

Executive Function, Emotional Regulation and Attention: Implications for Assessment and Intervention

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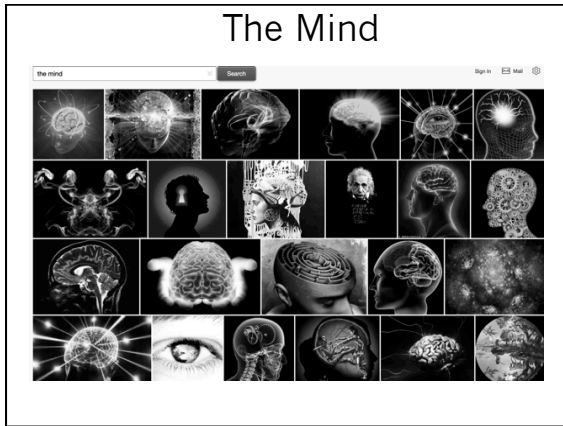
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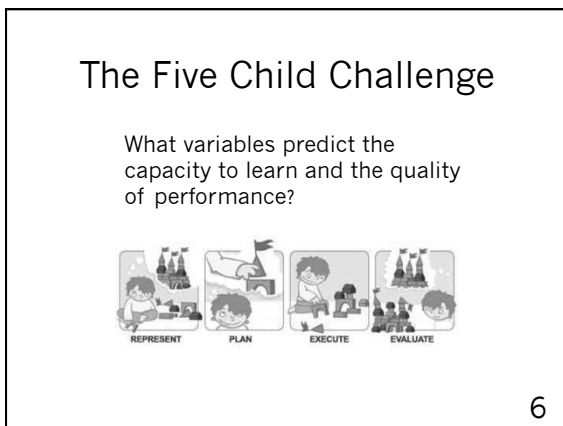
Springer, Wiley, Guilford, MHS, Pro-Ed, Psychological Corporation, Double Day, Specialty Press, McGraw Hill, Sage, Western Psychology Services book, journal and test publishers. Best friend of Bob Brooks.

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The Brain







EF & Achievement

WJ-III Achievement Tests

CEFI Scales	Total	Broad			Median
		Reading	Math	Written Language	
Full Scale	.51	.48	.49	.47	.49
Attention	.59	.52	.46	.55	.54
Emotion Regulation	.18	.27	.15	.17	.18
Flexibility	.61	.50	.55	.54	.55
Inhibitory Control	.23	.32	.15	.26	.25
Initiation	.32	.26	.38	.28	.30
Organization	.32	.31	.33	.33	.33
Planning	.58	.54	.57	.50	.56
Self-Monitoring	.53	.51	.51	.49	.51
Working Memory	.57	.48	.60	.47	.53
	p < .05	p < .01			

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EF & Intelligence

WISC-IV

	FS	VC	PR	WM	PS	CEFI	
						Mn	SD
CEFI							
Full Scale	.39	.44	.27	.30	.34	93.0	11.9
Attention	.39	.33	.32	.40	.35	91.8	11.2
Emotion Regulation	.14	.25	.08	-.06	.11	97.2	14.7
Flexibility	.57	.68	.45	.46	.37	93.8	11.0
Inhibitory Control	.21	.20	.13	.08	.27	97.7	13.5
Initiation	.25	.31	.14	.21	.25	91.2	15.1
Organization	.15	.17	.06	.14	.17	92.2	13.6
Planning	.46	.54	.31	.38	.39	93.6	11.1
Self-Monitoring	.39	.45	.31	.33	.27	92.0	11.3
Working Memory	.38	.43	.31	.36	.23	92.5	13.6
WISC-IV M	95.5	96.8	101.5	92.6	90.7	92.6	
WISC-IV SD	18.1	14.7	17.5	17.5	19.4	17.5	

Note: All correlations were corrected for range instability.

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EF & Neuropsychological Abilities

CAS

	FS	Plan	Sim	Att	Suc	CEFI	
						Mn	SD
CEFI							
Full Scale	.45	.49	.43	.37	.32	91.4	13.2
Attention	.40	.42	.39	.30	.35	90.3	12.8
Emotion Regulation	.26	.22	.23	.24	.13	96.9	14.7
Flexibility	.52	.54	.51	.40	.42	92.2	13.0
Inhibitory Control	.27	.29	.22	.18	.21	96.0	13.9
Initiation	.40	.37	.31	.30	.20	89.0	16.3
Organization	.29	.36	.21	.20	.23	90.5	14.3
Planning	.47	.54	.46	.37	.38	92.5	12.4
Self-Monitoring	.48	.50	.49	.43	.35	91.2	12.4
Working Memory	.48	.46	.45	.38	.30	91.0	14.0
CAS Mn	95.8	92.4	101.6	96.5	98.0		
CAS SD	17.1	14.5	17.0	15.1	14.6		

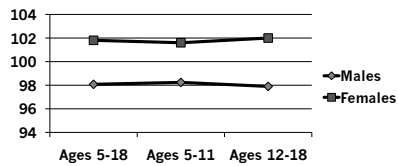
Note: All correlations were corrected for range instability.

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Gender Differences: Parent Raters

Girls have better EF 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

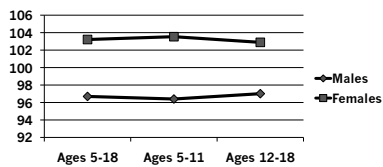


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Gender Differences: Teacher Raters

Girls have better EF 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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What do we mean by the term Executive Function(s)?

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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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What Neural Activities Require EF?

- Those that involve planning or decision making.
- Those that involve error correction or troubleshooting.
- Situations when responses are not well-rehearsed or contain novel sequences of actions.
- Dangerous or technically difficult situations.
- Situations that require the overcoming of a strong habitual response or resisting temptation.

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Goldstein, Naglieri, Princiotta, & Otero (2013)

- We found more than 30 definitions of EF(s).
- Executive function(s) has come to be an umbrella term used for many different abilities, including planning, working memory, attention, inhibition, self-monitoring, self-regulation and initiation carried out by pre-frontal areas of the frontal lobes.

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What is Executive Function(s)

1. Barkley (2011): "EF is thus a **self-directed set of actions**" (p. 11).
2. Dawson & Guare (2010): "Executive skills allow us **to organize our behavior over time**" (p. 1).
3. Delis (2012): "Executive functions reflect the **ability to manage and regulate one's behavior** (p. 14).

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What is Executive Function(s)

4. Denckla (1996): "EF (is) a set of **domain-general control processes...**" (p. 263).
5. Gioia, Isquith, Guy, & Kenworthy (2000): "a **collection of processes that are responsible for guiding, directing, and managing cognitive, emotional, and behavioral functions**" (p. 1).

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What is Executive Function(s)

6. Pribram (1973): "**executive programmes ...to maintain brain organization**" (p. 301).
7. Roberts & Pennington (1996): EF "**a collection of related but somewhat distinct abilities such as planning, set maintenance, impulse control, working memory, and attentional control**" (p. 105).

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What is Executive Function(s)

6. Stuss & Benson (1986): "a **variety of different capacities that enable purposeful, goal-directed behavior, including behavioral regulation, working memory, planning and organizational skills, and self-monitoring**" (p. 272).
7. Welsh and Pennington (1988): "the **ability to maintain an appropriate problem-solving set for attainment of a future goal**" (p. 201).

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What is Executive Function(s)

10. McCloskey (2006): "a **diverse group of highly specific cognitive processes collected together to direct cognition, emotion, and motor activity, including ...the ability to engage in purposeful, organized, strategic, self-regulated, goal directed behavior**" (p. 1)

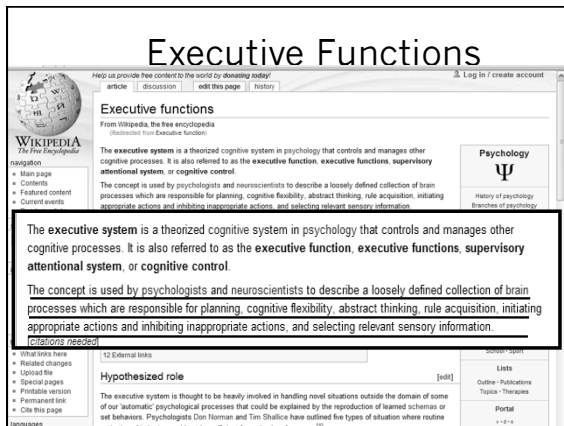
"think of executive functions as a set of independent but coordinated processes rather than a single trait" (p. 2).

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What is Executive Function(s)

10. Lezak (1995): "a **collection of interrelated cognitive and behavioral skills that are responsible for purposeful, goal-directed activity,**" ...
11. "how and whether a person goes about doing something" (p. 42).
12. Luria (1966): "... **ability to correctly evaluate their own behavior and the adequacy of their actions**" (p. 227).

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And Finally. . . .

An NICHD panel in
1994 identified 33 EFs
by consensus!

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The Top Six Were:

- Self-regulation
- Sequencing of behavior
- Flexibility
- Response inhibition
- Planning
- Organization of behavior

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What is the relationship of
EF to attention?

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Conditions and Disorders That Have Demonstrated EF Impairments

- Depression – sense of helplessness and hopelessness.
- Anxiety – lack of confidence in predicting outcome.
- ADHD – Immaturity in developing effective self-discipline.
- Oppositional and Conduct Disorders – noncompliance and rule violation.
- Autism – social learning impairment.
- Learning Disability – delayed acquisition of academic knowledge despite good instruction.

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Executive Function(s)

- One way to examine the issue addressing the nature of EF is to research the factor structure of behaviors related to EF(s)
- To do so, we examined the factor structure of a nationally representative sample of children.
- We conducted a series of research studies to answer the following question:
 - What is the underlying structure of EF behaviors?
 - Is there is just one underlying factor called Executive Function), or do the behaviors group together into different constructs suggesting a multidimensional structure?

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EXPLORATORY FACTOR ANALYSES

- Both item-level and scale-level exploratory factor analyses (EFA) were conducted.
- 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
- We used a standardization sample from our instrument the Comprehensive Executive Functioning Inventory (CEFI).

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Sample Characteristics

- 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
 - Parents provided PEL of both parents
 - The higher of the two levels was used to classify the parental education level of the child.
 - All raters completed the questionnaire via paper-and-pencil or online methods.

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EXPLORATORY FACTOR ANALYSES

- For the *first half* of the normative sample using item scores: EFA of the 90 items was conducted
- The scree plot test and the very simple solution criterion both indicated that only **one factor** should be retained.
- The ratio of the first and second eigenvalues was greater than four for all three forms, which is a common rule to support a **one factor solution**.

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EXPLORATORY FACTOR ANALYSES

- Using the *second half* of the normative sample EFA was conducted using raw scores for the Attention, Emotion Regulation, Flexibility, Inhibitory Control, Initiation, Organization, Planning, Self-Monitoring, and Working Memory scales
- Both the Kaiser rule (eigenvalues > 1) *and* the Eigenvalue Ratio criterion (> 4) unequivocally indicated **one factor**.

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EXPLORATORY FACTOR ANALYSES

- Factor analysis of the CEFI Scales also clearly indicated a one factor solution

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

- 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* functions is the best term to use.

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Naglieri & Goldstein, 2012

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



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What is Attention?

- Attention appears to primarily involve the basal ganglia, cerebellum and the frontal lobes.
- Problems with attention are often a bio-psychosocial phenomena often leading to/ interacting with cognitive deficits causing impairment in all walks of life.
- The symptoms of inattention as reflected in ADHD lead to a nearly infinite number of consequences (Barkley, 2015).

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Current diagnostic criteria specify that ADHD involves difficulties with inattention and/or hyperactivity/impulsivity. Researchers using factor analysis have consistently found support for an inattention factor in both children and adults. Findings have been mixed regarding whether hyperactivity and impulsivity reflect one or two dimensions.

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Inattention appears to be a condition stemming in part from inefficient operation of the physical brain moderated by the mind relative to task and environmental demands leading to poor execution of behavior.

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ADHD reflects exaggeration of normal behavior.

Poor regulation of attention leads to a nearly infinite number of consequences

Self-regulation

- The ability to inhibit
- The ability to delay
- The ability to separate thought from feeling
- The ability to separate experience from response
- The ability to consider an experience and change perspective
- The ability to consider alternative responses

Self-regulation

- The ability to choose a response and act successfully towards a goal
- The ability to change the response when confronted with new data
- The ability to negotiate life automatically
- The ability to track cues

Poor self-regulation is synonymous with. . .

Poor self-control

Poor self-regulation leads
to . . .

Impulsive behavior

Poor self-regulation leads
to:

- Knowing what to do is not the same as doing what you know
- Cue-less behavior
- Inconsistent behavior
- Unpredictable behavior
- The illusion of competence
- Riding an emotional roller coaster
- Problems with automatic behavior

In light of these data it is
not surprising that
inattention contributes to
EF deficits and that both
fuel poor emotional
regulation.

Symptom relief is not synonymous with changing long term outcome.

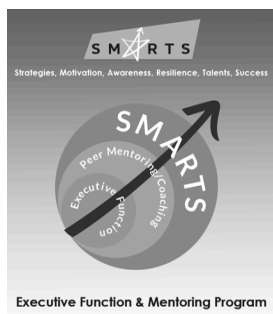
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Cognitive Strategy = EF Instruction

- A strategy is a procedure that the learner uses to perform academic tasks
- Using a strategy means the child thinks about 'how you do what you do'
- Successful learners use many strategies.
- Some of these strategies include visualization, verbalization, making associations, chunking, questioning, scanning, using mnemonics, sounding out words, and self-checking and monitoring.

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Promising Programs



Promising Programs

Tools of the Mind

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Focus on Self-Regulation

A growing body of research indicates that many children start school not ready to learn not because they do not know their letters or numbers but because they lack the critical ability to regulate their social, emotional, and cognitive behaviors. Current research shows that **self-regulation** – often called executive function – has a stronger association with academic achievement than IQ or entry-level reading or math skills.

Today's children come to school with lower levels of self-regulation and early childhood teachers report that they are ill-equipped to deal with these problems. [Read...](#)

Research indicates that interventions at the early childhood level can have a positive influence on self-regulation and the development of executive function in the early years and beyond. [Read...](#)

Tools of the Mind is a research-based early childhood program that builds strong foundations for school success in preschool and kindergarten children by promoting their intentional and self-regulated learning. In a series of rigorous experimental trials, Tools of the Mind has been shown to have a significant impact on self-regulation of preschool children. The study also found these gains in self-regulation to be related to scores in child achievement in early literacy and mathematics.

In a Tools classroom:

- Teachers systematically scaffold children's moving along the continuum of self-regulation from being regulated by others to engaging in "shared" regulation to eventually becoming "masters of their own behavior."
- Children gain control of their social, emotional, and cognitive behaviors by learning how to use a variety of "mental tools."

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Promising Resources

ERIC
CLEARINGHOUSE ON DISABILITIES
AND GIFTED EDUCATION

Home Parents Educators Kids What's New Gifted 101 Community Conferences Shop Support About PC Security

Strategy Instruction

The ERIC Clearinghouse on Disabilities and Gifted Education (ERIC EC)
E-mail: webmaster@ericdisnet.org
Internet: <http://ericdisnet.org>

ERIC EC Digest #638
Author: Pat Beckman
December 2002

For more than two decades there has been an abundance of research regarding strategy instruction. Originally, most of this research focused on the effects of strategy instruction on students with learning disabilities. Researchers are currently looking at how strategy instruction affects all learners.

What is a strategy?

In general, a strategy is a task, plan, or method used for accomplishing a task. Below are other terms associated with strategy instruction, some of which are discussed in this digest:

- Cognitive Strategy:** a strategy or group of strategies or procedures that the learner uses to perform academic tasks or to improve social skills. Often, more than one cognitive strategy is used with others, depending on the learner and higher schema for learning. In fact, research indicates that successful learners use numerous strategies. Some of these strategies include visualization, verbalization, making associations, chunking, questioning, scanning, underlining, assessing cues, using mnemonics, sounding out words, and self-checking and monitoring.
- Cues:** visual or verbal prompts to either remind the student what has already been learned or provide an opportunity to learn something new. Cues can also be employed to prompt student use of a strategy.
- Independent Strategic Learner:** the student who uses cues and strategies within higher learning schema, asks clarifying questions, listens,

Promising Resources

NCHC
National Dissemination Center
for Children with Disabilities

Home Disabilities Babies & Toddlers Children (3 to 22) Disability & Education Laws Research En Español

You are here: Home / Research Center / Evidence for Education / The Power of Strategy Instruction

The Power of Strategy Instruction

by Stephen D. Luke, Ed.D.

Evidence for Education, Volume 1, Issue 1, 2006
Links updated, October 2010
Download PDF

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- Early Studies of the Good Learner
- Spotlight on the SIM Model
- SIM Content Library Continuum: A Working Example
- Spotlight on SRS2 for Writing
- Combining Strategy Instruction with Direct Instruction
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- Conclusion

If you've ever played the game of chess, chances are you used a fairly unsophisticated approach when first making your way around the board. It's also likely that basic tactics quickly emerged after just a few games: moves that were at first aimless and erratic became much more planned and organized. You may

Tags

direct instruction, Evidence for Education, learning disabilities, learning strategy instruction, research, Self-Regulated Strategy Development/SRS2, SIM Model

Quick Links

- Topics, A-Z
- Publications
- State Organizations
- National Organizations

ESPECIALLY FOR...

- Families and Communities
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- Schools and Administrators

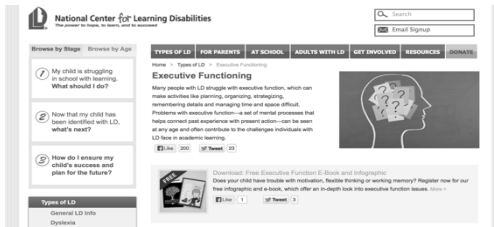
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Promising Resources



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Promising Resources



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Conclusions

The concept of EF is evolving.

Not unexpectedly there is a strong relationship between EF and attention.

Not unexpectedly both are bi-directional in their relationship to emotional regulation.

There is emerging evidence that children can be taught to be more strategic – an important indication of good EF behavior and outcome.

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TEDx

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The Power Of Resilience

https://www.youtube.com/watch?v=isfw6JJ-eWM&feature=youtu.be_gdata
