Five Dimensions of Executive Function

A Five Dimensional Model of Executive Function: Cognition, Behavior, Social-Emotional, Academics, & Impairment!

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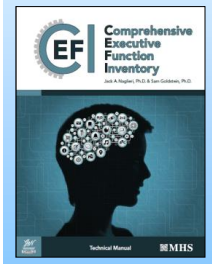
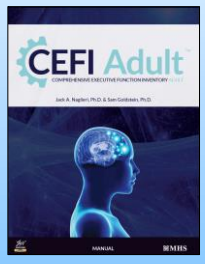
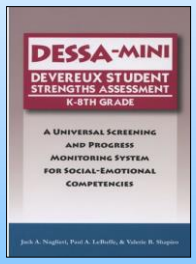
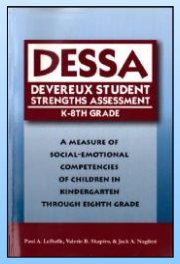
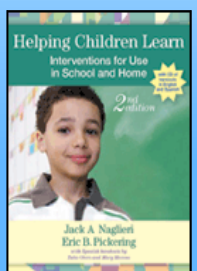
Resources and Disclosures

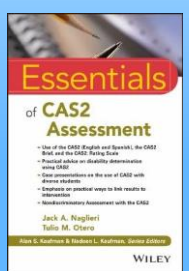


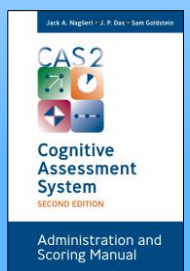












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www.jacknaglieri.com

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

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My Background

- Interest in intelligence and instruction
- Exper
  - Need
  - Psycl
  - Evide
- My pe
  resea
- Why t

conclusions

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Stimulating EF

- IF we want to get our students to THINK SMART then we have to engage them in the learning process
- One way to engage students is to have them work in groups
  - Conversations stimulate thinking and increase learning
- We will use this same approach in today's session using CORE GROUPS

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Core Group

- Share with your CORE GROUP
  - Your Name
  - Where are you from?
  - What do you do?
  - What brings you here today?
- Determine who will be the…

Coach
Organizer/Time Keeper
Recorder
Energizer

Decades of Research shows…

- In most classrooms, 20% of the students do 80% of the talking and thinking.
- Today, we will all be talking and **Thinking Smart** together, using strategies that maximize learning – THAT MAXIMIZES the use of Executive Function

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Presentation Outline

- Comprehensive Model of EF
  - Historical Perspective
  - Definitions of Executive Function
- EF as Behavior
  - EF in the Classroom or Clinic
- EF as an Ability (an intelligence)
- EF as Social Emotional Skills
- Academic
- Impairment and EF
- Research about EF as ability, behavior, and SEL
- Conclusions

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EF Lesson on Saturday Night Live

- We will begin by learning about how EF can be taught to students, using one of the lessons from **efintheclassroom.net**
- 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

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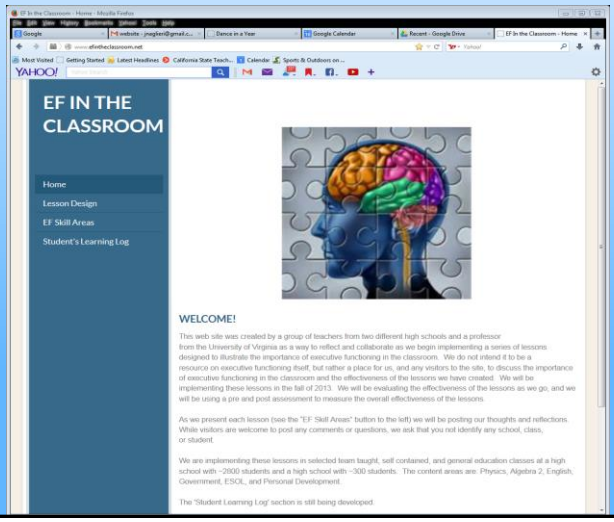
Time to Think and Talk

- **Task:**
- 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..

All Lessons available at: www.efintheclassroom.net



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

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.

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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'

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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'

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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

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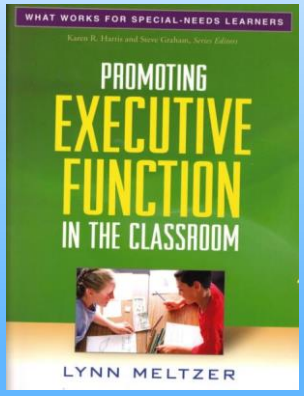
Meltzer (2010)

- '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'.



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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

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

Presentation Outline

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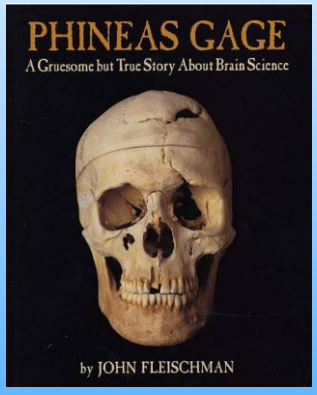
The Curious Story of Phineas Gage

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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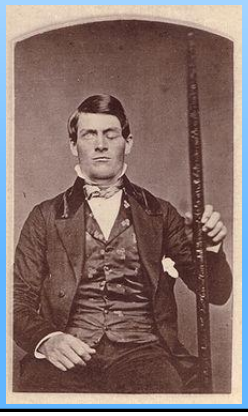
The Curious Story of Phineas Gage

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



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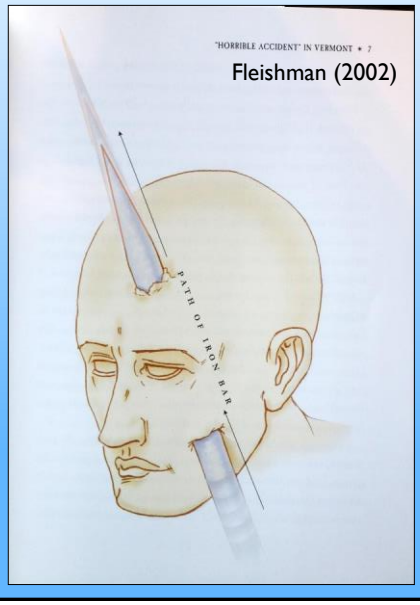
Fleishman (2002, p 70)

- 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



Fleishman (2002)

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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

1. Intellect
2. Behavior
3. Emotion
4. Work
5. Impairment

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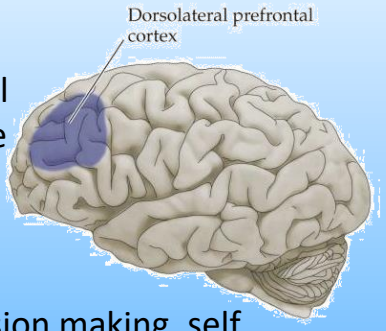
More Specifically



- 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.

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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 Function (s)

- In 1966 Luria first wrote and defined the concept of Executive Function (EF)
- He credited Bianchi (1895) and Bekhterev (1905) with the initial definition of the process

1902 - 1977

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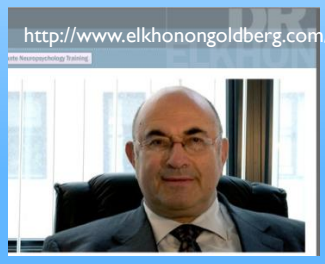
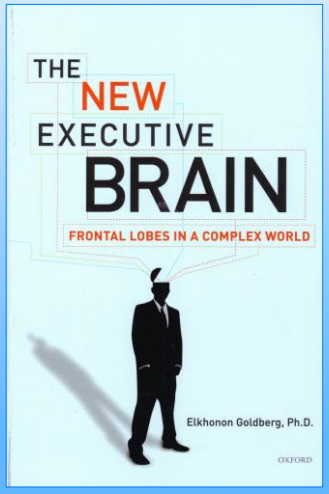
Executive Functions

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





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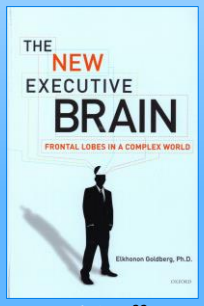
Goldberg (2009, p. 4)

- "The frontal lobes … are liked to intentionality, purposefulness, and complex decision making."
- They make us human, and as Luria stated, are "the organ of civilization"
- Frontal lobes are about …"leadership, motivation, drive, vision, self-awareness, and awareness of others, success, creativity, sex differences, social maturity, cognitive development and learning…"



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What is Executive Function(s)

There is no formal excepted definition of EF

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

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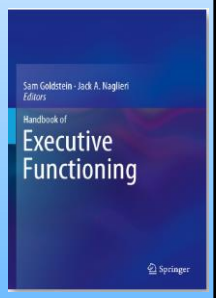
Goldstein, Naglieri, Princiotta, & Otero (2013)

- 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)



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Executive Function

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

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).

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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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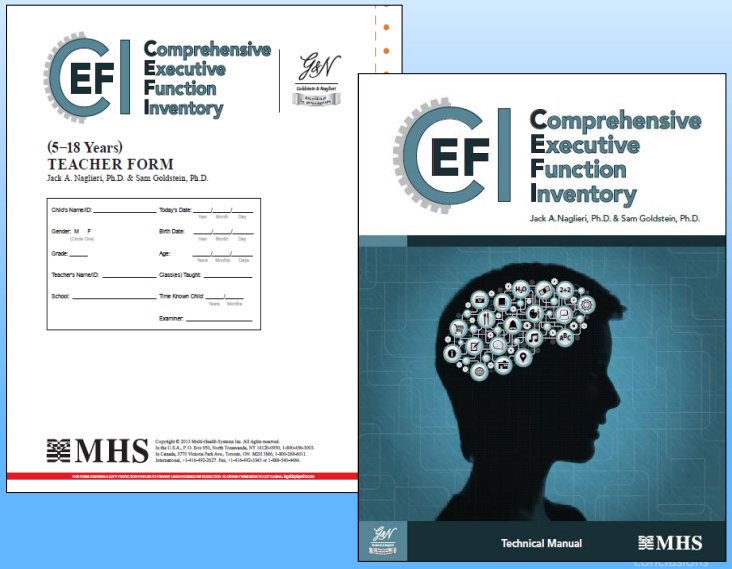
CEFI (Naglieri & Goldstein, 2012)



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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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EXPLORATORY FACTOR ANALYSES

- The normative samples for parents, teacher, and self ratings were randomly split into two samples and EFA conducted using
  - the item raw scores
  - nine scales' raw scores
- The sample …

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

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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

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ITEM FACTOR ANALYSES – PART 1

- For the *first half* of the normative sample for Parent, Teacher and Self ratings' **item scores** (90 items) was analyzed using exploratory factor analysis
- Using the *second half* of the normative sample EFA was conducted using scores for the Attention, Emotion Regulation, Flexibility, Inhibitory Control, Initiation, Organization, Planning, Self-Monitoring, and Working Memory **scales**

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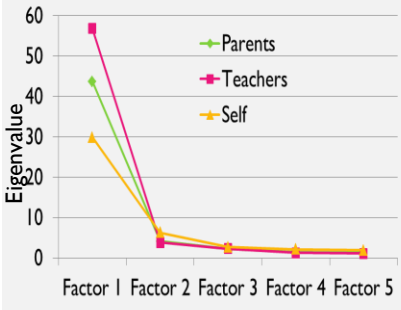
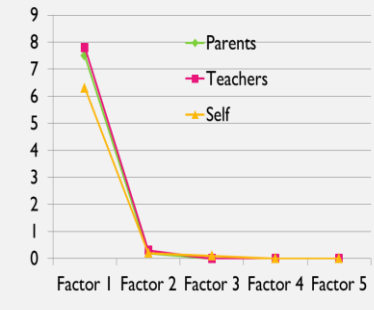
Item Factor Analyses – Part 1

- Item Level FA
- Scale Level FA





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


CEFI Adult

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

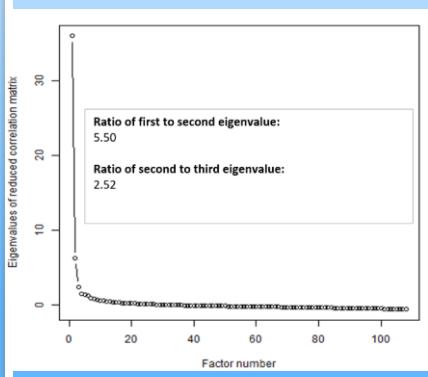
Observer Form

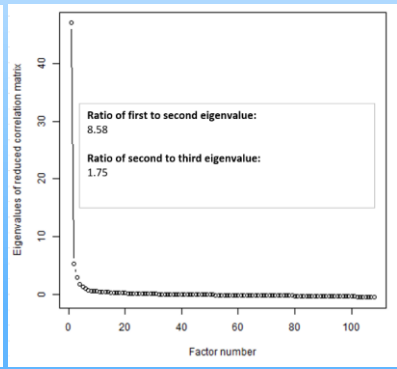
CLIENT'S NAME/ID	TODAY'S DATE: Year Month Day
GENDER: ☐M ☐F	BIRTH DATE: Year Month Day
OBSERVER'S NAME/ID:	AGE: Years Months Days
RELATIONSHIP TO CLIENT:	TIME KNOWN CLIENT: Years Months
EXAMINER:	

MHS

Adult CEFI Normative Samples

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





CEFI Adult Consistency of Loadings

Consistency of Factor Loadings Across Groups

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

Table 8.6. Consistency of Factor Loadings Across Groups

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

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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

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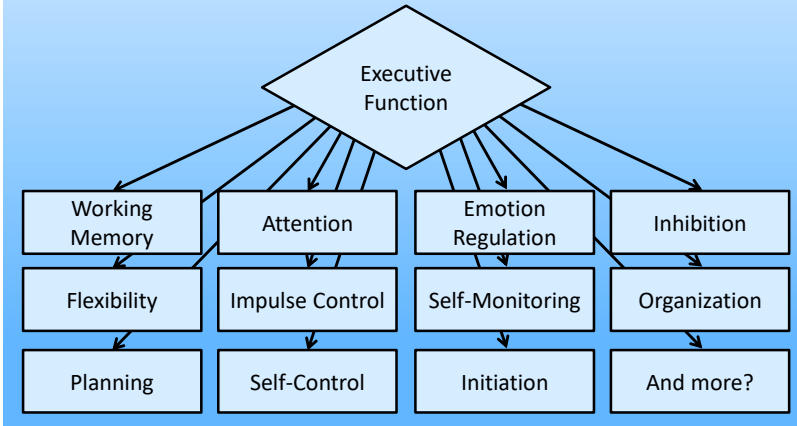
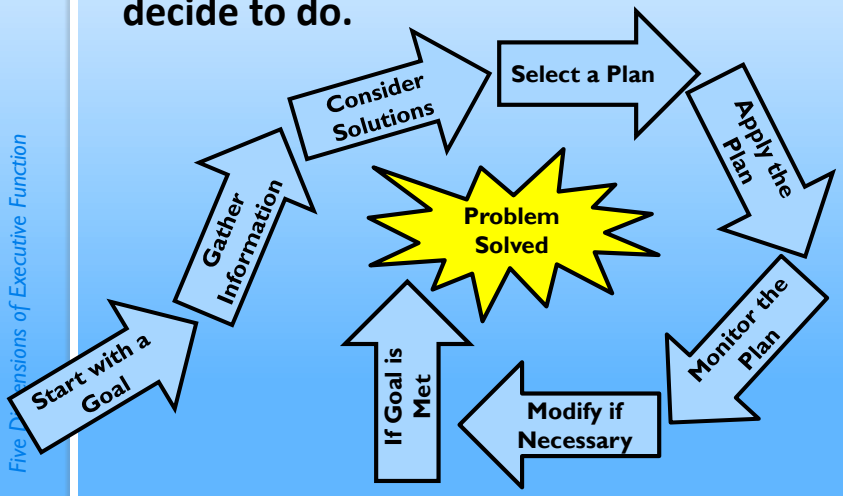
EF and its components

- Abilities, cognitive processes, and behaviors



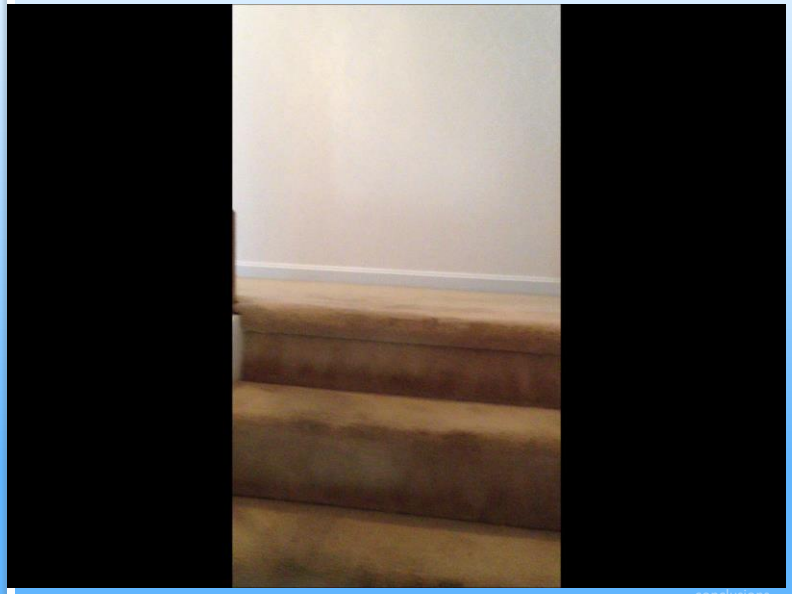
Naglieri & Goldstein, 2012

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



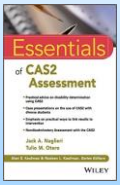
Does a13 month old have EF?

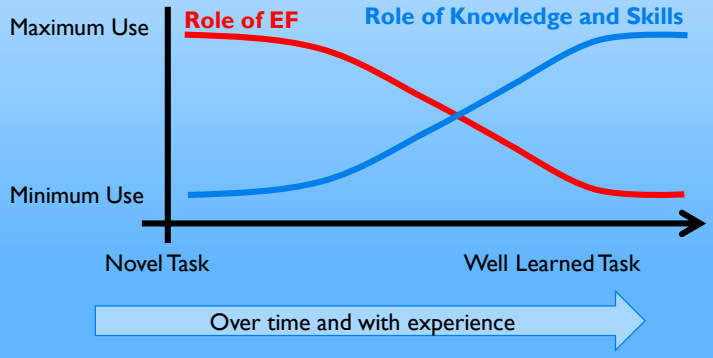
Age 19 months: Knowledge & EF



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





Which Lemming has good EF?

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.

Time to Think and Talk

- **Task:**
- Discuss in your groups
  - EF as a single concept
  - Other ideas
- Your own questions and thoughts..
- Report to the audience

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conclusions

EF: ability, behavior, social-emotional skill?

All are reflections of FRONTAL LOBE activity

Five Dimensions of Executive Function

conclusions 56

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

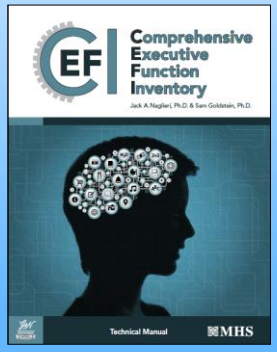
Presentation Outline

- Comprehensive Model of EF
  - Historical Perspective
  - Definitions of Executive Function
- EF as Behavior
  - EF in the Classroom or Clinic
- EF as an Ability (an intelligence)
- EF as Social Emotional Skills
- Academic
- Impairment and EF
- Research about EF as ability, behavior, and SEL
- Conclusions

Comprehensive Executive Function Inventory (CEFI)

Jack A. Naglieri & Sam Goldstein

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

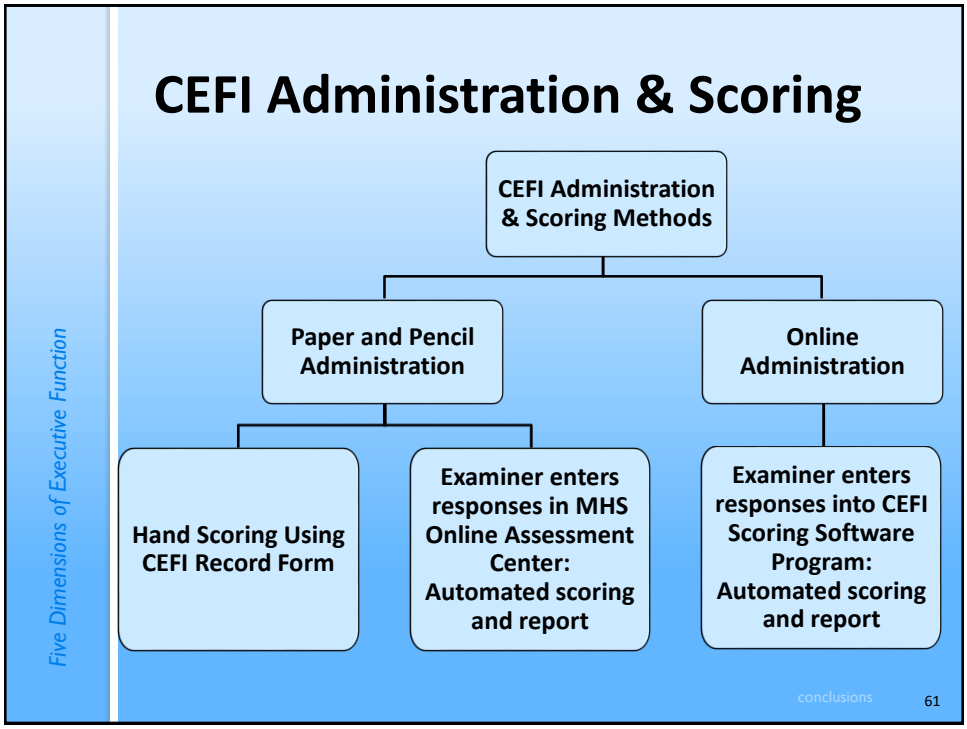


Five Dimensions of Executive Function

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

Five Dimensions of Executive Function


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
Five Dimensions of Executive Function
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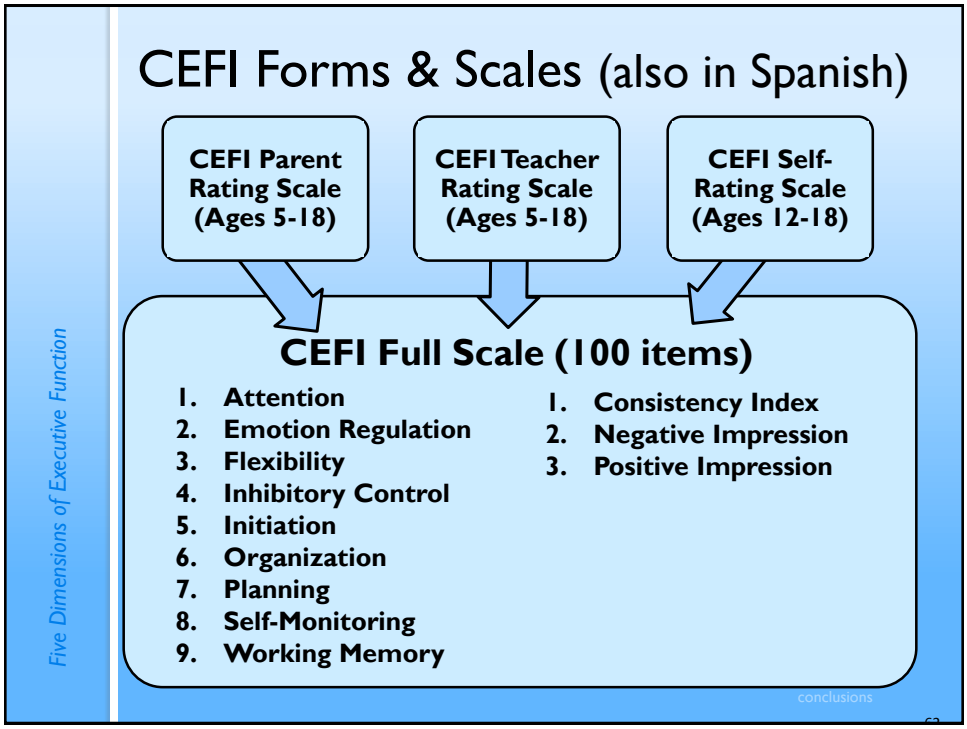

CEFI Forms & Scales (also in Spanish)
CEFI Parent Rating Scale (Ages 5-18)
CEFI Teacher Rating Scale (Ages 5-18)
CEFI Self-Rating Scale (Ages 12-18)
CEFI Full Scale (100 items)
1. Attention
2. Emotion Regulation
3. Flexibility
4. Inhibitory Control
5. Initiation
6. Organization
7. Planning
8. Self-Monitoring
9. Working Memory
1. Consistency Index
2. Negative Impression
3. Positive Impression
Five Dimensions of Executive Function
conclusions

CEFI Items by Scale

Five Dimensions of Executive Function

Table C.4. Attention (12 items)

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

Table C.5. Emotion Regulation (9 items)

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

Table C.6. Flexibility (7 items)

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

CEFI Items by Scale

Five Dimensions of Executive Function

Table C.7. Inhibitory Control (10 items)

Item #	Parent/Teacher Item *During the past 4 weeks, how often did the child...*	Self-Report Item *During the past 4 weeks, how often did you...*
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?

Table C.8. Initiation (10 items)

Item #	Parent/Teacher Item *During the past 4 weeks, how often did the child...*	Self-Report Item *During the past 4 weeks, how often did you...*
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 *During the past 4 weeks, how often did the child...*	Self-Report Item *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)

Five Dimensions of Executive Function

CEFI Items by Scale

Table C.10. Planning (11 items)

Item #	Parent/Teacher Item *During the past 4 weeks, how often did the child...*	Self-Report Item *During the past 4 weeks, how often did you...*
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 *During the past 4 weeks, how often did the child...*	Self-Report Item *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 *During the past 4 weeks, how often did the child...*	Self-Report Item *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?

Five Dimensions of Executive Function

One Factor and 9 Scales?

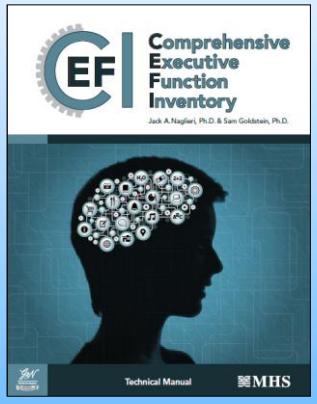
- NOTE: EF is a unidimensional concept
- Use the Full Scale to answer the question "Is the child poor in EF or not?"
- Use the 9 scales to identify the specific groups of items that represent 9 different types of behaviors that can be addressed by Intervention

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

Five Dimensions of Executive Function

CEFI Characteristics

- Automated scoring and reporting includes intervention suggestions
- Scores are based on nationally representative normative sample that is representative of the US



CEFI Full Scale and Treatment Scores

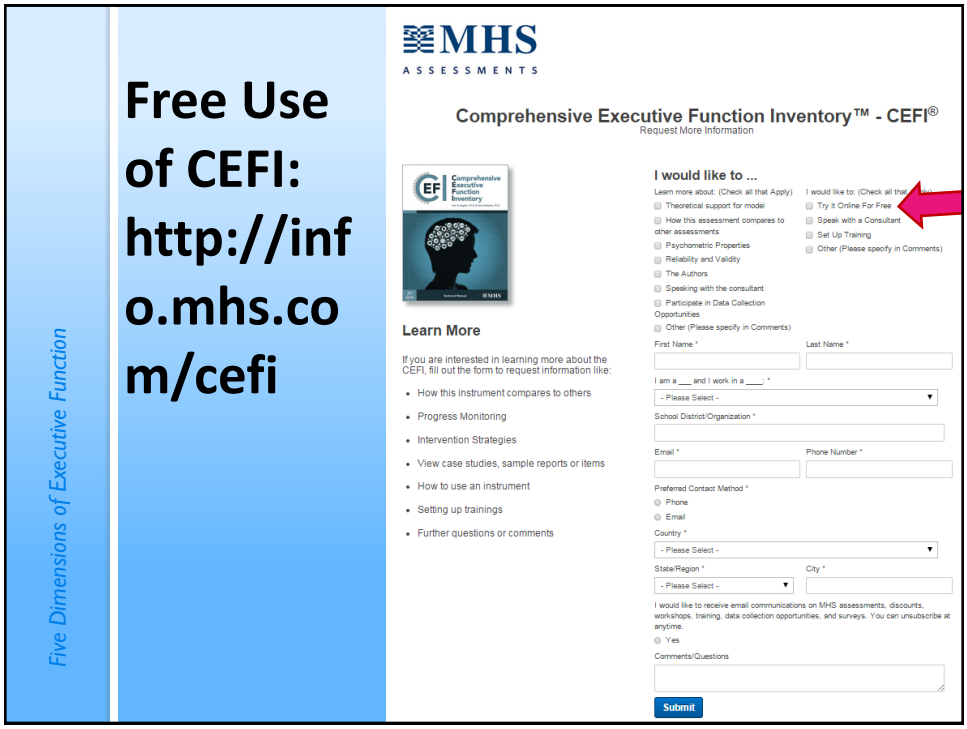
Figure 4.1. Illustration of Executive Function Weakness and Strengths on the CEFI (5–18 Years) Teacher Form

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

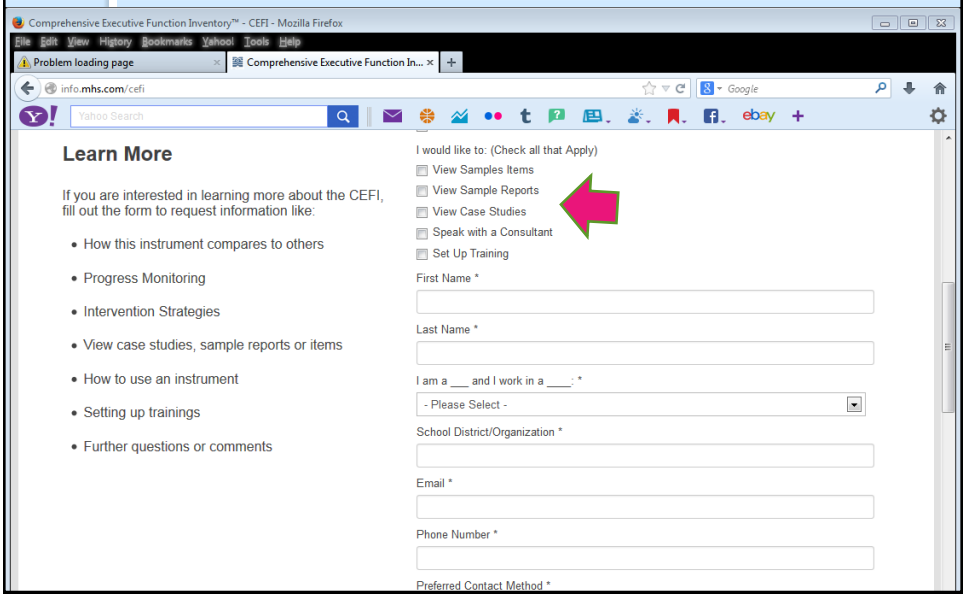
Note. Differences from the Child's/Youth's Average are significant at $p < .10$.

Five Dimensions of Executive Function

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



Free Use of CEFI: mhs.com/cefi



Five Dimensions of Executive Function

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

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Five Dimensions of Executive Function

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

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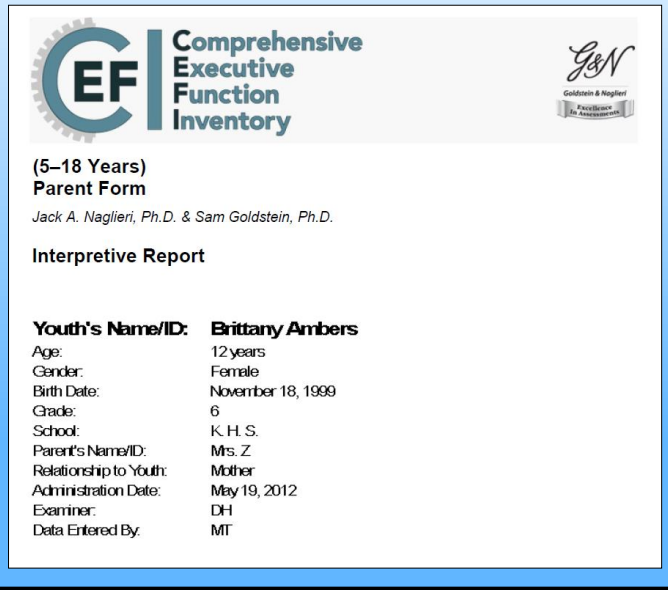
Five Dimensions of Executive Function

CEFI Interpretive Report



Comprehensive Executive Function Inventory

(5–18 Years)
Parent Form

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

Interpretive Report

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

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.	atings 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

Five Dimensions of Executive Function

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

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.

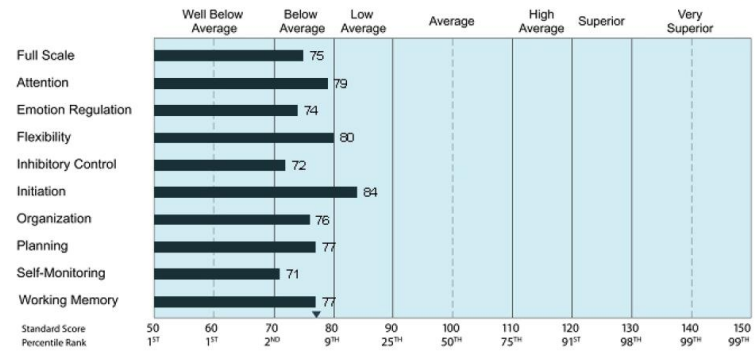
CEFI Interpretive Report

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.



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.

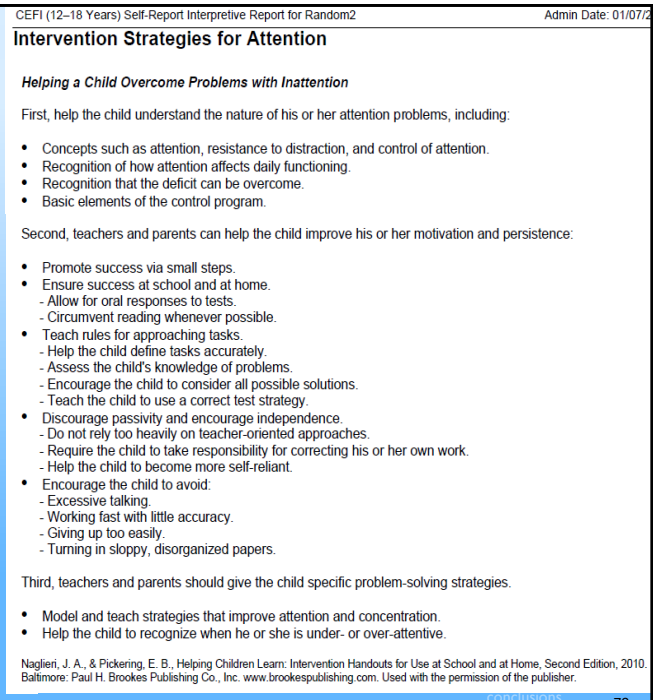
Brittany Ambers's **Flexibility** scale score describes how she adjusts her behavior to meet circumstances, including coming up with different ways to solve problems, having many ideas about how to do things, and being able to solve problems using different approaches. Her standard score of 80 falls 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.)

Five Dimensions of Executive Function

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.

Five Dimensions of Executive Function

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

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

Five Dimensions of Executive Function

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

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

Step 6: Compare Results Over Time

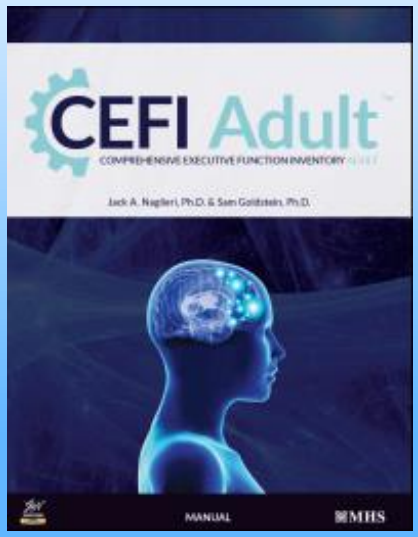
- Determine if CEFI pre post scores differ significantly – but also if the post-test standard score is in the Average range or higher

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

Five Dimensions of Executive Function

CEFI – ADULT FORM (2017)

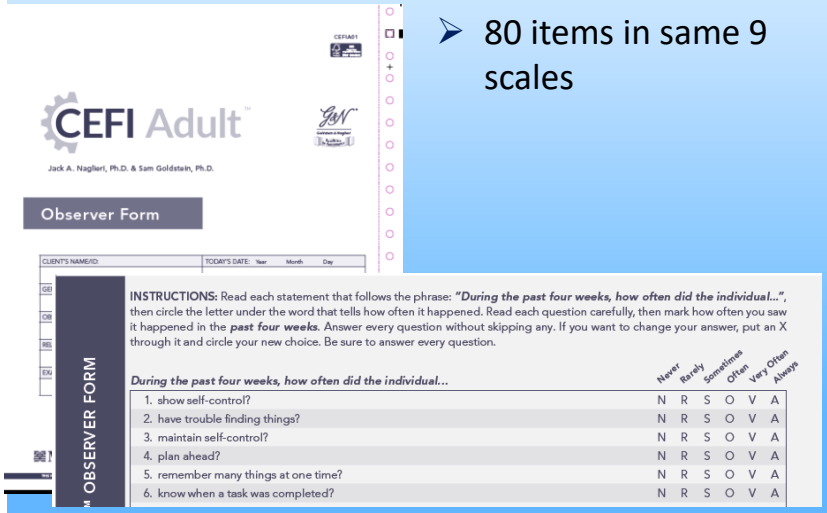


CEFI Adult (ages 18+)

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

Five Dimensions of Executive Function

CEFI Adult (ages 18+)



- 80 items in same 9 scales

Five Dimensions of Executive Function

Five Dimensions of Executive Function

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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Five Dimensions of Executive Function

Interpretive Report


CEFI:Adult
COMPREHENSIVE EXECUTIVE FUNCTION INVENTORY ADULT

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

Self-Report Form
Interpretive Report

Name/ID:	John Sample
Age:	55 years
Gender:	Male
Birth Date:	February 14, 1960
Administration Date:	September 5, 2016
Examiner:	SG
Data Entered By:	SAM

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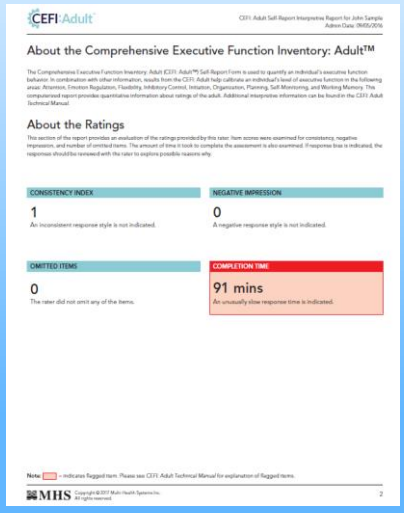
MHS


CEFI:Adult

About the Comprehensive Executive Function Inventory: Adult™

About the Ratings

CONSISTENCY INDEX	NEGATIVE IMPRESSION
1	0
An inconsistent response style is not indicated.	A negative response style is not indicated.

OMITTED ITEMS	COMPLETION TIME
0	91 mins
The rater did not omit any of the items.	An unusually slow response time is indicated.

Note: ▭ = indicates flagged item. Please see CEFI: Adult Technical Manual for explanation of flagged items.

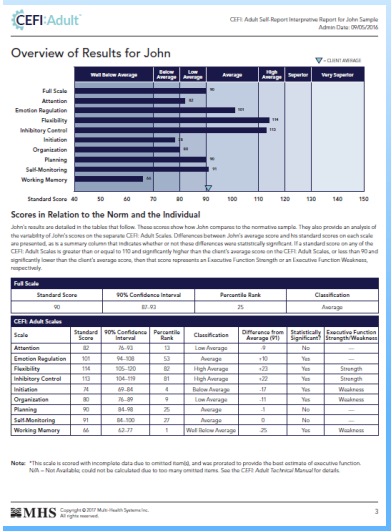
MHS

conclusions

90

Five Dimensions of Executive Function

Interpretive Report



CEFI:Adult

CEFI: Adult Self-Report Interpretive Report for John Sample
Admin Date: 09/05/2016

Overview of Results for John

▼ = CLIENT AVERAGE

Well Below Average	Below Average	Low Average	Average	High Average	Superior	Very Superior

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

Standard Score 40 50 60 70 80 90 100 110 120 130 140 150

Scores in Relation to the Norm and the Individual

John's results are detailed in the tables that follow. These scores show how John compares to the normative sample. They also provide an analysis of the variability of John's scores on the separate CEFI Adult Scales. Differences between John's average score and his standard scores on each scale are presented, as is a summary column that indicates whether or not these differences were statistically significant. If a standard score on any of the CEFI Adult Scales is greater than or equal to 110 and significantly higher than the client's average score on the CEFI Adult Scales, or less than 90 and significantly lower than the client's average score, then that score represents an Executive Function Strength or an Executive Function Weakness, respectively.

Full Scale

Standard Score	90% Confidence Interval	Percentile Rank	Classification
90	87-93	25	Average

CEFI Adult Scales

Scale	Standard Score	90% Confidence Interval	Percentile Rank	Classification	Difference from Average (91)	Statistically Significant?	Executive Function Strength/Weakness
Attention	82	76-93	12	Low Average	-9	No	—
Emotion Regulation	101	94-108	53	Average	+10	Yes	—
Flexibility	114	105-120	82	High Average	+23	Yes	Strength
Inhibitory Control	113	104-119	81	High Average	+22	Yes	Strength
Initiation	76	69-84	4	Below Average	-17	Yes	Weakness
Organization	80	76-89	9	Low Average	-11	Yes	Weakness
Planning	90	84-98	25	Average	-1	No	—
Self-Monitoring	91	84-100	27	Average	0	No	—
Working Memory	66	62-77	1	Well Below Average	-25	Yes	Weakness

Note: *This scale is scored with incomplete data due to omitted item(s), and was prorated to provide the best estimate of executive function. N/A = Not Available; could not be calculated due to too many omitted items. See the CEFI Adult Technical Manual for details.

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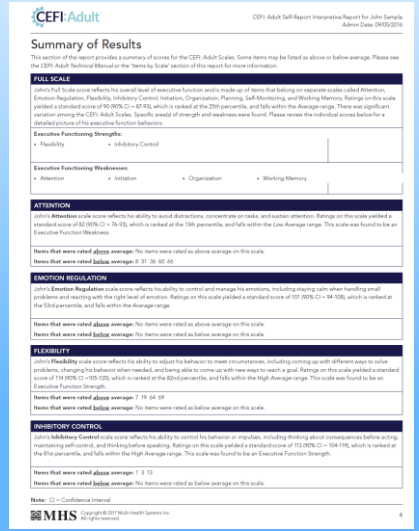

CEFI:Adult

CEFI: Adult Self-Report Interpretive Report for John Sample
Admin Date: 09/05/2016

Summary of Results

This section of the report provides a summary of scores for the CEFI Adult Scales. Some items may be listed as above or below average. Please see the CEFI Adult Technical Manual or the 'Items by Scale' section of this report for more information.

FULL SCALE

John's Full Scale score reflects his overall level of executive function and 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. Ratings on this scale yielded a standard score of 90 (90% CI = 87-93), which is ranked at the 25th percentile, and falls within the Average range. There was significant variation among the CEFI Adult Scales. Specific area(s) of strength and weakness were found. Please review the individual scores below for a detailed picture of his executive function behaviors.

Executive Functioning Strengths:
- Flexibility
- Inhibitory Control

Executive Functioning Weaknesses:
- Attention
- Initiation
- Organization
- Working Memory

ATTENTION

John's **Attention** scale score reflects his ability to avoid distractions, concentrate on tasks, and sustain attention. Ratings on this scale yielded a standard score of 82 (90% CI = 76-93), which is ranked at the 13th percentile, and falls within the *Low Average* range. This scale was found to be an Executive Function Weakness.

Items that were rated above average: No items were rated as above average on this scale.
Items that were rated below average: 8 31 36 60 66

EMOTION REGULATION

John's **Emotion Regulation** scale score reflects his ability to control and manage his emotions, including staying calm when handling small problems and reacting with the right level of emotion. Ratings on this scale yielded a standard score of 101 (90% CI = 94-108), which is ranked at the 53rd percentile, and falls within the *Average* range.

Items that were rated above average: No items were rated as above average on this scale.
Items that were rated below average: No items were rated as below average on this scale.

FLEXIBILITY

John's **Flexibility** scale score reflects his ability to adjust his behavior to meet circumstances, including coming up with different ways to solve problems, changing his behavior when needed, and being able to come up with new ways to reach a goal. Ratings on this scale yielded a standard score of 114 (90% CI =105-120), which is ranked at the 82nd percentile, and falls within the *High Average* range. This scale was found to be an Executive Function Strength.

Items that were rated above average: 7 19 64 69
Items that were rated below average: No items were rated as below average on this scale.

INHIBITORY CONTROL

John's **Inhibitory Control** scale score reflects his ability to control his behavior or impulses, including thinking about consequences before acting, maintaining self-control, and thinking before speaking. Ratings on this scale yielded a standard score of 113 (90% CI = 104-119), which is ranked at the 81st percentile, and falls within the *High Average* range. This scale was found to be an Executive Function Strength.

Items that were rated above average: 1 3 13
Items that were rated below average: No items were rated as below average on this scale.

Note: CI = Confidence Interval

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Five Dimensions of Executive Function

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.

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			

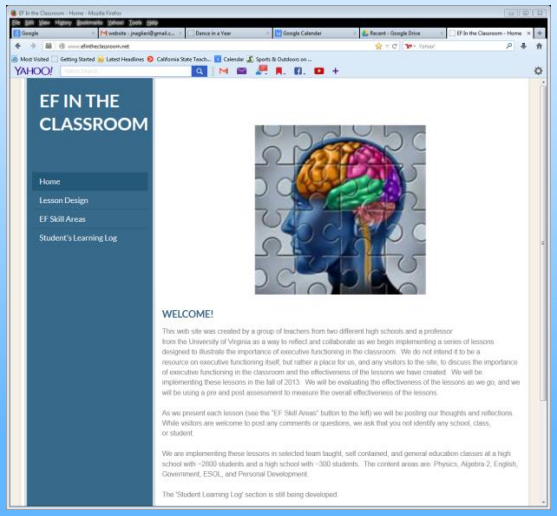
Note. Guidelines for interpreting Cohen's *d* are as follows: small effect size = 0.2; medium effect size = 0.5; large effect size = 0.8. Positive *d*-ratio values indicate higher scores in the Hispanic sample.

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.

INTERVENTIONS FOR EF BEHAVIORS

www.efintheclassroom.net

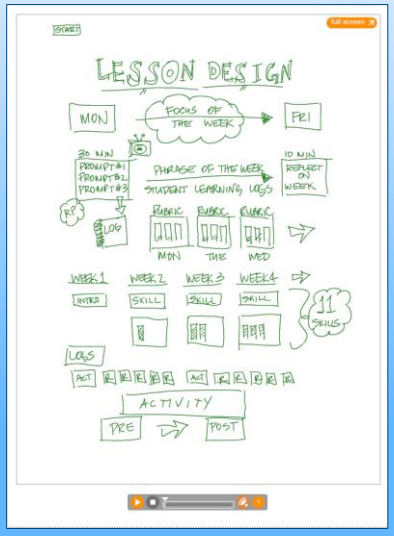
- Start with Awareness of thinking about thinking



Five Dimensions of Executive Function

Structure of the lessons

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



Five Dimensions of Executive Function

Interventions for EF Behaviors

Five Dimensions of Executive Function

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

EF Posters in the Class

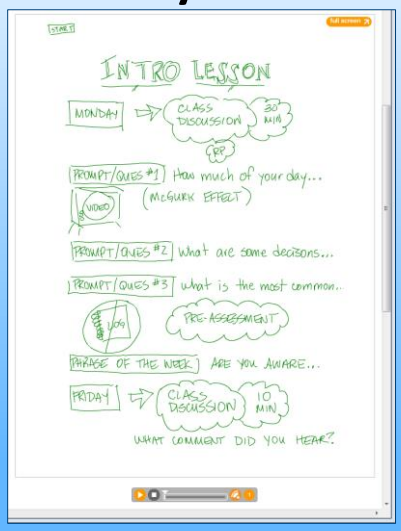
Interventions for EF Behaviors

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

Five Dimensions of Executive Function

Introductory Lesson: "Are you Aware"

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

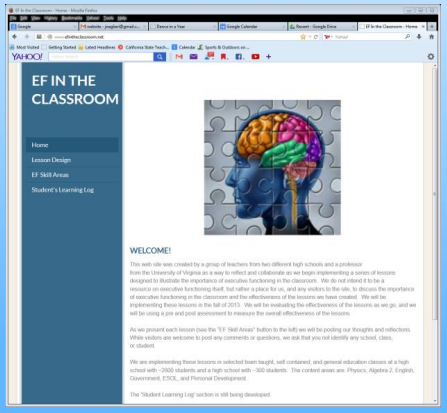


Five Dimensions of Executive Function

Introductory Lesson: "Are you Aware"

Other Lessons from www.efintheclassroom.net

Working Memory Lesson



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

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)

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.

Five Dimensions of Executive Function

conclusions

Ready
Trial 1

START

Five Dimensions of Executive Function

conclusions

Write the words down.

Five Dimensions of Executive Function

Next Item: Remember the words

conclusions

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Ready Trial 2

START

conclusions

Five Dimensions of Executive Function

Did you put the words into groups?

conclusions

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

The brain needs time **process!**

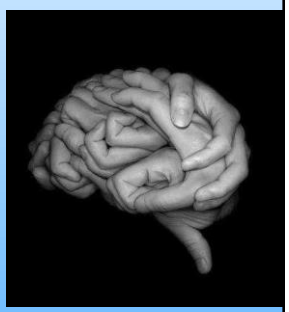
- **Stretch**
- Cross Laterals
- Walk and Talk
- Energizers
- Relaxers

Five Dimensions of Executive Function

conclusions 113

Why Brain Breaks?

- **SYN-NAPS: Neurotransmitters, brain transport proteins, needed for memory construction and attention are depleted after as little as ten minutes of doing the same activity. Syn-naps are brain-breaks where you change the learning activity to let the brain chemicals replenish.**
- **The Syn-naps can be stretching, singing, or acting out vocabulary words. After just a few minutes, refreshed brains will be ready for new memory storage. (Dr. Judy Willis)**



Five Dimensions of Executive Function

conclusions 114

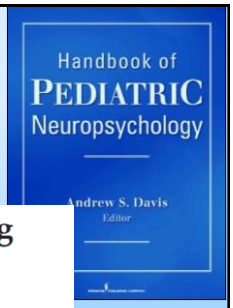
Presentation Outline

- Comprehensive Model of EF
  - Historical Perspective
  - Definitions of Executive Function
- EF as Behavior
  - EF in the Classroom or Clinic
- EF as an Ability (an intelligence)
- EF as Social Emotional Skills
- Academic
- Impairment and EF
- Research about EF as ability, behavior, and SEL
- Conclusions

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

A Theory of Learning



28 Cognitive Assessment System: Redefining Intelligence From a Neuropsychological Perspective

Jack A. Naglieri and Tulio M. Otero

INTRODUCTION

Pediatric neuropsychology has become an important field for understanding and treating developmental, psychiatric, psychosocial, and learning disorders. By addressing both brain functions and environmental factors intrinsic in complex behaviors, such as thinking, reasoning, planning, and the variety of executive capacities, clinicians are able to offer needed services to children with a variety of learning, psychiatric, and developmental disorders. Brain–behavior relationships are investigated by neuropsychologists by interpreting several aspects of an individual's cognitive, language, emotional, social, and motor behavior. Standardized instruments are used by neuropsychologists to collect information and derive inferences about brain–behavior relationships. 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 should not only evaluate the underlying processes necessary for efficient thinking and behavior but also provide for the development of effective interventions and address the question of prognosis.

FROM NEUROPSYCHOLOGY THEORY TO ASSESSMENT

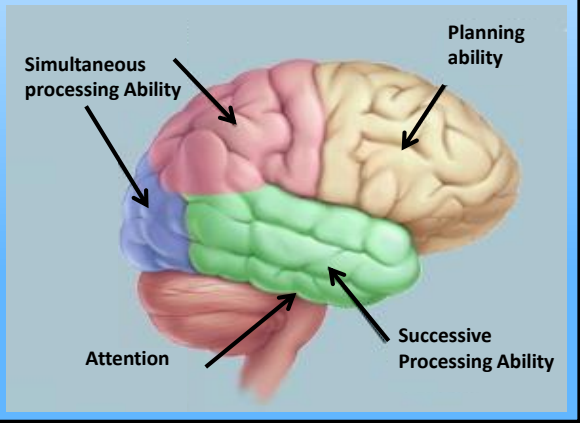
Luria's theoretical account of dynamic brain function is perhaps one of the most complete (Lewandowski & Scott, 2008). Luria conceptualized four interconnected levels of brain–behavior relationships and neurocognitive disorders that the clinician needs to know: the structure of the brain, the functional organization based on structure, syndromes and impairments arising in brain disorders, and clinical methods of assessment (Korkman, 1999). His theoretical formulations, methods, and ideas are articulated in works such as *Higher cortical functions in man* (1966, 1980) and *The Working Brain* (1973). Luria viewed the brain as a functional mosaic, the parts of which interact in dif-

nclusions

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.



Five Dimensions of Executive Function

Five Dimensions of Executive Function

IQ defined by BRAIN function

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

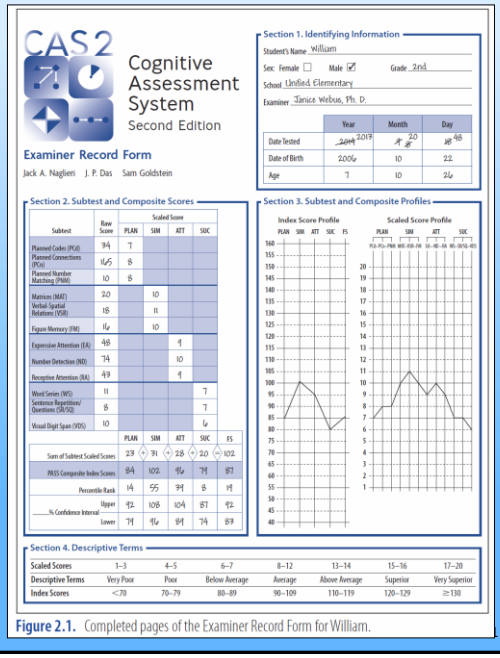
CAS2 (Ages 5-18 yrs.)

Five

Five Dimensions of Executive Function

CAS2

- CAS2 Yields PASS and Full Scale score but ALSO
- Executive Function which is the combination of a Planning and Attention subtests
- Also: Working Memory, Verbal, Nonverbal and a Visual and Auditory comparison


CAS2 Cognitive Assessment System Second Edition

Examiner Record Form

Jack A. Naglieri J. P. Das Sam Goldstein

Section 1. Identifying Information

Student's Name William

Sex: Female ☐ Male ☑ Grade 2nd

School Unified Elementary

Examiner Janice Webus, Ph. D.

	Year	Month	Day
Date Tested	2019	2	18
Date of Birth	2006	10	22
Age	7	10	26

Section 2. Subtest and Composite Scores

Subtest	Raw Score	Scaled Score PLAN	SIM	ATT	SUC
Planned Codes (PCd)	34	7			
Planned Connections (PCn)	165	8			
Planned Number Matching (PNM)	10	8			
Matrices (MAT)	20		10		
Verbal-Spatial Relations (VSR)	18		11		
Figure Memory (FM)	16		10		
Expressive Attention (EA)	48			9	
Number Detection (ND)	74			10	
Receptive Attention (RA)	49			9	
Word Series (WS)	11				7
Sentence Repetition/ Questions (SR/SQ)	8				7
Visual Digit Span (VDS)	10				6

	PLAN	SIM	ATT	SUC	FS
Sum of Subtest Scaled Scores	23	31	28	20	102
PASS Composite Index Scores	84	102	96	79	97
Percentile Rank	14	55	39	8	19
95% Confidence Interval Upper	92	108	104	87	92
95% Confidence Interval Lower	79	96	89	74	89

Section 3. Subtest and Composite Profiles

Index Score Profile

Scaled Score Profile

Section 4. Descriptive Terms

Scaled Scores	1–3	4–5	6–7	8–12	13–14	15–16	17–20
Descriptive Terms	Very Poor	Poor	Below Average	Average	Above Average	Superior	Very Superior
Index Scores	<70	70–79	80–89	90–109	110–119	120–129	≥130

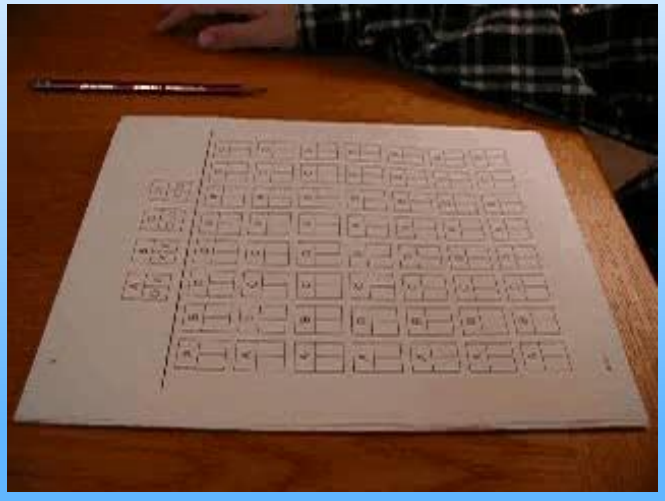
Figure 2.1. Completed pages of the Examiner Record Form for William.

Five Dimensions of Executive Function

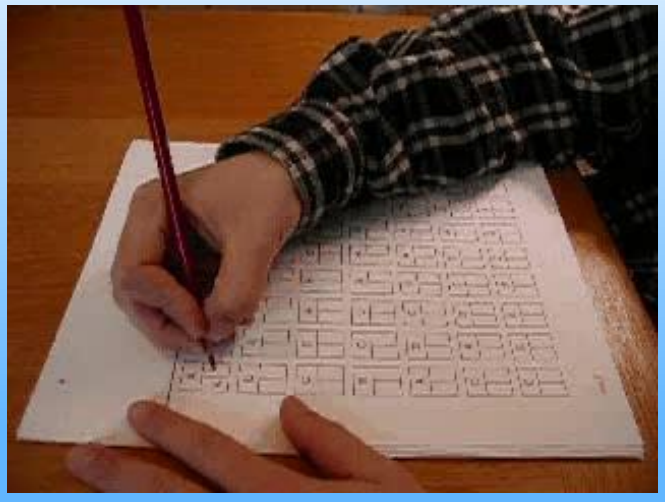
PASS Theory: Planning

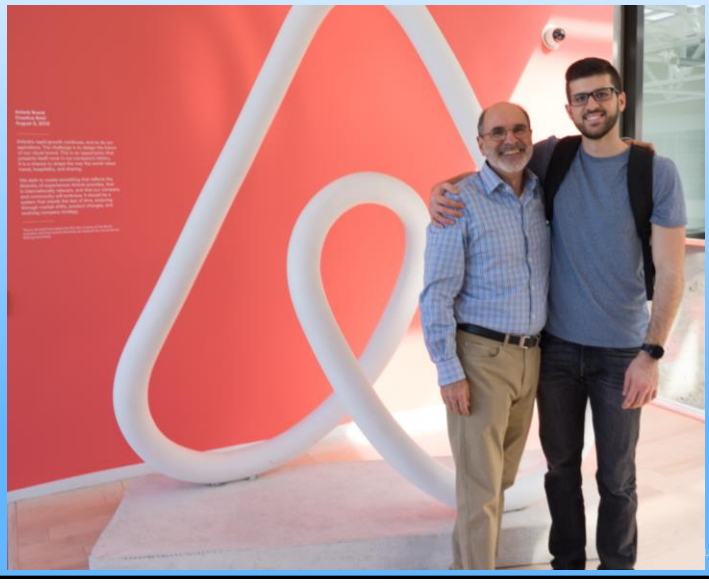
- **Planning** is a neurocognitive ability that a person uses to determine, select, and use efficient solutions to problems
  - problem solving
  - developing plans and using strategies
  - retrieval of knowledge
  - impulse control and self-control
  - control of processing

Planned Codes 1



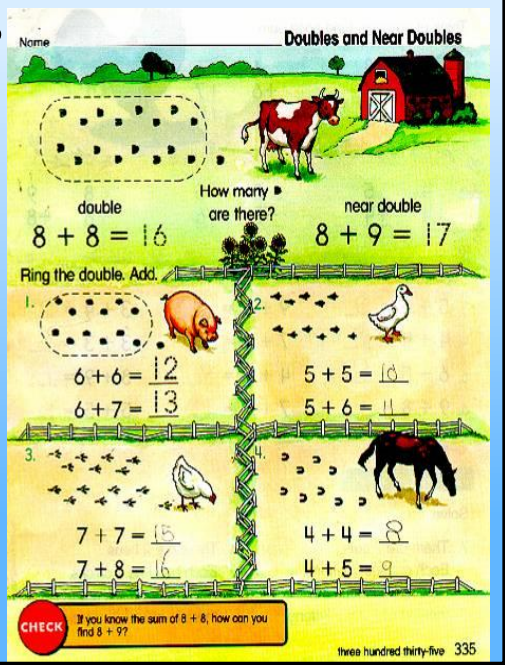
Planned Codes Page 2





Math Strategies

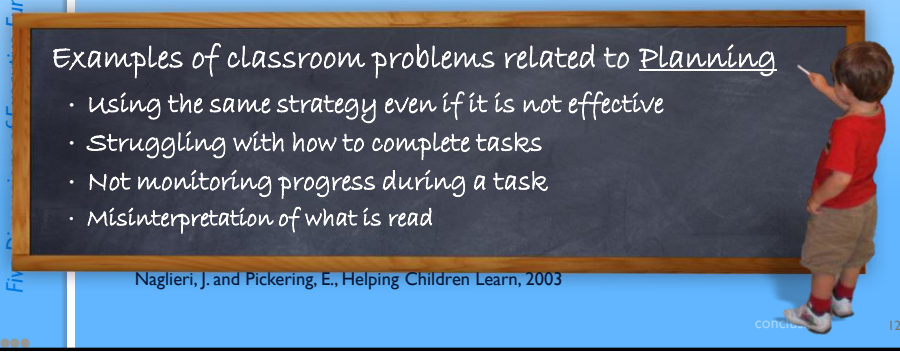
Note to the Teacher:
When we teach children skills by helping them use strategies and plans for learning, we are teaching both knowledge and processing. Both are important.



PASS Theory: Planning

Planning

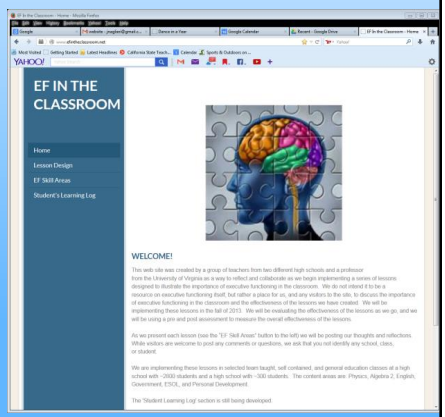
- Evaluate a task
- Select or develop a strategy to approach a task
- Monitor progress during the task
- Develop new strategies when necessary



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

Another Lesson from www.efintheclassroom.net

www.Efintheclassroom.net



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

Five Dimensions of Executive Function

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.

Five Dimensions of Executive Function

Antwerp train Station (2009)

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)

Five Dimensions of Executive Function

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)

Five Dimensions of Executive Function

Planning Lesson Student responses

Q5: How do you use planning in this class?

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

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

Like the Seinfeld video

This Planning Lesson

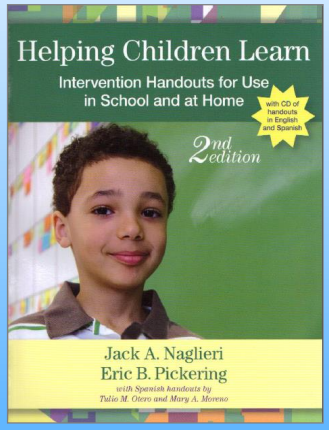
- This lesson brings to light the important distinction between planning over a long time (what was just shown) and real time planning

EF Instruction

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

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.



Five Dimensions of Executive Function

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.

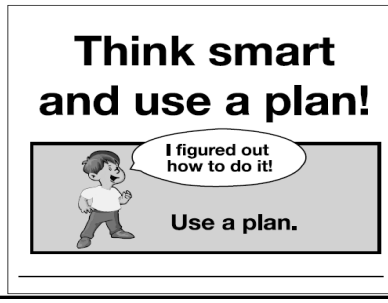
Talk with Students

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.



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!

Talk with Students

Five Dimensions of Executive Function

Teaching Students About Planning

How Learning Depends on Planning Ability

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

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

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

How to Teach Planning

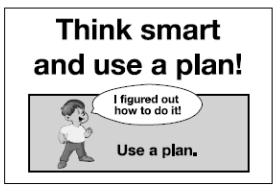


Figure 1. A drawing that helps students remember to use a plan.

The first step in teaching 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

Five Dimensions of Executive Function

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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HAMMILL INSTITUTE ON DISABILITIES

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http://journaloflearningdisabilities.sagepub.com
SAGE

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

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

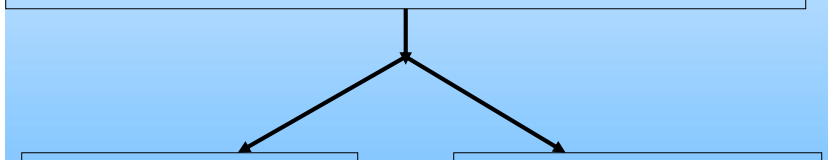
Abstract

The authors examined the effectiveness of cognitive strategy instruction b
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 sin
when provided the PASS-based cognitive strategy instruction.

Design of the Study

Experimental and Comparison Groups

7 worksheets with Normal Instruction



Experimental Group	Comparison Group
19 worksheets with Planning Facilitation	19 worksheets with Normal Instruction

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

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

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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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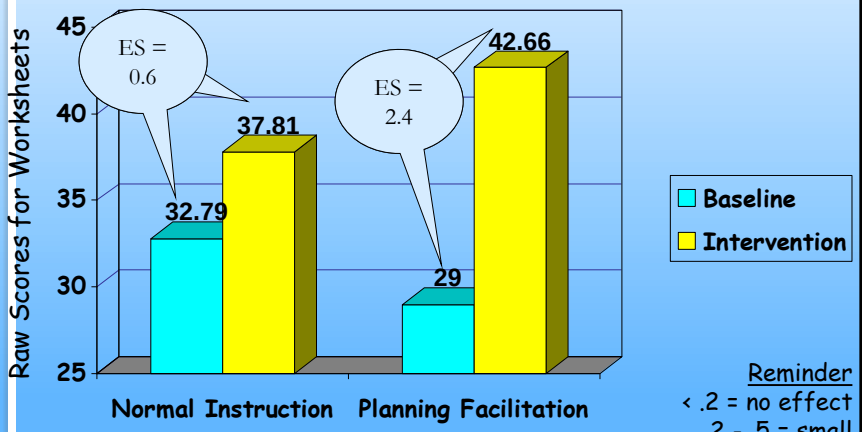
Student Plans

- "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."

Worksheet Means and Effect Sizes for the Students with ADHD



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

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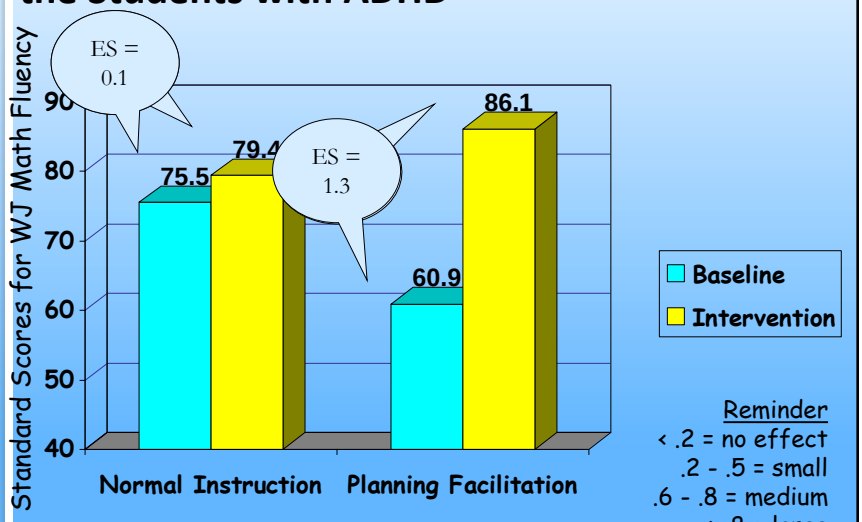
WJ Math Fluency Means and Effect Sizes for the Students with ADHD



Reminder
< .2 = no effect
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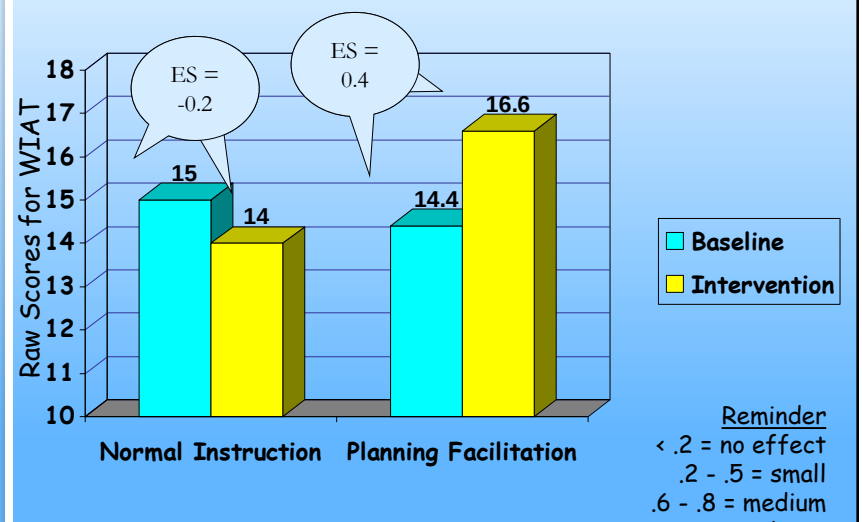
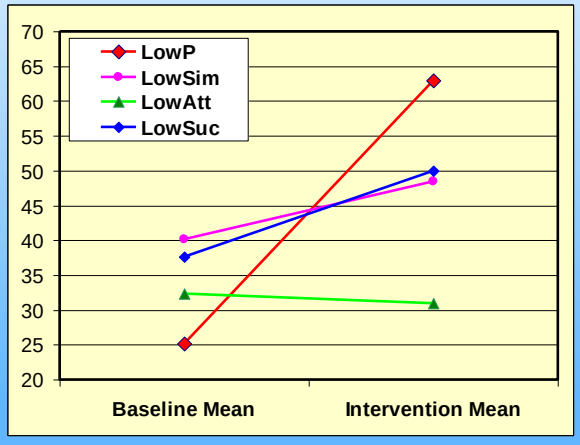
WIAT Numerical Operation Means and Effect Sizes for Students with ADHD



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

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

Five Dimensions of Executive Function

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)

EF and Reading Comprehension

Journal of Psychoeducational Assessment
2003, *21*, 282-289

PLANNING FACILITATION AND READING COMPREHENSION: INSTRUCTIONAL RELEVANCE OF THE PASS THEORY

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Kyrene School District, Tempe, Arizona

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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

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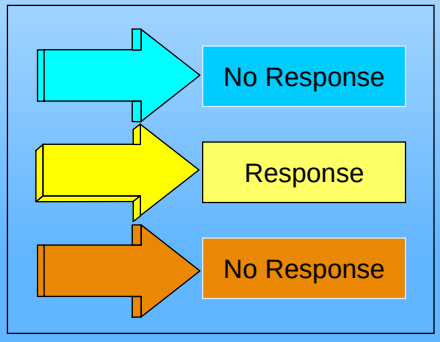
Five Dimensions of Executive Function

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



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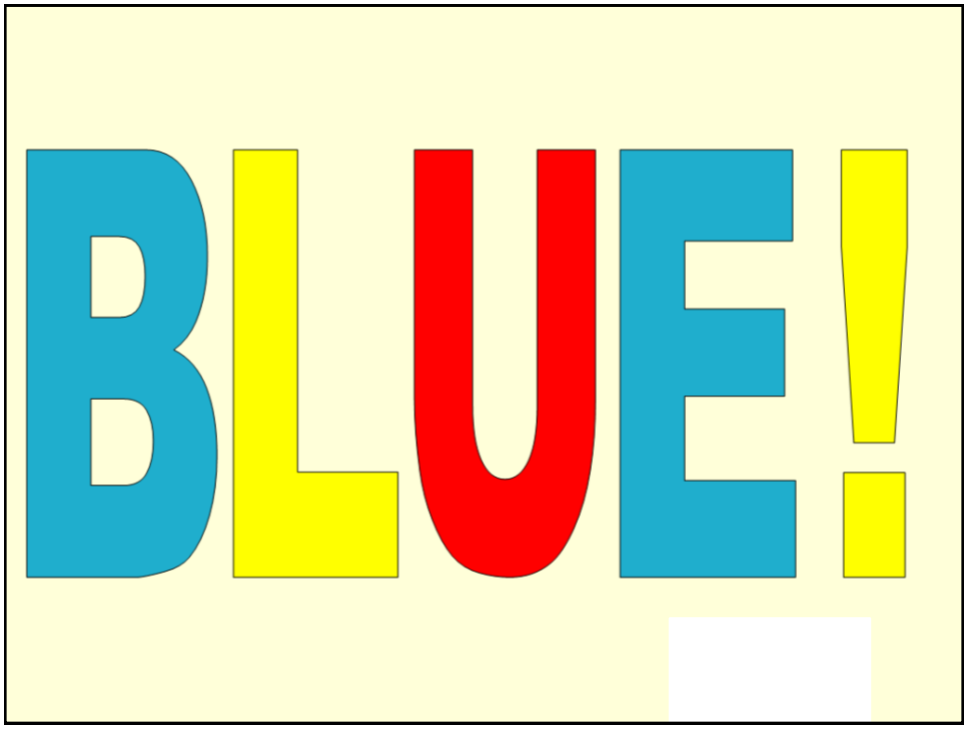
Attention Test Instructions:
You will see words like

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 ?



Expressive Attention - Italiano

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

Five Dimensions of Executive Function

conclusions 160

Expressive Attention – Korean CAS

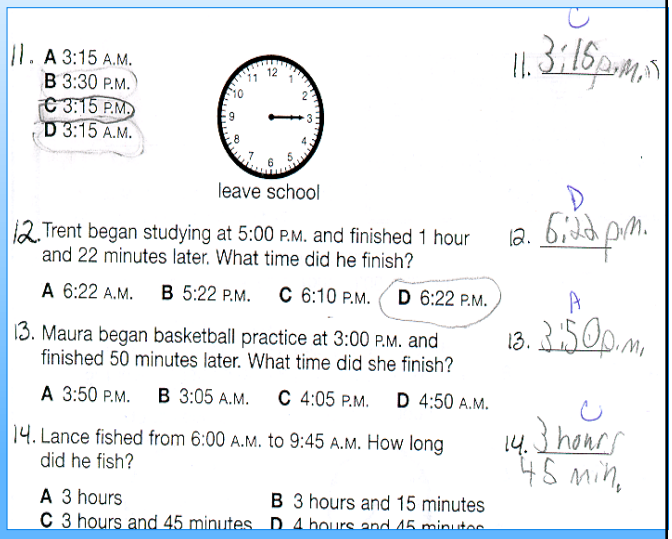
- The child says the color not the word

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

Five Dimensions of Executive Function

Attention

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



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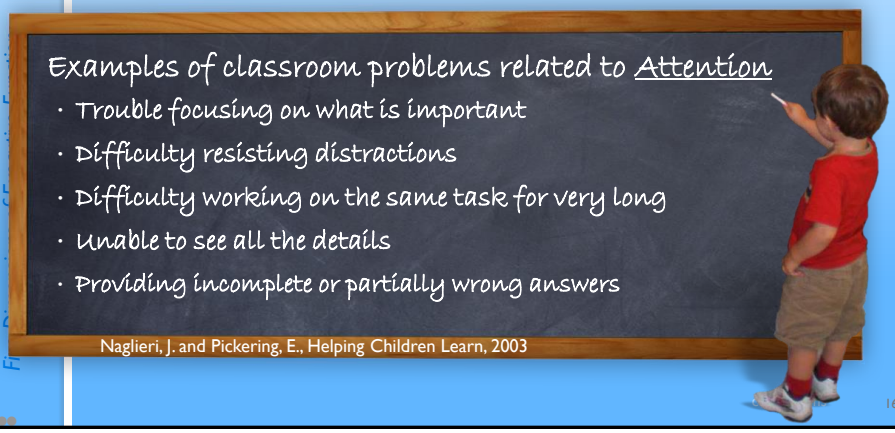
PASS Theory: Attention

Attention

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



Interventions for EF Behaviors

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

Five Dimensions of Executive Function

Five Dimensions of Executive Function

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.

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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.

Attention Lesson

Five Dimensions of Executive Function

OK

EF in the Classroom

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

Five Dimensions of Executive Function

Five Dimensions of Executive Function

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

Five Dimensions of Executive Function

WHAT IS NOT EF IN PASS

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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

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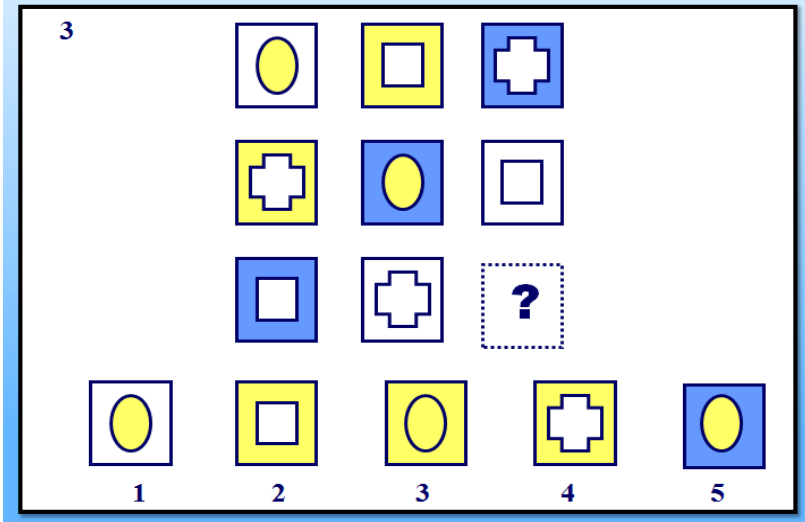
Progressive Matrices



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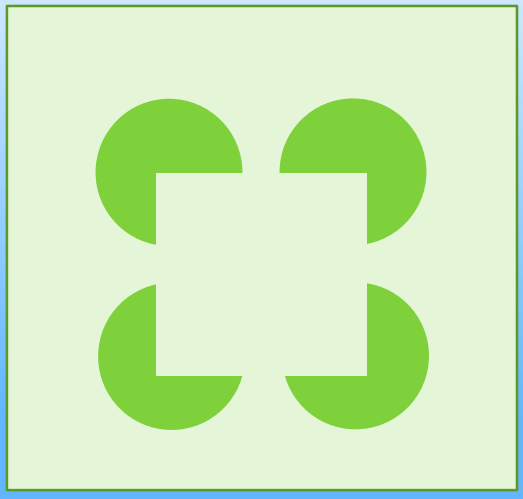
PASS Theory

- **Simultaneous** processing is what Gestalt psychology was based on
- Seeing the whole



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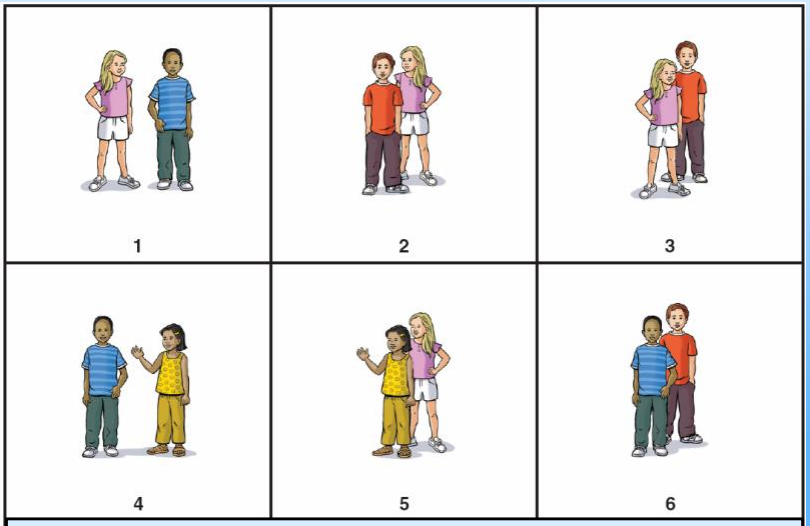
Verbal-Spatial Relations



Which picture shows a boy behind a girl?

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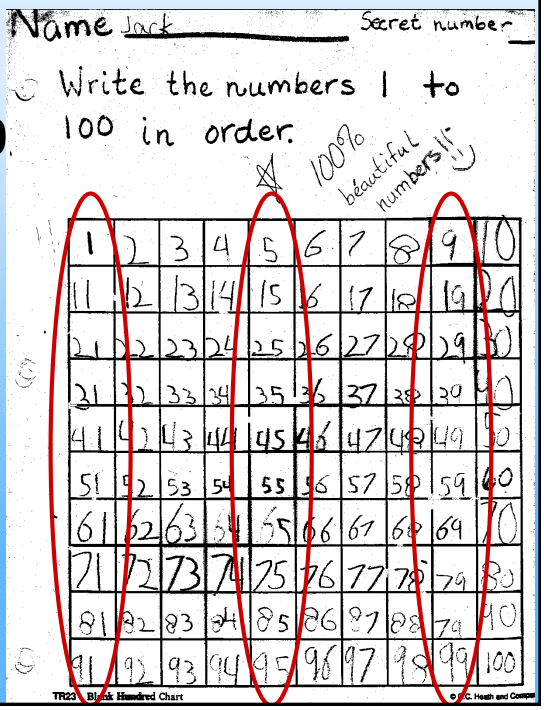
Numbers from 1 to 100

How can EF be brought to this Work sheet?

Use Simultaneous processing to see that patterns



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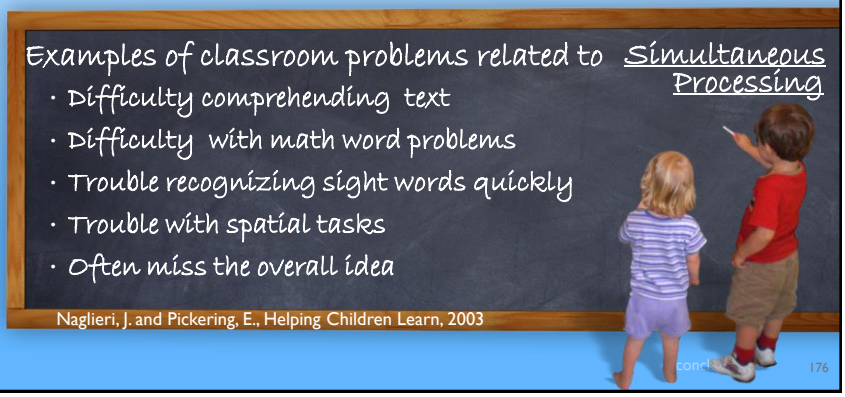
PASS Theory: Simultaneous

Simultaneous Processing

- Relate separate pieces of information into a group
- See how parts related to whole
- Recognize patterns



Use EF to manage low Simultaneous

- How do you help a child with low simultaneous ability?
- Teach students to USE EF STRATEGIES
- What kinds of strategies could you use for tasks that require seeing the whole?

Use EF

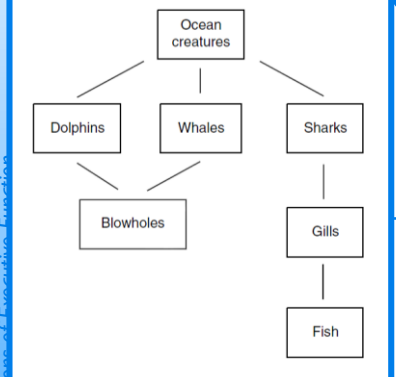


Figure 1. One kind of graphic organizer.

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.

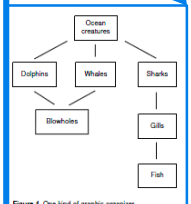


Figure 1. One kind of graphic organizer.

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.

Venn Diagram

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

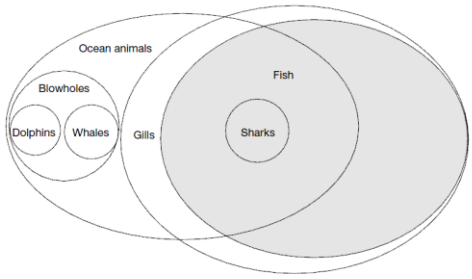
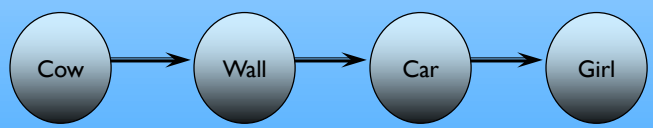


Figure 2. A Venn diagram used as a graphic organizer.

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.

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



Five Dimensions of Executive Function

Sentence Questions (Ages 8-17)

- The child answers a question read by the examiner

1. The blue is yellow. Who is yellow?

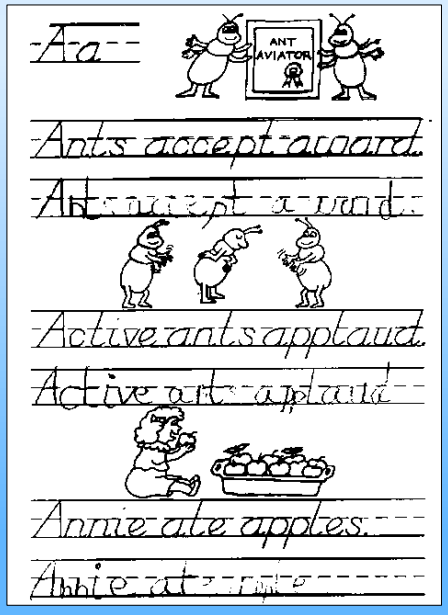
10. The red greened the blue with a yellow. Who used the yellow?

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?

Five Dimensions of Executive Function

Successive

The sequence of the sounds is emphasized in this work sheet



PASS Theory: Successive

Successive Processing

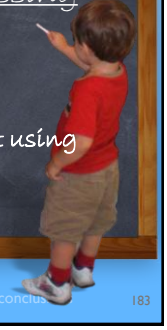
- Use information in a specific order
- Follow instructions presented in sequence

Five Dimensions of Executive Function

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

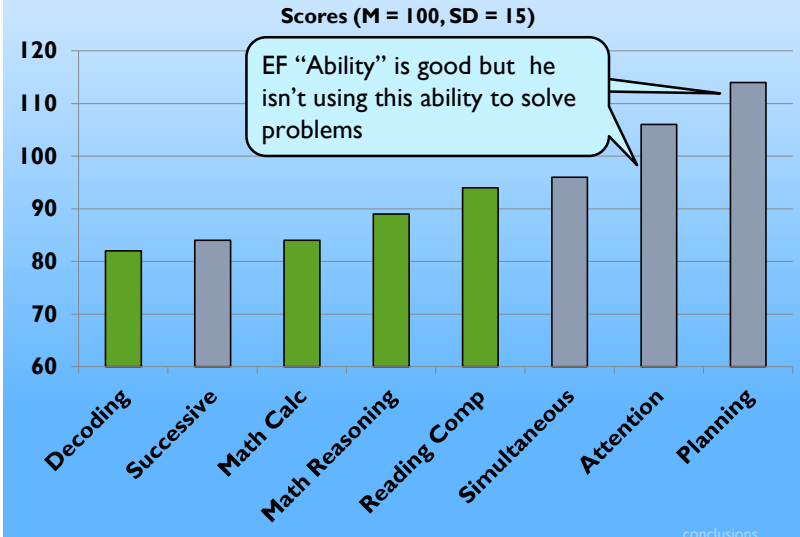


Ben's Problem with Successive Processing

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

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

Ben's Problem with Successive processing Ability



Five Dimensions of Executive Function

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	

Five Dimensions of Executive Function

Five Dimensions of Executive Function

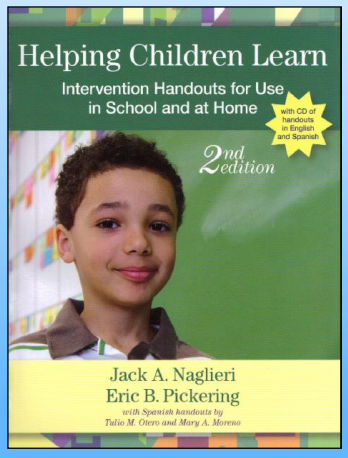
Ben's Problem with Successive Ability

- 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?

Five Dimensions of Executive Function

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.



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.

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

Ben's Problem with Successive Ability

- Teach him to use his strength in Planning

How to Be Smart: Planning

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

What Does Being Smart Mean?

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

Ben's Problem with Successive Ability

- Teach him to recognize sequences

How to Teach Successive Processing Ability

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

Ben's Problem with Successive Ability

- Teach him to use strategies

Chunking for Reading/Decoding

Segmenting Words for Reading/Decoding and Spelling

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

How to Teach Segmenting Words

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

Teaching Children to use EF

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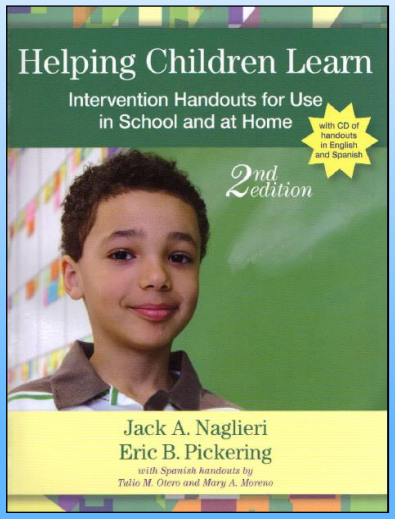

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Step 1 – Talk with Students

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Step 1 – Talk with Students

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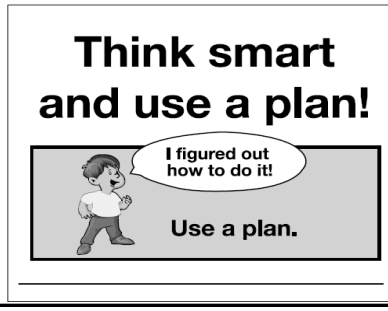

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Time to Think and Talk

- **Task:**
- Discuss in your groups
  - EF as intelligence?
  - Not on Wechsler…?
- Your own questions and thoughts..
- Report to the audience

Five Dimensions of Executive Function

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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

Presentation Outline

- Comprehensive Model of EF
  - Historical Perspective
  - Definitions of Executive Function
- EF as Behavior
  - EF in the Classroom or Clinic
- EF as an Ability (an intelligence)
- EF as Social Emotional Skills
- Academic
- Impairment and EF
- Research about EF as ability, behavior, and SEL
- Conclusions

Five Dimensions of Executive Function

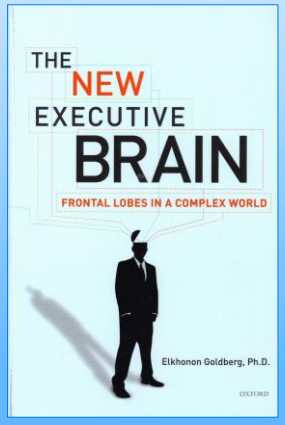
Phineas had Social Emotional deficit

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

Five Dimensions of Executive Function

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'



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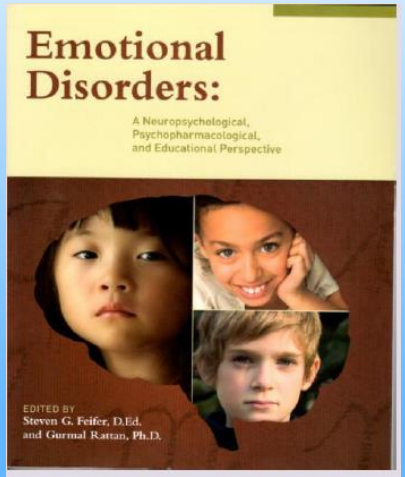
Feiffer & Rattan (2009)

- Provide a collection of paper on the relationship between EF and Emotional Disorders
- See Feifer@comcast.net



www.schoolneuropsychpress.com

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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*).

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Social Emotional Skills: From Conceptual to Assessment to Instruction

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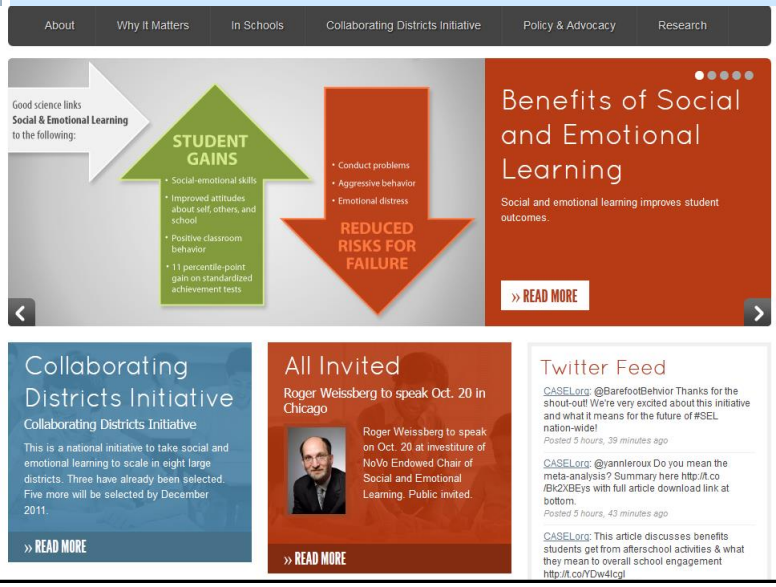
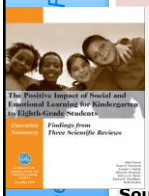
www.casel.org



Skills for Social and Academic Success

Research Links SEL to Higher Success

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



And Reduced Risks for Failure

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

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

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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]

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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)

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conclusions

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)

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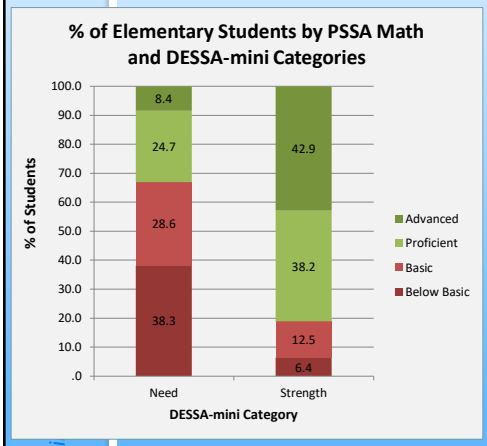
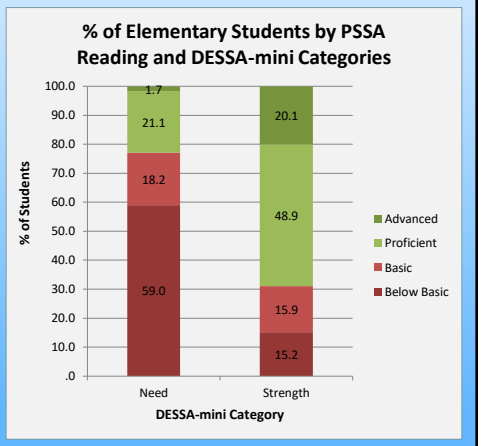
Relationship Between Academic Achievement and Social-Emotional Competence





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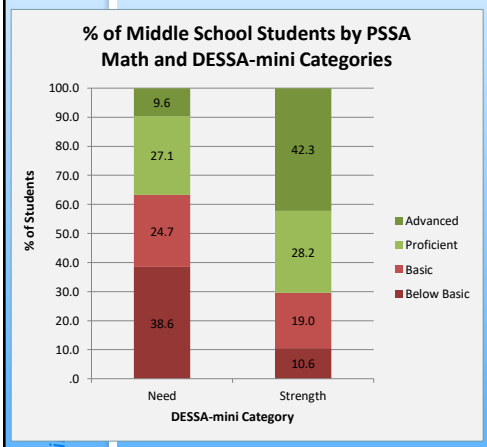
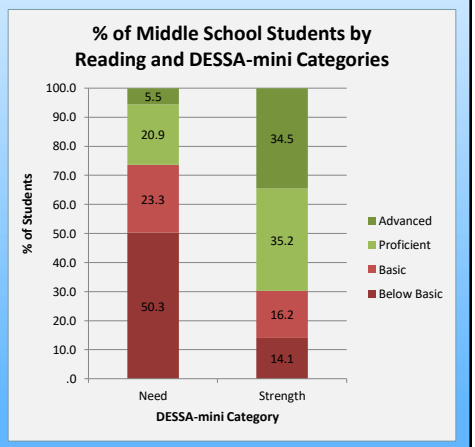
Relationship Between Academic Achievement and Social-Emotional Competence





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conclusions

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Predictive Validity

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 ($p < .001$)

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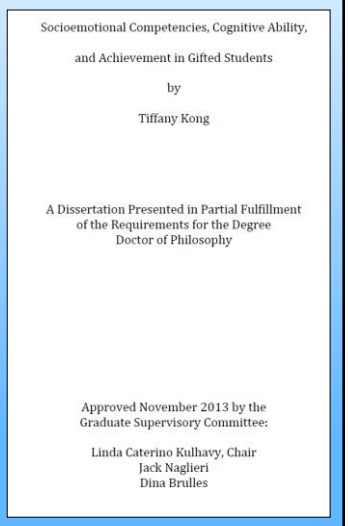
Kong (2013): IQ, SEL & Achievement

- 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

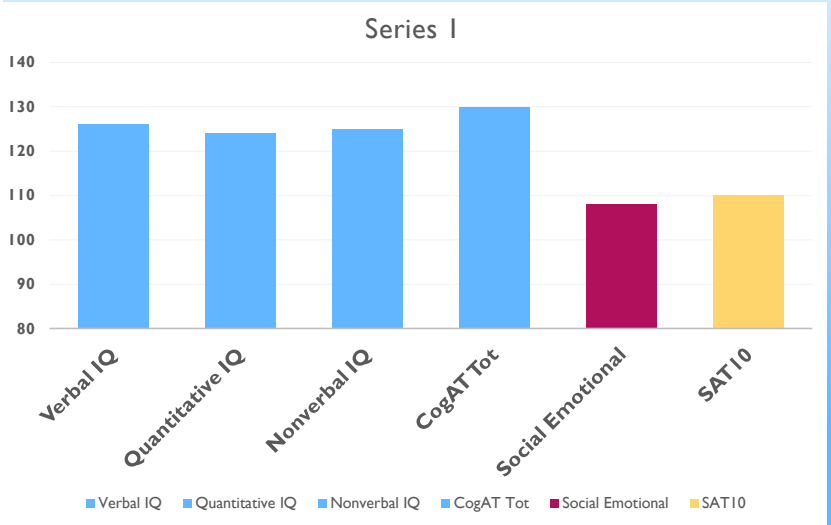
A Dissertation Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy

Approved November 2013 by the Graduate Supervisory Committee:

Linda Caterino Kulhavy, Chair
Jack Naglieri
Dina Brulles

Five Dimensions of Executive Function

Ability, Social Emotional & Skills



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Kong (2013): IQ, SEL & Achievement

- DESSA Total correlated .44 and CogAT Total correlated .36 with Total Achievement (reading, math, language)
  - A clearer picture of the relationships between IQ (CogAT) and SEL (DESSA) with achievement was obtained from hierarchical regression analysis…

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

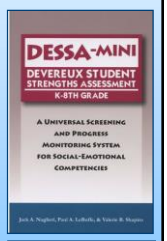
DESSA predicted reading, language and math scores over IQ (CogAt) scores

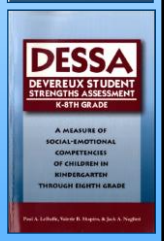
Relations between Cognitive Ability, Socioemotional Competency, and Achievement Variables

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.

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

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http://www.centerforresilientchildren.org/

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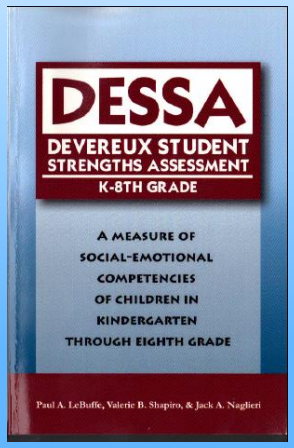
Assessment of Social Emotional Skills with the DESSA



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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

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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		

Five Dimensions of Executive Function

CASEL and DESSA Scales

1. **Self-awareness**—being able to ac and strengths; maintaining a well-
2. **Self-management**—being able to control impulses, and persevere progress toward personal and ac
3. **Social awareness**—being able to others; recognizing and appreciat differences; recognizing and usin
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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]

Social Emotional Composite

- Self Awareness
- Self Management
- Social Awareness
- Relationship Skills
- Decision Making
- Goal Directed Behavior
- Personal Responsibility
- Optimistic Thinking

Five Dimensions of Executive Function

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

Interventions for DESSA

Five Dimensions of Executive Function

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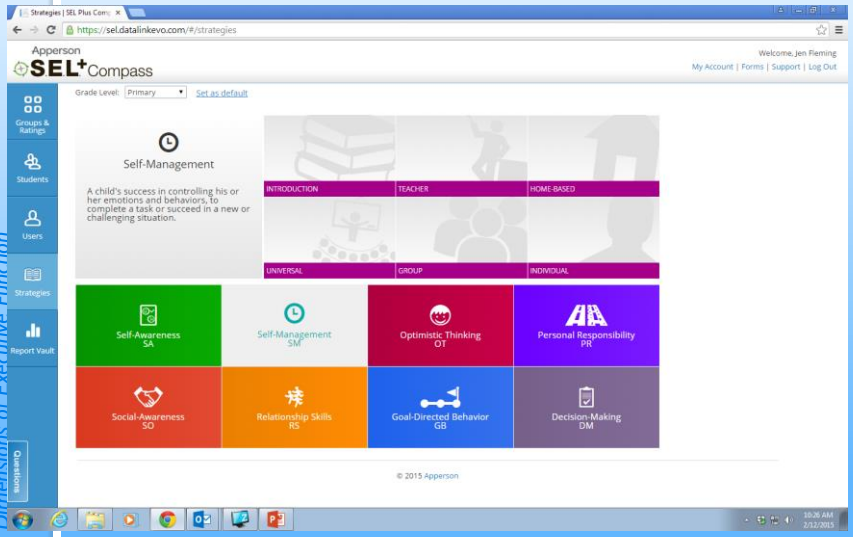

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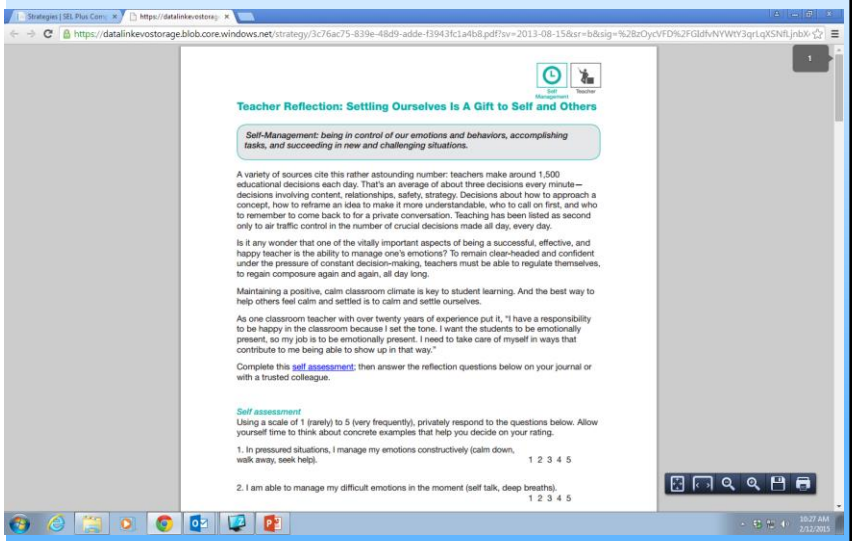
Five Dimensions of Executive Function



Teacher Reflection: Settling Ourselves Is A Gift to Self and Others

Self-Management: being in control of our emotions and behaviors, accomplishing tasks, and succeeding in new and challenging situations.

A variety of sources cite this rather astounding number: teachers make around 1,500 educational decisions each day. That's an average of about three decisions every minute—decisions involving content, relationships, safety, strategy. Decisions about how to approach a concept, how to reframe an idea to make it more understandable, who to call on first, and who to remember to come back to for a private conversation. Teaching has been listed as second only to air traffic control in the number of crucial decisions made all day, every day.

Is it any wonder that one of the vitally important aspects of being a successful, effective, and happy teacher is the ability to manage one's emotions? To remain clear-headed and confident under the pressure of constant decision-making, teachers must be able to regulate themselves, to regain composure again and again, all day long.

Maintaining a positive, calm classroom climate is key to student learning. And the best way to help others feel calm and settled is to calm and settle ourselves.

As one classroom teacher with over twenty years of experience put it, "I have a responsibility to be happy in the classroom because I set the tone. I want the students to be emotionally present, so my job is to be emotionally present. I need to take care of myself in ways that contribute to me being able to show up in that way."

Complete this self assessment; then answer the reflection questions below on your journal or with a trusted colleague.

Self assessment

Using a scale of 1 (rarely) to 5 (very frequently), privately respond to the questions below. Allow yourself time to think about concrete examples that help you decide on your rating.

1. In pressured situations, I manage my emotions constructively (calm down, walk away, seek help). 1 2 3 4 5

2. I am able to manage my difficult emotions in the moment (self talk, deep breaths). 1 2 3 4 5

conclusions

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HOW TO EMPOWER STUDENTS' MINDSET

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Mountain View Alternative HS

For Inspiration: Good Example of Growth Mindset

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Two Mindsets

Fixed mindset:

- ✧Effort will not make a difference
- ✧You either get it or you don't

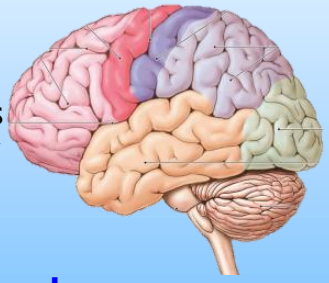
Growth mindset:

- ❖Enjoy effort and the process of learning
- ❖ You can always grow and learn

Five Dimensions of Executive Function

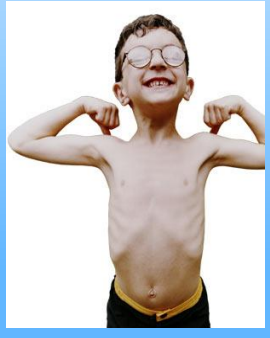
Mindsets + Skillsets = Results

- Mindsets & Skillsets include
  - Brain-based concepts such as
    - Executive Function
    - Metacognition
    - Self-Regulation
  - **These concepts are all closely related to the FRONTAL LOBES of the brain.**



Formula for Success (Kryza, 2013)

Mindsets plus **Skill Sets** equals **RESULTS!**



Five

PG. 12

Measure of Mindset (From Naglieri & Otero, 2017)

Measure of Mindset (Child & Adolescent)

Jack A. Naglieri & Kathleen M. Kryza - Copyright © 2015

Name _____

Date _____

Instructions: These 10 questions ask about how you think and feel. The answers you give can help us know your thoughts about how you learn. Please read every question carefully and circle the number under the word that tells what you do.

	Never	Sometimes	Most times	Always
1 I don't give up easily.	0	1	2	3
2 When things get hard I say, "I Can do it"	0	1	2	3
3 When I fail I try harder until I get it done.	0	1	2	3
4 I believe that I can learn from my mistakes.	0	1	2	3
5 I think I can do almost anything if I try hard enough.	0	1	2	3
6 When I don't understand something I give up.	0	1	2	3
7 I do not like to be challenged.	0	1	2	3
8 When work is hard I think, "I can not do it."	0	1	2	3
9 When things get hard I do something else.	0	1	2	3
10 When I fail I do something else that is more fun.	0	1	2	3

Figure 5.2 Measure of Mindset: Child & Adolescent Version

Measure of Mindset (Teacher & Parent)

Jack A. Naglieri & Kathleen M. Kryza - Copyright © 2015

Name _____

Date _____

Instructions: These 10 questions ask about a child or adolescent's attitudes toward learning. Please read every question carefully and circle the number under the word that tells what you have observed about your child.

	Never	Sometimes	Most times	Always
1 He/she doesn't give up easily.	0	1	2	3
2 When things get hard he/she says, "I can do it!"	0	1	2	3
3 Failure leads him/her to try harder until the task is finished.	0	1	2	3
4 He/she views failure as an important part of learning.	0	1	2	3
5 He/she believes that you can do anything if you try hard enough.	0	1	2	3
6 He/she is afraid of failure.	0	1	2	3
7 When things get hard he/she avoids the work.	0	1	2	3
8 He/she believes that hard work usually does not pay off.	0	1	2	3
9 He/she is fast to give up on a task.	0	1	2	3
10 He/she sees failure as proof of a person's limitations.	0	1	2	3

Figure 5.3 Measure of Mindset: Teacher & Parent Version

Five Dimensions of Executive Function

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

Five Dimensions of Executive Function

Task Initiation

- Students with any kind of learning challenge and many without any limitations need to be able to solve their own problems and be self-reliant
- Stuck on the Escalator video
- Discuss what the message is with the students

Low EF and an Enabled Society

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."

Time to Think and Talk

- **Task:**
- Discuss in your groups
  - EF as Social Emotional Skills?
- Your own questions and thoughts..
- Report to the audience

Five Dimensions of Executive Function

conclusions

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

Five Dimensions of Executive Function

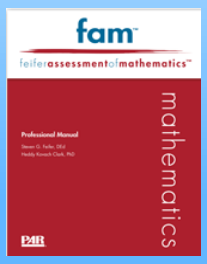
conclusions 238

Presentation Outline

- Comprehensive Model of EF
  - Historical Perspective
  - Definitions of Executive Function
- EF as Behavior
  - EF in the Classroom or Clinic
- EF as an Ability (an intelligence)
- EF as Social Emotional Skills
- Academic
- Impairment and EF
- Research about EF as ability, behavior, and SEL
- Conclusions

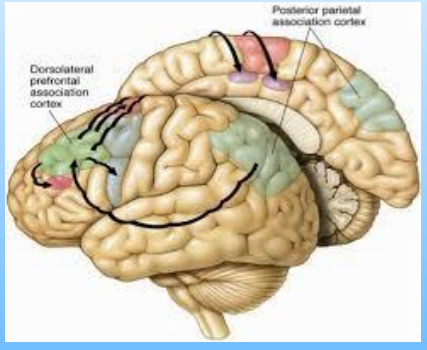
Academics Skills and EF

- Feifer Assessment of Reading (FAR) includes tasks that are sensitive to EF
  - Reading Comprehension Index
  - Silent Reading Fluency
- Feifer Assessment of Math (FAM) includes tasks that are also sensitive to EF
  - Semantic Index



Five Dimensions of Executive Function

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

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		

Five Dimensions of Executive Function

Silent Reading Fluency & EF

- 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)**

Five Dimensions of Executive Function

How to Pair Far & CAS2

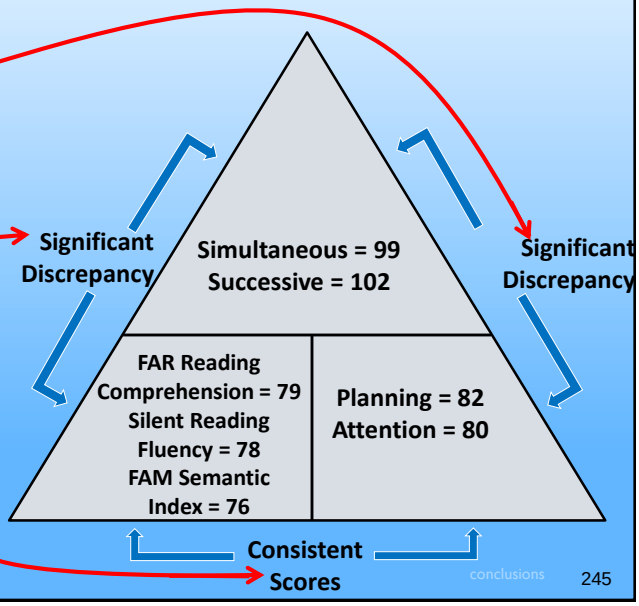
- **CAS2 -** determine if there is a cognitive processing weakness (i.e. **Planning**) and whether that particular weakness directly impacts the academic skill in question (Reading Comprehension) on the FAR.

- **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

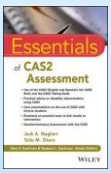
Discrepancy Consistency Model for SLD

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



Five Dimensions of Executive Function

Naglieri & Feifer (2017)



Rapid Reference 5.4

Reading Comprehension Strategies to Improve Planning and Attention

Stop and Start Technique:
The student reads a passage out loud, and every 30 seconds the teacher says "stop" and asks questions about the story. Eventually the time interval is lengthened.

Directional Questions:
Ask questions at the beginning of the text instead of the end so students can become more directional readers.

Story Maps:
This is a prereading activity in which graphic organizers are used to outline and organize information prior to reading the text.

Narrative Retelling:
Have the child retell the story after reading it aloud.

Read Aloud:
Reading out loud enables students to hear their own voices and can facilitate working memory.

Multiple Exposure:
Encourage students to skim the material on reading for the first time with an emphasis on chapter and text headings. Read for detail on the second exposure of the text.

Active Participation:
Encourage active reading by getting children in the habit of note-taking or putting asterisks next to important material in the text.

Create Questions:
Have students write their own test questions about the material.

Reduce Anxiety:
Anxiety inhibits working memory and leads to ineffective recall. Children who are anxious about reading out loud in front of their classmates should be provided an opportunity to read in a "safety zone" in class. This may also help to eliminate distractions as well.

Practice Terminology:
Practice defining new terms and concepts prior to reading material with dense language. Vocabulary enrichment is often the key to improving comprehension.

Five Dimensions of Executive Function

Planning Interventions

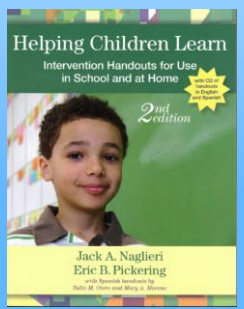
1. **Directional Questions** – ask questions at the beginning of the text instead of the end.
2. **Multiple Exposures**– encourage students to skim the material prior to reading, with emphasis on chapter and text headings.
3. **SOAR to SUCCESS** - A comprehension program for grades 3-6 to help students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

Five Dimensions of Executive Function

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**



Time to Think and Talk

- **Task:**
- Discuss in your groups
- What academic tasks do you see that requires EF?
- Your own questions and thoughts..
- Report to the audience

Presentation Outline

- Comprehensive Model of EF
  - Historical Perspective
  - Definitions of Executive Function
- EF as Behavior
  - EF in the Classroom or Clinic
- EF as an Ability (an intelligence)
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- Academic
- Impairment and EF
- Research about EF as ability, behavior, and SEL
- Conclusions

Rating Scale of Impairment & EF

- EF and Impairment …

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.

Five Dimensions of Executive Function

Standardization

- RSI Normative Sample:
  - **2800** ratings
    - **800** ratings for each of the RSI (5-12 Years) Parent and Teacher forms
    - **600** ratings for each of the RSI (13-18 Years) Parent and Teacher forms
- Within **1% the 2010 U.S. Census** targets on:
  - Race/ethnicity,
  - Region,
  - PEL
- Includes 11.6%-11.8% of clinical cases

conclusions

Five Dimensions of Executive Function

RSI Forms and Scores

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

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Five Dimensions of Executive Function

Factorial Support for RSI Scales

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

Five Dimensions of Executive Function

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

VIRGINIA DEPARTMENT OF EDUCATION

Guidance on
Evaluation and Eligibility
for the
Special Education Process

Educational Identification and Medical Diagnosis

Prescriptions, diagnosis, or reports issued by licensed medical professionals, using medical diagnosis and classification systems such as the International Statistical Classification of Diseases and Related Health Problems (ICD) and Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM 5), must be considered but are not sufficient to make an eligibility determination. The group must consider information from multiple sources that documents the presence of an impairment, the adverse impact on educational performance, and the need for specially designed instruction.

When a medical diagnosis is presented, groups should address the difference between educational identification under IDEA and medical diagnosis and review the criteria for the specific disability category mandated by the Virginia special education regulations.

Students may meet the criteria for educational identification as a child with a disability under one of the federal disability categories without having a medical diagnosis. It is also possible for a student to have a medical diagnosis but not meet the criteria for an educational identification as a child with a disability.

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Presentation Outline

- Comprehensive Model of EF
  - Historical Perspective
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conclusions

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Executive Function Behaviors, Intelligence, and Achievement test scores

EF and Achievement (Naglieri & Rojahn, 2004)

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

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

EF and Achievement (Naglieri & Rojahn, 2004)

- Correlation between Executive Function (Planning + Attention) and overall achievement (Skills Cluster) = **.51** (N = 1,559; $p < .001$)
- P&A added significantly to the prediction of achievement after Simultaneous and Successive scores were used in the regression equation

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

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

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

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

Five Dimensions of Executive Function

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

Five Dimensions of Executive Function

Take Away Messages

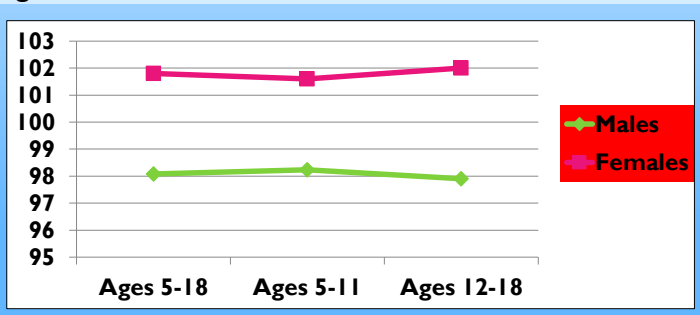
- EF behaviors are significantly correlated with scores from a nationally normed test of academic skills (WJ-III)
- EF behaviors are significantly correlated with all four PASS scales
- EF behaviors are mostly correlated with WISC-IV Verbal scale which requires a lot of knowledge

Sex Differences in Executive Function

CEFI Sex Differences: Parent Raters

- Girls are Smarter than Boys

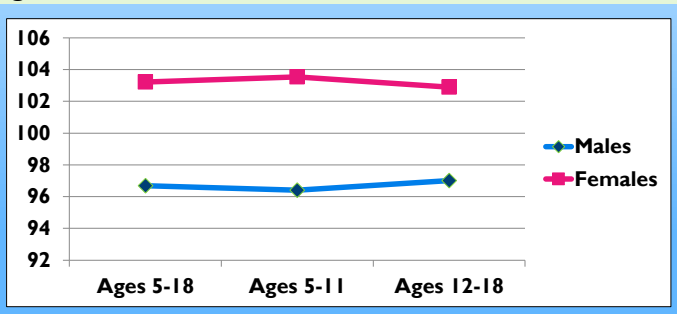
Parents	N	Mn	SD	N	Mn	SD	ES
Ages 5-18	700	**98.1**	14.9	699	**101.8**	15.0	**-0.25**
Ages 5-11	350	**98.2**	14.3	349	**101.6**	15.6	**-0.22**
Ages 12-18	350	**97.9**	15.4	350	**102.0**	14.4	**-0.28**



CEFI Sex Differences: Teacher Raters

- Girls are Smarter than Boys

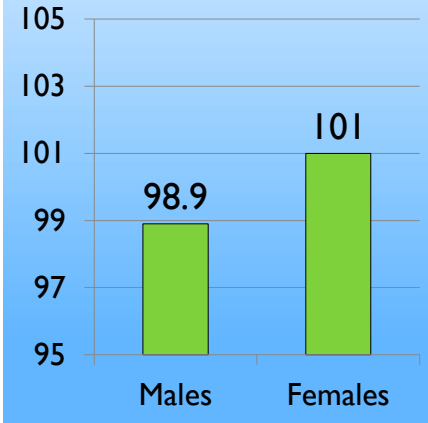
Teachers	N	Mn	SD	N	Mn	SD	ES
Ages 5-18	700	**96.7**	14.4	700	**103.2**	15.0	**-0.44**
Ages 5-11	350	**96.4**	14.5	350	**103.5**	14.9	**-0.49**
Ages 12-18	350	**97.0**	14.4	350	**102.9**	15.0	**-0.40**



Five Dimensions of Executive Function

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

Five Dimensions of Executive Function

Sex Differences: Ability

Journal of Educational Psychology
2001, Vol. 93, No. 2, 430–437

0022-0663/01/$5.00 DOI: 10.1037//0022-0663.93.2.430

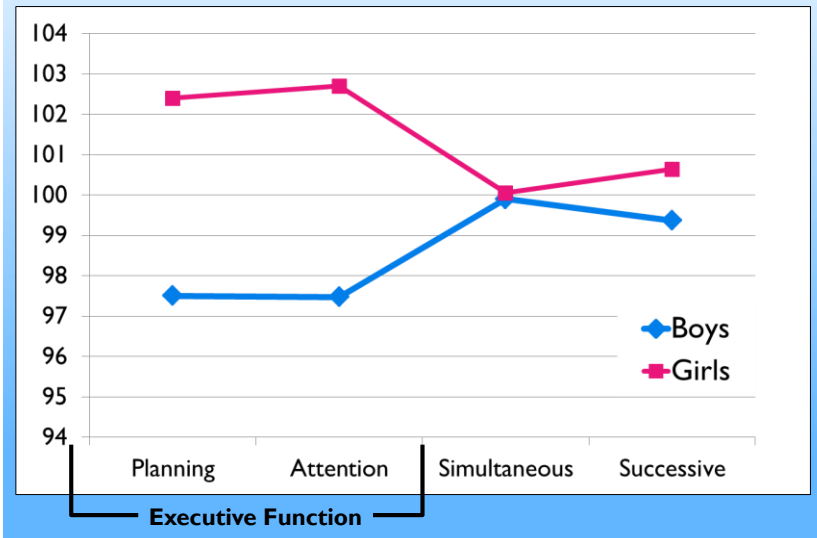
Gender Differences in Planning, Attention, Simultaneous, and Successive (PASS) Cognitive Processes and Achievement

Jack A. Naglieri
George Mason University

Johannes Rojahn
Ohio State University

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

Sex Differences: Ability



Five Dimensions of Executive Function

conclusions

Sex Differences: Social Emotional

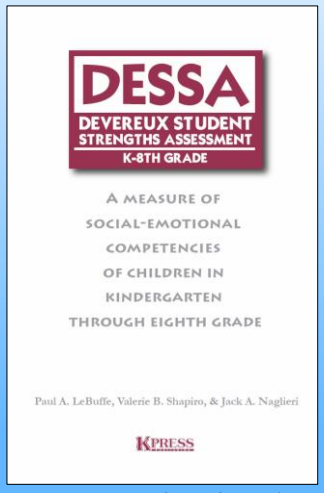


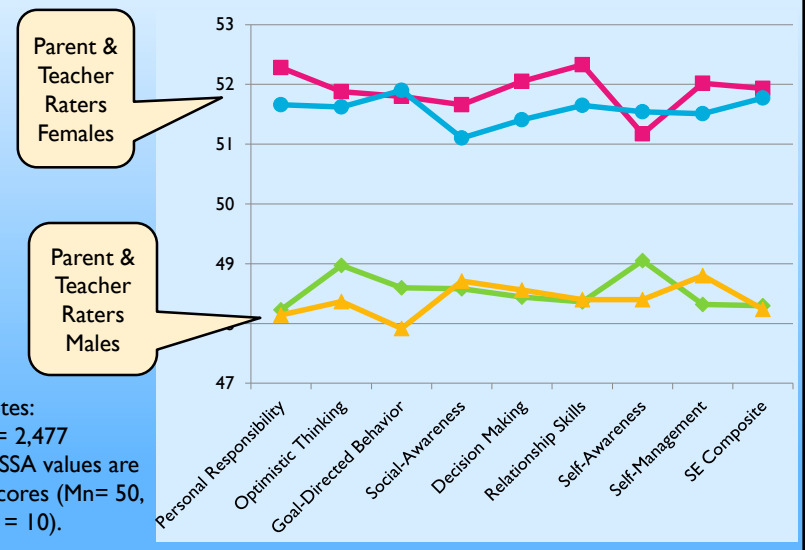
TABLE 2.6

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

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

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

Sex Differences: Social Emotional

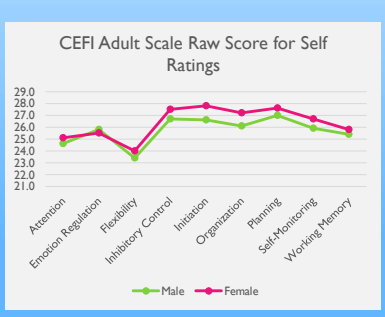


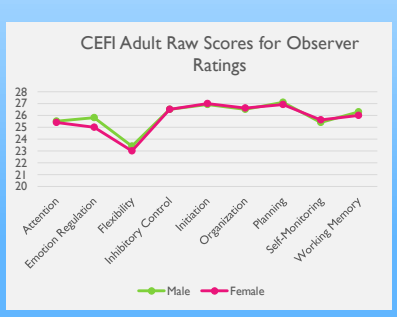
Notes:
N = 2,477
DESSA values are T-scores (Mn= 50, SD = 10).

Sex Differences

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





Five Dimensions of Executive Function

Five Dimensions of Executive Function

Developmental Differences in Executive Function

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Developmental Changes in EF

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

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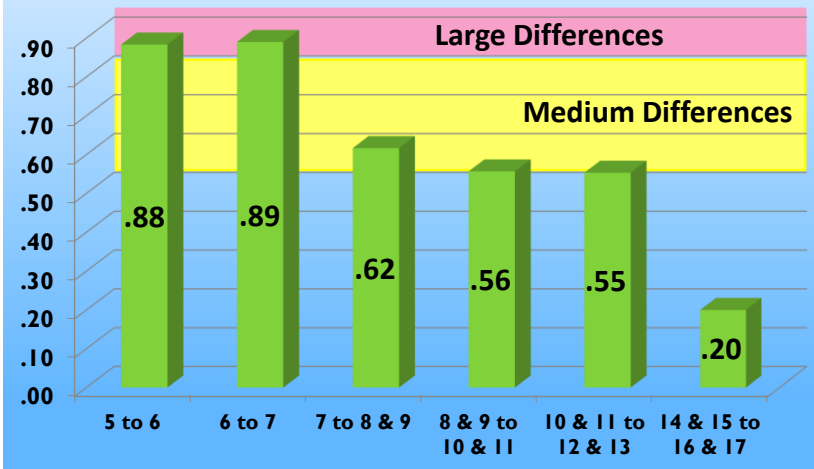
ABSTRACT

This study examined age-related changes in complex executive function (EF) in a large, representative sample ($N = 2036$) aged 5 to 17 using the Cognitive Assessment System (CAS; Naglieri & Das, 1997a). Relations between complex EF and academic achievement were examined on a sub-sample ($N = 1395$) given the Woodcock–Johnson Tests of Achievement–Revised (Woodcock & Johnson, 1989). Performance on the three complex EF tasks improved until at least age 15, although improvement slowed with increasing age and varied some across tasks. Moreover, the different developmental patterns in the correlations between completion time and accuracy provide clues to developmental processes. Examination of individual achievement subtests clarified the specific aspects of academic performance most related to complex EF. Finally, the correlation between complex EF and academic achievement varied across ages, but the developmental pattern of the strength of these correlations was remarkably similar for overall math and reading achievement, suggesting a domain-general relation between complex EF and academic achievement.

Developmental Changes in EF

- Best, et al (2011) reported means score differences between adjacent age groups of a large (N = 2, 036) nationally representative sample (CAS normative group)
- Results showed that EF does **not** develop consistently across the 5 year to 18 year age range
- Age differences were reported in effect sizes (.2 to .4 = small; .5 to .7 = medium; .8 and above = large)

Developmental Changes in EF



Five Dimensions of Executive Function

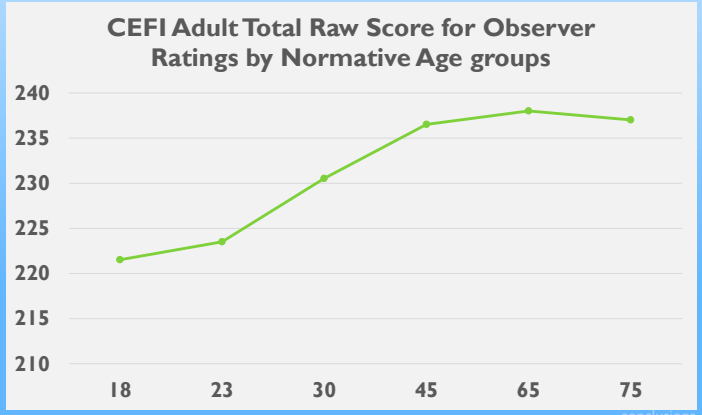
Developmental Changes in EF

- 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

Five Dimensions of Executive Function

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 ($p < .01$).



Presentation Outline

- Comprehensive Model of EF
  - Historical Perspective
  - Definitions of Executive Function
- EF as Behavior
  - EF in the Classroom or Clinic
- EF as an Ability (an intelligence)
- EF as Social Emotional Skills
- Academic
- Impairment and EF
- Research about EF as ability, behavior, and SEL
- Conclusions

Conclusions

- The goal of education should be to give the student knowledge of facts ***and*** to encourage the use of Executive Function
- When we give students the responsibility to figure out how to do things we teach them to **THINK SMART! and use EF**
- **This is the gift of smarter thinking**
- **This is a gift of optimism**
- **This is a gift for life success**
- **EF is about LIFE not just school**

Five Dimensions of Executive Function