# Multidimensional Assessment of Executive Function: Cognition, Behavior, Social-Emotional, Academics, & Impairment

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conclusions

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# Resources and Disclosures



conclusions

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I

# www.jacknaglieri.com

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



# My Background

➢ Interest in intelligence and instruction

➢ Exper

- Need
- Psych
- Evide

➢ My pe resear

➢ Why t

## Core Group Discussion → Deeper Learning

- **C**oach – Help the group decide what to do
- **O**rganizer – Have your group discuss the case of Manuel
- **R**eporter – Keep notes and speak for the group
- **E**nergizer – Focus the group !



conclusions

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# Goal of this presentation

A comprehensive approach to understanding and assessing EF needs to include several conceptual areas.

| Behaviors related to Cognition | Behaviors related to Social-Emotional Skills | Academic and job skills |
|---|---|---|
| Neurocognitive Ability is the foundation | | |

conclusions

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# Presentation Outline

➤Comprehensive Model of EF
  • Historical Perspective and Definitions
➤EF as Behavior
➤EF as an Ability (an intelligence)
➤EF as Social Emotional Skills
➤EF and Academic 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

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# EF Lesson on Saturday Night Live

➤We will begin by learning about how EF can be encouraged, using one of the lessons in *www.efintheclassroom.net* curriculum

➤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

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# EF Lesson on Saturday Night Live



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# 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   10

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# Time to Think and Talk

➢ **Task:**

START

**4**
**minutes**
**left**

conclusions

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# Core Group Discussion

TALKING POINTS

➢ 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

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## All Lessons available at: www.efintheclassroom.net
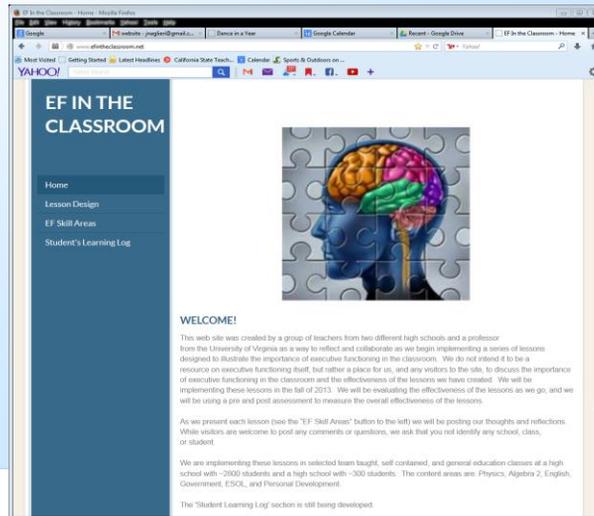


conclusions    13

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## 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    14

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# 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

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# 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

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# 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        17

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# 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        18

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## 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'.
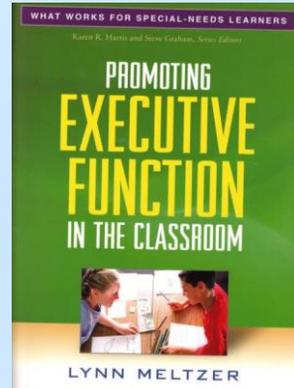
conclusions    19

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## 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    20

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## 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

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## 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.
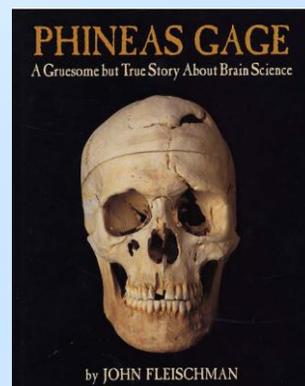


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## The Curious Story of Phineas Gage

➤ September 13, 1848 26 year old Phineas Gage was in charge of a railroad track construction crew blasting granite bedrock near Cavendish, Vermont

➤ The job Phineas has is to use a "tamping iron" to set explosives

➤ The tamping iron is a rod about 3 ½ feet long weighing 13 ½ lbs pointed at one end
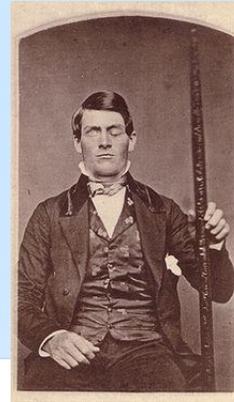
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## Fleishman (2002, p 70)

➤ 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

"HORRIBLE ACCIDENT" IN VERMONT • 7

Fleishman (2002)

PATH OF IRON BAR
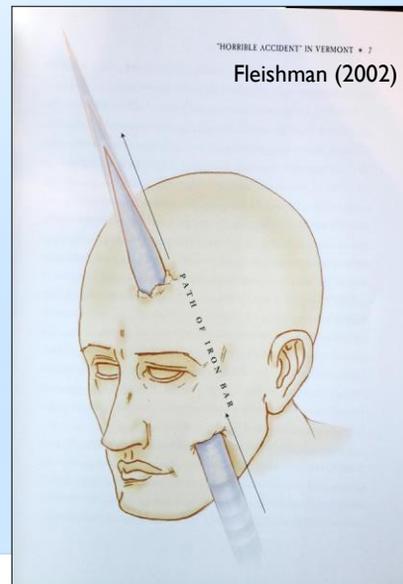
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# Before . . . & . . . After

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

● **After** the accident his ability to direct others was gone, he had considerable trouble with decision making, control of impulses and interpersonal relationships – management of intellect, behavior and emotion

conclusions    25

# 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.



usions    26

## More Specifically
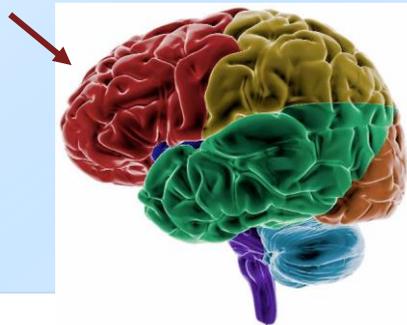
Dorsolateral prefrontal cortex

➤ 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.
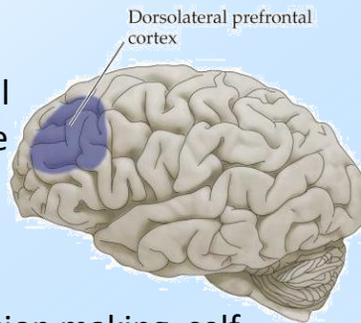
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## The Curious Story of Phineas Gage

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.    28

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# Frontal Lobes and Executive Function(s)

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

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# Executive Functions

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

- Elkhonon Goldberg provides a valuable review of what the frontal lobes do
- Describes EF as the orchestra leader



http://www.elkhonongoldberg.com/
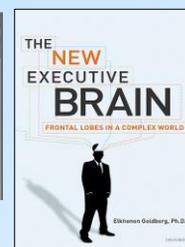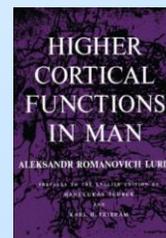
30

# Goldberg (2009, p. 4)

➤ "The frontal lobes … are related 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…"

THE **NEW** EXECUTIVE **BRAIN**
FRONTAL LOBES IN A COMPLEX WORLD
Elkhonon Goldberg, Ph.D.
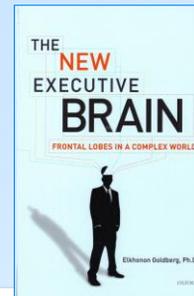
conclusions 31

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# What is Executive Function(s)

There is no formal accepted definition of EF

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

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## 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
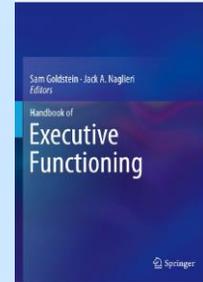
conclusions     33

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## Executive Function

➢ EF 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**.

## Executive Functions

➢ EF has **three components**: *inhibitory control, set shifting (flexibility), and working memory* (e.g., Davidson, et al., 2006).

➢ Executive Functions is a **multidimensional** model (Friedman et al., 2006) with independent **abilities** (Wiebe, Espy, & Charak, 2008).

conclusions     34

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# 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)

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# CEFI (Naglieri & Goldstein, 2012)



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**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

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# 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

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# Factor Analysis

➤ Item Level Analysis

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

➤ Scale Level Analysis

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

conclusions

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# Adult CEFI Samples

➤ Self (N = 1,600), Observer (N = 1,600) results: 1 factor



**Eigenvalues Items**

**Eigenvalues 9 Scales**

Table 8.2. Eigenvalues from the Inter-Item Correlations

| Form | 1st:2nd | Factor | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 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 | Factor | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 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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# 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
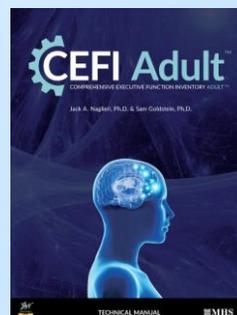
conclusions

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## Adult CEFI Samples

➢ Self (N = 1,600), Observer (N = 1,600) results: 1 factor



Eigenvalues Items — Self-Report / Observer

Eigenvalues 9 Scales — Self-Report / Observer

Table 8.2. Eigenvalues from the Inter-Item Correlations

| Form | 1st-2nd | Factor | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th |
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| Observer | 11.3 | 35.3 | 3.1 | 2.2 | 1.0 | 0.9 | 0.8 | 0.7 | 0.5 | 0.5 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | 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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## 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

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# 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.

Consistency of Factor Loadings Across Groups

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

conclusions

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# EF and its components

➤Abilities, cognitive processes, and behaviors



conclusions

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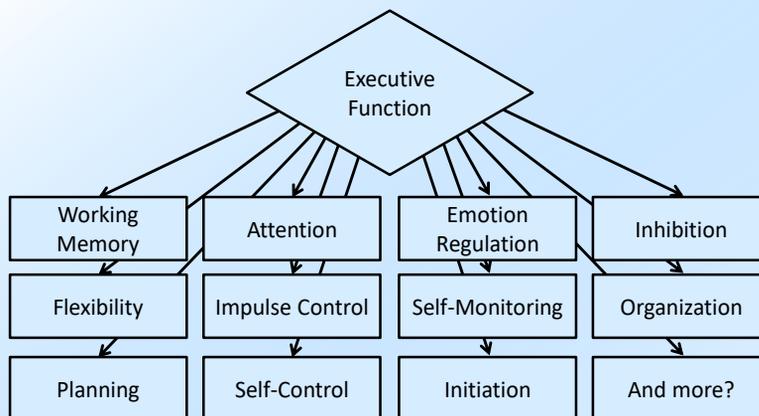
## Naglieri & Goldstein, 2012

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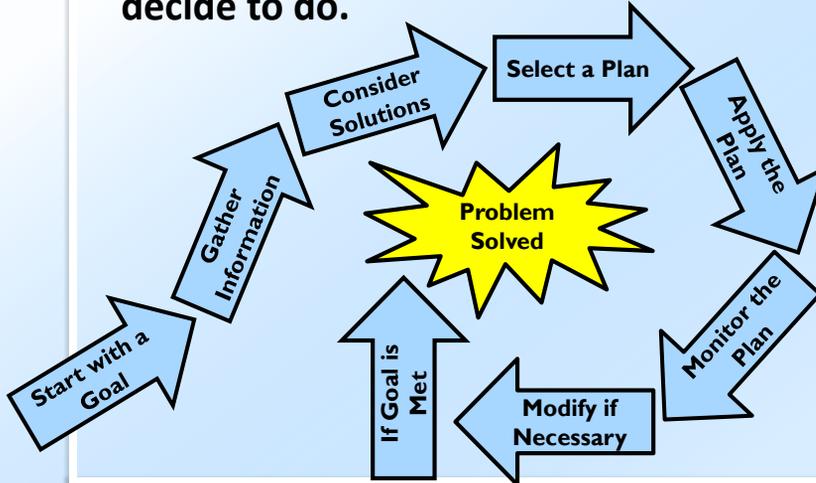


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## Does a13 month old have EF?



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# Age 19 months: Knowledge & EF
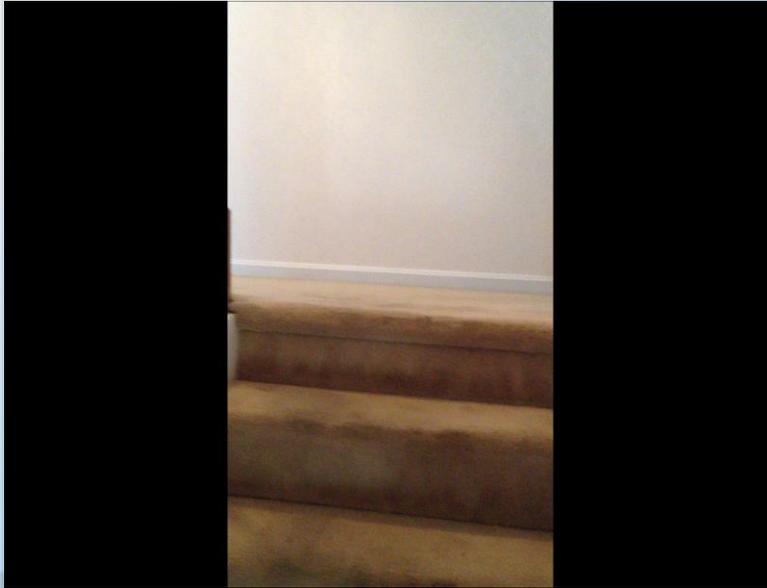


conclusions
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# EF's Learning Curves (Naglieri & Otero, 2017)

➢ 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



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

Minimum Use

Novel Task          Well Learned Task

Over time and with experience

conclusions

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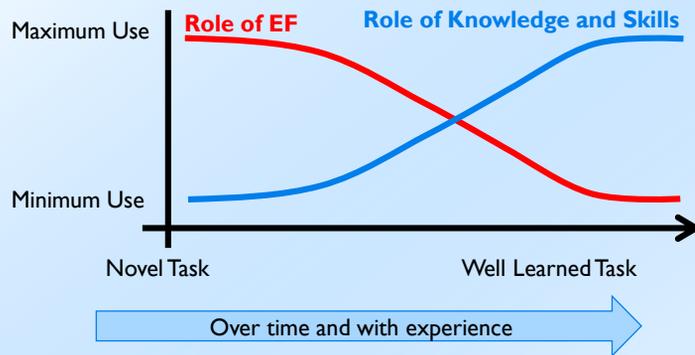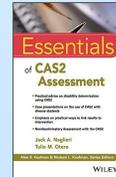
# Executive Function Involves

➢ *"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   51

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# Which Lemming has good EF?

conclusions   52

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## Core Group Activity

- **O**rganizer – Have the group discuss this question: "How do you feel about what was just presented?"
- **C**oach – guide the discussion so that the group arrives at an answer to the question
- **R**eporter – record and report to the group
- **E**nergizer – keep the discussion going !



conclusions    53

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## EF: ability, behavior, social-emotional skill?

All are reflections of FRONTAL LOBE activity

conclusions    54

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# 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    55

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# Presentation Outline

➢Comprehensive Model of EF
  • Historical Perspective and Definitions
➢EF as Behavior
➢EF as an Ability (an intelligence)
➢EF as Social Emotional Skills
➢EF and Academic 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    56

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# Comprehensive Executive Function Inventory - CEFI and CEFI Adult



- 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 & CEFI-Adult Scales



| Comprehensive Executive Function Inventory Forms | |
|---|---|
| **CEFI (5–18 Years) Parent Form**<br>**CEFI (5–18 Years) Teacher Form**<br>Age Range: 5–18 Years<br>Number of Items: 100 | **CEFI (12–18 Years) Self-Report Form**<br>Age Range: 12–18 Years<br>Number of Items: 100 |

Consistency Index
Negative Impression Scale
Positive Impression Scale

**Full Scale**

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

| CEFI ADULT SELF-REPORT FORM<br>NUMBER OF ITEMS: 80 | CEFI ADULT OBSERVER FORM<br>NUMBER OF ITEMS: 80 |
|---|---|

Consistency Index
Negative Impression Scale

**Full Scale**

**CEFI Adult Scales**

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

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

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# CEFI Administration & Scoring

CEFI Administration & Scoring Methods

Paper and Pencil Administration

Online Administration

Hand Scoring Using CEFI Record Form

Examiner enters responses in MHS Online Assessment Center: Automated scoring and report

Examiner enters responses into CEFI Scoring Software Program: Automated scoring and report
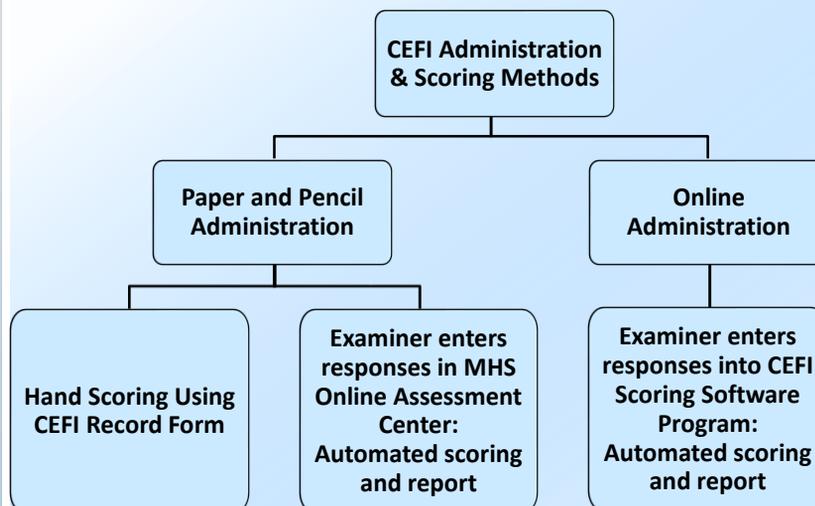
conclusions 60

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# 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
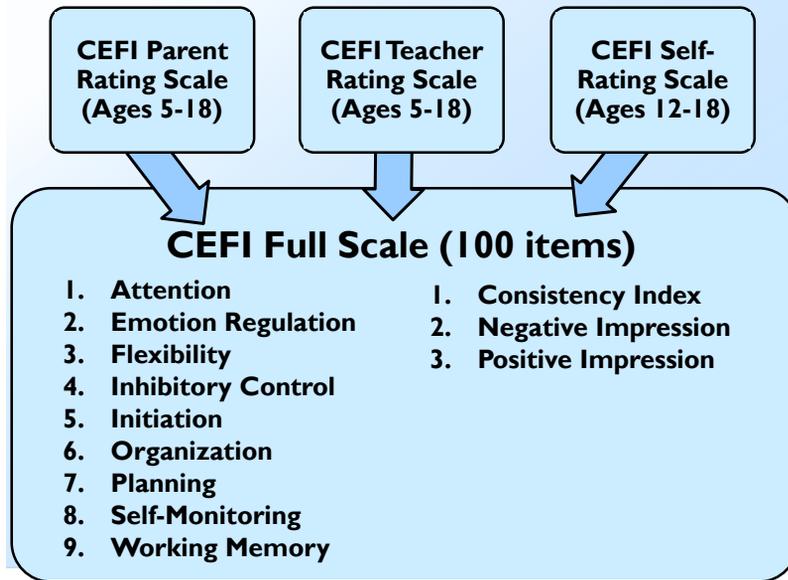
conclusions

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# CEFI Forms

➢ Each 100-item form yields scales set at a mean of 100 and SD of 15

| English Parent Form (5-18 years) | English Teacher Form (5-18 years) | English Self-Report Form (12-18 years) |
|---|---|---|
| Spanish Parent Form (5-18 years) | Spanish Teacher Form (5-18 years) | Spanish Self-Report Form (12-18 years) |
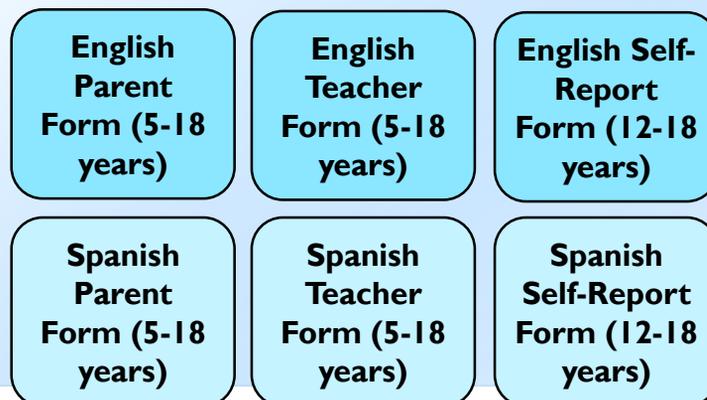
conclusions   62

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# CEFI Forms

Each form
yields a **Full
Scale** score
and 9
separate
content
scales which
contain items
as follows…

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

conclusions    63

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# CEFI Items by Scale

**Table C.4. Attention (12 items)**

| Item # | Parent/Teacher Item<br>*During the past 4 weeks, how often did the child...* | Self-Report Item<br>*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<br>*During the past 4 weeks, how often did the child...* | Self-Report Item<br>*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<br>*During the past 4 weeks, how often did the child...* | Self-Report Item<br>*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    64

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# CEFI Items by Scale

**Table C.7. Inhibitory Control (10 items)**

| Item # | Parent/Teacher Item<br>*During the past 4 weeks, how often did the child...* | Self-Report Item<br>*During the past 4 weeks, how often did you...* |
|---|---|---|
| 1. | think before acting? | think before acting? |
| 19. | find it hard to control his/her actions? (R) | find it hard to control your actions? (R) |
| 32. | think of the consequences before acting? | think of the consequences before acting? |
| 38 | | |
| 49 | | |

**Table C.8. Initiation (10 items)**

| Item # | Parent/Teacher Item<br>*During the past 4 weeks, how often did the child...* | Self-Report Item<br>*During the past 4 weeks, how often did you...* |
|---|---|---|
| 16. | start something without being asked? | start something without being asked? |
| 30. | start conversations? | start conversations? |
| 39. | take on new projects? | take on new projects? |

**Table C.9. Organization (10 items)**

| Item # | Parent/Teacher Item<br>*During the past 4 weeks, how often did the child...* | Self-Report Item<br>*During the past 4 weeks, how often did you...* |
|---|---|---|
| 5. | complete one task before starting a new one? | complete one task before starting a new one? |
| 13. | organize his/her thoughts well? | organize your thoughts well? |
| 18. | appear disorganized? (R) | appear disorganized? (R) |

conclusions  65

# CEFI Items by Scale

**Table C.10. Planning (11 items)**

| Item # | Parent/Teacher Item<br>*During the past 4 weeks, how often did the child...* | Self-Report Item<br>*During the past 4 weeks, how often did you...* |
|---|---|---|
| 9. | prepare for school or work? | prepare for school or work? |
| 15. | solve problems creatively? | solve problems creatively? |
| 22. | do things in the right order? | do things in the right order? |
| 28. | plan for future events? | plan for future events? |

**Table C.11. Self-Monitoring (10 items)**

| Item # | Parent/Teacher Item<br>*During the past 4 weeks, how often did the child...* | Self-Report Item<br>*During the past 4 weeks, how often did you...* |
|---|---|---|
| 6. | ask for help when needed? | ask for help when needed? |
| 14. | fix his/her mistakes? | fix your mistakes? |
| 17. | change a plan that was not working? | change a plan that was not working? |
| 29. | learn from past mistakes? | learn from past mistakes? |

**Table C.12. Working Memory (11 items)**

| Item # | Parent/Teacher Item<br>*During the past 4 weeks, how often did the child...* | Self-Report Item<br>*During the past 4 weeks, how often did you...* |
|---|---|---|
| 4. | forget instructions? (R) | forget instructions? (R) |
| 8. | remember how to do something? | remember how to do something? |
| 23. | forget instructions with many steps? (R) | forget instructions with many steps? (R) |
| 26. | remember many things at one time? | remember many things at one time? |

# One Factor and 9 Scales?

➢NOTE: EF is a unidimensional concept

➢Use the Full Scale to answer the question "Is the child poor in EF or not?"

➢Use the 9 scales to identify the specific groups of items that represent 9 different types of behaviors that can be addressed by Intervention

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

conclusions          67

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# CEFI Characteristics

➢Automated scoring and reporting includes intervention suggestions

➢Scores are based on nationally representative normative sample that is representative of the US

**CEF** Comprehensive Executive Function Inventory
Jack A. Naglieri, Ph.D. & Sam Goldstein, Ph.D.

Technical Manual          MHS

conclusions          68

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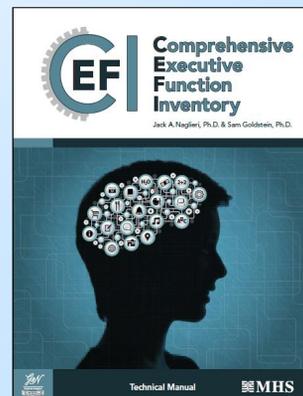
# CEFI Full Scale and Treatment Scores

**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 +9 | 101.7 | | Youth's Average | | | |

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

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



**MHS ASSESSMENTS**

**Comprehensive Executive Function Inventory™ - CEFI®**
Request More Information

**Learn More**

If you are interested in learning more about the CEFI, fill out the form to request information like:

- How this instrument compares to others
- Progress Monitoring
- Intervention Strategies
- View case studies, sample reports or items
- How to use an instrument
- Setting up trainings
- Further questions or comments

**I would like to ...**

Learn more about: (Check all that Apply)
- Theoretical support for model
- How this assessment compares to other assessments
- Psychometric Properties
- Reliability and Validity
- The Authors
- Speaking with the consultant
- Participate in Data Collection Opportunities
- Other (Please specify in Comments)

I would like to: (Check all that apply)
- Try it Online For Free
- Speak with a Consultant
- Set Up Training
- Other (Please specify in Comments)

First Name *

Last Name *

I am a ___ and I work in a ___ : *
- Please Select -

School District/Organization *

Email *

Phone Number *

Preferred Contact Method *
- Phone
- Email

Country *
- Please Select -

State/Region *
- Please Select -

City *

I would like to receive email communications on MHS assessments, discounts, workshops, training, data collection opportunities, and surveys. You can unsubscribe at anytime.
- Yes

Comments/Questions

Submit

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# Free Use of CEFI: mhs.com/cefi



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# CEFI Scale Reliability

| CEFI Internal Reliability Coefficients for the Normative Sample | | | |
|---|---|---|---|
| | Parent (N = 1,396) | Teacher (N=1,400 ) | Self (N = 700 ) |
| Full Scale | .99 | .99 | .97 |
| Attention | .93 | .96 | .86 |
| Emotion Regulation | .89 | .93 | .78 |
| Flexibility | .85 | .90 | .77 |
| Inhibitory Control | .90 | .94 | .80 |
| Initiation | .89 | .93 | .80 |
| Organization | .91 | .94 | .85 |
| Planning | .92 | .96 | .85 |
| Self-Monitoring | .87 | .92 | .78 |
| Working Memory | .89 | .94 | .83 |

conclusions

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# CEFI Interpretation

Step 1: Examine Quality of the Ratings:
Consistency, Positive and Negative
Impression

Step 2: Interpret Scale Scores

Step 3: Compare CEFI Scale Scores

Step 4: Examine Item-Level Responses

Step 5: Compare Results Across Raters

Step 6: Compare Results Over Time

conclusions    73

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# Step 1: Consistency Index

➢The Consistency Index provides information about whether the rater responded to similar items differently.

➢Inconsistent responding can occur intentionally or unintentionally, and could be due to deliberate non-compliance, fatigue, a misunderstanding of the items or instructions, inattention, disinterest, or a lack of motivation

conclusions    74

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# Step 1: Impression Scales

➢ The Negative Impression scale evaluates the likelihood that the rater underestimated the individual's functioning.

➢ The Positive Impression scale evaluates the likelihood that the rater overestimated the individual's functioning.

conclusions  75

75

# Step 1: Impression Scales

➢ A particular response style is indicated if the standard score is less than 76 (< 5% of the normative sample).

| Scale | Interpretive Text | |
| --- | --- | --- |
| | Standard Score ≤ 75 | Standard Score > 75 |
| Consistency Index | The rater responded in a different way to similar items. This rating pattern is not typical and should be further investigated. | The pattern of ratings is typical. |
| Negative Impression Scale | The pattern of ratings may under-estimate the child's behavior. This rating pattern is not typical and should be further investigated. | ratings is typical. |
| Positive Impression Scale | The pattern of ratings may over-estimate the child's behavior. This rating pattern is not typical and should be further investigated. | The pattern of ratings is typical. |
| Time to Completion | The rater spent considerably less time than is usual completing the CEFI. | The time the rater took to complete the CEFI was typical. |

**Time to Completion is only for online administration**

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# CEFI Interpretive Report



# CEFI Interpretive Report



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# CEFI Interpretation

Step 1: Examine Quality of the ratings:
Consistency, Positive and Negative
Impression

Step 2: Interpret Scale Scores

Step 3: Compare CEFI Scale Scores

Step 4: Examine Item-Level Responses

Step 5: Compare Results Across Raters

Step 6: Compare Results Over Time

conclusions    79

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# Step 2: Interpret Scale Scores

➢ All scales are set at mean of 100, SD of 15

➢ Low scores mean poor EF

**Table 4.3. Interpretation Guidelines for Examining Scale Scores**

| Scale | Interpretation Guidelines |
|---|---|
| Full Scale | Reflects overall executive function. The Full Scale score is made up of 90 items from nine different areas that are conceptually related to executive function (i.e., Attention, Emotion Regulation, Flexibility, Inhibitory Control, Initiation, Organization, Planning, Self-Monitoring, and Working Memory). The CEFI Scales describe the content of the items for intervention purposes. If there is significant variation among the CEFI Scales, the Full Scale score will sometimes be higher and other times lower than scores on these scales. However, the Full Scale score is a good description of a child's/youth's executive function behaviors if there is no significant variation among the CEFI Scales. |
| Attention | Describes how well a child/youth can avoid distractions, concentrate on tasks, and sustain attention. |
| Emotion Regulation | Indicates the child's/youth's control and management of emotions, including staying calm when handling small problems and reacting with the right level of emotion. |
| Flexibility | Reflects a child's/youth's skill at adjusting 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. |

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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



conclusions    81

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# 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    82

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## 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    83

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## CEFI Interpretation

Step 1: Examine Quality of the ratings: Consistency, Positive and Negative Impression

Step 2: Interpret Scale Scores

**Step 3: Compare CEFI Scale Scores**

Step 4: Examine Item-Level Responses

Step 5: Compare Results Across Raters

Step 6: Compare Results Over Time

conclusions    84

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# Step 3: Compare CEFI Scale 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 ÷9 | 101.7 | Youth's Average | | | | |

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

# CEFI Interpretation

Step 1: Examine Quality of the ratings:
    Consistency, Positive and Negative
    Impression

Step 2: Interpret Scale Scores

Step 3: Compare CEFI Scale Scores

Step 4: Examine Item-Level Responses

**Step 5: Compare Results Across Raters**

Step 6: Compare Results Over Time

conclusions      86

## Step 5: Between Rater Comparisons

Table 4.5. Critical Values ($p < .10$) Denoting Statistically Significant Differences Between

| Scale | Parent to Parent | | Teacher to Teacher | | Parent to Teacher | | Parent to Self-Report | Teacher to Self-Report |
|---|---|---|---|---|---|---|---|---|
| | 5–11 Years | 12–18 Years | 5–11 Years | 12–18 Years | 5–11 Years | 12–18 Years | 12–18 Years | 12–18 Years |
| Full Scale | 5 | 5 | 4 | 4 | 4 | 4 | 8 | 5 |
| Attention | 10 | 10 | 7 | 7 | 9 | 9 | 13 | 11 |
| Emotion Regulation | 13 | 12 | 10 | 10 | 11 | 11 | 15 | 14 |
| Flexibility | 14 | 14 | 12 | 12 | 13 | 13 | 15 | 15 |
| Inhibitory Control | 12 | 12 | 9 | 9 | 11 | 10 | 14 | 13 |
| Initiation | 13 | 12 | 10 | 10 | 12 | 11 | 14 | 14 |
| Organization | 12 | 10 | 10 | 9 | 11 | 10 | 12 | 12 |
| Planning | 11 | 10 | 8 | 8 | 10 | 9 | 13 | 11 |
| Self-Monitoring | 14 | 12 | 11 | 11 | 13 | 11 | 15 | 14 |
| Working Memory | 13 | 12 | 9 | 9 | 11 | 11 | 11 | 13 |

conclusions 87

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## CEFI Interpretation

Step 1: Examine Quality of the ratings: Consistency, Positive and Negative Impression

Step 2: Interpret Scale Scores

Step 3: Compare CEFI Scale Scores

Step 4: Examine Item-Level Responses

Step 5: Compare Results Across Raters

Step 6: Compare Results Over Time

conclusions 88

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# Step 6: Compare Results Over Time

➢Determine if CEFI pre post scores differ significantly – but also if the post-test standard score is in the Average range or higher

**Table 4.6. Critical Values Denoting Statistically Significant Change Over Time**

| | Parent Form | | | | Teacher Form | | | | Self-Report Form | |
| | 5–11 Years | | 12–18 Years | | 5–11 Years | | 12–18 Years | | 12–18 Years | |
| Scale | $p < .05$ | $p < .10$ | $p < .05$ | $p < .10$ | $p < .05$ | $p < .10$ | $p < .05$ | $p < .10$ | $p < .05$ | $p < .10$ |
|---|---|---|---|---|---|---|---|---|---|---|
| Full Scale | 6 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 8 | 6 |
| Attention | 12 | 10 | 11 | 10 | 9 | 7 | 9 | 7 | 16 | 13 |
| Emotion Regulation | 15 | 13 | 14 | 12 | 11 | 10 | 11 | 10 | 20 | 17 |
| Flexibility | 17 | 14 | 16 | 14 | 14 | 12 | 14 | 12 | 20 | 17 |
| Inhibitory Control | 15 | 12 | 14 | 12 | 11 | 9 | 11 | 9 | 19 | 16 |
| Initiation | 15 | 13 | 14 | 12 | 12 | 10 | 12 | 10 | 19 | 16 |
| Organization | 14 | 12 | 12 | 10 | 11 | 10 | 11 | 9 | 17 | 14 |
| Planning | 13 | 11 | 12 | 10 | 10 | 8 | 9 | 8 | 17 | 14 |
| Self-Monitoring | 17 | 14 | 14 | 12 | 13 | 11 | 12 | 11 | 20 | 17 |
| Working Memory | 15 | 13 | 14 | 12 | 11 | 9 | 11 | 9 | 18 | 15 |

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# CEFI – ADULT FORM (2017)
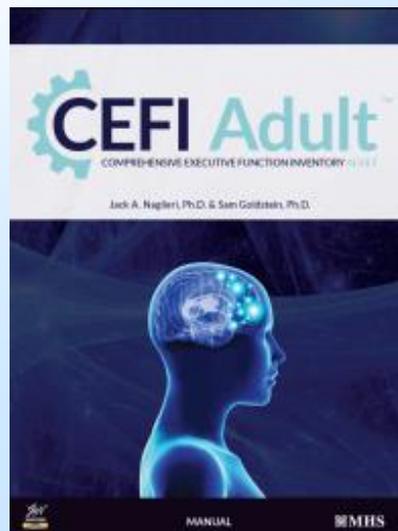


conclusions    90

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# CEFI Adult (ages 18+)

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

conclusions  91

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# CEFI Adult (ages 18+)

➢ 80 items in same 9 scales

**INSTRUCTIONS:** Read each statement that follows the phrase: *"During the past four weeks, how often did the individual..."*, then circle the letter under the word that tells how often it happened. Read each question carefully, then mark how often you saw it happened in the *past four weeks*. Answer every question without skipping any. If you want to change your answer, put an X through it and circle your new choice. Be sure to answer every question.

| During the past four weeks, how often did the individual... | Never | Rarely | Sometimes | Often | Very Often | Always |
|---|---|---|---|---|---|---|
| 1. show self-control? | N | R | S | O | V | A |
| 2. have trouble finding things? | N | R | S | O | V | A |
| 3. maintain self-control? | N | R | S | O | V | A |
| 4. plan ahead? | N | R | S | O | V | A |
| 5. remember many things at one time? | N | R | S | O | V | A |
| 6. know when a task was completed? | N | R | S | O | V | A |

conclusions  92

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# CEFI Adult (ages 18+)

➢ Same interpretation method

**CEFI ADULT RESULTS**

See chapter 3 of the *CEFI Adult Technical Manual* for complete scoring instructions.

1. See the circled raw scores in the appropriate Norms Conversion Table to find the *Standard Score*, *Percentile Rank*, and *Classification* for each scale.
2. *Individual's Average:* Sum the CEFI Adult Scales' standard scores and divide the total by nine. Round to one decimal place.
3. *Difference from Individual's Average:* Subtract the Individual's Average from the standard score for each CEFI Adult Scale. Retain the positive and negative signs.
4. Determine if *Differences from Average* are *Statistically Significant* (see Table 3.4 in chapter 3).
5. Determine if each CEFI Adult Scale is an *Executive Function Strength* (standard score is greater than 109 and significantly higher than Individual's Average), or an *Executive Function Weakness* (standard score is less than 90 and significantly lower than the Individual's Average).
6. *90%/95% Confidence Intervals:* Locate values in appendix B of the *CEFI Adult Technical Manual*.

| Full Scale | Standard Score | 90%/95% (circle one) Confidence Interval | | Percentile Rank | Classification |
|---|---|---|---|---|---|
| | | _____ to _____ | | | |

| CEFI Adult Scales | Standard Score | Difference from Average | Statistically Significant? (Yes/No) | Executive Function Strength/Weakness | 90/95% (circle one) Confidence Interval | Percentile Rank | Classification |
|---|---|---|---|---|---|---|---|
| Attention (AT) | | | | | _____ to _____ | | |
| Emotion Regulation (ER) | | | | | _____ to _____ | | |
| Flexibility (FX) | | | | | _____ to _____ | | |
| Inhibitory Control (IC) | | | | | _____ to _____ | | |
| Initiation (IT) | | | | | _____ to _____ | | |
| Organization (OG) | | | | | _____ to _____ | | |
| Planning (PL) | | | | | _____ to _____ | | |
| Self-Monitoring (SM) | | | | | _____ to _____ | | |
| Working Memory (WM) | | | | | _____ to _____ | | |
| Sum of Standard Scores | ÷ 9 | | Individual's Average | | | | |

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# Interpretive Report



conclusions

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# Interpretive Report

# Interpretive Report

# CEFI Adult Online vs Paper

➤ No differences across administration method

Table F.2. Mean Standard Score Differences Between Administration Methods for the CEFI Adult Self-Report Form

| Scale | Obt. r | Cor. r | Online | | Paper-and-Pencil | | d-ratio | F (1, 53) | p |
|---|---|---|---|---|---|---|---|---|---|
| | | | M | SD | M | SD | | | |
| Full Scale | .99 | .99 | 102.9 | 12.4 | 102.7 | 12.6 | -0.01 | 0.40 | .531 |
| Attention | .90 | .96 | 101.9 | 11.3 | 101.7 | 12.0 | -0.02 | 0.07 | .793 |
| Emotion Regulation | .97 | .98 | 103.8 | 13.7 | 103.8 | 13.8 | 0.00 | 0.01 | .938 |
| Flexibility | .98 | .99 | 103.1 | 13.3 | 103.3 | 13.5 | 0.01 | 0.29 | .590 |
| Inhibitory Control | .97 | .98 | 101.5 | 13.5 | 101.2 | 13.6 | -0.03 | 0.65 | .423 |
| Initiation | .89 | .95 | 102.4 | 12.3 | 102.1 | 11.9 | -0.03 | 0.19 | .662 |
| Organization | .95 | .98 | 102.2 | 11.6 | 102.2 | 11.0 | 0.00 | 0.01 | .942 |
| Planning | .95 | .98 | 102.7 | 11.6 | 102.3 | 12.1 | -0.04 | 0.68 | .412 |
| Self-Monitoring | .98 | .99 | 101.9 | 12.2 | 101.9 | 12.2 | 0.00 | 0.03 | .856 |
| Working Memory | .98 | .99 | 102.6 | 13.1 | 102.3 | 13.4 | -0.03 | 0.65 | .424 |

Note. Obt. r = Obtained correlation, Cor. r = Corrected correlation. All correlations significant, $p < .001$. $N = 52$. Guidelines for interpreting Cohen's d are as follows: small effect size = 0.2, medium effect size = 0.5, and large effect size = 0.8. Positive d-ratio values indicate higher scores for the paper-and-pencil administration.

conclusions    97

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# CEFI Adult Race & Ethnicity

Table 8.9. CEFI Adult Full Scale Score Comparison Between Black and White Groups

| Form | | Black Sample | Matched White Sample | d-ratio | F (df) | p |
|---|---|---|---|---|---|---|
| Self-Report Form | M | 100.5 | 98.5 | 0.13 | 1.56 (1,352) | .212 |
| | SD | 16.2 | 14.4 | | | |
| | N | 177 | 177 | | | |
| Observer Form | M | 99.5 | 99.7 | -0.01 | 0.02 (1,362) | .892 |
| | SD | 15.5 | 13.9 | | | |
| | N | 182 | 182 | | | |

Note. Guidelines for interpreting Cohen's d are as follows: small effect size = 0.2; medium effect size = 0.5; large effect size = 0.8. Positive d-ratio values indicate higher scores in the Black sample.

Table 8.10. CEFI Adult Full Scale Score Comparison Between Hispanic and White Groups

| Form | | Hispanic Sample | Matched White Sample | d-ratio | F (df) | p |
|---|---|---|---|---|---|---|
| Self-Report Form | M | 101.0 | 99.4 | 0.10 | 0.95 (1,346) | .330 |
| | SD | 16.8 | 13.6 | | | |
| | N | 174 | 174 | | | |
| Observer Form | M | 98.9 | 100.6 | -0.12 | 1.29 (1,358) | .258 |
| | SD | 14.7 | 15.0 | | | |
| | N | 180 | 180 | | | |

Note. Guidelines for interpreting Cohen's d are as follows: small effect size = 0.2; medium effect size = 0.5; large effect size = 0.8. Positive d-ratio values indicate higher scores in the Hispanic sample.

Note: . Samples of Black and Hispanic individuals from the normative sample were compared to samples of White individuals from the normative sample matched on age, gender, U.S. geographical region, and education level.

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## Core Group Activity

- **O**rganizer – Have the group discuss this question: "How do you feel about what was just presented?"
- **C**oach – guide the discussion so that the group arrives at an answer to the question
- **R**eporter – record and report to the group
- **E**nergizer – keep the discussion going !



conclusions 99

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# INTERVENTIONS FOR EF BEHAVIORS

conclusions 100

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# www.efintheclassroom.net

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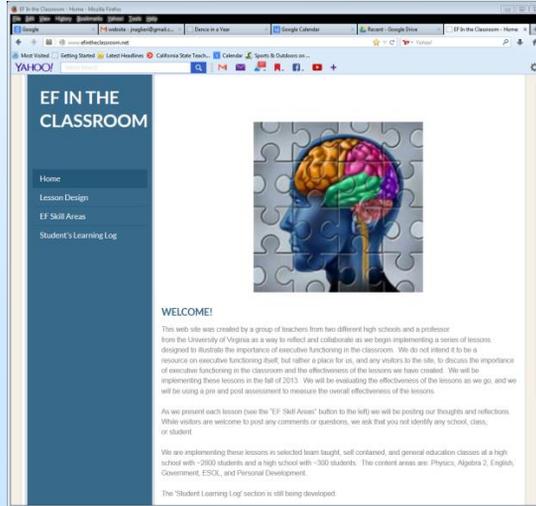


conclusions    101

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# Structure of the lessons

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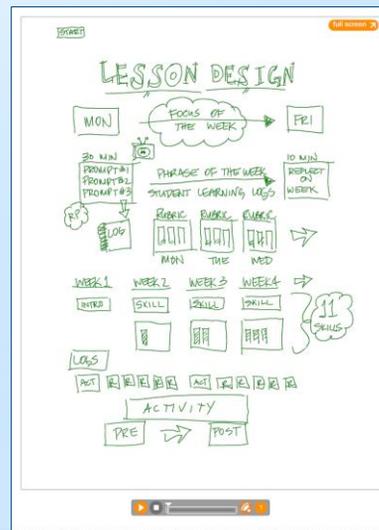


conclusions    102

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# Interventions for EF Behaviors

➢ **CEFI Scales**
- Attention
- Emotion Regulation
- Flexibility
- Inhibitory Control
- Initiation
- Organization
- Panning
- Self-Monitoring
- Working Memory

➢ **Efintheclassroom.net**
- Sustained Attention
- Emotional Control
- Cognitive Flexibility
- Response Inhibition
- Task Initiation
- Organization
- Planning
- Response Inhibition
- Working Memory
- Goal Directed Persistence

conclusions    103

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# Other Lessons from www.efintheclassroom.net

Working Memory
Lesson
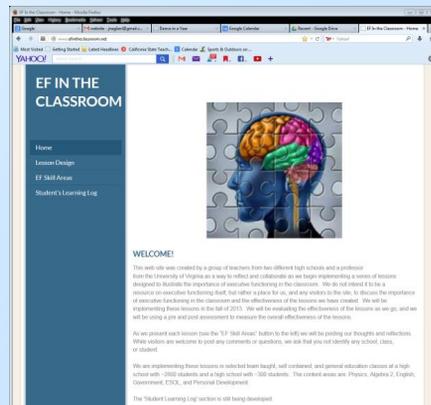


conclusions    104

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# Interventions for EF Behaviors

- ➢ CEFI Scales
  - ▪ Attention
  - ▪ Emotion Regulation
  - ▪ Flexibility
  - ▪ Inhibitory Control
  - ▪ Initiation
  - ▪ Organization
  - ▪ Panning
  - ▪ Self-Monitoring
  - ▪ Working Memory

- ➢ Efintheclassroom.net
  - ▪ Sustained Attention
  - ▪ Emotional Control
  - ▪ Cognitive Flexibility
  - ▪ Response Inhibition
  - ▪ Task Initiation
  - ▪ Organization
  - ▪ Planning
  - ▪ Response Inhibition
  - ▪ Working Memory
  - ▪ Goal Directed Persistence

conclusions

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# What is Working Memory

- ➢ Georgiou, Das, and Hayward (2008) described *working memory* as the capacity of the individual to store information for a short period of time and manipulate it using a phonological loop and visual–spatial sketchpad (Baddeley & Hitch, 1974)
- ➢ The *visual–spatial sketchpad* is described as a mental image of visual and spatial features (Engle & Conway, 1998)
- ➢ The *phonological loop* refers to retention of information from speech-based systems that are particularly important when order of information is required (Engle & Conway, 1998)

conclusions

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## Working Memory Game

➢ You will see a series of words presented at 2 per second. The words are from two different categories. For example, Man - Hammer - Boat - Woman, would be organized into Man and Woman (people), Hammer and Saw (tools)

➢ When you see the STOP sign, that is the time for you will write the words down in two columns.

conclusions

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# Ready Trial 1

**START** →

conclusions

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conclusions

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STOP
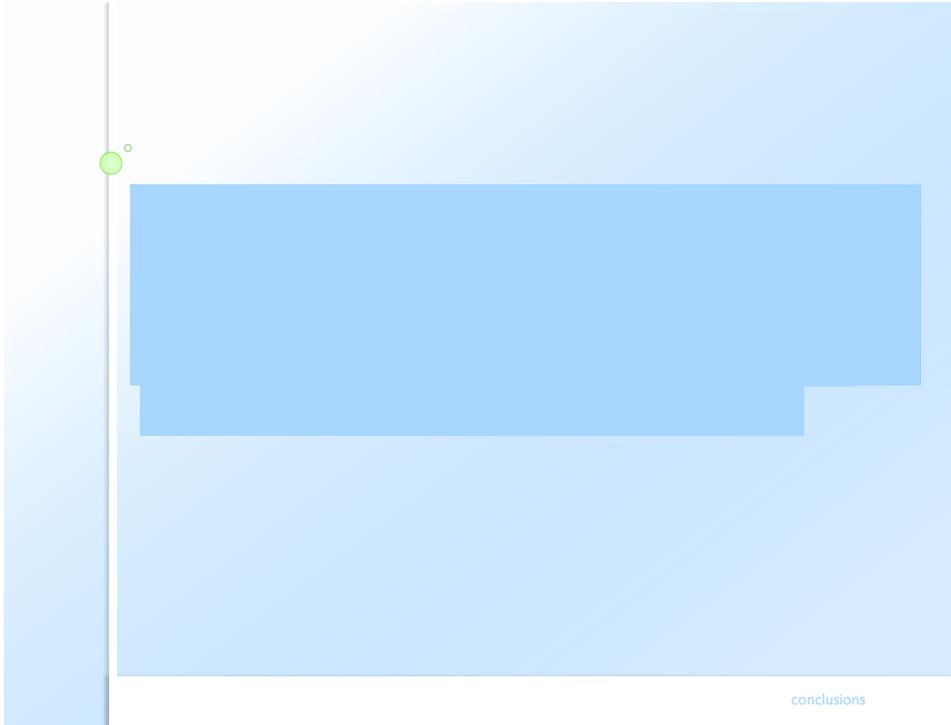
**Put the words in groups.**
**Write them down.**

conclusions

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**Next Item:**
**Put the words in SOME**
**NUMBER of groups.**

conclusions

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# Ready
# Trial 2

**START**

conclusions

112

113



**Put the words into groups. Write them down.**

114

## Let's Take a Mindful Moment or Brain Break (or Syn-nap)

The brain needs time process!

➢ **Stretch**
➢ Cross Laterals
➢ Walk and Talk
➢ Energizers
➢ Relaxers

conclusions   115

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## Presentation Outline

➢Comprehensive Model of EF
  • Historical Perspective and Definitions
➢EF as Behavior
➢EF as an Ability (an intelligence)
➢EF as Social Emotional Skills
➢EF and Academic 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
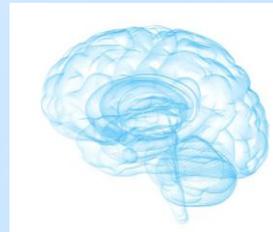
conclusions   116

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## 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  117

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## Cognition or Knowledge?

➤ What does the student have to **know** to complete a task?

• This is dependent on *instruction*

➤ How does the student have to **think** to complete a task?

• This is dependent on the *brain – PASS*

I know that!

I need a plan!

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# A Theory of Learning

**28** Cognitive Assessment System: Redefining Intelligence From a Neuropsychological Perspective

*Jack A. Naglieri and Tulio M. Otero*
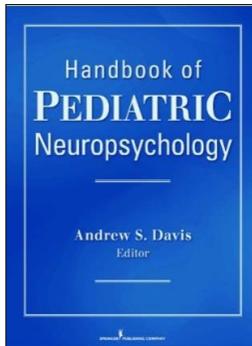
Handbook of PEDIATRIC Neuropsychology

Andrew S. Davis
Editor

an important field
mental, psychiat-
rs. By addressing
l factors intrinsic
reasoning, plan-
acities, clinicians
dren with a vari-
mental disorders.
gated by neurop-
pects of an indi-
social, and motor
used by neurop-
derive inferences
Technology, such
as magnetic resonance imaging (MRI), functional MRI
(FMRI), positron emission tomography, computerized
tomography, and diffusion tensor imaging, has reduced
the need for neuropsychological tests to localize and
access brain damage. Neuropsychological tests, however,

Such tools sho
cesses necessa
also provide
tions and addr

**FROM NEUR
TO ASSESSM**

Luria's theore
perhaps one o
2008). Luria c
of brain–beha
orders that the
the brain, the f
syndromes an
and clinical m
theoretical fo
lated in works
1980) and *The Working Brain* (1973). Luria viewed the brain
as a functional mosaic, the parts of which interact in dif-

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**

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# 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.

**Planning ability**

**Simultaneous processing Ability**

**Attention**

**Successive Processing Ability**
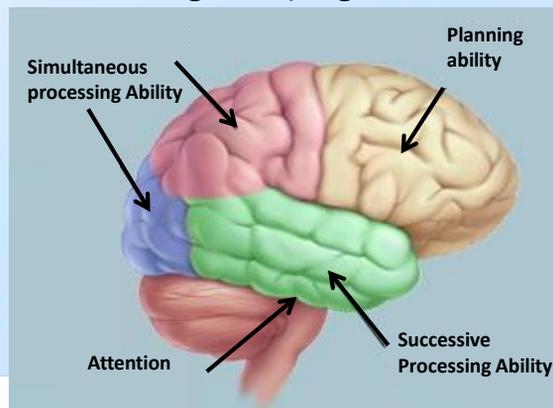
120

# IQ defined by BRAIN function

➢ **PASS** theory is a modern way to define 'ability' (AKA – intelligence)

**EF**

➢ **P**lanning = THINKING ABOUT THINKING

➢ **A**ttention = BEING ALERT

➢ **S**imultaneous = GETTING THE BIG PICTURE

➢ **S**uccessive = FOLLOWING A SEQUENCE

conclusions    121

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# The Brain and Intelligence as PASS

PASS: A neuropsychological approach to intelligence based on three Functional Units described by A. R. Luria (1972)



**Planning**
The "How To", cognitive control, use of processes and knowledge, intentionality

**Attention**
Focused cognitive activity and resistance to distraction

**Simultaneous & Successive Processing**
Two forms of processing information
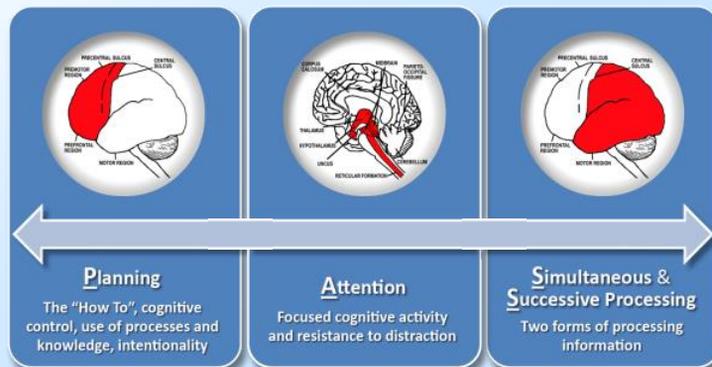
122

conclusions

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# 100 Years of Intelligence and IQ
## http://www.jacknaglieri.com/cas2.html
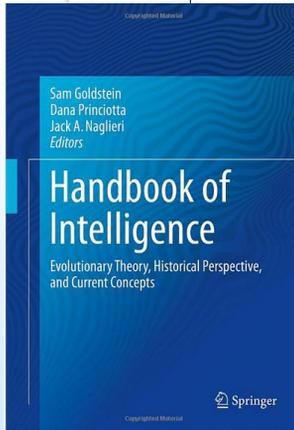
**Hundred Years of Intelligence Testing: Moving from Traditional IQ to Second-Generation Intelligence Tests**

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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

Sam Goldstein
Dana Princiotta
Jack A. Naglieri
*Editors*

# Handbook of Intelligence

Evolutionary Theory, Historical Perspective, and Current Concepts

🕿 Springer

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 Psychological Association. Yerkes made an

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).

The Alpha tests were designed to measure

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# CAS2 for  (Ages 5-18 yrs.)
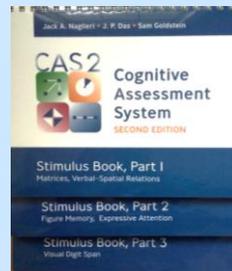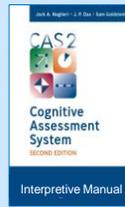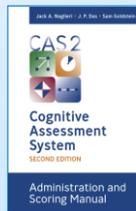
conclusions

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# CAS2 (Ages 5-18 yrs.)



conclusions

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# CAS2

- CAS2 Yields PASS and Full Scale score but ALSO
- Executive Function is the combination of 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.

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# 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

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# Planned Codes 1
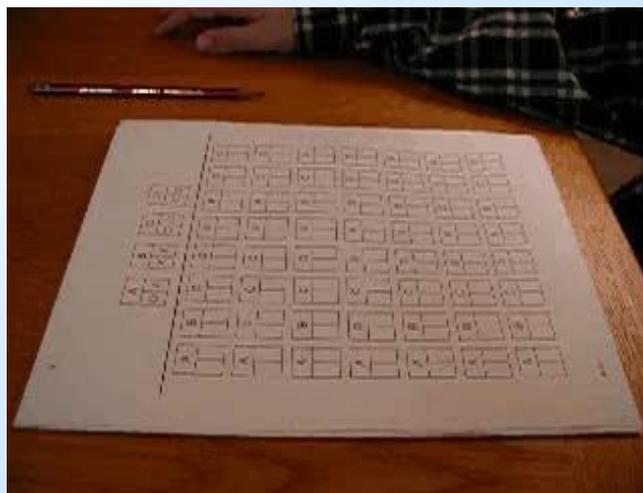


conclusions

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# Planned Codes Page 2

129
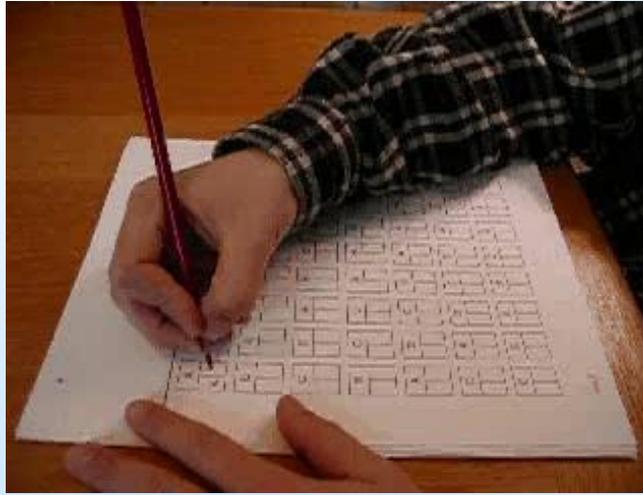
130

# Math Strategies

**Note to the Teacher:**
When we teach children skills by helping them use strategies and plans for learning, we are teaching both knowledge and processing. Both are important.



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# **P**ASS Theory: Planning

Planning
- Evaluate a task
- Select or develop a strategy to approach a task
- Monitor progress during the task
- Develop new strategies when necessary

Examples of classroom problems related to Planning
- Using the same strategy even if it is not effective
- Struggling with how to complete tasks
- Not monitoring progress during a task
- Misinterpretation of what is read

Naglieri, J. and Pickering, E., Helping Children Learn, 2003

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**POOR PLANNING**
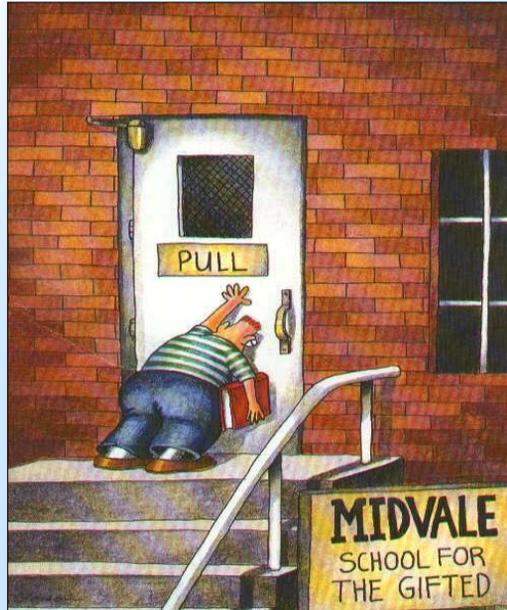
conclusions  133

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# 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  134

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## Antwerp train Station (2009)

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## 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)

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## **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)

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## **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?

Like the Seinfeld video

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# 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

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# EF Instruction

➢We use posters like this one to remind the students of the importance of PLANNING
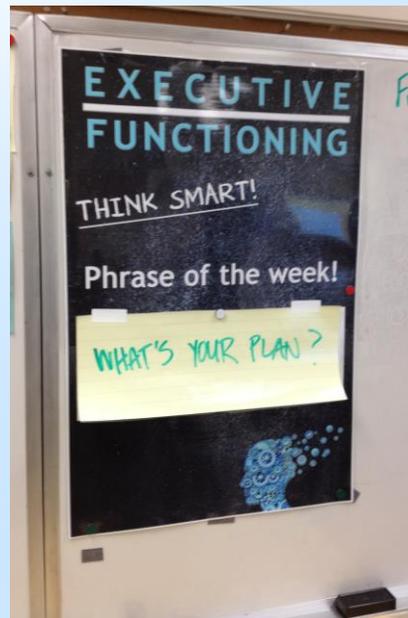
140

## 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.

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# 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.

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# 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!

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# 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 |
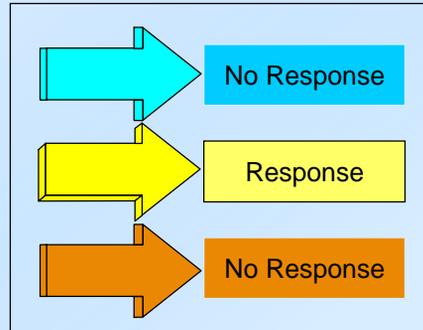
conclusions   145

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**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   146

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**BLUE!**
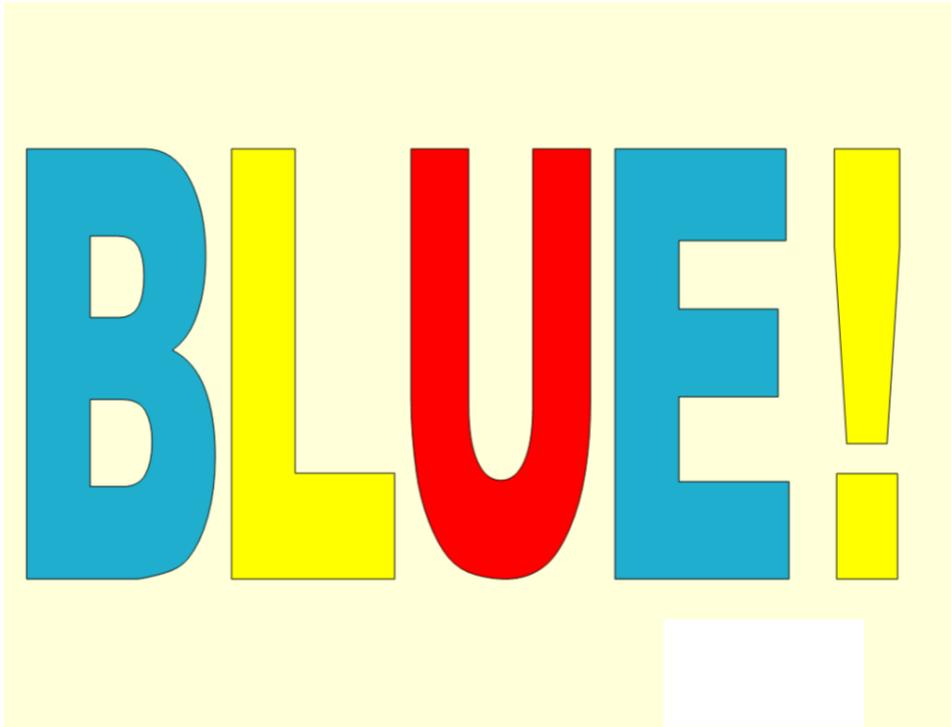
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## Expressive Attention - Italiano

| ROSSO | BLU | VERDE | GIALLO |
|---|---|---|---|
| GIALLO | VERDE | ROSSO | BLU |
| ROSSO | GIALLO | GIALLO | VERDE |
| BLU | VERDE | ROSSO | ROSSO |
| VERDE | GIALLO | BLU | GIALLO |

conclusions    148

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# 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    149

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# 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    150

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# P**A**SS Theory: Attention

## Attention

➢ Focus on one thing and ignore others
➢ Resist distractions in the learning environment

Examples of classroom problems related to <u>Attention</u>
· Trouble focusing on what is important
· Difficulty resisting distractions
· Difficulty working on the same task for very long
· Unable to see all the details
· Providing incomplete or partially wrong answers

Naglieri, J. and Pickering, E., Helping Children Learn, 2003

151
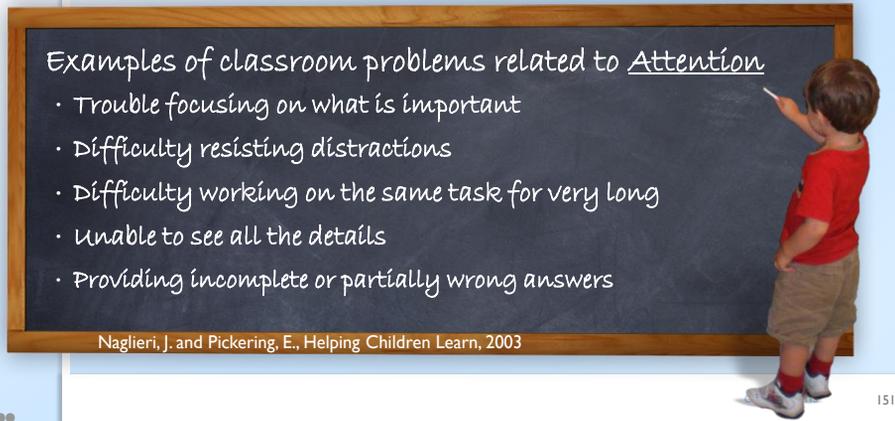
151

# 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     152

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# 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     153

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# Attention Lesson



OK

conclusions     154

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## Core Group Activity

➤ Discuss
- 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..

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## 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

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# 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    157

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# 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

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
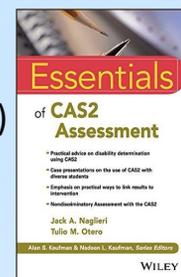
conclusions    158

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## 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**

**Significant Discrepancy**

**HIGH SCORES**
Simultaneous
Successive

**LOW SCORES**
Math Calculation
Written Language
Reading
Comprehension

**LOW SCORES**
CAS2:
Planning, Attention
or Executive
Function

**Consistent Scores**

conclusions

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# 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

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# www.efintheclassroom.net

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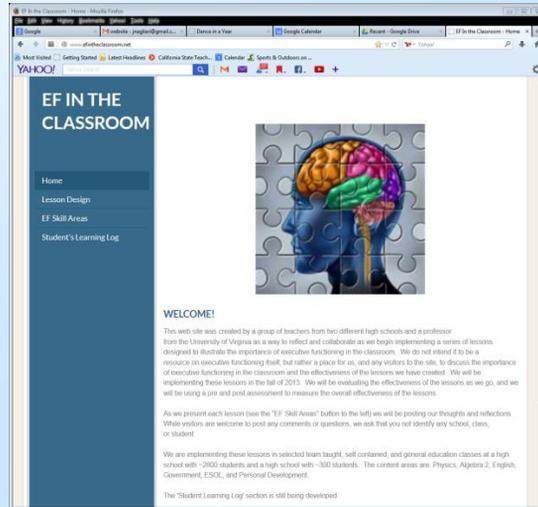


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# Introductory Lesson: "Are you Aware"

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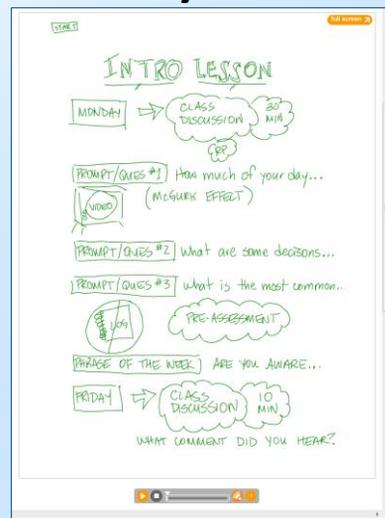


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# Introductory Lesson: "Are you Aware"

conclusions
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# Other Lessons from www.efintheclassroom.net

www.Efintheclassroom.net

Research support?
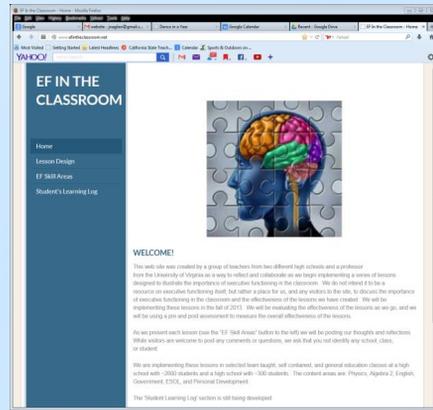
conclusions
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# www.efintheclassroom.net

### 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 165

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# 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 more 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

**166** conclusions

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# 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.

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# 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 Nu... 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 si... when provided the PASS-based cognitive strategy instruction.

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# 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 |
|---|---|---|---|
| Control Group → | Complete math worksheet | Normal Math Instruction | Complete math worksheet |
| Experimental Group → | Complete math worksheet | Planning Facilitation | Complete math worksheet |
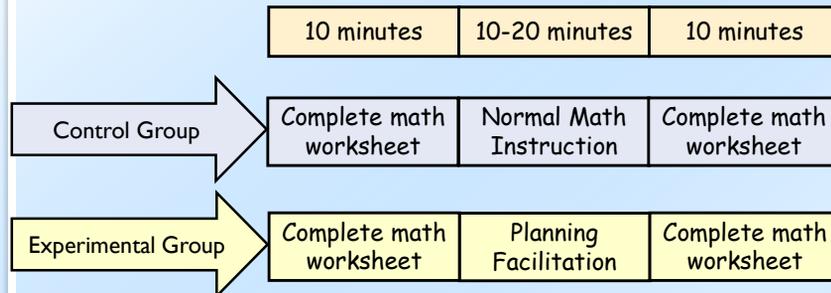
conclusions    169

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# Normal Instruction and Planning Facilitation Sessions

▶ Normal Instruction
- 10 minute math worksheet
- 10 - 20 of math instruction
- 10 minute math worksheet

▶ Planning Facilitation
- 10 minute math worksheet
- 10 minutes of planning facilitation
- 10 minute math worksheet

conclusions    170

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# 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        171

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# 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        172

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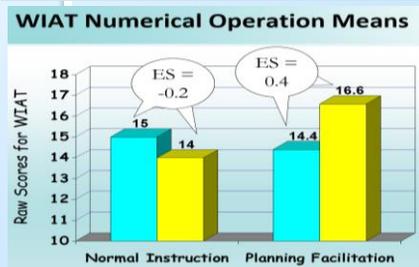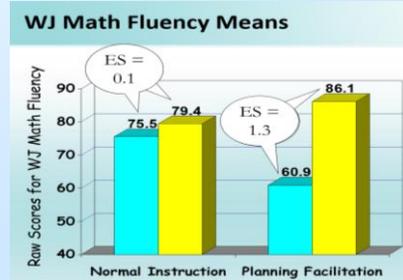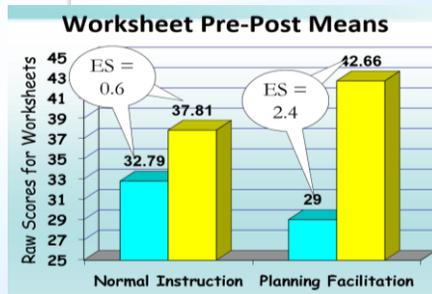
### Worksheet Pre-Post Means



ES = 0.6

ES = 2.4

42.66

37.81

32.79

29

Normal Instruction    Planning Facilitation

Raw Scores for Worksheets

### WJ Math Fluency Means



ES = 0.1

ES = 1.3

86.1

79.4

75.5

60.9

Normal Instruction    Planning Facilitation

Raw Scores for WJ Math Fluency

### WIAT Numerical Operation Means



ES = -0.2

ES = 0.4

16.6

15

14

14.4

Normal Instruction    Planning Facilitation

Raw Scores for WIAT

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

www.jacknaglieri.com

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# Iseman (2005)

➢ Baseline Intervention means by PASS profile

➢ Different response to the same intervention



- LowP
- LowSim
- LowAtt
- LowSuc

Baseline Mean        Intervention Mean
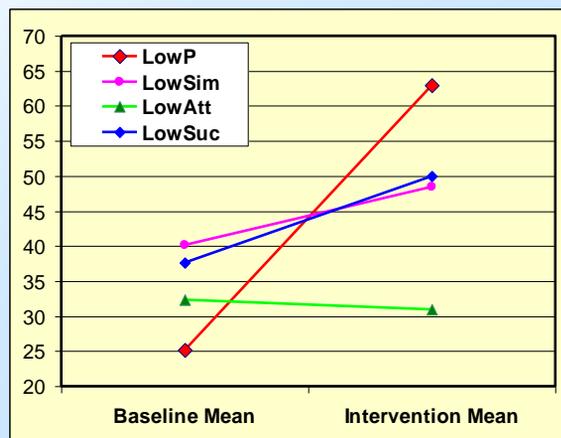
conclusions    174

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# 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   175

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# EF and Reading Comprehension



Journal of Psychoeducational Assessment
2003, 21, 282-289

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   176

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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          177

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# Summary of PASS Intervention Research in Essentials of CAS2



conclusions          178

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# WHAT IS NOT EF IN PASS

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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

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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       181

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# Progressive Matrices
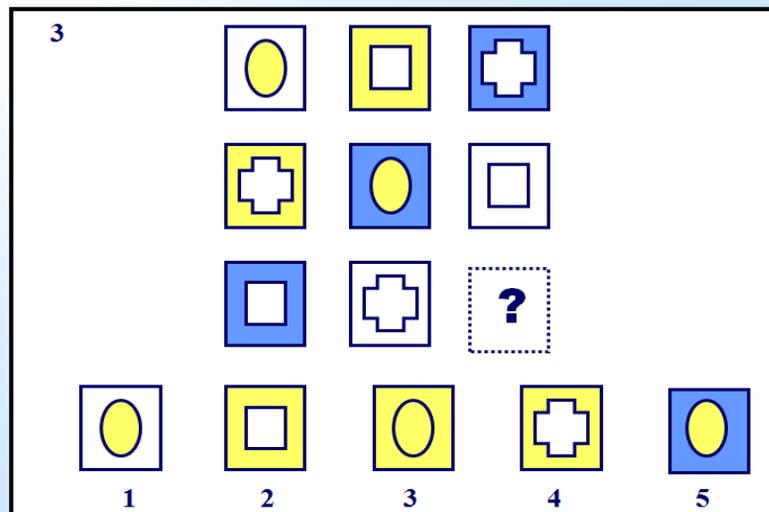


conclusions       182

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# PASS Theory

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

➤ Seeing the whole
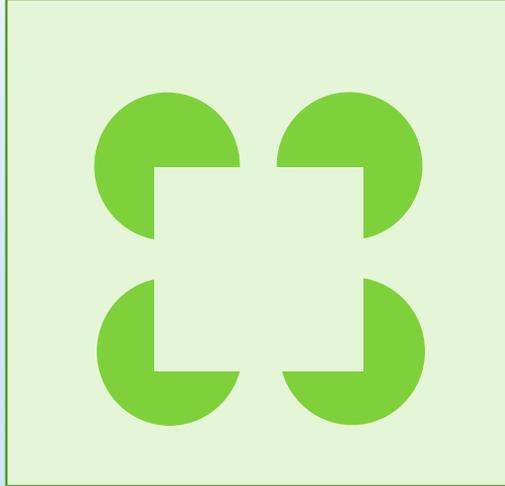
conclusions    183

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# Verbal-Spatial Relations

Which picture shows a boy behind a girl?

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# Numbers from 1 to 100

How can EF be brought to this Work sheet?

Use Simultaneous processing to see that patterns



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# PA**S**S Theory: Simultaneous

## Simultaneous Processing
➤ Relate separate pieces of information into a group
➤ See how parts related to whole
➤ Recognize patterns

Examples of classroom problems related to  Simultaneous Processing
· Difficulty comprehending text
· Difficulty with math word problems
· Trouble recognizing sight words quickly
· Trouble with spatial tasks
· Often miss the overall idea

Naglieri, J. and Pickering, E., Helping Children Learn, 2003

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# 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

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# Use EF
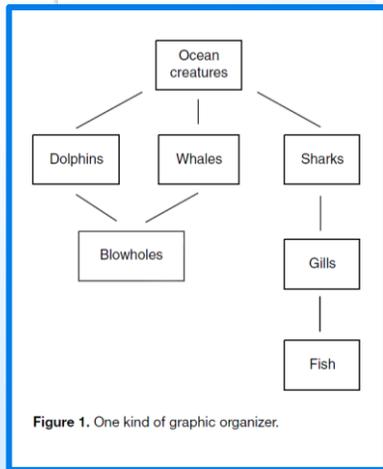


**Figure 1.** One kind of graphic organizer.

## 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.

page 1 of 2

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# Venn Diagram

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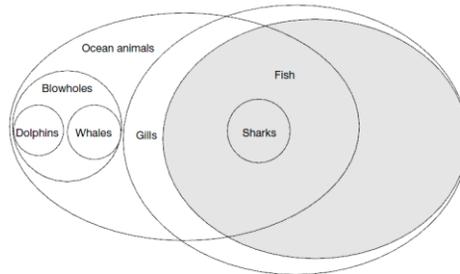


Figure 2. A Venn diagram used as a graphic organizer.

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
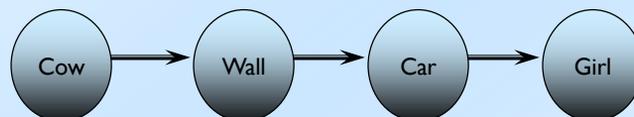


conclusions

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## 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    191

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## Successive

The sequence of the sounds is emphasized in this work sheet
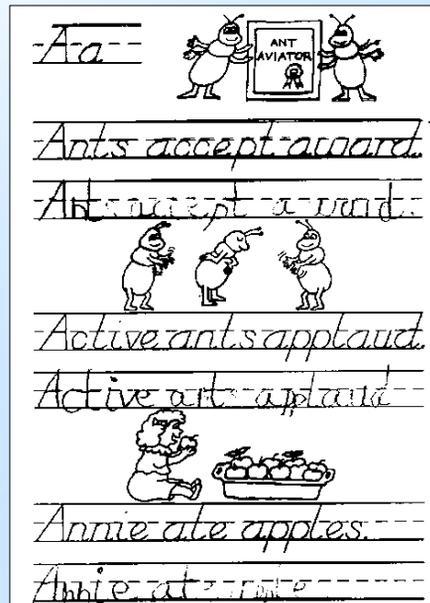


conclusions    192

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## PAS**S**  Theory: Successive

### **Successive**  Processing

➢ Use information in a specific order
➢ Follow instructions presented in sequence

Examples of classroom problems related to  Successive Processing

· Trouble blending sounds to make words

· Difficulty remembering numbers in order

· Reading decoding problems

· Difficulty remembering math facts when they are taught using rote learning (4 + 5 = 9).

Naglieri, J. and Pickering, E., Helping Children Learn, 2003

conclus                                                                      193
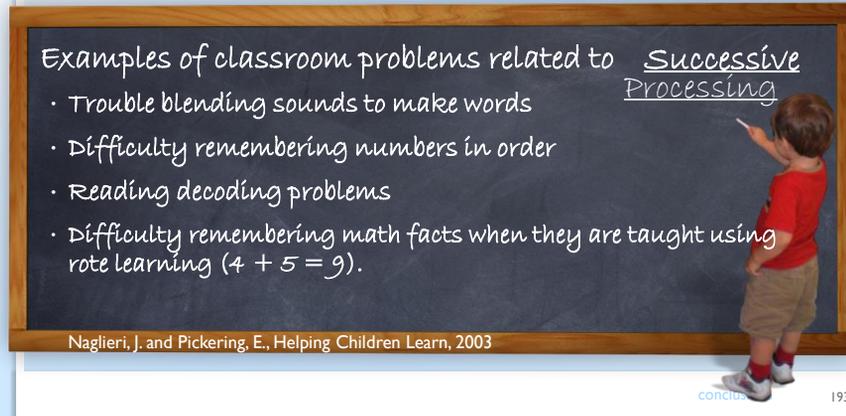
193

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32                                                                Helping Children Learn

## Ben's Problem with Successive Processing

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

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

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## Ben's Problem with Successive processing Ability

**Scores (M = 100, SD = 15)**



EF "Ability" is good but he isn't using this ability to solve problems
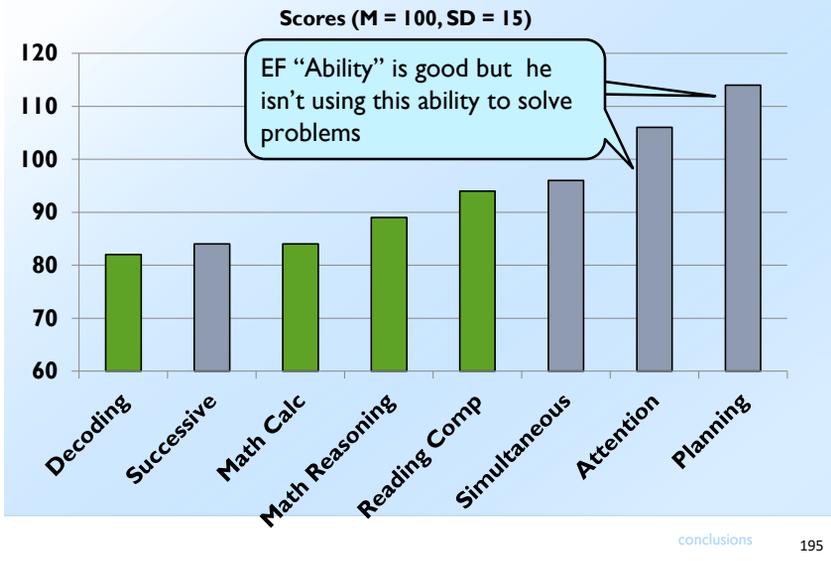
conclusions  195

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## 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  196

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## 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        197

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## 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.
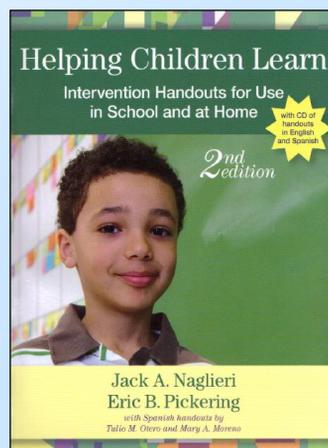


conclusions        198

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# 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!

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# 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.

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# 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.

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# Ben's Problem with Successive Ability

➤Teach him to use strategies

## Chunking for Reading/Decoding

Readin
stand
quence
more r
easily
units fo

## 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 helpf reading as well as spelling.

How

Teache
be rem

Plan

Look at
Find the
Sound

### How to Teach Segmenting Words

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

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## 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          203

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## Want to Learn More… Join us in California July 12-17, 2020



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I02

# Core Group Activity

- **O**rganizer – Have the group discuss this question: "How do you feel about what was just presented?"
- **C**oach – guide the discussion so that the group arrives at an answer to the question
- **R**eporter – record and report to the group
- **E**nergizer – keep the discussion going !



conclusions        205

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# Presentation Outline

➢ Comprehensive Model of EF
  - Historical Perspective and Definitions
➢ EF as Behavior
➢ EF as an Ability (an intelligence)
➢ EF as Social Emotional Skills
➢ EF and Academic 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        206

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## Phineas had Social Emotional deficit

➢ Phineas had profound social emotional problems after his injury to the frontal lobes
➢ Phineas is
- insulting
- impulsively says 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    207

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## 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'

THE **NEW** EXECUTIVE BRAIN

FRONTAL LOBES IN A COMPLEX WORLD

Elkhonon Goldberg, Ph.D.

OXFORD
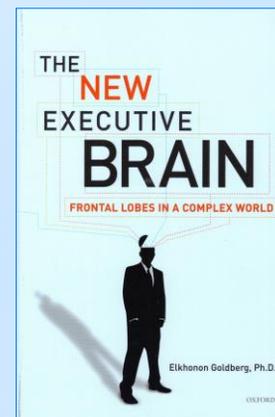
conclusions    208

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## Feiffer & Rattan (2009)

> Provide a collection of papers on the relationship between EF and Emotional Disorders

Emotional Disorders:

A Neuropsychological, Psychopharmacological, and Educational Perspective

EDITED BY
Steven G. Feifer, D.Ed.
and Gurmal Rattan, Ph.D.

www.schoolneuropsychpress.com
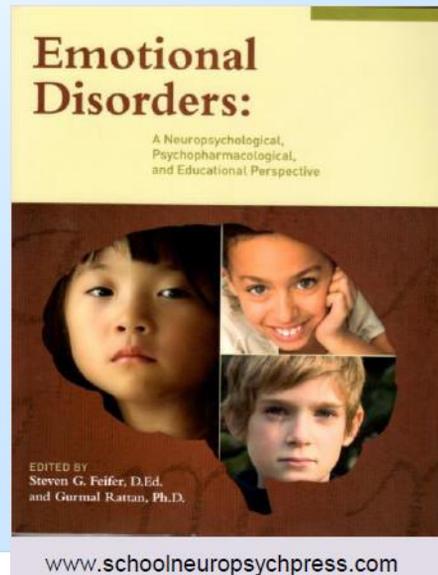
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## Feiffer & Rattan (2009) on EF and Frontal Lobes

**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    210

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# Social Emotional Skills: From Conceptual to Assessment to Instruction

211

# www.casel.org



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## 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.

conclusions

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# Social Emotional Skills

Five key social-emotional skills from CASEL

These are in many state and local standards

**What is Social and Emotional Learning?**

The Collaborative for Academic, Social, and Emotional Learning (CASEL) describes SEL as the process of developing the following five sets of core competencies in the context of safe, caring, well-managed, academically rigorous, and engaging learning environments:

1. **Self-awareness**—being able to accurately assess one's feelings, interests, values, and strengths; maintaining a well-grounded sense of self-confidence

2. **Self-management**—being able to regulate one's emotions to handle stress, control impulses, and persevere in overcoming obstacles; setting and monitoring progress toward personal and academic goals; expressing emotions effectively

3. **Social awareness**—being able to take the perspective of and empathize with others; recognizing and appreciating individual and group similarities and differences; recognizing and using family, school, and community resources

4. **Relationship skills**—being able to establish and maintain healthy and rewarding relationships based on cooperation; resisting inappropriate social pressure; preventing, managing, and resolving interpersonal conflict; seeking help when needed

5. **Responsible decision-making**—being able to make decisions based on consideration of reason, ethical standards, safety concerns, social norms, respect for self and others, and likely consequences of various actions; applying decision-making skills to academic and social situations; contributing to the well-being of one's school and community.[1]

conclusions 214

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# Relationship Between Academic Achievement and Social-Emotional Competence

**% of Elementary Students by PSSA Math and DESSA-mini Categories**

Need: Advanced 8.4, Proficient 24.7, Basic 28.6, Below Basic 38.3
Strength: Advanced 42.9, Proficient 38.2, Basic 12.5, Below Basic 6.4

Legend: Advanced, Proficient, Basic, Below Basic

Y-axis: % of Students
X-axis: DESSA-mini Category

**% of Elementary Students by PSSA Reading and DESSA-mini Categories**

Need: Advanced 1.7, Proficient 21.1, Basic 18.2, Below Basic 59.0
Strength: Advanced 20.1, Proficient 48.9, Basic 15.9, Below Basic 15.2

Legend: Advanced, Proficient, Basic, Below Basic

Y-axis: % of Students
X-axis: DESSA-mini Category

conclusions

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# Relationship Between Academic Achievement and Social-Emotional Competence

**% of Middle School Students by PSSA Math and DESSA-mini Categories**

Need: Advanced 9.6, Proficient 27.1, Basic 24.7, Below Basic 38.6
Strength: Advanced 42.3, Proficient 28.2, Basic 19.0, Below Basic 10.6

Legend: Advanced, Proficient, Basic, Below Basic

Y-axis: % of Students
X-axis: DESSA-mini Category

**% of Middle School Students by PSSA Reading and DESSA-mini Categories**

Need: Advanced 5.5, Proficient 20.9, Basic 23.3, Below Basic 50.3
Strength: Advanced 34.5, Proficient 35.2, Basic 16.2, Below Basic 14.1

Legend: Advanced, Proficient, Basic, Below Basic

Y-axis: % of Students
X-axis: DESSA-mini Category

conclusions

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## Close Reading:  What's SEL got to do with it? (Chicago Public Schools)

Close Reading is a set of strategies that allow students to productively struggle with complex text in ways that accelerate and deepen their learning.

| Elements of Close Reading Include: | Self-Management skills required | Relationship skills required | Responsible Decision Making skills required |
|---|---|---|---|
| Individual reading of complex text | • Self control<br>• Self motivation<br>• Perspective Taking | n/a | n/a |
| Group exploration of complex text | • Self control<br>• Self motivation<br>• Perspective Taking<br>• Setting and Achieving goals | • Communicating clearly<br>• Working collaboratively<br>• Resolving conflicts<br>• Seeking help | • Considering the well-being of self and others<br>• Recognizing one's responsibility to behave ethically<br>• Evaluating realistic consequences of various actions |
| Student-led discussion and analysis of text | • Regulating one's emotions<br>• Self control<br>• Self motivation<br>• Perspective Taking<br>• Setting and Achieving goals | • Communicating clearly<br>• Working collaboratively<br>• Resolving conflicts<br>• Seeking help | • Considering the well-being of self and others<br>• Recognizing one's responsibility to behave ethically<br>• Basing decisions on safety, social and ethical considerations<br>• Evaluating realistic consequences of various actions |

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## rd Graders SEC (N=148)

Variance Explained

76%
SBA Reading
24%
Low Income
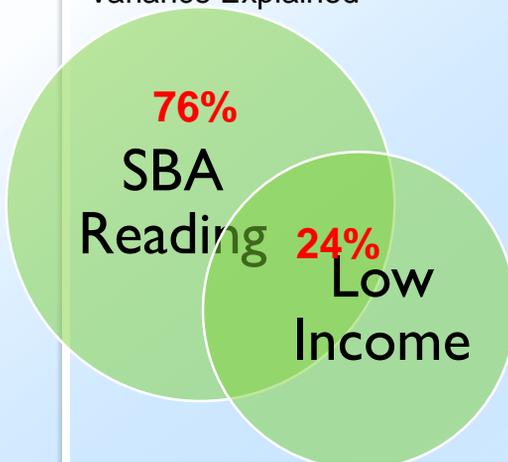
- Economic disadvantage explains approx 24% of SBA variance.

- Low income students predicted to average 80 pts lower on the SBA (1 SD).

conclusions

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## rd Graders SEC (N=148)

Variance Explained

**53%**
SBA Reading

**22%**    **9%**

**16%**

SEC    Low Income
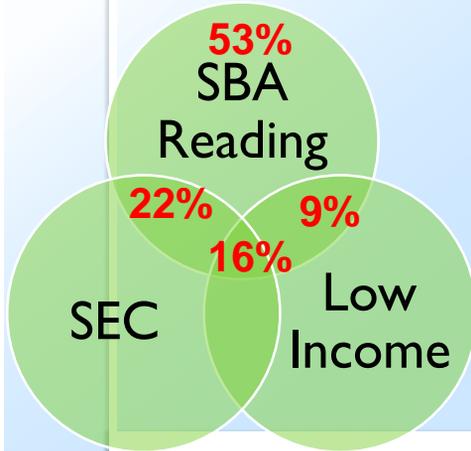
- When DESSA scores are added, an additional 22% of SBA variance is uniquely predicted.
- Together, 47% of SBA variance is predictable from economic disadvantage and DESSA.
- Impact of poverty reduced to predicting an average of 50 points less on SBA.
- Students with SEC 1 SD above the mean predicted to average 40 pts higher on the SBA, controlling poverty    conclusions

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## Same Skills Needed in the Workplace

➢Secretary's Commission on Achieving Necessary Skills (SCANS) Report -1999

- Skills needed by the workforce
- 50% (8 of 16) were social and emotional skills
  - Decision-making
  - Problem-solving
  - Personal responsibility
  - Sociability
  - Self-management
  - Integrity

conclusions

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## Prediction of Challenging Behaviors

➤ Allentown Social Emotional Learning Initiative
- approximately 12,000 students K-8th grade (ages 6-16)

➤ All students screened in October with the DESSA-Mini
- 9,248 students

➤ Random 5 students/classroom assessed in October with DESSA
- 1,960 students

➤ Analysis Sample (n=1875)

conclusions

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## Sample Demographics

➤ Gender
- 47% female

➤ Race/Ethnicity
- 65% Hispanic/Latino
- 17% Black/African American
- 14% White/European American
- 4% multi/other races (e.g., Asian/Pacific Islander American, Native American)

conclusions

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## The Result

Students who were identified as having a Need for SEL Instruction in October were 4.5 times more likely to have a record of serious infraction by the end of the academic year as compared to those who were not identified as having a Need of Instruction in October ($p<0.001$)

conclusions

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## 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
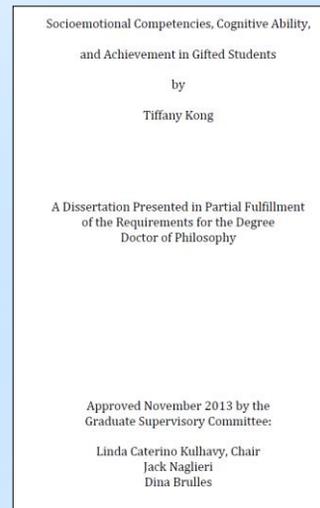
conclusions          224

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## Ability, Social Emotional & Skills

Series 1



| | | | | | |
|---|---|---|---|---|---|
| ■ Verbal IQ | ■ Quantitative IQ | ■ Nonverbal IQ | ■ CogAT Tot | ■ Social Emotional | ■ SAT10 |

conclusions    225
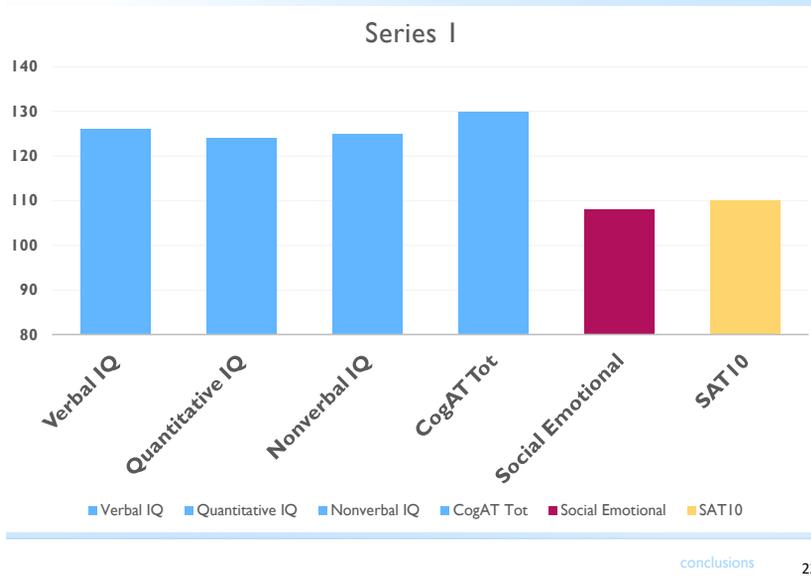
225

## 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    226

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## 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.

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## 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  228

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# http://www.centerforresilientchildren.org/
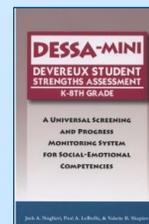
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# Assessment of Social Emotional Skills with the DESSA
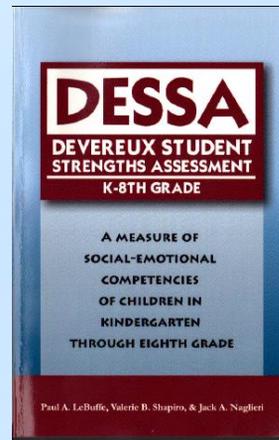
conclusions   230

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# The DESSA

➢ Based on resilience theory & SEL principles described by CASEL

- Identify social-emotional strengths and needs of elementary and middle school children (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    231

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# DESSA Norms

➢ 2,475 children, grades K-8

➢ All 50 states included in sample

➢ Representative of US Population

**TABLE 2.1**

**DESSA Standardization Sample Characteristics by Grade and Gender**

| | Males | | Females | | Total | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Kindergarten | 256 | 52.0 | 236 | 48.0 | 492 | 19.8 |
| 1st Grade | 186 | 50.0 | 186 | 50.0 | 372 | 15.1 |
| 2nd Grade | 161 | 50.0 | 161 | 50.0 | 322 | 13.1 |
| 3rd Grade | 160 | 50.0 | 160 | 50.0 | 320 | 12.9 |
| 4th Grade | 134 | 47.5 | 148 | 52.5 | 282 | 11.4 |
| 5th Grade | 138 | 49.1 | 143 | 50.9 | 281 | 11.3 |
| 6th Grade | 88 | 48.9 | 92 | 51.1 | 180 | 7.2 |
| 7th Grade | 57 | 46.7 | 65 | 53.3 | 122 | 4.9 |
| 8th Grade | 46 | 44.2 | 58 | 55.8 | 104 | 4.2 |
| Total Sample | 1,226 | 49.5 | 1,249 | 50.5 | 2,475 | |
| U.S. % | | 51.2 | | 48.8 | | |

conclusions    232

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## CASEL    and    DESSA Scales

| 1 | **Self-awareness**—being able to ac and strengths; maintaining a well- | **Self Awareness** |
| 2 | **Self-management**—being able to control impulses, and persevere progress toward personal and ac | **Self Management** |
| 3 | **Social awareness**—being able to others; recognizing and appreciat differences; recognizing and usin | **Social Awareness** |
| 4 | **Relationship skills**—being able t relationships based on cooperatic preventing, managing, and resolv needed | **Relationship Skills** |
| 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] | **Decision Making** |

**Goal Directed Behavior**

**Social Emotional Composite**

**Personal Responsibility**

**Optimistic Thinking**

conclusions    233

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## DESSA Strategies

- Provided as part of Apperson EvoSEL assessment platform
- 5 different levels of strategies for each of the eight DESSA scales
  – Teacher Reflection & Action
  – Universal
  – Group
  – Individual Student
  – Home
- 3 different age groupings: primary, intermediate elementary, and middle school

conclusions

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# Interventions for DESSA



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## 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    237

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# Core Group Activity

- **O**rganizer – Have the group discuss this question: "How do you feel about what was just presented?"
- **C**oach – guide the discussion so that the group arrives at an answer to the question
- **R**eporter – record and report to the group
- **E**nergizer – keep the discussion going !



conclusions    238

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# Presentation Outline

➢Comprehensive Model of EF
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➢EF and Academic 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        239

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# CAS-2 Planning & Reading Comprehension

➢**Planning** – provides the ability to apply knowledge, use a strategy, and self-monitor performance while working toward a solution.
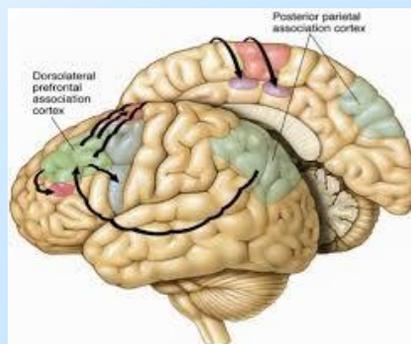


➢**Planning & Reading -** read with a specific question or purpose in mind when seeking specific information. In other words, plan a strategy!!

conclusions        0

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# Far Word Recall: Word **Planning**

❏ PK–Grade 2

| | Item |
|---|---|
| 1. | chain |
| 2. | drum |
| 3. | pepper |
| 4. | wheel |
| 5. | guitar |
| 6. | celery |
| 7. | brake |
| 8. | trumpet |
| 9. | tomato |

**Trial 2: Bicycle words**

| | | | Intrusions |
|---|---|---|---|
| chain | ❏ | R | |
| wheel | ❏ | R | |
| brake | ❏ | R | |
| 3rd+ handlebars | ❏ | R | |

**Trial 2: Musical instruments**

| | | | Intrusions |
|---|---|---|---|
| drum | ❏ | R | |
| guitar | ❏ | R | |
| trumpet | ❏ | R | |
| 3rd+ piano | ❏ | R | |

❏ Grades 3+

| | Item |
|---|---|
| 1. | chain |
| 2. | drum |
| 3. | pepper |
| 4. | wheel |
| 5. | guitar |
| 6. | celery |
| 7. | brake |
| 8. | trumpet |
| 9. | tomato |
| 10. | handlebars |
| 11. | piano |
| 12. | carrot |

**Trial 2: Fruits and vegetables**

| | | | Intrusions |
|---|---|---|---|
| pepper | ❏ | R | |
| celery | ❏ | R | |
| tomato | ❏ | R | |
| 3rd+ carrot | ❏ | R | |

**Trial 2 subtotals**

| | | |
|---|---|---|
| | | |
| Number correct | Repetitions | Intrusions |

To calculate the Word Recall total, transfer the Trial 1 and Trial 2 subtotals to the appropriate spaces below. Sum the number correct subtotals and record this value in the space provided.

| | | | |
|---|---|---|---|
| Trial 1 subtotals | | | |
| Trial 2 subtotals | + | | |
| Word Recall (WR) total | = | Repetitions | Intrusions |
| | Number correct | | |

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---

# Silent Reading Fluency:
## Text **Planning**

➢ 2 passages and sets of comprehension questions based on grade level; 60 seconds to read each passage
- Story is removed before asking questions.
- 4 questions are literal from story **(Text Attention)**
- 4 questions are inferential from story **(Text Planning)**

conclusions  2

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## How to Pair Far & CAS2

➤**CAS2 -** determine if there is a cognitive processing weakness (i.e. **Planning**) and whether that particular weakness directly impacts the academic skill in question (Reading Comprehension) on the FAR.

➤**Far:** The **Silent Reading Fluency** has individual stories followed by sets of questions. The story is removed, and followed by 4 literal and 4 inferential questions. Pair with **Word Recall to** determine the extent of poor planning at both the word and text level.

**Poor Planning (CAS-2) + Poor Comprehension Index (FAR) = SLD in Reading Comprehension**

conclusions     3

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# Topical Outline

➤ Introduction to Traditional IQ
➤ IDEA and SLD
➤ A neuropsychological approach called PASS used to define "basic psychological process"
   • Using CAS2, FAR and FAM to identify SLD according to IDEA
➤ Which ability test to use?
➤ Which achievement test to use?
➤ Measure PASS and specific academic skills (FAR)
➤ Case studies

conclusions     4

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# Rowan  4ᵗʰ grade: ADHD & Reading

| CAS-2 | COMPOSITE SCORE | RANGE | PERCENTILE RANK |
|---|---|---|---|
| **Planning:**  the ability to apply a strategy, and self-monitor and self- correct performance while working toward a solution. | **85** | **Below Average** | **16%** |
| **Attention:** the ability to selectively focus on a stimulus while inhibiting responses from competing stimuli. | **77** | **Poor** | **6%** |
| *Simultaneous Processing-* is the ability to reason and problem solve by integrating separate elements into a conceptual whole, and often requires strong visual-spatial problem solving skills. | **105** | **Average** | **63%** |
| *Successive Processing-* is the ability to put information into a serial order or particular sequence. | **100** | **Average** | **50%** |
| **CAS-2 COMPOSITE SCORE** | **87** | **Below Average** | **18%** |

5

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# Rowan  4ᵗʰ grade: ADHD & Reading

| FAR COMPREHENSION INDEX | Score | Percentile | Descriptor |
|---|---|---|---|
| **Semantic Concepts–** a multiple choice test requiring the student to select the correct antonym or synonym of a target word. | 95 | 37% | Average |
| **Word Recall –** requires the student to repeat back a list of words over a series of two trials.  The second trial requires the student to recall a word from a selected list. | 82 | 11% | Below Average |
| **Morphological Processing –** a multiple choice test requiring students to choose the correct prefix, suffix, or stem that best completes an incomplete target word. | 90 | 25% | Average |
| **Silent Reading Fluency –** requires the student to silently read a passage, and then answer a series of literal and inferential questions about the story.  Reading rate is also recorded as well. | 75 | 5% | Moderately Below Average |
| **FAR COMPREHENSION INDEX** | **84+/-8** | **14%** | **Below Average** |
| **WIAT III Reading Comprehension** | 96 | 39% | Average |

conclusions   6

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# SLD Eligibility

➢Discrepancy/Consistency Method (Naglieri & Otero, 2017)

- is based on theoretically defined measures of neurocognitive processes rather than traditional IQ achievement discrepancy
- and combined with academic test scores to form a Pattern of Strengths and Weaknesses

**NASP 2018 Symposium**                conclusions    247

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# Discrepancy Consistency Method for SLD

- **Discrepancy #1** between high and low processing scores
- **Discrepancy #2** between high processing and low achievement
- **Consistency** between low processing and low achievement

**Significant Discrepancy**

**AVERAGE SCORES** in Basic Psychological Processes and Achievement

**Significant Discrepancy**

**BELOW AVERAGE scores in academic skills**

**BELOW AVERAGE scores in basic psych processes**

**Consistent Scores**

conclusion 248

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## Rowan has SLD – a disorder in basic psychological process of EF

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

**Significant Discrepancy**

**Significant Discrepancy**

Simultaneous = 105
Successive = 100

Far CI Index = 84

Planning = 85
Attention = 77
CEFI = 81
DESSA also low

**Consistency**

conclusions

2
4
9

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## Planning Interventions

1. **Directional Questions** – ask questions at the beginning of the text instead of the end.
2. **Multiple Exposures**– encourage students to skim the material prior to reading, with emphasis on chapter and text headings.
3. **SOAR to SUCCESS** - A comprehension program for grades 3-6 to help students develop a reading plan.
   - 30-35 minute lessons…18 weeks.

conclusions

0

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# Planning Interventions

4. **Story Maps** – pre-reading activity where graphic organizers are used to outline and organize the information.

5. **Planning Facilitation** – encourages students to use strategies in reading (and math)

These interventions along with reproducible teacher, parent and student *handouts* are included in **Helping Children Learn-Second Edition**
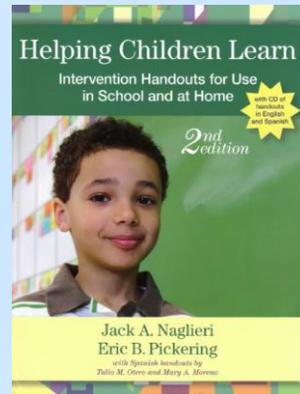
conclusions  1

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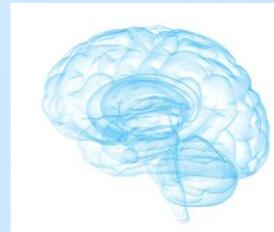
conclusions  252

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# Rating Scale of Impairment & EF

➢ EF and Impairment …

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# 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.

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# 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<br>Reading Level: 5.8<br>Admin Time: 10 mins. | Number of Items: 29<br>Reading Level: 6.6<br>Admin Time: 5 mins. | Number of Items: 49<br>Reading Level: 5.9<br>Admin Time: 10 mins. | Number of Items: 29<br>Reading Level: 6.6<br>Admin Time: 5 mins. |
| **RSI Scales**<br>School<br>Social<br>Mobility<br>Domestic<br>Family | **RSI Scales**<br>School<br>Social<br>Mobility | **RSI Scales**<br>School/Work<br>Social<br>Mobility<br>Domestic<br>Family<br>Self-Care | **RSI Scales**<br>School<br>Social<br>Mobility |
| TOTAL SCORE | TOTAL SCORE | TOTAL SCORE | TOTAL SCORE |

255

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# RSI and EF correlations (Manual pg. 115)

| RSI Total Score | | |
|---|---|---|

| Adaptive Behavior | | Symptom Scales | |
|---|---|---|---|
| -.54 | Adaptive Behavior Assessment System-II | .26 | Conners CBRS — Content Scales |
| | | .29 | Conners CBRS — Symptom Scales |

| Social-Emotional Competency | | Ability & Achievement | |
|---|---|---|---|
| -.71 | Devereux Student Strength Assessment | -.05 | Wechsler Intelligence Scale for Children-IV |

| Symptom Scales | | | |
|---|---|---|---|
| -.78 | Comprehensive Executive Function Inventory | -.06 | Woodcock Johnson III Achievement |
| | | -.03 | Cognitive Assessment System |

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# Take Away Messages

➢Social emotional skills and behaviors related to EF are strongly correlated with levels of impairment

➢EF MATTERS !!!

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# Presentation Outline

➢Comprehensive Model of EF
  • Historical Perspective and Definitions
➢EF as Behavior
➢EF as an Ability (an intelligence)
➢EF as Social Emotional Skills
➢EF and Academic 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

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# Executive Function Behaviors, Intelligence, and Achievement test scores

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# EF and Achievement (Naglieri & Rojahn, 2004)

Journal of Educational Psychology
2004, Vol. 96, No. 1, 174–181

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0022-0663/04/$12.00    DOI: 10.1037/0022-0663.96.1.174

## 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

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# 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 | 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 |

Column group heading: CAS Standard Battery subtests

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

conclusions
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# 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

| Demographic | | CAS N | CAS % | WISC-IV N | WISC-IV % | WJ III ACH N | WJ III ACH % |
|---|---|---|---|---|---|---|---|
| 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.

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# 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 |

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# 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

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# Sex Differences in Executive Function

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# 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** |

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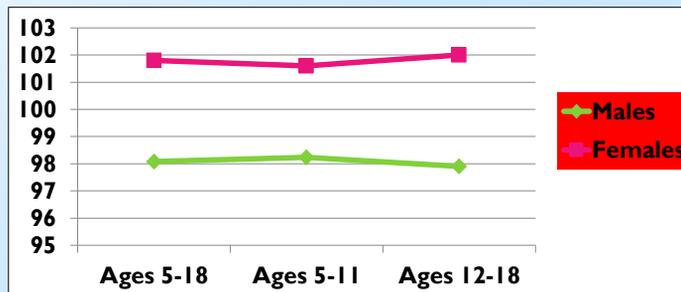
# CEFI Sex Differences: Teacher Raters

➤ 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 |
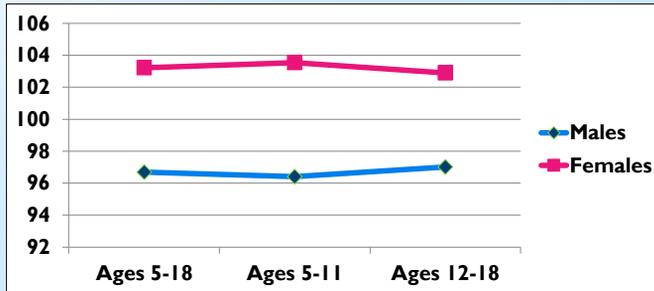


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# Gender Differences: Self Raters

➤ Girls are better EF than Boys
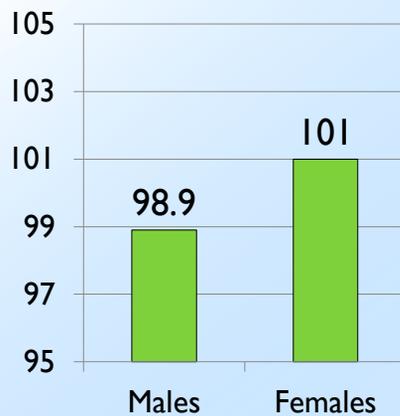


|  | Mean | SD | N |
|---|---|---|---|
| Male | 98.9 | 15.4 | 350 |
| Female | 101.0 | 14.6 | 350 |

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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.

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# Sex Differences: Ability



Executive Function

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# Sex Differences: Social Emotional

## DESSA
### DEVEREUX STUDENT STRENGTHS ASSESSMENT
#### K-8TH GRADE

A MEASURE OF

SOCIAL-EMOTIONAL

COMPETENCIES

OF CHILDREN IN

KINDERGARTEN

THROUGH EIGHTH GRADE

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

**KPRESS**
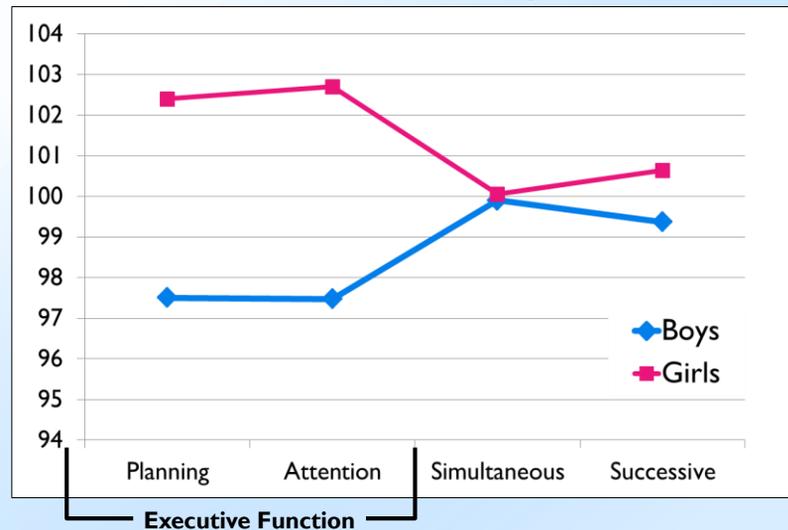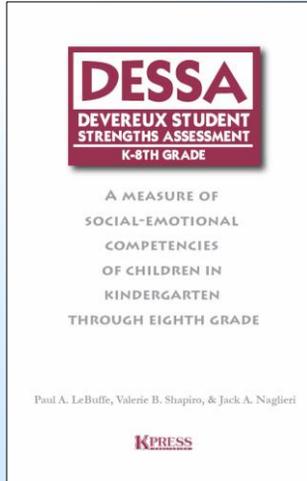
| | Males | | | Male Female d-ratio | Females | | |
|---|---|---|---|---|---|---|---|
| **TABLE 2.6** *Means, SDs, Ns,* **and** *d*-**ratios for DESSA** *T*-**Scores by Gender** | | | | | | | |
| | Mean | SD | n | | Mean | SD | n |
| **TEACHER RATERS** | | | | | | | |
| Personal Responsibility | 48.23 | 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)

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# Sex Differences: Social Emotional

Parent & Teacher Raters Females

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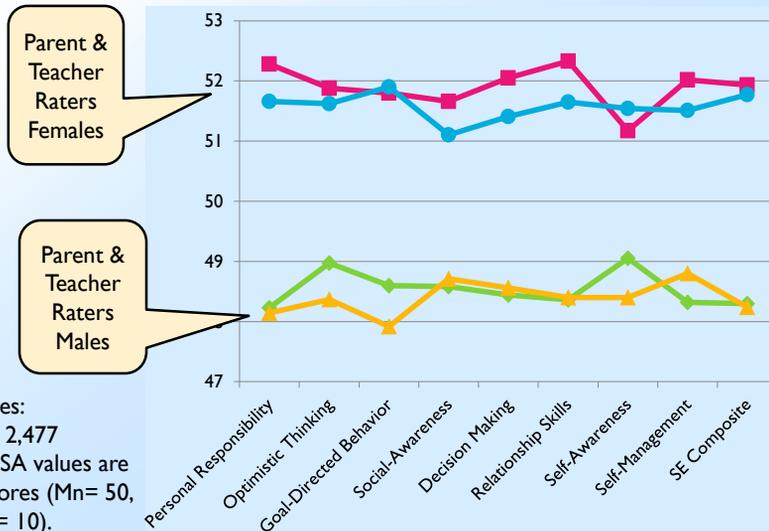
Notes:
N = 2,477
DESSA values are T-scores (Mn= 50, SD = 10).

Categories: Personal Responsibility, Optimistic Thinking, Goal-Directed Behavior, Social-Awareness, Decision Making, Relationship Skills, Self-Awareness, Self-Management, SE Composite

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# Sex Differences

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---

# CEFI Adult Sex Differences

➢Negligible gender differences (median Cohen's *d* effect size was 0.15) were found for the CEFI Adult

- CEFI Adult Full Scale male female d was -0.12 for self ratings and 0.03 for observer ratings
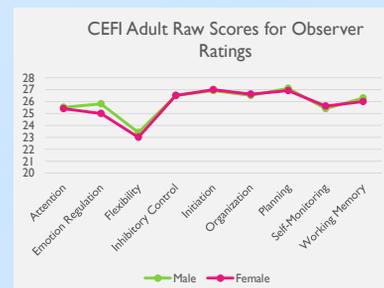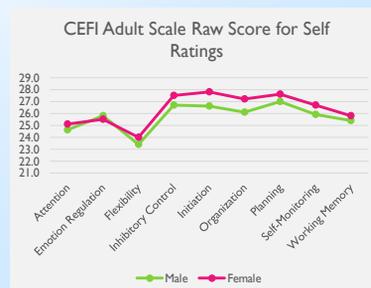
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# Developmental Differences in Executive Function

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# Developmental Changes in EF

Contents lists available at ScienceDirect

## Learning and Individual Differences

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

ELSEVIER

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

ARTICLE INFO

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.

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# 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)

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# Developmental Changes in EF



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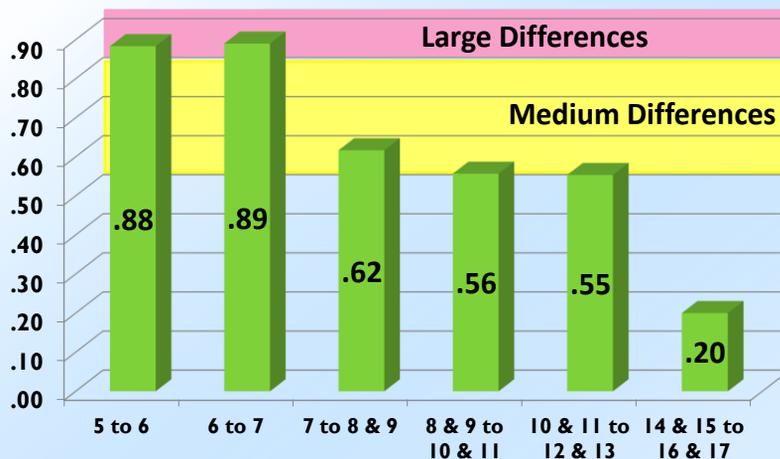
# Developmental Changes in EF

➤ 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

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# CEFI Adult by Age

➤ Observer Forms, small age differences were found on the Full Scale and all scale scores except Flexibility and Working Memory (effect sizes ranging from .010 to .026), with differences also being significant for Emotion Regulation, Inhibitory Control, Initiation, Organization and Planning scales ($p < .01$).

**CEFI Adult Total Raw Score for Observer Ratings by Normative Age groups**
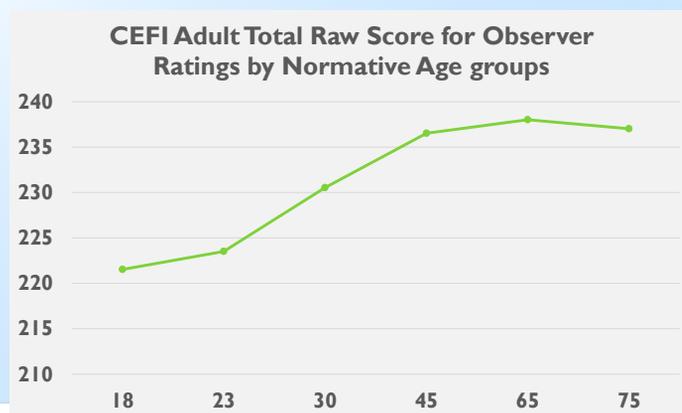


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# EF Lessons for High School

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# Presentation Outline

➢Comprehensive Model of EF
  • Historical Perspective and Definitions
➢EF as Behavior
➢EF as an Ability (an intelligence)
➢EF as Social Emotional Skills
➢EF and Academic 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

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# www.efintheclassroom.net

➢ **Start with Awareness of thinking about thinking**
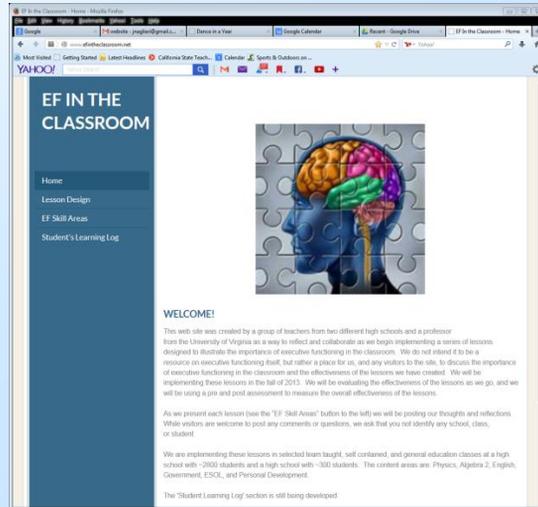
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# Structure of the lessons

- Each topic is discussed for one week
- Monday – class lesson
- Tues-Thurs reminders
- Friday – class reflection
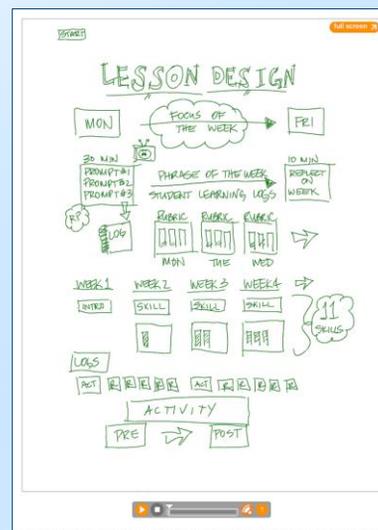
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## EF Lesson Plan *Themes*

➢Attention
➢Flexibility
➢Inhibition
➢Initiation
➢Self-Monitoring
➢Working Memory
➢Organization
➢Planning
➢Emotional Regulation

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# EF Posters in the Class



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# Mountain View Alternative HS

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# Introductory Lesson: "Are you Aware"

- Ask for volunteers to NOT look at the video and report what word they hear
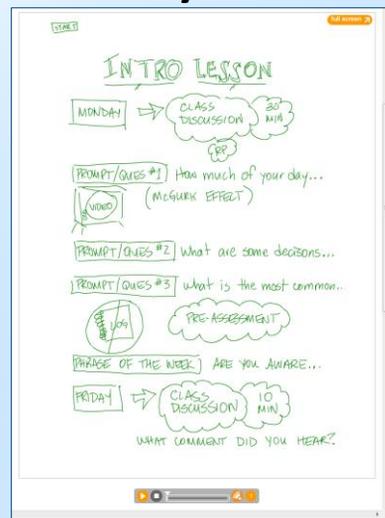
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## Introductory Lesson: "Are you Aware"



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## Other Lessons from www.efintheclassroom.net

www.Efintheclassroom.net

Research support?



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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.

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# Planning

## Planning Facilitation for Math Calculation

Math calculation is a complex activity that involves recalling basic math facts, following proce-dures, 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 min-utes 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.

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9/30/2019

# 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 Nu[...] 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 si[...] when provided the PASS-based cognitive strategy instruction.

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# Design of the Study

## Experimental and Comparison Groups

7 worksheets with Normal Instruction

## Experimental Group

19 worksheets with Planning Facilitation

## Comparison Group

19 worksheets with Normal Instruction
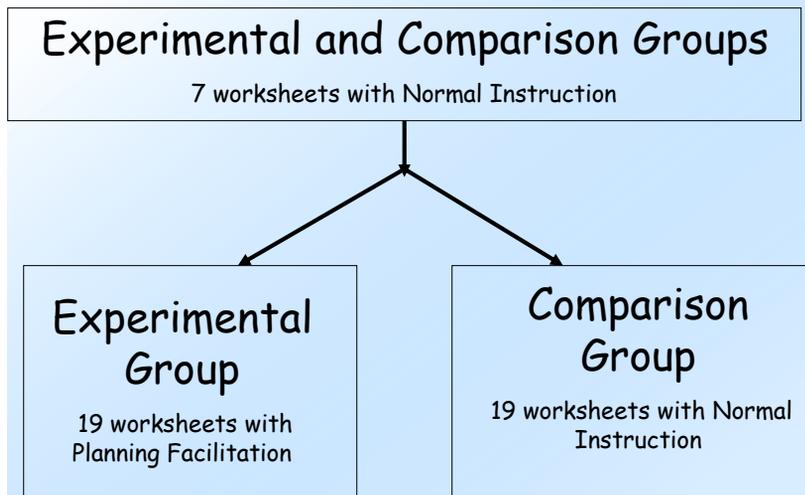
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# Instructional Sessions

➢ 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                    295

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# 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

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# 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?

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# 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."



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## Worksheet Means and Effect Sizes for the Students with ADHD

Raw Scores for Worksheets

ES = 0.6

45

42.66

ES = 2.4

40

37.81

35

32.79

30

29

25

Normal Instruction    Planning Facilitation

Baseline
Intervention

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

conclusions    299
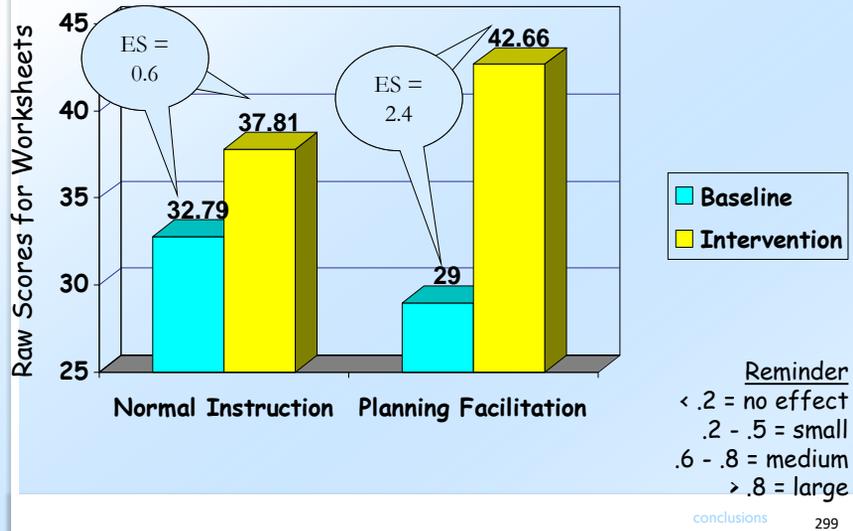
299

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

Standard Scores for WJ Math Fluency

ES = 0.1

90

86.1

79.4

ES = 1.3

80

75.5

70

60.9

60

50

40

Normal Instruction    Planning Facilitation

Baseline
Intervention

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

conclusions    300
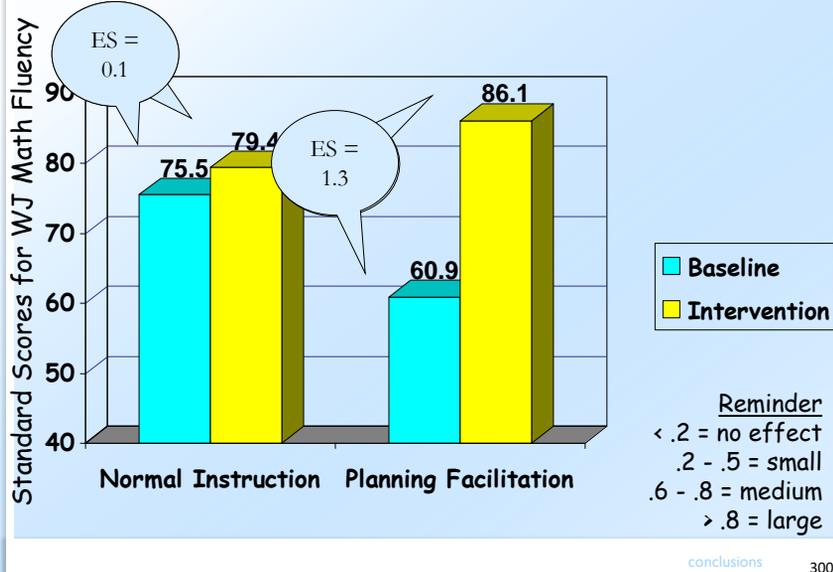
300

## WIAT Numerical Operation Means and Effect Sizes for Students with ADHD
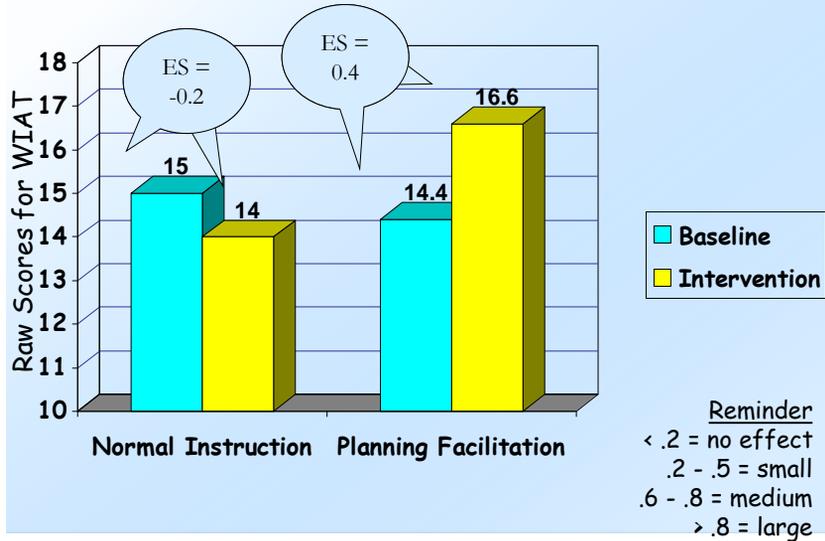


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# Iseman (2005)

➢ Baseline Intervention means by PASS profile

➢ Different response to the same intervention
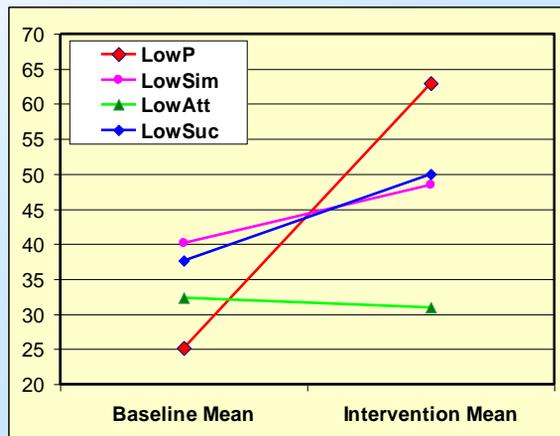


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# One Year Follow-up

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                     303

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# 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                     304

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## 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    305

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## Core Group Activity

- **O**rganizer – Have the group discuss this question: "How do you feel about what was just presented?"
- **C**oach – guide the discussion so that the group arrives at an answer to the question
- **R**eporter – record and report to the group
- **E**nergizer – keep the discussion going !



conclusions    306

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## Other Lessons from www.efintheclassroom.net

Working Memory
Lesson
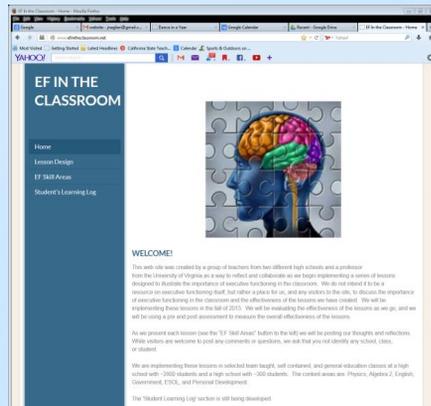


conclusions    307

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# Teach Self-reliance

➢Students with any kind of learning challenge and many without any limitations need to be self-reliant

➢Show the Stuck on the Escalator video

➢Discuss what the message is with the students

conclusions    308

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## Low EF and an Enabled Society

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## Stuck on the Escalator

➢ "A student in 4th period (we are doing the EF lessons in that class) was working in her Chemistry class (that teacher is NOT doing the EF lessons) spontaneously said, "Man, I am stuck on the escalator" (a phrase of the week)  even though that phrase is not used in Chem.  I took this as evidence that the (cuing) skills being learned in one class are transferring to another.  It is encouraging."

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# Teaching Children to use EF

➢ 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.
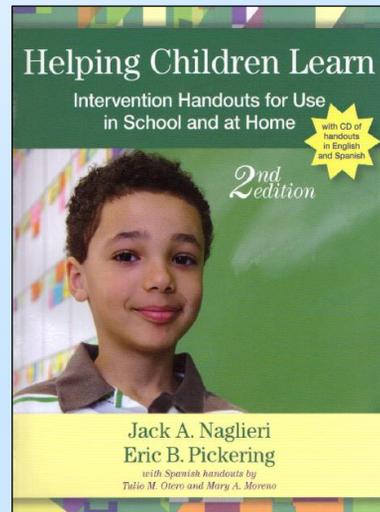
conclusions 311

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# 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.

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## 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!

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## Presentation Outline

➢Comprehensive Model of EF
  • Historical Perspective and Definitions
➢EF as Behavior
➢EF as an Ability (an intelligence)
➢EF as Social Emotional Skills
➢EF and Academic 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          314

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# Conclusions-- on Education

➢ Benjamin Franklin – Tell me and I forget. Teach me and I remember. Involve me and I learn.

➢ Teacher's role is to give only as much help as is necessary, **NOT to be the frontal lobes for the student**

conclusions    315

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# Conclusions

➢ The teacher's role is to give students 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    316

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