Executive Function: From Theory to Assessment and Effective Classroom Instruction

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Presentation Outline

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

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

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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 child's life

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Executive Function Goals

➢ Today we will be *thinking about thinking*

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

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

➢ The goal is to engage the frontal lobes

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➤ Conclusions

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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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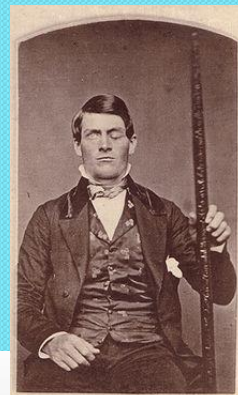
Fleishman (2002, p 70)

➢ 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

"HORRIBLE ACCIDENT" IN VERMONT • 7

Fleishman (2002)

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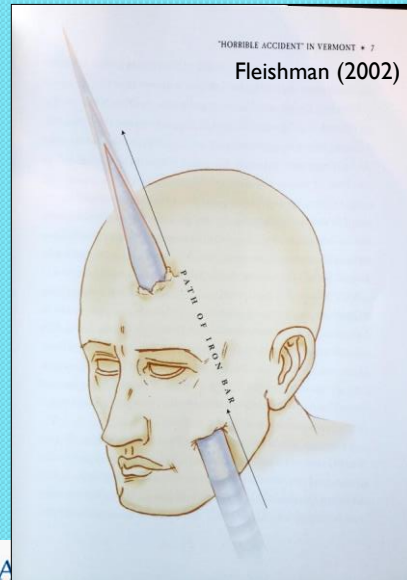
Before . . . & . . . After

➢ **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 – management of intellect, behavior and emotion

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More Specifically

Dorsolateral prefrontal cortex

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

➢That is: planning and decision making, self monitoring, self correction, especially when responses are not well-rehearsed or contain novel sequences of actions.
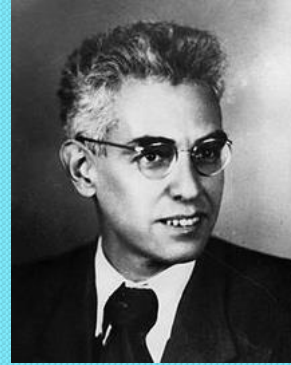
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Frontal Lobes and Executive Function(s)

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

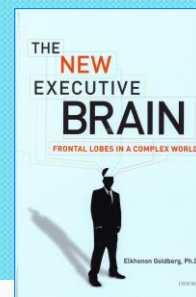LEARNING & the BRAIN

1902 - 1977

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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…"

THE NEW EXECUTIVE BRAIN
FRONTAL LOBES IN A COMPLEX WORLD

Elkhonon Goldberg, Ph.D.

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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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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 Function**s** 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?

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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

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

➤ The sample ...

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Item Factor Analyses – Part 1

90 Item factor analysis clearly indicted that one factor was the best solution

Eigenvalue

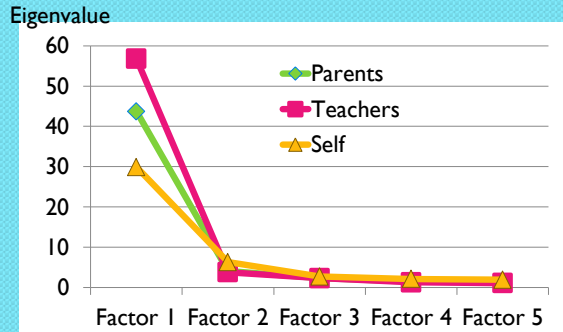Table 8.2. Eigenvalues from the Inter-Item Correlations

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

Note. Extraction ncipal Axis Factoring. Only the first 10 eigenvalues are presented.

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Item Factor Analyses – Part 1

EFA for item groups: Attention, Emotion Regulation, Flexibility, Inhibitory Control, Initiation, Organization, Planning, Self-Monitoring, and Working Memory scales
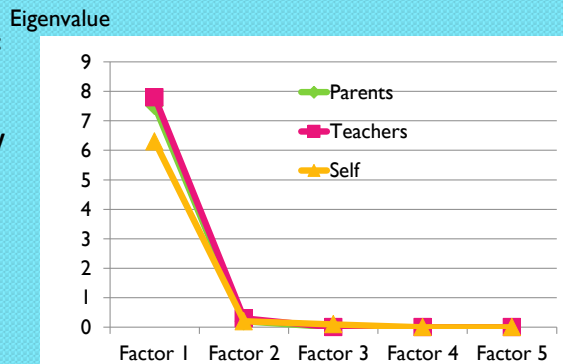
Eigenvalue

Table 8.4. Eigenvalues of the CEFI Scales Correlations

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

Note. Extraction method: Png.

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EXPLORATORY FACTOR ANALYSES

Table 8.6. Consistency of Factor Loadings Across Groups

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

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

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EXPLORATORY FACTOR ANALYSES

➤Conclusions

• When using parent (N = 1,400), teacher (N = 1,400), or self-ratings (N = 700) based on behaviors observed and reported for a nationally representative sample (N = 3,500) aged 5 to 18 years Executive Function *not* function**s** is the best term to use

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EF's Learning Curves

➢ Learning depends upon instruction and intelligence (&EF)
➢ At first, intelligence plays a major role in learning
➢ When a new task is learned and practiced it becomes a skill and execution requires less intelligence

Maximum Use | **Role of Ability** .... **Role of Knowledge and Skills**

Minimum Use

Novel Task .... Well Learned Task

Over time and with experience
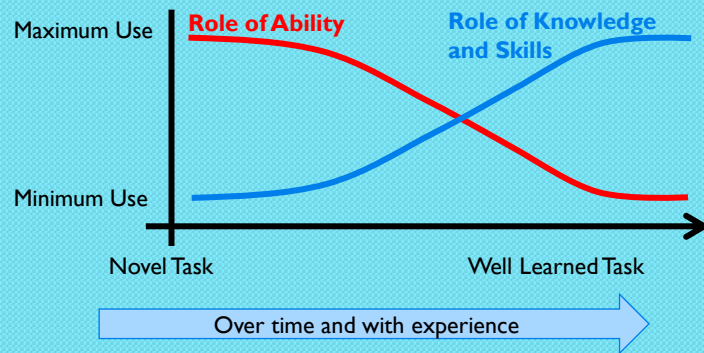
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Executive Function Involves

➢ *"How* you decide *what* to do" demands…

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

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A look at some EF Rating Scales

Sam Goldstein · Jack A. Naglieri
Editors

Handbook of
**Executive
Functioning**

Springer

From Handbook of
Executive Function
(Goldstein & Naglieri, 2014)

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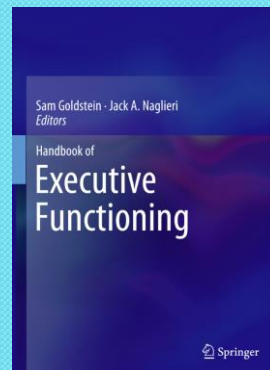
EF Rating Scales

➢Measures real world behavior
➢Able to sample multiple sources (self, parents, teachers)
➢Efficient ways to evaluate EF
➢However
- self-ratings may be limited by impaired self-awareness
- Observers may not be good at observing !
- The quality of EF rating scales varies considerably

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Behavior Rating Inventory of Executive Functioning (BRIEF)

BRIEF
Behavior Rating
Inventory of
Executive Function
PROFESSIONAL MANUAL

PAR

STANDARDIZATION

Demographic Characteristics

The goal of the sampling procedure for the normative group was to approximate the population of the United States according to key demographic variables: gender, socioeconomic status (SES), ethnicity, age, and geographical population density. The normative data samples were obtained through public and private school recruitment in urban, suburban, and rural settings in the State of Maryland, which has a full range of ethnicities, socioeconomic classes, and population densities. A total of 25 schools were sampled, including 12 elementary, 9 middle, and 4 high schools. A small subgroup of ratings of adolescents ($n = 18$) was obtained from the normal control group in a study of patients with traumatic brain injury at Case Western Reserve University in Cleveland, Ohio (Turkstra, 2000).

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Educational Attainment

Annual averages of Educational Attainment by State for persons 25 years old and over based on 2000 Census (American National Standards Institute)

State	2009		
	High school graduate or more	Bachelor's degree or more	Advanced degree or more
United States	85.3	27.9	10.3
1 Massachusetts	89.0	38.2	16.4
2 Maryland	88.2	35.7	16.0
3 Connecticut	88.6	35.6	15.5
4 Virginia	86.6	34.0	14.1
5 New York	84.7	32.4	14.0
6 Vermont	91.0	33.1	13.3
7 New Jersey	87.4	34.5	12.9
8 Colorado	89.3	35.9	12.7
9 Illinois	86.4	30.6	11.7
10 Rhode Island	84.7	30.5	11.7

Median household income for the US is $50,022 and for Maryland is $64,596

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BRIEF-Adolescent (N=1,118)

STANDARDIZATION

Demographic Characteristics of the Normative Sample

The goal of the sampling procedure for the normative group was to approximate the U.S. population according to key demographic variables: age, gender, race/ethnicity, parent education, and geographical population density. The normative data samples were obtained through public and private school recruitment in urban, suburban, and rural settings in Maryland, Ohio, Vermont, New Hampshire, Florida, and Washington state. Combined, these environments offer a full range of races/ethnicities, socioeconomic classes, and population densities.

BRIEF-SR
Behavior Rating
Inventory of
Executive Function-
Self-Report Version

PROFESSIONAL MANUAL

Steven C. Guy, PhD
Peter K. Isquith, PhD
Gerard A. Gioia, PhD

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Delis-Rating of Executive Function

Delis-Rating of Executive Function (D-REF)

Author(s): Dean C. Delis

A quick measure of an individual's behaviors related to executive function difficulties

At a Glance:

Administration: On-line (paper available)

Completion Time: 5-10 minutes per form

Scores: T scores; Composite level

Report Options: Single rater parent, teacher, or child reports; multiple rater reports, progress monitoring report

Qualification level: B-Level

Publication Date: 2012

Ages / Grades: Individuals 5–18 years old

Reading Level: 4th grade

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Standardization Sample

➢ Manual states that the samples (Parent Raters N = 500; Teacher Raters N = 342; Self Ratings N = 220) are representative of the US population (ages 5-18 years)

Description and Representativeness of the Sample

The D-REF normative data are based on national samples representative of the U.S. population ages 5–18 years. Tables 3.1, 3.2, and 3.3 provide a comparison of the sample demographics to U.S. census targets for the Parent, Teacher, and Self rating forms. An analysis of data gathered in 2010 by the U.S. Bureau of the Census provided the basis for stratification according to the following variables: age, sex, race/ethnicity, and education level. All examinees were

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Parent Form (N = 500)

Demographic Characteristics of the Normative Sample by Parent Education Level, Race/Ethnicity, Geographic Region, and Sex, by Age Group: Parent Form

	Parent Form											
	Age											
	5–6		7–8		9–10		11–12		13–14		15–18	
	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)
Parent Education Level												
Grade 11 or Less	13.0	11.7	11.0	11.7	8.6	10.7	5.7	10.4	6.7	10.2	10.0	9.8
High School or GED	23.0	24.1	25.0	26.0	28.6	26.5	27.1	25.7	25.0	26.9	27.0	26.1
Post Secondary	64.0	64.2	64.0	62.3	62.9	62.8	67.1	64.0	68.3	62.8	63.0	64.0
Race/Ethnicity												
African American	29.0	12.7	26.0	13.5	8.6	13.1	12.9	14.0	16.7	14.3	6.0	14.3
Hispanic	20.0	24.7	18.0	23.5	17.1	23.0	20.0	20.2	10.0	19.7	30.0	18.2
White	47.0	54.3	50.0	54.8	67.1	56.7	57.1	58.3	70.0	58.1	57.0	60.4
Other [b]	4.0	8.3	6.0	8.3	7.1	7.3	10.0	7.5	3.3	7.9	7.0	7.1
Geographic Region												
Northeast	31.0	15.8	37.0	17.3	12.9	16.7	5.7	16.8	1.7	18.6	8.0	17.6
Midwest	6.0	21.2	8.0	21.9	30.0	22.2	25.7	21.3	21.7	21.4	2.0	22.8
South	51.0	38.1	37.0	36.5	38.6	37.3	64.3	38.3	76.7	36.0	84.0	36.6
West	12.0	25.0	18.0	24.3	18.6	23.8	4.3	23.6	–	24.0	6.0	22.9
Sex												
Female	56.0	48.9	48.0	49.4	50.0	49.2	51.4	48.1	45.0	48.7	52.0	48.7
Male	44.0	51.1	52.0	50.6	50.0	50.8	48.6	51.9	55.0	51.3	48.0	51.3

Teacher Form (N = 342)

Table 3.2

Demographic Characteristics of the Normative Sample by Parent Education Level, Race/Ethnicity, Geographic Region, and Sex, by Age Group: Teacher Form

	Teacher Form											
	Age											
	5–6		7–8		9–10		11–12		13–14		15–18	
	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)
Parent Education Level												
Grade 11 or Less	9.2	11.7	10.5	11.7	10.0	10.7	6.0	10.4	10.0	10.2	14.0	9.8
High School or GED	25.0	24.1	25.0	26.0	27.5	26.5	28.0	25.7	28.0	26.9	40.0	26.1
Post Secondary	65.8	64.2	64.5	62.3	62.5	62.8	66.0	64.0	62.0	62.8	46.0	64.0
Race/Ethnicity												
African American	39.5	12.7	36.8	13.5	12.5	13.1	14.0	14.0	8.0	14.3	8.0	14.3
Hispanic	10.5	24.7	17.1	23.5	15.0	23.0	12.0	20.2	6.0	19.7	34.0	18.2
White	44.7	54.3	39.5	54.8	60.0	56.7	64.0	58.3	80.0	58.1	50.0	60.4
Other [b]	5.3	8.3	6.6	8.3	12.5	7.3	10.0	7.5	6.0	7.9	8.0	7.1
Geographic Region												
Northeast	32.9	15.8	38.2	17.3	–	16.7	–	16.8	–	18.6	2.0	17.6
Midwest	6.6	21.2	5.3	21.9	40.0	22.2	32.0	21.3	30.0	21.4	2.0	22.8
South	42.1	38.1	27.6	36.5	47.5	37.3	66.0	38.3	70.0	36.0	90.0	36.6
West	18.4	25.0	28.9	24.3	12.5	23.8	2.0	23.6	–	24.0	6.0	22.9
Sex												
Female	53.9	48.9	48.7	49.4	52.5	49.2	52.0	48.1	48.0	48.7	40.0	48.7
Male	46.1	51.1	51.3	50.6	47.5	50.8	48.0	51.9	52.0	51.3	60.0	51.3

Self Form (N = 220)

	Self Form					
	Age					
	11–12		13–14		15–18	
	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)	Sample (%)	U.S. Pop.[a] (%)
Parent Education Level						
Grade 11 or Less	4.0	10.4	8.0	10.2	11.7	9.8
High School or GED	30.0	25.7	24.0	26.9	25.8	26.1
Post Secondary	66.0	64.0	68.0	62.8	62.5	64.0
Race/Ethnicity						
African American	16.0	14.0	16.0	14.3	7.5	14.3
Hispanic	16.0	20.2	22.0	19.7	32.5	18.2
White	64.0	58.3	60.0	58.1	54.2	60.4
Other[b]	4.0	7.5	2.0	7.9	5.8	7.1
Geographic Region						
Northeast	6.0	16.8	2.0	18.6	8.3	17.6
Midwest	26.0	21.3	14.0	21.4	1.7	22.8
South	66.0	38.3	84.0	36.0	83.3	36.6
West	2.0	23.6	—	24.0	6.7	22.9
Sex						
Female	50.0	48.1	46.0	48.7	52.5	48.7
Male	50.0	51.9	54.0	51.3	47.5	51.3

Barkley's EF Scale

Barkley Deficits in Executive Functioning Scale— Children and Adolescents (BDEFS-CA)

Russell A. Barkley

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Barkley's EF Scale

The breakdown in educational categories for the parent respondents in comparison with the 2000 U.S. Census (*www.census.gov*) is shown in the following:

Education category	Normative sample	U.S. Census
Less than high school	4.1%	19.1%
High school (diploma or equivalency)	28.1%	28.6%
Some college, no degree	20.6%	21.0%
Associates degree	9.2%	6.3%
Bachelor's degree	22.6%	15.5%
Graduate degree	15.4%	8.9%

The present sample is generally comparable to the U.S. population in the percentage having high school diplomas or equivalency, some college, or associate's degrees but has a slight overrepresentation of individuals with bachelor's or graduate degrees. The sample also contains a lower percentage of those having less than a high school education than appear in the U.S. Census. The breakdown of educational levels of the nonrespondent parents follows: less than high school, 6.6%; high school, 20.6%; some college, no degree, 20.6%; associate's degree, 10.2%; bachelor's degree, 22.8%; graduate degree, 14.8%. These percentages are very similar to those for the respondent parents. The mean educational level for the children in the sample was 7.4 years ($SD = 3.5$, range = kindergarten [1] to 12th grade [13]), or roughly a mid-6th-grade education.

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Importance of a National Norm

➤ What is the problem with not scores based on a sample that is not representative of the U.S. populations?
  • You don't know how much the score you get is influenced by demographic variables
  • Let's look at some data …
➤ I created norms for groups of children based on PEL levels to see just how much influence this variable could have on a standard score (Mean = 100, SD = 15)

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Importance of a National Norm

Calibration of Standard Scores (Mn = 100; SD = 15) Across Parental Educational Levels for CEFI Parent Ratings.

Raw Score	<HS	HS Grad	Some Coll	Coll Grad	National
230	96	91	88	85	90
235	97	9_	_9	87	91
240	98	93	90	88	92
245	99	95	92	89	93
250	100	96	93	90	94
255	101	97	94	92	95
260	102	98	95	93	97
265	103	99	96	94	98
270	104	100	98	95	99
275	105	10_	99	96	100
280	106	102	100	98	101
285	107	103	101	99	102
290	108	105	102	100	103
295	109	106	103	101	105
300	110	107	105	103	106
305	111	108	106	104	107
310	112	109	107	105	108
315	113	110	108	106	109

10 points

8 points

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Take Away Messages

➢ Scores are only as good as the tests we use.

➢ The quality of the reference group can make a huge difference in the conclusions reached.

➢ Norms that represent a typical population are needed for all assessment tools.

➢ Only scores based on nationally representative samples can provide the accuracy and precision that we must have.

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Comprehensive Executive Function Inventory (CEFI)

Jack A. Naglieri
Sam Goldstein

A rating scale designed to measure behaviors association with Executive Function for ages 5-18 years rated by a parent, teacher, or the child/youth.
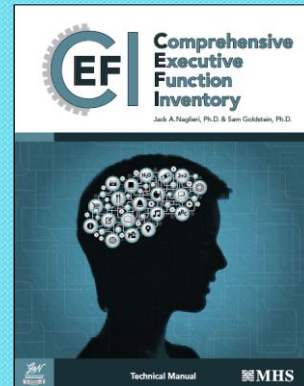
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CEFI and BRIEF

➢ The CEFI and BRIEF were compared using 320 parent, teacher, and self-ratings

➢ BRIEF yields T scores (50;10) scaled so that high scores indicate poor EF

- These scores were converted to the 100 & 15 metric and inverted so that both tests have the same scaling

➢ Group was diagnosed with ADHD

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Areas Operationalized: CEFI vs. BRIEF

CEFI		BRIEF	
Emotion Regulation	Control of emotions, staying calm when dealing with small problems, reacting with the right amount of emotion.	**Emotional Control**	Modulate emotional responses/mood appropriately
Flexibility	Ability to respond appropriately to changing or altered situations or different people/circumstances	**Shift**	Transition smoothly between or adapt to new activities/ situations; problem-solve flexibly
Impulse Control	Restraining impulses, reactions, or behavior	**Inhibit**	Control, delay or stop impulses/ behavior
Initiate	Willing exertion of physical or mental effort in pursuit of a goal	**Initiate**	Begin activity; generate ideas; start new tasks
Memory	Ability to store, retain, manipulate, & recall information	**Working Memory**	Hold information in mind to complete a task; sustain focus
Organization	Applying a structure or system for arranging or classifying objects & tasks; methodical and efficient behavior	**Organization of Materials**	Clean up after oneself
Planning	Holding a mental representation of intended action that guides behavior; outline of steps to complete a task/solve a problem	**Plan/Organize**	Anticipate future events; set goals; develop steps; grasp main ideas; think prospectively; follow a plan
Self/Performance Monitoring	Ability to attend to & evaluate ongoing behavior/outcomes to make necessary corrections for successful goal completion	**Monitor**	Check work; assess performance; monitor effect of behavior on others

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CEFI and BRIEF: ADHD

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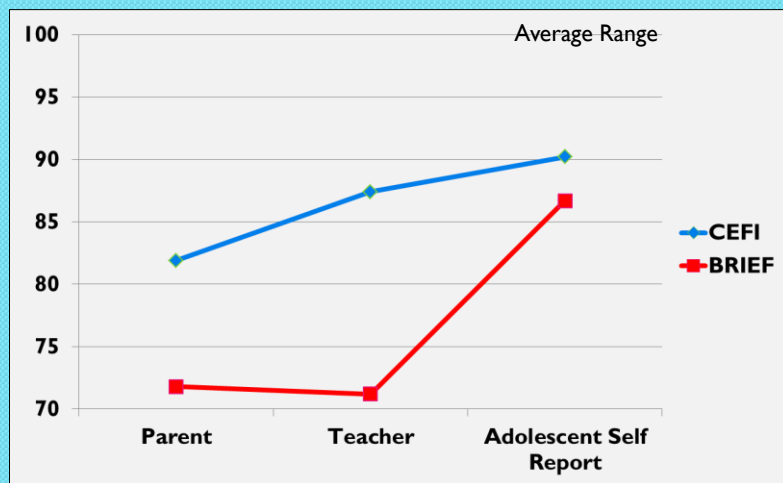
Take Away Messages

➤The strong correlations between CEFI and BRIEF provide evidence of validity.

➤The finding that BRIEF scores are more extreme illustrates the value of a nationally representative norm group

Calibration of Standard Scores (Mn = 100; SD = 15) Across Parental Educational Levels for CEFI Parent Ratings.

	Standard Scores				
Raw Score	<HS	HS Grad	Some Coll	Coll Grad	National
230	96	91	88	85	90
235	97	9 10 points 9		87	91
240	98	93	90	88	92
245	99	95	92	89	93
250	100	96	93	90	94
255	101	97	94	92	95
260	102	98	95	93	97
265	103	99	96	94	98
270	104	100	98	95	99
275	105	10 8 points 99		96	100
280	106	102	100	98	101
285	107	103	101	99	102
290	108	105	102	100	103
295	109	106	103	101	105
300	110	107	105	103	106

LEARNING & the BRAIN

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Presentation Outline

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

➤EF as Behavior

➤EF as an Ability (an intelligence)

➤EF as Social Emotional Skills

➤Research about EF as ability, behavior, and SE

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

➤ Conclusions

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EF is a Brain-Based Ability

- EF is an ability by virtue of its relationship to the brain
- Because there is a relationship between BRAIN FUNCTION and BEHAVIOR, behaviors tell us about the ABILITY (sometimes…)
- EF skills are the result of EF Ability *and* well practiced behaviors that reflect EF
  - Not all abilities and not all behaviors involve EF

LEARNING *& the* **BRAIN**

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A Theory of Learning

28 Cognitive Assessment System: Redefining Intelligence From a Neuropsychological Perspective

Jack A. Naglieri and Tulio M. Otero

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 o cesses necessary for effi also provide for the de tions and address the qu

FROM NEUROPSYCH TO ASSESSMENT

Luria's theoretical accou perhaps one of the most 2008). Luria conceptual of brain–behavior relatio orders that the clinician the brain, the functional syndromes and impairm and clinical methods of a theoretical formulations, lated 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-

Handbook of
PEDIATRIC
Neuropsychology

Andrew S. Davis
Editor
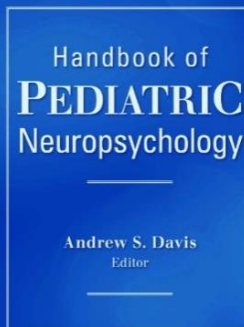
IQ defined by BRAIN function

➢ **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

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PASS Comprehensive System
(Naglieri, Das, & Goldstein, 2014)

CAS2 Rating Scale (4 subtests)	CAS2 Brief (4 subtests)	CAS2 Core (8 subtests)	CAS2 Extended (12 subtests)
Total Score Planning Simultaneous Attention Successive	Total Score Planning Simultaneous Attention Successive	Full Scale Planning Simultaneous Attention Successive	Full Scale Planning Simultaneous Attention Successive Supplemental Scores Executive Function Working Memory Verbal / Nonverbal Visual / Auditory

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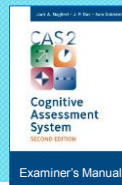
Brain, Cognition, & Behavior

➢ The brain is the seat of abilities called PASS

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

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

Planning ability

Simultaneous processing Ability

Attention

Successive Processing Ability

🧠 LEARNING
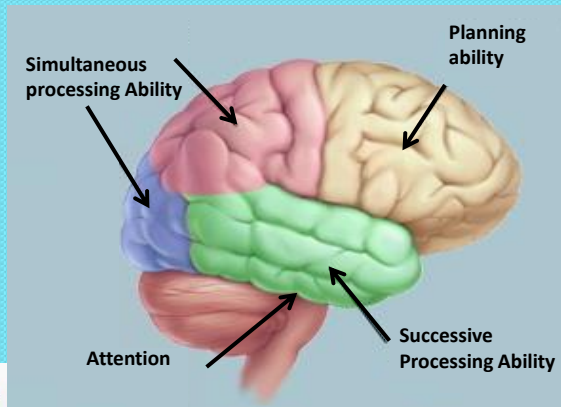
Brain, Cognition, & Behavior

➢ **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 because they may be different

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PASS Theory: Planning

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

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Encourage Planning

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

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

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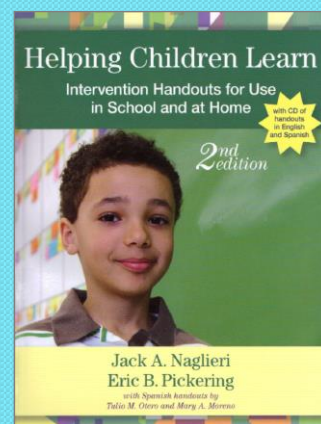
Step 1 – Talk with Students

How to Be Smart: Planning

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

What Does Being Smart Mean?

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

Step 1 – Talk with Students

How Can You Be Smarter?

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

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

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

Think smart and use a plan!

I figured out how to do it!

Use a plan.

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

PASS Theory

▶ **Attention** is a neurocognitive ability that a person uses to selectively attend to some stimuli and ignore others

- selective attention
- focused cognitive activity over time
- resistance to distraction

No Response

Response

No Response

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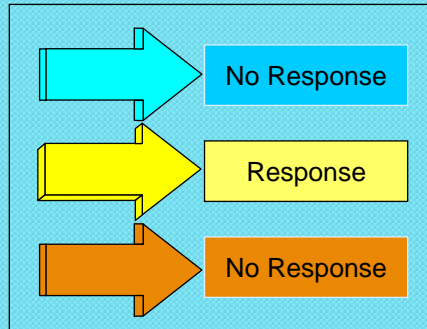
Attention

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

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

leave school

11. 3:15 p.m.

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

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

12. 6:22 p.m.

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

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

13. 3:50 p.m.

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

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

14. 3 hours 45 min.

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Planning and Attention = EF

➢ So far, the first two parts of the PASS theory fit nicely in the concept of EF

➢ How can EF behaviors be evaluated by the teacher?

• Two methods…

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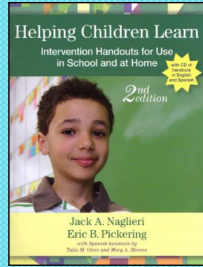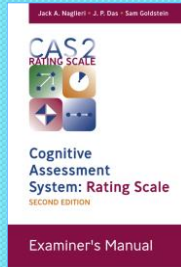
CAS2: Rating Scale Planning

Directions for Items 1–14. These questions ask how well the child or adolescent decides how to do thing achieve a goal. They also ask how well a child or adolescent thinks before acting and avoids impulsivity. Please how well the child or adolescent creates plans and strategies to solve problems.

During the past month, how often did the child or adolescent …	Never	Rarely	Sometimes	Frequently	Always
1. control his or her behavior?	0	1	2	3	4
2. produce a well-written sentence or a story?	0	1	2	3	4
3. evaluate his or her own actions?	0	1	2	3	4
4. produce several ways to solve a problem?	0	1	2	3	4
5. have many ideas about how to do things?	0	1	2	3	4
6. have a good idea about how to complete a task?	0	1	2	3	4
7. solve a problem with a new solution when the old one did not work?	0	1	2	3	4
8. use information from many sources when doing work?	0	1	2	3	4
9. complete work in an organized way?	0	1	2	3	4
10. effectively solve new problems?	0	1	2	3	4
11. accept feedback or corrections well?	0	1	2	3	4
12. have well-described goals?	0	1	2	3	4
13. think before acting?	0	1	2	3	4
14. consider new ways to finish a task?	0	1	2	3	4

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CAS2: Rating Scale Attention

Directions for Items 30–43. These questions ask how well the child or adolescent pays attention and resists distractions. The questions also ask about how well someone attends to one thing at a time. Please rate how well the child or adolescent pays attention.

During the past month, how often did the child or adolescent . . .

	Never	Rarely	Sometimes	Frequently	Always
30. direct his or her attention to one person at a time?	0	1	2	3	4
31. become easily absorbed in an activity?	0	1	2	3	4
32. work well in a noisy area?	0	1	2	3	4
33. stay with one task long enough to complete it?	0	1	2	3	4
34. focus when working alone?	0	1	2	3	4
35. not allow the actions or conversations of others to interrupt his or her work?	0	1	2	3	4
36. stay on task easily?	0	1	2	3	4
37. concentrate on a task until it was done?	0	1	2	3	4
38. listen carefully?	0	1	2	3	4
39. work without getting distracted?	0	1	2	3	4
40. have a good attention span?	0	1	2	3	4
41. listen to instructions or directions without getting off task?	0	1	2	3	4
42. pay attention in class?	0	1	2	3	4
43. attend to the details of a task?	0	1	2	3	4

naglieri@gmu.edu

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EF ability and the brain

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

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

- We will see what they are and …

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

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PASS Theory

➤ **Simultaneous** is a neurocognitive ability a person uses to integrate stimuli into groups

- Parts are seen as a whole
- Each piece of information is related to others
- Visual spatial tasks like blocks and puzzles on the Wechsler Nonverbal Scale
- KABC Simultaneous Scale

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Progressive Matrices

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Verbal-Spatial Relations

Which picture shows a boy behind a girl?

PA**S**S Theory: Simultaneous

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

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

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

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Use EF

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.
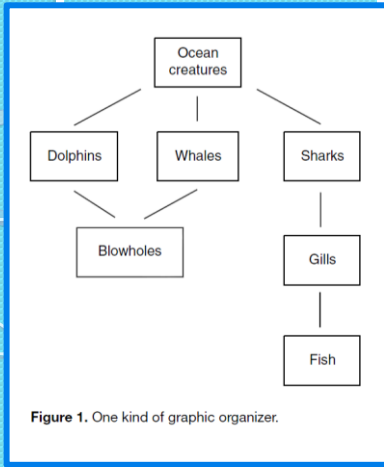
Figure 1. One kind of graphic organizer.

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.

LEARNING &

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

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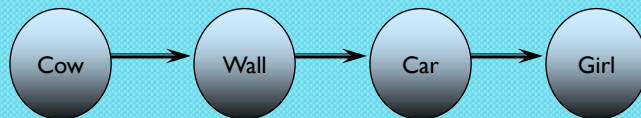
Word Series

- The child repeats a series of words in the same order the examiner says them

  1. Wall-Car
  2. Shoe-Key
  ...
  10. Cow-Wall-Car-Girl
  11. Dog-Car-Girl-Shoe-Key
  ...
  27. Cow-Dog-Shoe-Wall-Man-Car-Girl

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Sentence Questions (Ages 8-17)

- The child answers a question read by the examiner

1. The blue is yellow. Who is yellow?

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

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

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Successive

The sequence of the sounds is emphasized in this work sheet

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PAS**S** Theory: Successive

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

Examples of classroom problems related to _Successive Processing_

· Trouble blending sounds to make words

· Difficulty remembering numbers in order

· Reading decoding problems

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

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

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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

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Presentation Outline

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

➢EF as Behavior

➢EF as an Ability (an intelligence)

➢EF as Social Emotional Skills

➢Research about EF as ability, behavior, and SE

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

➢ Conclusions

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Phineas had Social Emotional deficit

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

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In Goldstein & Brookes (2013)

Measuring Resilience in Children: From Theory to Practice*

14

Jack A. Naglieri, Paul A. LeBuffe, and Katherine M. Ross

Introduction

The concept of resilience, like all psychological constructs, must have certain characteristics in order to be subjected to experimental testing so as to be effectively applied to benefit our constituency. A primary characteristic is that resilience must be operationally defined in a way that is reliable across time, subjects, and researchers. Once a concept is operationalized in a reliable manner, then its validity can be examined. When we have sufficiently operationalized the concept of resilience, and there is evidence that it can be measured in

a reliable and valid way, then application in clinical and educational settings becomes possible. This is an ideal sequence for the development tools for testing new concepts, but it is not how many concepts and tests used in education and psychology have been promulgated.

In practice, there is great emphasis on helping clients and pressure to implement new approaches even if they have only been minimally tested. If an idea appears logical and appears to help clients then it seems reasonable to believe that the construct possesses validity, however ill-defined that may be. Unfortunately, what seems logical and consistent with clinical experience may not be true. As noted by Garb (2003, p. 32), "Results

Sam Goldstein · Robert B. Brooks
Editors

Handbook of
Resilience in
Children

Second Edition

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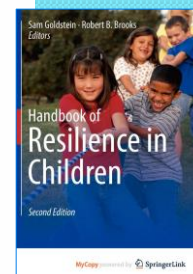
Quality of SEL Measures

Table 14.1 Psychometric characteristics of scales used to measure variables related to resilience

Rating scale	No. of items	Age range	Informants	Scores for scales	Comparison sample size	Sample description	Match to US population
Ages and Stages Questionnaire: Social–Emotional (ASQ-SE)	Varies	3–66 months	Parents	Raw score	2,633	National sample	No
Behavioral and Emotional Rating Scale (BERS)	52	6–9 years	Teachers, parents, self	Raw scores, percentiles, scales scores	2,176	National sample	Yes
Devereux Early Childhood Assessment (DECA)	37	2–5 years	Parents and teachers	T-score	2,000	National sample	Yes
Devereux Early Childhood Assessment—Clinical (DECA-C)	62	2–5 years	Parents and teachers	T-score	2,000	National sample	Yes
Devereux Early Childhood Assessment—Infant Toddler (DECA-IT)	33 (infant form) and 36 (toddler form)	1–36 months	Parents and teachers	T-score	2,183	National sample	Yes
Devereux Student Strengths Assessment (DESSA)	72	5–14 years	Parents and teachers	T-score	2,500	National sample	Yes
Devereux Student Strengths Assessment—Mini (DESSA-mini)	Four 8 item forms	5–14 years	Teachers	T-score	1,250	National sample	Yes
Devereux Student Strengths Assessment—Second Step Edition (DESSA-SSE)	36 items	5–14 years	Teachers	T-score	1,250	National sample	Yes
Penn Interactive Play Scale	32	preK & K	Parents and teachers	T-score	312	African American Head Start populations living in high-risk, low income urban populations	No
Preschool Behavioral and Emotional Rating Scale (preBERS)	42	3–6 years	Parents and teachers	Scaled scores	1,471	Typical preschool, head start, and early childhood special education	Yes
Resiliency Scales for Children and Adolescents (RSCA)	64	9–18 years	Self report	T-score	650	National sample	No

14 Measuring Resilience in Children: From Theory to Practice

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The DESSA Comprehensive System

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

➢ 72-item *DESSA* to find specific areas of need
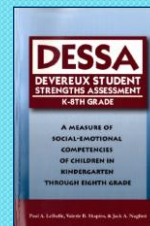
Paul LeBuffe & Valerie Shapiro

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Assessment of Social Emotional Skills with the DESSA

DESSA
DEVEREUX STUDENT
STRENGTHS ASSESSMENT
K-8TH GRADE

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

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

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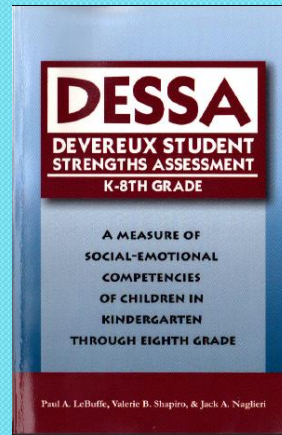
The DESSA

➢ 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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CASEL and DESSA Scales

1 **Self-awareness**—being able to ac and strengths; maintaining a well-	**Self Awareness**
2 **Self-management**—being able to control impulses, and persevere progress toward personal and ac	**Self Management**
3 **Social awareness**—being able to others; recognizing and appreciat differences; recognizing and usin	**Social Awareness**
4 **Relationship skills**—being able t relationships based on cooperatio preventing, managing, and resolv needed	**Relationship Skills**
5 **Responsible decision-making**—b consideration of reason, ethical for self and others, and likely co making skills to academic and so one's school and community.[1]	**Decision Making**
	Goal Directed Behavior
Social Emotional Composite	**Personal Responsibility**
	Optimistic Thinking

LEARNING & the BRAIN

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DESSA Rating Form (72 items)

LEARNING & the BRAIN

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DESSA Individual Student Profile

http://nrepp.samhsa.gov

Universal Screening of Social-Emotional Skills

The DESSA-mini

➤The DESSA-mini allows for:
- Universal screening
- Determination of need for instruction

➤Four equivalent 8-item forms
- Ongoing Progress Monitoring
- Completed in 1-2 minutes by teachers
- Yields one score – Social-Emotional Total Score

Four Forms of DESSA-mini

DEVEREUX STUDENT STRENGTHS ASSESSMENT – MINI — FORM 1
(DESSA-MINI)

DEVEREUX STUDENT STRENGTHS ASSESSMENT – MINI — FORM 2
(DESSA-MINI)

DEVEREUX STUDENT STRENGTHS ASSESSMENT – MINI — FORM 3
(DESSA-MINI)

DEVEREUX STUDENT STRENGTHS ASSESSMENT – MINI — FORM 4
(DESSA-MINI)
JACK A. NAGLIERI, PAUL A. LEBUFFE, AND VALERIE B. SHAPIRO

Child's Name _____ Gender _____ DOB _____ Grade _____
Person Completing this Form _____ Relationship to Child _____
Date of Rating _____ School/Organization _____ Classroom/Program _____

This form describes a number of behaviors seen in some children. Read the statements that follow the phrase: *During the past 4 weeks, how often did the child…* and place a check mark in the box underneath the word that tells how often you saw the behavior. Answer each question carefully. There are no right or wrong answers. Please answer every item. If you wish to change your answer, put an X through it and fill in your new choice as shown to the right.

	Never	Rarely	Occasionally	Frequently	Very Frequently
	☒	☑	2	3	4

Item #	During the past 4 weeks, how often did the child...	Never	Rarely	Occasionally	Frequently	Very Frequently	Score
1.	look forward to classes or activities at school?	0	1	2	3	4	_____
2.	show appreciation of others?	0	1	2	3	4	_____
3.	encourage positive behavior in others?	0	1	2	3	4	_____
4.	teach another person to do something?	0	1	2	3	4	_____
5.	show an awareness of her/his personal strengths?	0	1	2	3	4	_____
6.	make a suggestion or request in a polite way?	0	1	2	3	4	_____
7.	use available resources (people or objects) to solve a problem?	0	1	2	3	4	_____
8.	seek out additional knowledge or information?	0	1	2	3	4	_____

Raw Score Sum _____

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

LEARNING *& the* BRAIN

Presentation Outline

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

➢EF as Behavior

➢EF as an Ability (an intelligence)

➢EF as Social Emotional Skills

➡ Research about EF as ability, behavior, and SE

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

➢ Conclusions

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Executive Function Behaviors, Intelligence, and Achievement test scores

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EF and Achievement (Best, et al, 2011)

Contents lists available at ScienceDirect

Learning and Individual Differences

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

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

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

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

ARTICLE INFO

ABSTRACT

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

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EF, WISC-IV, CAS, Achievement

➢ Data from Sam Goldstein's evaluation center in Salt Lake City, UT

➢ Children given the WISC-IV (N = 43), CAS (N = 62), and the WJIII achievement (N = 58) as part of the typical test battery

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

Demographic		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.

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EF Behaviors (CEFI) & CAS

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

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

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

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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

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Kong (2013): IQ, SEL & Achievement

➤ Mean IQ score = 129.6 nearly 2 SDs above the normative mean (achievement also high)

➤ Mean SEL score on DESSA was only ½ SD above the normative mean (T = 55.5)

Table 1

Means and Standard Deviations of Study Variables

Construct	Mean	SD
Age	10.96	1.81
DESSA Total	55.51	9.41
Verbal	125.69	13.74
Quantitative	124.41	10.34
Nonverbal	125.10	12.56
CogAT Composite	129.61	8.22
Reading	75.56	15.72
Language	69.46	19.60
Math	76.30	17.13
SAT10 Achievement Composite	73.77	12.66

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

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

Relations between Cognitive Ability, Socioemotional Competency, and

Achievement Variables

Hierarchical regression analyses were conducted to determine which scales and subtests predicted the most variance in the dependent achievement variables. Composite CogAT scores were not found to significantly predict composite achievement, $R^2\Delta = .03$, $F(1, 121) = 3.27$, $p > .05$, reading, language, or math scores over-and-above the DESSA Total scores (Table 11). On the other hand, the DESSA Total scores significantly predicted composite achievement, $R^2\Delta = .05$, $F(1, 121) = 6.99$, $p < .05$; language scores, $R^2\Delta = .03$, $F(1, 121) = 4.26$, $p < .05$; and math scores, $R^2\Delta = .05$, $F(1, 121) = 6.09$, $p < .05$, over-and-above the composite CogAT scores.

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Take Away Messages

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

➢ EF behaviors are significantly correlated with all four PASS scales

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

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Sex Differences in Executive Function

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CEFI Sex Differences: Parent Raters

➤Girls are Smarter than Boys

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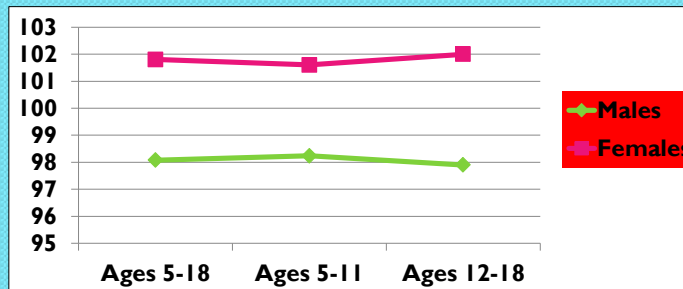
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CEFI Sex Differences: Teacher Raters

➤Girls are Smarter than Boys

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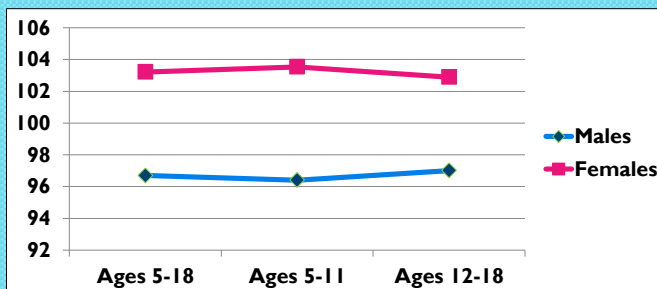
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Sex Differences: Ability

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

Jack A. Naglieri
George Mason University

Johannes Rojahn
Ohio State University

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

Sex Differences: Ability

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Sex Differences: Social Emotional

DESSA
DEVEREUX STUDENT STRENGTHS ASSESSMENT
K-8TH GRADE

A MEASURE OF

SOCIAL-EMOTIONAL

COMPETENCIES

OF CHILDREN IN

KINDERGARTEN

THROUGH EIGHTH GRADE

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

KPRESS
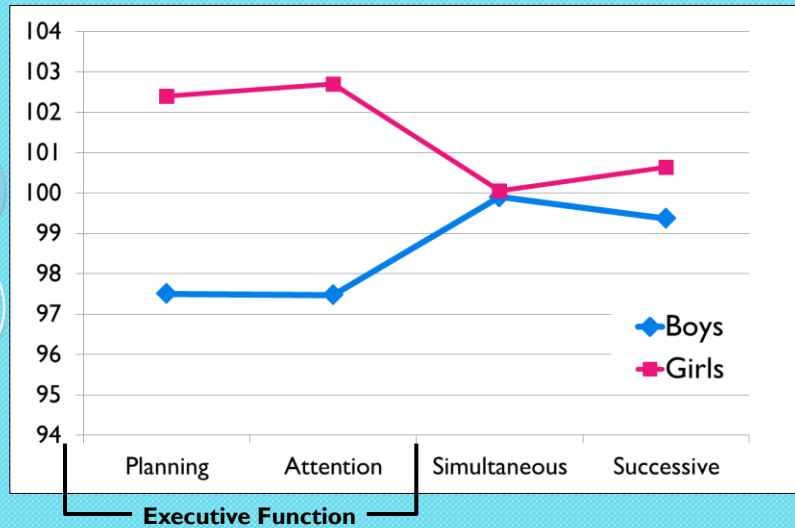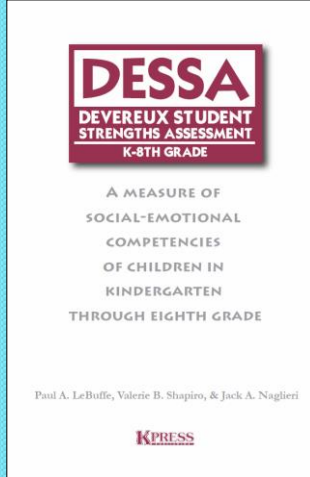
TABLE 2.6

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

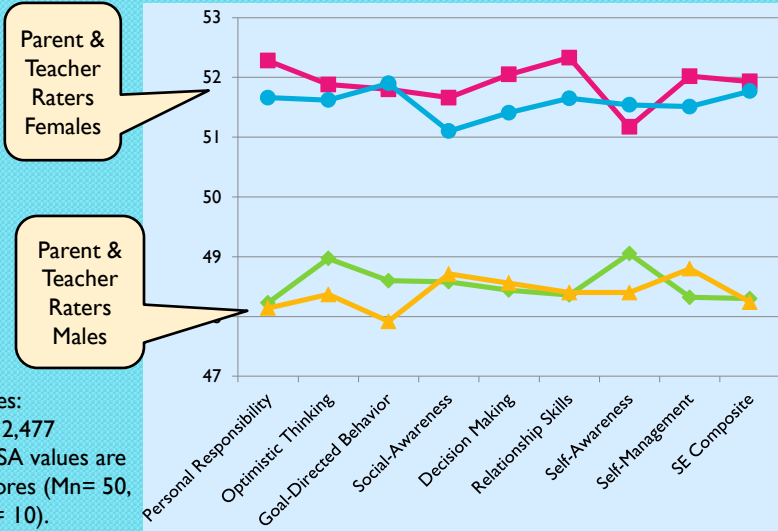|	Males			Male Female d-ratio	Females		
	Mean	SD	n		Mean	SD	n
TEACHER RATERS							
Personal Responsibility	48.23	9.98	631	-0.42	52.28	9.30	611
Optimistic Thinking	48.97	10.14	627	-0.30	51.88	9.47	612
Goal-Directed Behavior	48.60	10.05	631	-0.33	51.80	9.38	611
Social-Awareness	48.58	10.13	630	-0.31	51.66	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)

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Sex Differences: Social Emotional

Parent & Teacher Raters Females

Parent & Teacher Raters Males

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

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

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Take Away Messages

➢As a group, boys need more help developing Executive Function skills than girls

➢Because of the rapid growth of EF skills in the early grades -- intervene ASAP

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Presentation Outline

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

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Kryza Practical EF Instruction
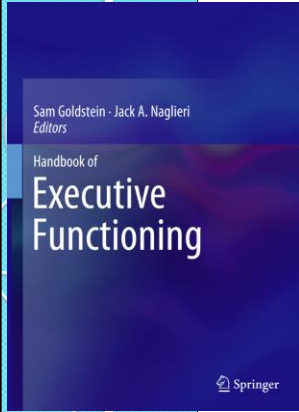
Practical Strategies for Developing Executive Functioning Skills for ALL Learners in the Differentiated Classroom 1 2 3 4

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Kathleen Kryza 5

It's the first week of school for Alicia, a middle school teacher in a large school district in Michigan. She's been prepping for the first days of school for weeks, getting her room ready, and planning lessons. Last week she attended staff development sessions to learn about the new district and state initiatives and mandates that must be followed this year. Starting tomorrow, she will be immersed for the next 180 school days with a full day's schedule of three different preps—seven 50-minute classes with at least 32 students in each class. She can't imagine adding one more thing to her already overfull "To Do" list. But over the summer, Alicia read a book on teaching executive functioning skills to special needs learners. She really sees the value in teaching these important skills to her most at-risk students, but when can she possibly find time to do this? And how? 6 7 8 9 10 11 12 13 14 15 16 17

Alicia, like many teachers, understands the importance of developing executive functioning skills in her students, but given the full schedule of required academic content she needs to teach,

According to Judy Willis, a neurologist turned middle school teacher and international educational consultant, "We can identify the practices that benefit all learners by looking at the skills 40 41 42 43
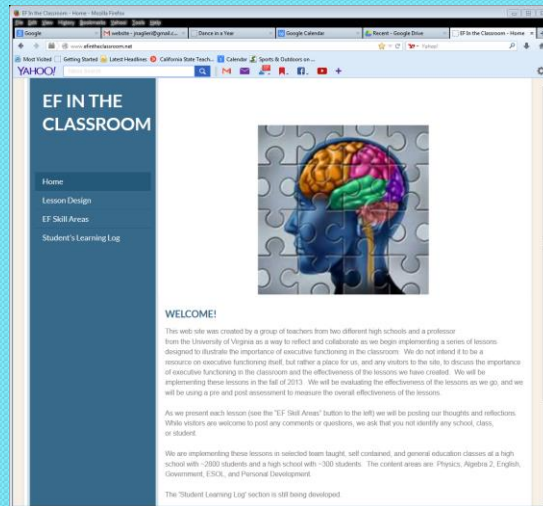
Sam Goldstein · Jack A. Naglieri
Editors

Handbook of
Executive Functioning

Springer

EF Lessons for High School

www.efintheclassroom.net

➤ **Start with Awareness of thinking about thinking**

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EF Lesson Plan *Themes*

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

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EF Posters in the Class

Planning

Planning Facilitation for Math Calculation

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

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

How to Teach Planning Facilitation

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

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

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

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

Abstract

The authors examined the effectiveness of cognitive strategy instruction [
Successive) given by special education teachers to students with ADHD
experimental group were exposed to a brief cognitive strategy instructi
development and application of effective planning for mathematical comp
standard math instruction. Standardized tests of cognitive processes a
students completed math worksheets throughout the experimental p
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

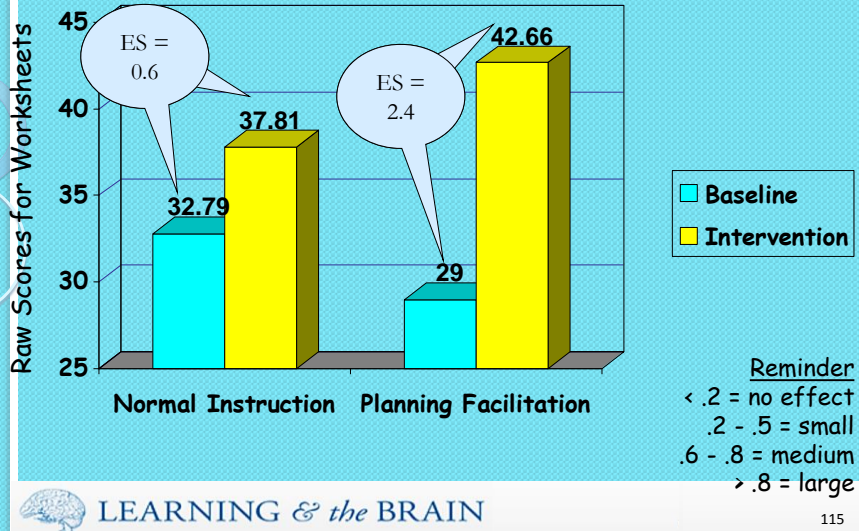### Experimental Group
19 worksheets with Planning Facilitation

Comparison Group
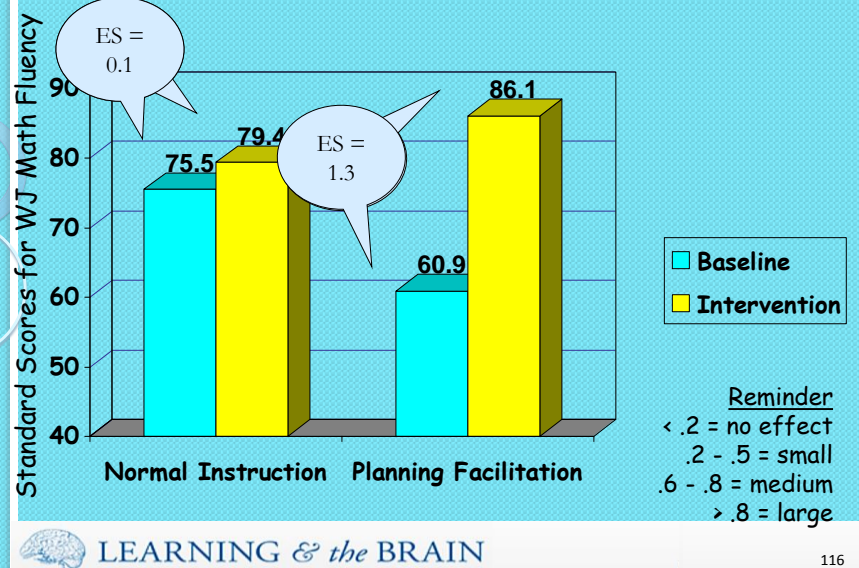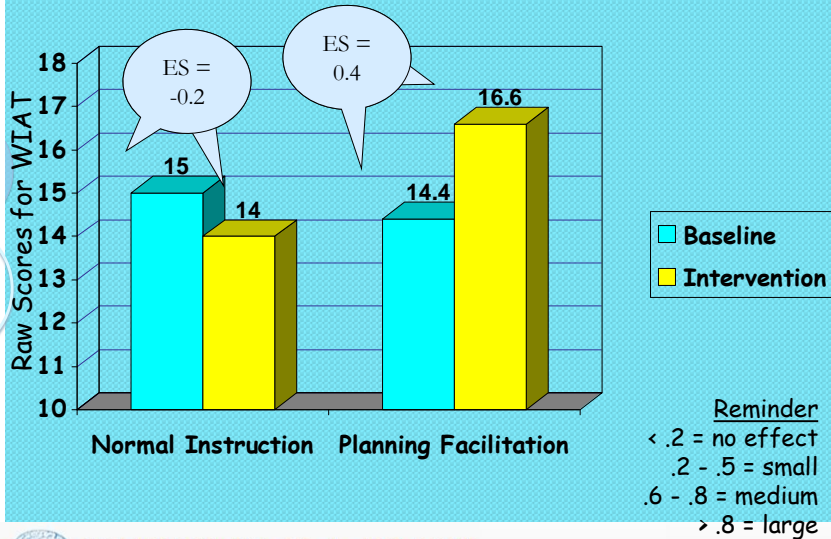19 worksheets with Normal Instruction

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Worksheet Means and Effect Sizes for the Students with ADHD

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

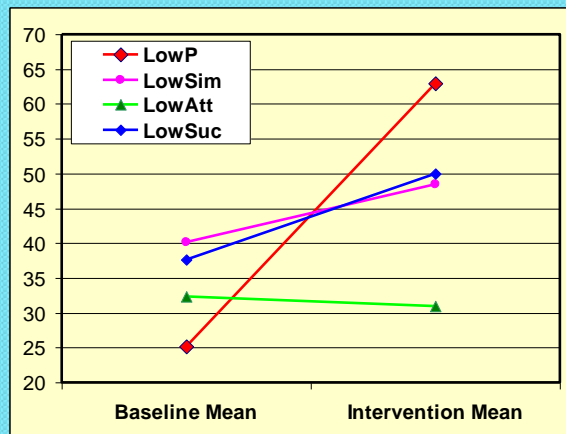# WIAT Numerical Operation Means and Effect Sizes for Students with ADHD

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

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Iseman (2005)

➢ Baseline Intervention means by PASS profile

➢ Different response to the same intervention

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One Year Follow-up

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

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Cognitive Instructional Methods
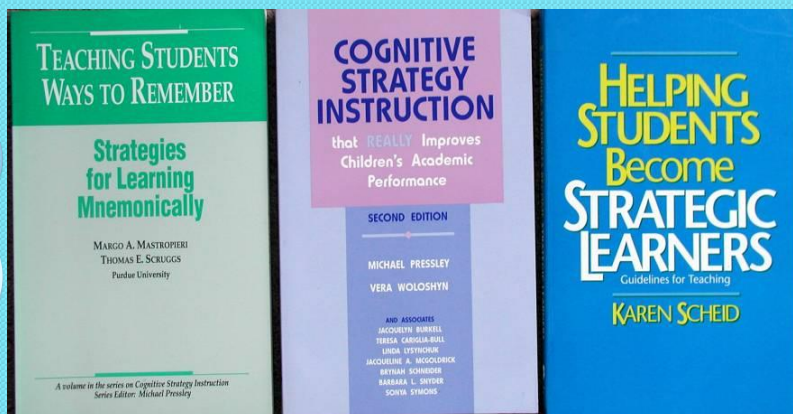
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Presentation Outline

➢Comprehensive Model of EF
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  • More lesson plans for improving components of EF
➢Conclusions

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Conclusions-- on Education

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

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

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Conclusions

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

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

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

➢**This is a gift of optimism**

➢**This is a gift for life success**

➢**EF is about LIFE not just school**

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Thank you for attending.

Jack A. Naglieri, Ph.D.

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Senior Research Scientist, Devereux
Center for Resilient children
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