.66	9.87	641
Optimistic Thinking	48.37	9.86	602	-0.33	51.62	9.82	641
Goal-Directed Behavior	47.92	9.51	602	-0.41	51.90	9.96	641
Social-Awareness	48.71	9.75	602	-0.25	51.10	9.71	641
Decision Making	48.56	9.76	602	-0.29	51.41	9.62	641
Relationship Skills	48.40	9.72	602	-0.33	51.65	9.90	641
Self-Awareness	48.40	10.03	602	-0.32	51.54	9.51	641
Self-Management	48.80	9.98	602	-0.27	51.51	9.94	641
Social-Emotional Composite	48.24	9.51	602	-0.37	51.77	9.60	641

Devereux Elementary Student Strength Assessment (DESSA, LeBuffe Shapiro & Naglieri, 2009)

Sex Differences: Social Emotional

Parent & Teacher Raters Females

Parent & Teacher Raters Males
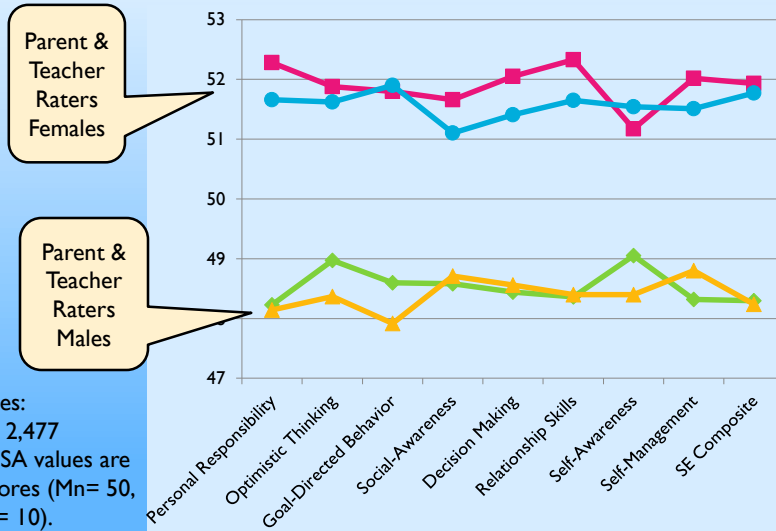
Notes:
N = 2,477
DESSA values are T-scores (Mn= 50, SD = 10).

Sex Differences

conclusions   191

Developmental Differences in Executive Function

conclusions   192

Developmental Changes in EF

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

John R. Best [a,*], Patricia H. Miller [b], Jack A. Naglieri [c]

[a] Department of Psychology, University of Georgia, Athens, GA, 30602-3013, USA
[b] Department of Psychology, San Francisco State University, San Francisco, CA, 94132, USA
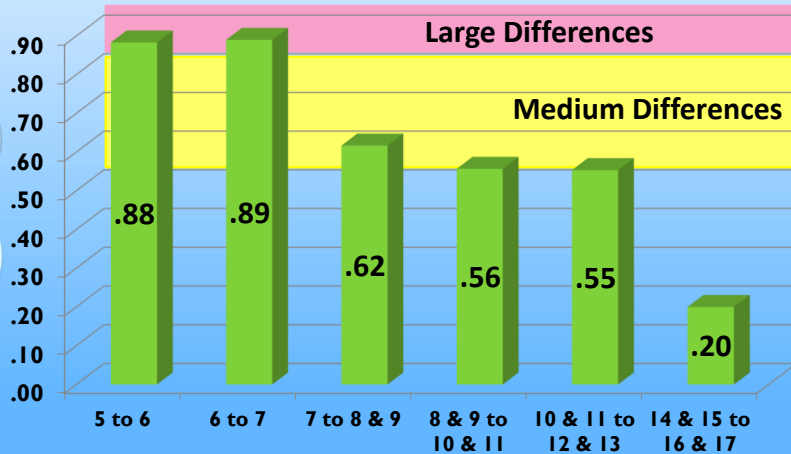[c] Department of Psychology, George Mason University, Fairfax, VA, 22030, USA

ABSTRACT

This study examined age-related changes in complex executive function (EF) in a large, representative sample (N=2036) 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 15, although improvement slowed with increasing age and varied some across tasks. Moreover, the different developmental patterns in the correlations between completion time and accuracy provide clues to developmental processes. Examination of individual achievement subtests 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.

Developmental Changes in EF

➢ Best, et al (2011) reported means score differences between adjacent age groups of a large (N = 2, 036) nationally representative sample (CAS normative group)

➢ Results showed that EF does **not** develop consistently across the 5 year to 18 year age range

➢ Age differences were reported in effect sizes (.2 to .4 = small; .5 to .7 = medium; .8 and above = large)

conclusions 194

Developmental Changes in EF

Large Differences

Medium Differences

.88	.89	.62	.56	.55	.20
5 to 6	6 to 7	7 to 8 & 9	8 & 9 to 10 & 11	10 & 11 to 12 & 13	14 & 15 to 16 & 17

conclusions 195

Developmental Changes in EF

➢ These developmental data suggest that instruction in EF Skills should be stressed when growth is most rapid, that is, during early elementary and middle school years

➢ Students need to be TOLD what EF is and how it can be used to help them learn, especially during the early years when growth in ABILITY is ….so that growth in BEHAVIOR and EMOTION follow

conclusions 196

Presentation Outline

➢Comprehensive Model of EF
- Historical Perspective
- Definitions of Executive Function

➢EF as Behavior

➢EF as an Ability (an intelligence)

➢EF as Social Emotional Skills

➢Research about EF as ability, behavior, and SE

➢**Think Smart!** -- EF Skills in the Classroom
- More lesson plans for improving components of EF

➢Conclusions

conclusions   197

Conclusions

➢The teacher's role is to give the student knowledge of facts *and* to encourage the use of Executive Function

➢When we give students the responsibility to figure out how to do things we teach them to **THINK SMART! and use EF**

➢**This is the gift of smarter thinking**

➢**This is a gift of optimism**

➢**This is a gift for life success**

➢**EF is about LIFE not just school**

conclusions   198