Helping Them Show What They Know; Caring for Students with Regulatory Difficulties

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What are the Executive Functions?

- "An "umbrella" term, encompassing… those interrelated skills necessary for purposeful, goal-directed activity" (Anderson, 1998)
- "Capacities that enable a person to engage successfully in independent, purposeful, self-serving behaviors" (Lezak, 1993)

Executive Functions: A classic definition

"The planning and sequencing of complex behaviors, the ability to pay attention to several components at once, the capacity for grasping the gist of a complex situation, the resistance to distraction and interference, the inhibition of inappropriate response tendencies, and the ability to sustain behavioral output for relatively prolonged periods." (Stuss & Benton, 1984).

Executive Functions: An applied definition

"A toddler forming a sentence. A kindergartener reciting the alphabet in order. A ninth-grader staying in sync with her clique. A college senior interviewing for a job. A writer formulating his next newspaper column. An entrepreneur strategizing the company's initial public stock offering. Despite the vast array of ages, tasks, and situations, these events all involve executive function, the mental process of planning and organizing flexible, strategic, appropriate actions." (Moran & Gardner, 2007).

More Definitions…

Orchestration of basic cognitive processes during goal-oriented problem-solving (Neisser, 1967)

Ability to maintain appropriate problem-solving set for attainment of future goal (Welsh & Pennington, 1988). Involves one or more of the following:

- intention to inhibit/defer response
- strategic plan of action sequences
- mental representation of the task including relevant stimulus information and desired future goal state.

Critical features of Executive Control (Denckla 2007)

Provide for delayed responding
Future-oriented
Strategic action selection
Intentionality
Anticipatory Set
Freedom from interference
Ability to sequence behavioral outputs

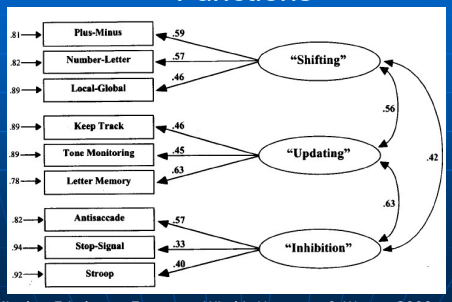
The Unity and Diversity of Executive Functions and Their Contributions to Complex "Frontal Lobe" Tasks: A Latent Variable Analysis

Akira Miyake, Naomi P. Friedman, Michael J. Emerson, Alexander H. Witzki, and Amy Howerter

Cognitive Psychology **41,** 49–100 (2000)

The main results from the CFA analyses indicate that executive functions may be characterized as separable but related functions that share some underlying commonality. Thus, as Teuber (1972) suggested in his review of frontal lobe functions more than a quarter of a century ago, the results point to both unity and diversity of executive functions and indicate that both of these aspects need to be taken into consideration in developing a theory of executive functions (see also Duncan et al., 1997).

Neurocognitive Model: The Unity and Diversity of Executive Functions



Miyake, Friedman, Emerson, Witzki, Howerter & Wager, 2000

The Nature and Organization of Individual Differences in Executive Functions: Four General Conclusions

Akira Miyake[1] and **Naomi P. Friedman**[2]

Individual differences in executive functions:

1. Show unity and diversity- are related yet separable
2. Reflect substantial genetic contributions
3. Are related to clinically & societally important phenomena
4. Show some developmental stability

Curr Dir Psychol Sci. 2012 February ; 21(1): 8–14. doi:10.1177/0963721411429458.

Disorder of Executive/Regulatory Functioning

Inhibitory Control (unable to control response that will result in reinforcement)

- positive and negative reinforcement

Working Memory (directs activities)

- holding information/strategy in memory while performing some operation (holding goal state in mind)

Regulatory control (emotional regulation, activity regulation, motivation)

Functional Domains of The Executive (Old Model)

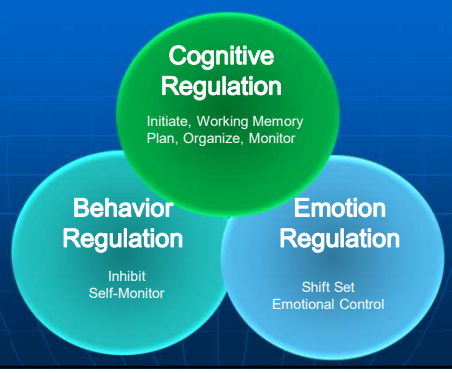
Behavioral Regulation

- Inhibit - stop an action or not react to impulse
- Shift - move from one task or situation to another
- Emotional Control - regulate emotional response

Metacognitive

- Working Memory/Sustain - hold information actively in mind
- Initiate - begin task, activity, attention
- Plan - anticipate future events and develop steps
- Organize - establish, maintain order
- Self-monitor - attend to behavior/output; revise

Three Factor Model



Outcome of "Good" Executive Function

- Purposeful, goal-directed activity
- Active problem solving
- Self-control
- Independence
- Reliability and consistency
- Positive self-efficacy
- Internal locus of control

Outcome of Executive "dys"Function

Initiate - deficits beginning task, activity
Working Memory - difficulties holding information actively in mind
Inhibit - problems stopping an action
Shift - difficulties moving from one task or situation to another, perseveration, rigidity
Plan - deficits anticipating future events and developing steps/contingencies
Organize - problems establishing, maintaining order
Self-monitor - lack of attention to own behavior or performance
Emotional Control - deficits regulating emotional response

Behavioral Descriptors

Initiate:
- trouble starting chores
- "couch potato"
- relies on others to structure time, tasks

Sustain:
- starts strong but fades across tasks
- attention/concentration wanes

Inhibit:
- blurts out
- acts quickly without regard to consequences
- distracted, sidetracked

Shift:
- stuck on a topic or activity
- poor flexibility
- resists change in routine

Behavioral Descriptors

Self-monitor:
- unaware of impact of own behavior
- makes careless errors
- doesn't check work

Plan:
- does assignments at last minute
- underestimates time needed

Organize:
- worse in chaos
- not a leader with peers
- messy
- homework poorly organized

Working Memory:
- Cannot remember multi-step instructions

Disorders of Executive Function

1. No singular, core disorder; these difficulties are ubiquitous in learning, attention, anxiety, mood, autism spectrum, & acquired neurological disorders.
2. Symptom onset delayed due to environmental demand
3. Performance on standardized tests often appropriate
4. Discrepancy between ability and performance
5. Social domain most challenging…

Executive Functions & the Frontal Lobes: A Conceptual View

"There is no unitary executive function.
Rather, distinct processes related to the frontal lobes can be differentiated which converge on a general concept of control functions."

Stuss, D.T., & Alexander, M.P. Psychological Research, 2000.

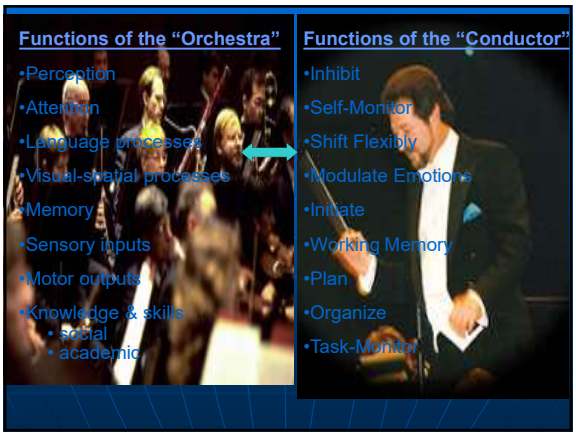
Executive function is a multidimensional construct

An umbrella term encompassing distinct, but interrelated, abilities that contribute to management of goal directed behaviors including inhibiting, shifting, regulation emotions, initiating, planning, organizing, and monitoring while holding goals in working memory.

Gioia, Isquith, Guy & Kenworthy, 2000

Orchestration of basic cognitive processes during goal-oriented problem-solving

Neisser, 1967



Proportional size of prefrontal region

- Human 29%
- Chimpanzee 17%
- Gibbon/Macaque 11.5%
- Lemur 8.5%
- Dog 7%
- Cat 3.5%

Neuroanatomic Organization

- Executive function & neurological development are parallel
- Development of prefrontal cortex is central
- Frontal lobe damage can result in dysfunction of various executive subdomains
- BUT - Executive functions do not simply reside in the frontal lobes

3 Neuroanatomic Axes and Neuropsychological Function

Anterior-Posterior Axis

Anterior Systems <------> Posterior Systems

- Anticipates behavior
- Selects Goals
- Organizes/ Plans
- Orchestrates organization
- Monitors
- Modulates

- Receives information
- Encodes
- Stores
- Structure/ of Knowledge Base

<----> Complimentary Relationship

Lateral Axis

Left Hemisphere Systems		Right Hemisphere Systems
Preferentially involved with:	<-->	**Preferentially** involved with:
▪ Building blocks of language		▪ Spatial information
▪ Parts of complex materials		▪ Relationship between parts
▪ Temporal processing		▪ Configuration of complex
▪ Processing unimodal codable information		▪ Processing multi-modal novel information
▪ Executive of discrete motor		▪ Emotional tone in speech

Cortical-Subcortical

Cortical (Thinking) Systems

Frontal System Modulation

Inhibition and selection

Subcortical Systems

Retic. Activ Syst Emotions/Drive	Motor Control
-Arousal	- Impulses
-Alertness	-
Emotional/Social Drives	

Neuroanatomic Organization:

- Frontal lobes are densely connected with other cortical and subcortical regions
- Prefrontal system is highly, reciprocally interconnected with the
  - limbic (motivational) system,
  - reticular activating (arousal) system
  - posterior association cortex (perceptual/ cognitive processes and knowledge base)
  - motor (action) regions of the frontal lobes

Central neuroanatomic position underlies regulatory control over:

- Perceptual coding in posterior/temporal isotypic regions
- Conceptual processes of the posterior association cortex
- Attentional functions supported by subcortex (reticular activating system)
- Emotional functions subserved by subcortex (limbic system)

Frontal system versus frontal lobe

- Frontal system acknowledges & incorporates interconnectedness
- A disorder within any component of the frontal system network can result in executive dysfunction

Disorders of Executive Function

1. No singular, core disorder; these difficulties are ubiquitous in learning, attention, anxiety, mood, autism spectrum, & acquired neurological disorders.
2. Symptom onset delayed due to environmental demand
3. Performance on standardized tests often appropriate
4. Discrepancy between ability and performance
5. Social domain most challenging…

Etiologies of Executive Deficits

- No one basis, no single cause
- In utero exposure to ETOH, cocaine, opiates
- Toxic exposures (lead)
- Low birth weight
- Birth trauma
- Traumatic brain injury
- Genetics
- Emotional Trauma

Conditions that render the frontal systems vulnerable include:

- Connectivity disorders such as cranial radiation and white matter development (migration errors)
- Lead poisoning affecting synaptogenesis
- Direct prefrontal trauma in traumatic brain injury
- Dysfunctional neurotransmitters (e.g., dopamine in TS & ADHD)
- Posterior cortex disorders including LD
- Arousal mechanism disorders in TBI (shearing), severe depression.

Contribution of EF to Other Disorders

- Language-based Learning Disability
  - Reading (comprehension, monitoring)
  - Writing & Organization (basic mechanics, coherency)
- Visual/Nonverbal LD
  - Visual problem solving
  - Visual organization
  - Mathematics difficulties
- The "Social Executive"/ASD
- Psychiatric symptoms (depression, anxiety, impulse control disorders)

Looks Like *Won't…*	Could be *Can't*
Oppositional, Stubborn	Difficulty shifting Avoiding overload
Can do it if he wants to	Difficulty shifting Lack of salience
Self Centered	Impaired social cognition Poor self monitoring
Won't put good ideas on paper	Poor fine motor Disorganization
Sloppy, erratic	Poor self monitoring Overloaded
Won't control outbursts	Overloaded Disinhibition
Doesn't care what others think	Impaired social cognition Poor self monitoring

Relationship between ADHD and EF

EF ≠ ADHD

All ADHD have some EFD

<u>but</u>

All EFD not ADHD

A New Disorder of Attention? Sluggish Cognitive Tempo – or CDD??

- Common presenting symptoms:
  - Daydreaming, Spacey, Stares, Mentally "Foggy"
  - Hypoactive, Slow moving, Lethargic,
  - Motorically and cognitively sluggish
- Slower, error prone information processing
- Poor focused or selective attention (?)
- Erratic retrieval – long-term memory (?)
- Socially withdrawn or shy (Neglected)
- Not impulsive (by definition, not ADHD then)
- Little association with executive functioning deficits
  - Small relationship to working memory and self-organization

General Conclusions

- Multidimensionality of Executive Function provides a more comprehensive yet more specific model of ADHD, incorporating a more full set of relevant symptom behaviors.

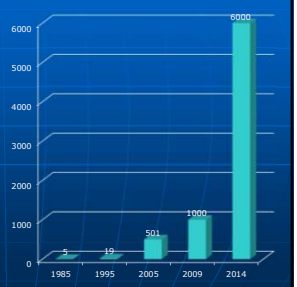
Why Are Executive Functions Important?

Interest in Executive Function in Children

- 5 articles in 1985
- 14 articles in 1995
- 501 articles by 2005
- >1000 articles by 2010
- >6000 articles by 2014

Bernstein & Waber

In Meltzer (2007) Executive Function in Education



Why are executive functions important?

Executive Functioning Predicts School Readiness and Success: Implications for Assessment and Intervention

For example, EF has been described as the single best predictor of school readiness (Blair & Razza, 2007). Moreover, EF has been implicated in numerous facets of functioning, such as academic, social, psychological, and behavioral domains. (Zhou, Chen, & Main, 2012).

Cantin, R.H., Mann, T.M. & Hund, A.M. (2012). NASP Communiqué, 41.

Infant & Childhood Neglect

- Neglected children lag behind in language, learning and executive functions (particularly planning and problem solving).
- This association persists even after controlling for IQ.

De Bellis, Hooper, Spratt, & Woolley (2009). Neuropsychological findings in childhood neglect and their relationship to pediatric PTSD. *Journal of the International Neuropsychological society, 15*, 868-878.

Developmental Psychology
2014, Vol. 50, No. 10, 2368–2379

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0012-1649/14/$12.00 http://dx.doi.org/10.1037/a0037495

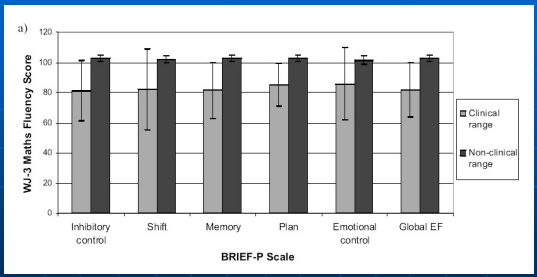
Relations Between Inhibitory Control and the Development of Academic Skills in Preschool and Kindergarten: A Meta-Analysis

Nicholas P. Allan, Laura E. Hume, Darcey M. Allan, Amber L. Farrington, and Christopher J. Lonigan
Florida State University

Table 1
Meta and Subgroup Analyses

Variable	Q_B (*df*)	*k*	*r*	95% CI LL	95% CI UL	*p*
Overall	347.70	85	.27	.24	.29	<.001
Inhibitory control measure	8.63 (1)	81				.003
Hot		20	.17	.12	.24	<.001
Cool		61	.28	.25	.31	<.001
Behavioral task vs. parent report	6.81(1)	87				.010
Behavioral task		75	.28	.25	.31	<.001
Parent report		12	.16	.08	.25	<.001
Behavioral task vs. teacher report	2.10 (1)	85				.147
Behavioral task		75	.28	.25	.31	<.001
Teacher report		10	.22	.13	.30	<.001

Associations between teacher ratings on the BRIEF-P at 4 years and performance on WJ3 Math Fluency at 6 years



Clark, CA, Pritchard, VE & Woodward, LJ. (2010). Preschool executive functioning abilities predict early mathematics achievement. Developmental Psychology, 46, 1176-91.

Effects of the Student Success Skills Program on Executive Functioning Skills, Feelings of Connectedness, and Academic Achievement in a Predominantly Hispanic, Low-Income Middle School District

Matthew E. Lemberger, James P. Selig, Hannah Bowers, and Jennifer E. Rogers

The authors examined the effects of the Student Success Skills program on executive functioning, feelings of connectedness, and academic achievement of a sample of 193 middle school students in a predominantly Hispanic and economically challenged school district in the southwestern United States. Using multilevel regression analyses in a two-level randomized design, the authors found treatment effects for multiple executive functioning scales, feelings of connectedness to classmates, and mathematics and reading achievement.

Cogn Ther Res (2014) 38:612–620
DOI 10.1007/s10608-014-9629-5

BRIEF REPORT

Executive Function Deficits in Daily Life Prospectively Predict Increases in Depressive Symptoms

Allison M. Letkiewicz · Gregory A. Miller · Laura D. Crocker · Stacie L. Warren · Zachary P. Infantolino · Katherine J. Mimnaugh · Wendy Heller

Parent, peer, and executive function relationships to early adolescent e-cigarette use: A substance use pathway?

Mary Ann Pentz *, HeeSung Shin, Nathaniel Riggs, Jennifer B. Unger, Katherine L. Collison, Chih-Ping Chou

Institute for Health Promotion and Disease Prevention Research, Department of Preventive Medicine, Keck School of Medicine, University of Southern California, 2001 N. Soto St., Soto Building, Los Angeles, CA 90089-9239, USA

HIGHLIGHTS

- Lifetime e-cigarette use was almost twice the use of cigarettes in early adolescents.
- Executive function (EF) deficits related to e-cigarette, cigarette, and alcohol use.
- EF deficits were more important than demographic, peer, or parent influences on use.
- Suggests adolescent drug use prevention programs should include EF skills training.

Behavioural ratings of self-regulatory mechanisms and driving behaviour after an acquired brain injury

Per-Ola Rike[1], Pål Ulleberg[2], Maria T. Schultheis[3], Anna Lundqvist[4], & Anne-Kristine Schanke[1,2]

Abstract

Objective: To explore whether measurements of self-regulatory mechanisms and cognition predict driving behaviour after an acquired brain injury (ABI).
Design: Consecutive follow-up study.
Participants: At baseline participants included 77 persons with stroke and 32 persons with a traumatic brain injury (TBI), all of whom completed a multidisciplinary driving assessment (MDA). A follow-up cohort of 34 persons that succeeded the MDA was included.
Baseline measurements: Neuropsychological tests and measurements of self-regulatory mechanisms (BRIEF-A and UPPS Impulsive Behaviour Scale), driving behaviour (DBQ) and pre-injury driving characteristics (mileage, compensatory driving strategies and accident rates).
Follow-up measurements: Post-injury driving characteristics were collected by mailed questionnaires from the participants who succeeded the MDA.
Methods: A MDA, which included a medical examination, neuropsychological testing and an on-road driving test, was considered in the decision for or against granting a driver's license. Self-regulatory mechanisms and driving behaviour were examined for research purposes only.
Results: At baseline, self-regulatory mechanisms were significantly associated to aberrant driving behaviour, but not with neuropsychological data or with the outcome of the on-road driving test. Aspects of self-regulation were associated to driving behaviour at follow-up.
Conclusion: It is recommended that self-regulatory measurements should regularly be considered in the driving assessments after ABI.

Use of the Behavior Rating Inventory of Executive Function and Child Behavior Checklist in Ugandan Children With HIV or a History of Severe Malaria

Itziar Familiar, PhD, MD,* Horacio Ruisenor-Escudero, PhD, MD,* Bruno Giordani, PhD,† Paul Bangirana, PhD,‡ Noeline Nakasujja, PhD,‡ Robert Opoka, MMED,§ Michael Boivin, PhD*

ABSTRACT: *Objective:* To assess the structural overlap between the Behavior Rating Inventory of Executive Function (BRIEF) and Achenbach Child Behavior Checklist (CBCL) among children in Uganda. *Methods:* Caregiver ratings for the BRIEF and CBCL were obtained for 2 independent samples of school-aged children: 106 children (5–12 years old, 50% males) with a history of severe malaria and on 144 HIV-infected children (5–12 years old, 58% males) in Uganda. Exploratory factor analysis was used to evaluate the factor structure of the 8 subscales for the BRIEF and the 8 scales of the CBCL to determine correlation. *Results:* Overall, children in the severe malaria group had higher (increased symptom) BRIEF and CBCL scores than those in the HIV-infected group. Three factors that provided a reasonable fit to the data and could be characterized as 3 specific domains were identified: (1) Metacognition, which consisted of the scales in the BRIEF Metacognition domain, (2) Behavioral Adjustment, which comprised of the scales in the BRIEF Behavioral Regulation domain and the Externalizing Symptoms scales in the CBCL, and (3) Emotional Adjustment, which mainly consisted of the Internalizing Symptoms scales in the CBCL. The BRIEF Behavior Regulation and CBCL Externalizing Symptoms scales, however, did overlap in terms of assessing similar behavior symptoms. These findings were consistent across the severe malaria and HIV-infected samples of children. *Conclusion:* The BRIEF and CBCL instruments offer distinct, yet complementary, assessments of behavior in clinical pediatric populations in the Ugandan context, supporting the use of these measures for similar research settings.

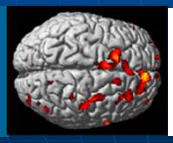
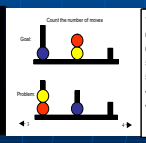
(J Dev Behav Pediatr 0:1–8, 2015) **Index terms:** BRIEF, CBCL, psychological assessment, behavior, children, sub-Saharan Africa.

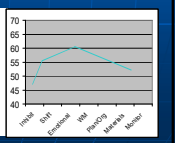
How Do We Assess Executive Functions?

Methods of Assessing EF

Micro — **Molar** — **Macro**

Genetics	Structural & Functional Imaging	Performance Tests	Observations Rating Scales



Advantages of EF Performance Tests:

- Increased specificity of processes
- Increased task control and internal validity
- Decades of research on test behavior

Limitations to Performance Tests

Performance tests tap individual components of executive function over a short time frame and not the integrated, multidimensional, relativistic, priority-based decision-making that is often demanded in real world situations

(Goldberg & Podell, 2000)

1994- Recognized need for…

- external validation, ecological validity for tests
- Standardized data about everyday executive function
- Standardized parent / teacher/ self ratings
- assess multiple aspects of executive functions
- Time & cost efficiency

What Do We Do About Executive Function Deficits?

What Executive Function Intervention is Not…

1. Specific set of skills/ information to “teach” student (e.g., group study skills class).
2. List of steps taped to top of the student’s desk.
3. Simple behavior modification to increase motivation.
4. A “student thing” - listing IEP goals without attention to the “how, who, where, when” of the classroom delivery system.

Initiating:

Increase structure of tasks
Establish and rely on routines
Determine minimal level of cue to help start and reduce cue over time
Break tasks into small, manageable steps
Place child with partner or group for modeling and cueing from peers
Reframe "lack of motivation" as initiation deficit for child, parent, teachers

Sustaining:

Increase salience in task- rely on high interest tasks
Hands-on activities support sustained attention problems
Ask child to choose among topics of interest to increase investment
Use verbal mediation to help remain focused
Write down list of what to attend to for a specific task

Sustaining, II:

- Make time limits to work explicit (the never ending worksheet problem)
- Repeat instructions as needed, perhaps quietly to the child
- Keep instructions clear and concise
- Have child take frequent, brief breaks (30 seconds to one minute)
- Use variety - avoid lengthy, monotonous tasks

Inhibiting:

- Increase structure in environment to set limits for inhibition problems
- Make behavior and work expectations clear and explicit; review with student
- Post milieu rules in view; point to them when child breaks rule
- Teach response delay techniques (counting to ten before acting)

Shifting:

- Increase routine to the day
- Make schedule clear and public
- Forewarn of any changes in schedule
- Give 2 minute warnings of time to change
- Make changes from one task to the next, or one topic to the next, clear and explicit
- Shifting may be a problem of inhibiting, so apply strategies for inhibition problems

Organizing:

- Increase organization in milieu
- Increase organization of therapy to serve as model and help child grasp structure of novel material
- Present the framework of new information to be learned at the outset, and review again at the end of a lesson
- Begin with tasks with only few steps and increase gradually

Planning:

- Practice with tasks with only a few steps first
- Teach simple flow charting as planning tool
- Practice with planning tasks (e.g., mazes)
- Ask child to verbalize plan before beginning work
- Ask child to verbalize second plan if first doesn't work
- Ask child to verbalize possible consequences of actions before beginning
- Review incidents of poor planning/anticipation with child

Self-monitoring:

- Anticipate performance- ask child to state how he/she will do on a task, then compare gently with actual performance
- Videotape child's behavior and review with child in supportive manner
- Increase attention to behavior- ask child to verbalize steps as he/she is doing them

What else can we do?

1. seat placement/facilitated attention
2. individualized and untimed testing
3. adjusted workload/frequent checks
4. repetition of instructions/written instructions
5. break things into manageable bits
6. provide motivation
7. make it hands on/interactive
8. allow for physical activity/breaks

What else can we do…

Curriculum-based approaches:

1. Teach strategies that students use independently
2. Ingrain the idea of working smarter rather than harder
3. Teach self-monitoring in the face of academic challenge
4. Connect prior with new learning
5. Teach students how the brain works (encodes, stores, retrieves information)
6. Ingrain the notion that knowledge and strategy use are more important than innate ability
7. Teach students about active learning
8. Help students understand themselves as learners (what works, what doesn't).

These are good approaches for all students. However, they are imperative for "at risk" students, who do not tend to *discover* them on their own.

Between Teacher and Child
by Dr. Haim G. Ginott

I have come to a frightening conclusion.
I am the decisive element in the classroom.
It is my personal approach that creates the climate.
It is my daily mood that makes the weather.
As a teacher I possess tremendous power to make a child's life miserable or joyous.
I can be a tool of torture or an instrument of inspiration.
I can humiliate or humor, hurt or heal.
In all situations, it is my response that decides whether a crisis will be escalated or de-escalated,
and a child humanized or de-humanized.

Classroom Management I: Tips for Teachers

- Educate yourself about learning, attention, anxiety/mood, autism spectrum, & acquired neurological disorders (nature, course, outcome, & causes).
- Keep in mind the 30% rule; anticipate the difficulties!
- Keep in mind that interventions within the school setting are most effective for improving school performance
- Get in-depth training and consultation on behavioral principles & modification
- Pick good administrators ☺; those that support & recognize your efforts!
- Know your limits and practice good self-care…

Classroom Management II: More Tips for Teachers

- Establish behavioral control – Primary objective in the first two weeks of school
- Decrease workload, or give smaller quotas of work
- Traditional desk arrangement & seat close to teaching area
- Target productivity first; accuracy comes later
- Don't send home unfinished class work
- Give weekly homework assignment sheets; ahead of time!
- Consider reducing/eliminating homework!?!?
- Allow restlessness…
- Review homework at start of class; this helps all students!
- Help the student "think aloud & think ahead"

General & Specific Resources

Executive function in education: From theory to practice (2007). L. Meltzer (ed.). The Guilford Press.

Executive skills in children and adolescents: A practical guide to assessment and intervention (2010). P. Dawson & R. Guare. The Guilford Press.

Coaching students with executive skills deficits (2012). P. Dawson & R. Guare. The Guilford Press.

ADAPT: Attention deficit accommodations plan for teaching (1992). H. Parker. Specialty Press, Inc.

The ADD-Hyperactivity handbook for schools (1992). H. Parker. Routledge Press.

Ch.A.D.D. educator's manual on AD/HD, 2nd edition. (2007). Ch.A.D.D.

Treatment of ADHD in the school setting (2006). R. Barkley. In Attention deficit hyperactivity disorder: A handbook for diagnosis and treatment. R. Barkley. The Guilford Press.

Overcoming underachieving: An action guide to helping your child succeed in school (1998). S. Goldstein & N. Mather. Wiley Press.

Why bright kids get poor grades: And what you can do about it (1996). S. Rimm. Three Rivers Press.

A Collaborative Problem-Solving Model of Everyday Executive Function Intervention

Mark Ylvisaker & Tim Feeney

- Knowledge Base
- Settings
- Delivery System
- Tool Kit

Knowledge Base

- Operational Definitions of EF
- Clinical Profiles
- Assess executive functions

Settings: Where to Intervene?

- Home
- School
- Community (Job, sports, theater, peers)

Delivery: Who Intervenes?

- Key Personnel: Mentor/ coach/ co-conductor
- "With" not "for"
- External to internal

Tool Kit

- Targeted Functional Domains
- Strategies
- Scripts/ Routines

EF Intervention
General Principles

- Teach goal-directed problem-solving process,
- within everyday meaningful routines,
- having real-world relevance and application,
- using key people as models & "coaches"

Based on the work of Mark Ylvisaker & Tim Feeney

Goal-Plan-Do-Review

GOAL

What do I want to accomplish?

PLAN

How am I going to accomplish my goal?

MATERIALS/ EQUIPMENT	STEPS/ASSIGNMENTS
1.	1.
2.	2.

PREDICTION: HOW WELL WILL I DO?

Self rating	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Other Rating	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

How much will I get done?

DO

PROBLEMS	SOLUTIONS
1.	1.
2.	2.
3.	3.

REVIEW: HOW DID I DO?

Self rating	1	2	3	4	5	6	7	8	9	10
Other rating	1	2	3	4	5	6	7	8	9	10

WHAT WORKED?	WHAT DIDN'T WORK
1.	1.
2.	2.

WHAT WILL I TRY NEXT TIME?

COACHING

Intervention strategy in which a "coach" (adult or peer) works with a student to set goals (long-term, short-term, daily) designed to enhance executive skills and lead to improved self-regulation.

Dawson, P. Guare, R. (2012). Coaching Students with Executive Skills Deficits, Guilford Press

Key Components of Coaching

- Goal-setting (long, short-term)
- Correspondence training
- Coach in daily goal-oriented plans
- Teach students self-management

Goal-Setting

Evidence shows that individuals who set goals are more likely to achieve higher levels of performance.

Have student set goals

Correspondence Training

Correspondence training is based on evidence that individuals who make a verbal commitment are more likely to follow through.

Have students verbally state goals

Meet with students to make daily plans linked to their goals.

Basic Format: R.E.A.P.

Review: go over plans from previous session to determine if carried out

Evaluate: Did the student carry out plan? If not, why not?

Anticipate: Plan tasks to accomplish today--review upcoming tests, assignments.

Plan: Have the student identify when he plans to do each task and *how* he plans to do each task.

Change in grades with coaching

	A-B	C-D
Before coaching	**19**	**81**
During coaching	**63**	**37**

Chi Square = 39.41, $p < .001$

Specific Interventions

REVIEW

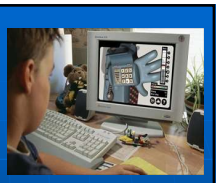
Interventions Shown to Aid Executive Function Development in Children 4 to 12 Years Old

Adele Diamond[1*] and Kathleen Lee[2]

Diamond, A. & Lee, K. (2011) Science, 333

www.devcogneuro.com

Working Memory Training



- Most studied intervention
- Gains do not generalize beyond WM
- Some evidence of gains in classroom
- Gains maintained at six months
- Gains more limited at 1 year

Inhibition Training

- More limited success
- No evidence of transfer beyond computer
- Combination of WM and Inhibition training: those trained on WM did not improve on Inhibition and vice versa

Aerobics?

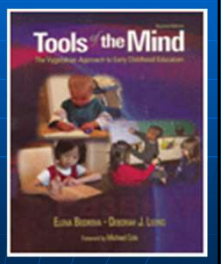
- Running improved 8-12 yr olds' cognitive flexibility and creativity but not non-EF skills
- 2 hrs fitness training improved working memory in 7-9 year olds vs controls

Martial Arts Executive Training?

Martial arts training (with mindfulness) associated with improved attention, generalized to tests and classroom

Tools of the Mind

- Preschool curriculum based on Vygotsky's notions of development
- Pretend play requires inhibition, flexibility, and working memory
- Children involved in Tools program showed better performance on range of EF tasks



Children with poor EF gain most from training

Largest differences seen on more demanding EF tasks; Little on low demand tasks

Must be continuously challenged; keeping status quo does not lead to improvement

Diamond et al, 2011

The question is not can we change executive functioning? The question is will we?

Adele Diamond, 2015

Medication Intervention Studies using Rating Scale Measures

ADHD	Other
Biderman et al., 2011	Tourette's: Cummings et al., 2002
DuPaul et al., 2012	TBI: Beers et al., 2005
Findling et al., 2009	Depression: Roth et al., 2012; Madoo et al., 2014
Maziade et al., 2009	Hypertension (lande et al., 2010
Turgay et al., 2010	
Yange et al., 2011	

Double-Blind, Placebo-Controlled, Crossover Study of the Efficacy and Safety of Lisdexamfetamine Dimesylate in College Students With ADHD

Journal of Attention Disorders
16(3) 202-220
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DOI: 10.1177/1087054711427299
http://jad.sagepub.com
SAGE

George J. DuPaul[1], Lisa L. Weyandt[2], Joseph S. Rossi[2], Brigid A. Vilardo[1], Sean M. O'Dell[1], Kristen M. Carson[1], Genevieve Verdi[2], and Anthony Swentosky[2]

Abstract

Objective: To evaluate stimulant medication on symptoms and functioning for college students with ADHD using double-blind, placebo-controlled, crossover design. **Method:** Participants included 24 college students with ADHD and 26 college students without psychopathology. Lisdexamfetamine dimesylate (LDX) was examined for ADHD participants over five weekly phases (no-drug baseline, placebo, 30-, 50-, and 70-mg LDX per day). Self-report rating scales of functioning and direct assessment of ADHD symptoms, verbal learning/memory, and adverse side effects were collected (baseline only for control students). **Results:** LDX was associated with large reductions in ADHD symptoms and improvement in executive functioning along with smaller effects for psychosocial functioning. Reduction in ADHD symptoms was found for 86.4% of participants; however, large differences in symptoms and executive functioning remained relative to controls. **Conclusion:** LDX is a safe, efficacious treatment for symptom relief in college students with ADHD. Research documenting medication effects on academic functioning and evaluating psychosocial/educational interventions is needed. *(J. of Att. Dis. 2012; 16(3) 202-220)*

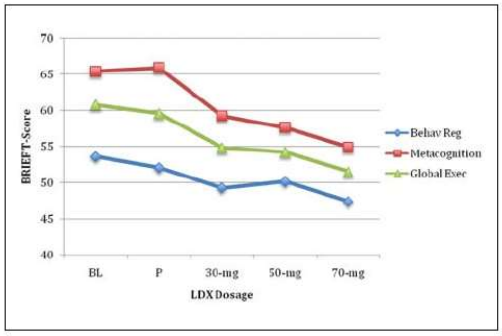


Figure 3. Self-report ratings of executive functioning across dosage conditions

DuPaul et al., 2012

Effect of Lisdexamphetamine Dimesylate (Vyvanse) in Adults with Executive Dysfunction and Partial or Full remission of Major Depression

✓ DSM-IV dx of MDD- recurrent, no psychotic features

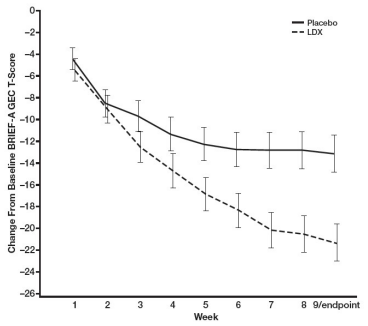
Table 1. Self-Report and Informant BRIEF-A GEC T-Scores and MADRS Total Scores Full Analysis Set (LOCF)

	LDX (n=71)	Placebo (n=72)
BRIEF-A Self-Report GEC T-score		
Baseline, mean ± SD	76.8±9.66	74.2±8.88
Endpoint, mean ± SD	55.2±16.15	61.4±14.61
LS mean (95% CI) reduction at endpoint	−21.2 (−24.5, −17.9)	−13.2 (−16.5, −9.9)
LS mean (95% CI) treatment difference	−8.0 (−12.7, −3.3) P=0.0009	
BRIEF-A Informant GEC T-Score		
Baseline, mean ± SD	63.9±10.81	63.1±11.01
Endpoint, mean ± SD*	54.8±11.85	59.6±10.71
LS mean (95% CI) reduction at endpoint	−9.3 (−11.6, −6.9)	−3.3 (−5.7, −1.0)
LS mean (95% CI) treatment difference	−5.9 (−9.3, −2.6) P=0.0006	
MADRS total score		
Baseline, mean ± SD	12.7±3.23	11.8±3.77
Endpoint, mean ± SD	7.6±6.28	8.9±5.67
LS mean (95% CI) reduction at endpoint	−5.0 (−6.3, −3.6)	−3.1 (−4.4, −1.8)
LS mean (95% CI) treatment difference	−1.9 (−3.7, 0.0) P=0.0465	

*Data are based on n=66 for LDX and n=67 for placebo.

Madhoo et al. (2014) *Neuropsychopharmacology*

Figure 2. LS Mean ± SE Changes From Baseline in BRIEF-A Self-report GEC T-score, Full Analysis Set (LOCF)



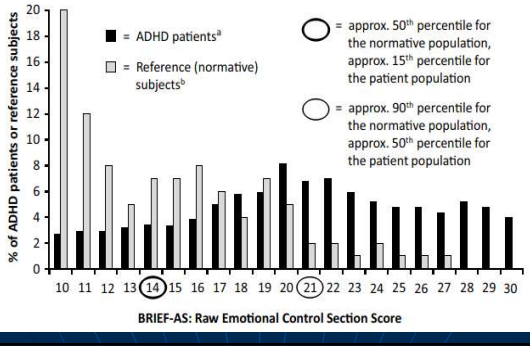
The effects of atomoxetine on emotional control in adults with ADHD: An integrated analysis of multicenter studies

P. Asherson [a,*], S. Stes [b,c], M. Nilsson Markhed [d], L. Berggren [e], P. Svanborg [f], A. Kutzelnigg [g], W. Deberdt [h]

- Emotional control recognized as a characteristic in ADHD for 100 years
- Thought to be associated with ADHD, but recent evidence suggests it may be a core symptom
- Treatment studies show emotional control responds to treatment for ADHD
- Integrated analysis of 2846 adults with ADHD

P. Asherson et al. / European Psychiatry 30 (2015) 511–520

BRIEF-A Emotional Control scores in ADHD vs Controls



Treatment effects in Atomoxetine vs Placebo

Table 4
Efficacy data: change from baseline to endpoint[a] in selected scales for the placebo-controlled population (LYDZ, LYEE studies), analyzed using ANCOVA.

	ATX	Placebo	*P*-value (ATX vs. placebo)
BRIEF-AS total: *n*	335	352	
Change from baseline, mean (95% CIs)	−21.63	−13.46	< 0.0001
	(−24.20, −19.06)	(−16.00, −10.92)	
Effect size	0.34		
BRIEF-AS Emotional control: *n*	338	353	
Change from baseline, mean (95% CIs)	−2.37	−1.60	0.0128
	(−2.81, −1.94)	(−2.03, −1.18)	
Effect size	0.19		
BRIEF-AS Emotional control in patients with subscores > 20: *n*	142	141	
Change from baseline, mean (95% CIs)	−4.73	−3.31	0.0081
	(−5.48, −3.97)	(−4.07, −2.55)	
Effect size	0.32		

P. Asherson et al. / European Psychiatry 30 (2015) 511–520

BRIEF-A EC Correlates with Change in ADHD Symptoms

Table 5
Correlations of changes from baseline to endpoint[a] between BRIEF-AS emotional control subscore and selected scales, for the overall population.

	Correlation coefficient (Spearman)	95% confidence intervals	*n*
CAARS-Self scores			
SV total	0.49	0.46, 0.52	2334
Hyperactive-impulsive	0.46	0.42, 0.49	2336
Inattentive	0.46	0.43, 0.49	2339
CAARS-Inv scores			
SV total	0.41	0.38, 0.45	2369
Hyperactive-impulsive	0.38	0.35, 0.42	2369
Inattentive	0.39	0.35, 0.42	2369
AAQoL total score	−0.54	−0.56,−0.51	2347

P. Asherson et al. / European Psychiatry 30 (2015) 511–520

Non-medication interventions using Rating Scales as Outcome Measures

- Liver transplant: Sorenson et al., 2011
- Chemotherapy: Kesler et al., 2011; McDonald et al., 2013
- Corticosteroids: Mrakostsky, 2012
- Family Problem Solving; Wade et al., 2004, 2005
- Cognitive Remediation: Beck et al., 2010; Hahn-Markowitz 2011, Toglia 2010
- Flexibility in ASD: Kenworthy et al., 2014

A Cognitive-Behavior Therapy and Mentoring Program for College Students With ADHD

Arthur D. Anastopoulos and Kristen A. King, *University of North Carolina at Greensboro*

	1	2	3	4	5	6	7	8
ADHD Knowledge	Introduction to ACCESS What is ADHD?	What causes ADHD?	Assessment of ADHD	How does ADHD affect school? Does ADHD only affect school?	Depression, anxiety, and other things that may go with ADHD Sex, drugs, and ADHD	What medications are used to treat ADHD?	Is medication the only way to treat ADHD?	A look into the future
Behavioral Strategies	Accessing resources at UNCG	Choosing tools: using a planner and notebook	Getting organized	Getting the most from classes	Studying effectively	Taking exams Managing papers and long term projects	Healthy lifestyle Handling relationships	Setting long-term goals Maintaining your skills
Cognitive Therapy	What is cognitive therapy?	Recognizing maladaptive thinking	Replacing maladaptive thinking with adaptive thinking	How can adaptive thinking help me manage ADHD and improve my school work?	Dealing with emotions and resisting harmful temptations	Sticking with treatment	Improving relations with friends and family	An "adaptive thinking" look into the future Relapse Prevention

Figure 1. Session-by-Session Outline for Group Cognitive-Behavior Therapy Component of ACCESS.

Cognitive and Behavioral Practice 22 (2015) 141-151

Table 2
Results for Measures Assessing Functional Outcome

Measure	Pretreatment *M* (*SD*)	Posttreatment *M* (*SD*)	*t*	Cohen's *d*
CAARS-S:L				
Inattention	19.40 (4.52)	15.20 (4.71)	4.81*	0.76
Hyper–Imp	13.88 (6.23)	12.33 (5.74)	1.99**	0.31
Total	33.25 (8.73)	27.55 (8.77)	3.80*	0.60
BRIEF-A				
Metacognition	93.71 (9.25)	81.15 (14.36)	4.84*	0.86
Behavioral Regulation	62.26 (9.84)	54.59 (11.15)	4.29*	0.74
Global Executive	155.97 (15.14)	135.74 (22.37)	4.97*	0.88
BDI-II	17.24 (9.93)	14.74 (11.78)	1.54***	0.27
BAI	18.47 (11.95)	15.26 (9.77)	1.99**	0.35

Note. All *t* tests performed using raw scores; CAARS-S:L = Conners Adult ADHD Rating Scale, Self-Report, Long Version; Inattentive = DSM-IV inattentive symptoms; Hyper–Imp = DSM-IV hyperactive–impulsive symptoms; Total = DSM-IV ADHD symptom total; BRIEF-A = Behavior Rating Inventory of Executive Function–Adult Version; BDI-II = Beck Depression Inventory–II; BAI = Beck Anxiety Inventory.
* $p < .001$; ** $p < .06$; *** $p < .15$.

Cognitive and Behavioral Practice 22 (2015) 141-151

N = 45

The effects of problem-solving skills training based on metacognitive principles for children with acquired brain injury attending mainstream schools: a controlled clinical trial D. Y. K. CHAN[1,2] & K. N. K. FONG[2]

- 32 children with mod-severe TBI
- 32 non-injured children
- Participated in problem solving skills training to teach metacognitive awareness and problem solving

Disability and Rehabilitation, 2011; 33(21–22): 2023–2032

Table I. Summary of problem-solving skills training programme.

Session	Theme	Heuristics	Examples of activity
1	Paying attention	1. Minimise environmental distraction 2. Maintain attention through different sensory inputs, e.g. auditory, visual	1. Warm-up games (introducing each other) 2. Vigilance exercises, e.g. cancellation exercises 3. Home exercises – writing down their problems in real-life 4. Self-evaluation
2	Remembering and organising	1. Association 2. Grouping 3. Categorisation	1. Review of previous session 2. What's wrong? (picture card games in daily life) 3. Classifying daily objects into groups 4. Association pictures, e.g. wood/furniture, tram/ferry, ruler/watch 5. Self-evaluation 6. Home exercises – categorising daily objects at home
3 and 4	Defining the problem, gathering information and goals setting	1. Problem documentation 2. Note taking	1. Review of previous sessions 2. Treasure hunts 3. Recording information exercises, e.g. shopping in the supermarket to facilitate grouping, association and categorisation 4. Role playing: 'I am a little teacher' (identifying problems for students) 5. Reading newspapers and picking up relevant information 6. Group and self-evaluation 7. Homes exercises – identifying the scenarios behind their real-life problems

Disability and Rehabilitation, 2011; 33(21–22): 2023–2032

5 and 6	Planning	1. Brainstorming 2. Think aloud 3. Means-end analysis	1. Review of previous sessions 2. Role playing: 'Being a salesman' (employing the brainstorming strategy) 3. Role playing: 'I am a detective' (employing the means-end analysis) 4. Group and self-evaluation 5. Home exercises – brainstorming solutions when they face different problems
7–10	Representing the problem	1. Visual imagery 2. Flow chart 3. Mind mapping 4. Time estimation	1. Review of previous sessions 2. 'Pictionary' game 3. Chocolate factory manufacturing line (employing the mind-mapping technique) 4. Time estimation – to make their bed and desktop 5. Planning a final group project 6. Group and self-evaluation 7. Home exercises – focussing on mind mapping and time estimation
11 and 12	Monitoring	1. Forward and backward chaining 2. Error prediction and goals checking 3. Repetition and error finding 4. Recognising limitation	1. Review of previous sessions 2. Debating (making arguments and conclusive statements) 3. Planning for a graduation ceremony (involving in organising an event and role playing) 4. Group and self-evaluation 5. Home exercises – revision of all metacomponents

Disability and Rehabilitation, 2011; 33(21–22): 2023–2032

Table III. Comparison of groups in post-test scores of dependent variables.

Dependent variable		Experimental group ($n = 16$) Mean (SD)	Comparison group ($n = 16$) Mean (SD)	p
TONI-3	Post-test	36.94 (3.73)	21.94 (6.02)	0.000*
	Change	11.69 (7.51)	0.94 (1.95)	
BRIEF	Post-test	51.94 (3.87)	69.69 (16.44)	0.000*
	Change	−15.62 (5.34)	0.75 (2.32)	
COPM – performance				
Child's perspective	Post-test	22.88 (3.26)	15.38 (4.43)	0.000*
	Change	7.62 (2.75)	0.25 (0.86)	
Parent's perspective	Post-test	21.13 (2.71)	11.75 (4.37)	0.000*
	Change	8.38 (6.60)	0.00 (0.00)	

Disability and Rehabilitation, 2011; 33(21–22): 2023–2032

The Slow-to-Recover Youth (Post-Concussion Syndrome?)

The Montreal Children's Hospital Active Rehabilitation Program for Slow-To-Recover Children & Adolescents: Four-component graded rehabilitation program

1. Submaximal aerobic training
2. Light coordination exercises
3. Visualization and imagery techniques
4. Home program for continued tranining

- Post-Concussion Scale* 17.4 ± 12.8 2.7 ± 3.2 3.79 **0.004**
- Energy level (PedsQL)*
- General fatigue 47.9 ± 16.9 83.3 ± 12.1 −5.43 **<0.001**
- Cognitive fatigue 63.7 ± 11.6 85.8 ± 10.2 5.48 **<0.001**
- Sleep/rest 49.9 ± 18.8 81.6 ± 10.9 4.47 **0.002**
- Fatigue total score 52.1 ± 12.3 83.1 ± 9.1 −5.91 **<0.001**
- Beck Youth Depression 45.0 ± 8.4 41.3 ± 6.9 3.26 **0.01**

Active Rehabilitation

1. Rest during "Temporal Window" – Rest during the first couple of days addresses cellular & vascular changes, allows for physical & cognitive recovery, prevents second injury, and facilitates the recovery process.

2. Exercise as Treatment – Converging lines of evidence clearly indicate the positive effects of exercise on brain health & functioning, including cognition, fitness, self-esteem, & somatic complaints.

3. Education & Reassurance as Early Intervention – Ponsford et. al. (2001) showed that youth provided information and support early in recovery were less symptomatic at 3 months. School personnel are in an ideal position to assist with this.

Online Counselor Assisted Problem Solving (CAPS)

- 7 sessions address common consequences of TBI using a problem solving framework.
- Training in problem-solving and communication skills to address family/ teen-identified goals.
- Initial session face-to-face in family's home.
- All sessions include online module and videoconference with psychologist.

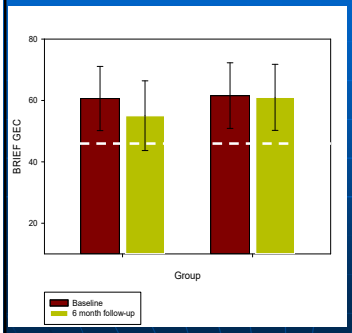
The CAPS Intervention

- 7 core sessions
  - Face-to-face introduction/overview
  - Staying Positive
  - Solving Problems
  - Dealing with Cognitive Challenges
  - Staying in Control
  - Handling Crises
  - Planning for the Future

Study Design

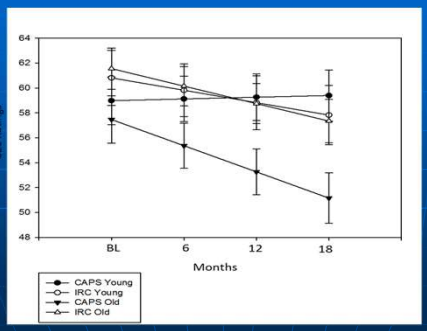
- Randomized Controlled Trial, single blind
- Multicenter cross-section study
- CAPS group (57) had web /videoconference intervention.
- Control group (63) had internet resources regarding TBI (Internet Resource Comparison; IRC)
- All received computers and high speed internet access
- Evaluators were naïve to group assignment (single blind)
- Average age at injury 14.5 years, 3.6 months post injury
- Mean GCS 10.05; 40% with severe TBI
- Outcome Measure: BRIEF

Post-Intervention in Older Adolescents



- GEC mean change **CAPS -4.78**, IRC -0.86 (F=6.74, p=0.01)
- Similar results for BRI and MI subscales in older adolescents (High school age)
- No significant differences in CAPS and IRC in the entire sample or younger teens

Longitudinal Results



Kurowski et al., 2014 *JAMA Pediatrics*

Conclusion

- CAPS improved executive function immediately post-intervention
- benefits maintained up to 12 months in older adolescents
- Large, randomized controlled treatment trials for pediatric TBI demonstrating efficacy of an online problem solving intervention for management of executive dysfunction
- Utilization of the CAPS intervention clinically should be considered

Improving School Readiness in Preschoolers with Behavior Problems: Results from a Summer Treatment Program

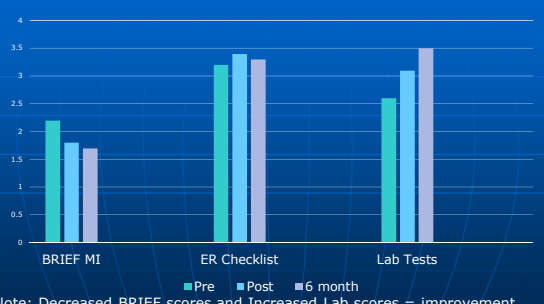
Paulo A. Graziano • Janine Slavec • Katie Hart • Alexis Garcia • William E. Pelham Jr.

J Psychopathol Behav Assess
DOI 10.1007/s10862-014-9418-1

Well designed feasibility study with:

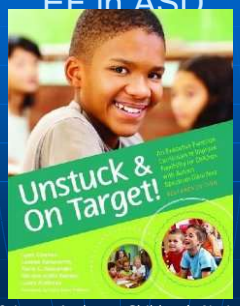
- 30 preschooler aged 4-6 years
- At risk or significant behavior/emotional problems
- 8 week summer intensive program:
  - Parent behavior management training
  - Behavior modification
  - School readiness
  - Social-emotional and self-regulation training

Change in EF and ER with Intervention



Note: Decreased BRIEF scores and Increased Lab scores = improvement
Increased ER Checklist scores = improved functioning

Real-World Collaborative Problem-Solving Intervention for EF in ASD



Lauren Kenworthy & Laura Anthony, Children's National

Unstuck Philosophy: Principles of Remediation

1. Teach by Doing—Coaching Model: Support, Fade, Generalize
2. Talk Less—Self-regulatory scripts
3. Be consistent
4. Provide visual cues
5. Collaborate, use humor, have fun

Ylvisaker & Feeny, 1998; Feeny & Ylvisaker, 2008

Unstuck and On Target!

Introduction	• Guide to Using This Manual
Topic 1	• The Meaning of Flexibility
Topic 2	• Cognitive Flexibility Defined
Topic 3	• Coping Strategies
Topic 4	• Personal Heroes
Topic 5	• Why Be Flexible?
Topic 6	• Your Goals: Getting What You Want
Topic 7	• Scripts for How to Be Flexible
Topic 8	• Journey to Target Island
Topic 9	• Being Flexible Makes You a Good Friend
Topic 10	• Flexible Futures

Flexible	• Flexible is stronger • If I am flexible, more good things happen for me
Unstuck	• I'm getting stuck on ___, how can I get unstuck?
Compromise	• Let's compromise so we both get some of what we want
Whim/On Target	• Is this a whim, or are we on target? • What is our target goal?
Plan A/Plan B	• What is our plan? • What is our Plan B?
Big Deal/Little Deal	• Is this a big deal or a little deal? • How can we make this big deal into a little deal?
Choice/No Choice	• Do we have a choice about this? • Is this a no choice situation?

Flexible	• Flexible is stronger • If I am flexible, more good things happen for me
Unstuck	• I'm getting stuck on ___, how can I get unstuck?
Compromise	• Let's compromise so we both get some of what we want
Whim/On Target	• Is this a whim, or are we on target? • What is our target goal?
Plan A/Plan B	• What is our plan? • What is our Plan B?
Big Deal/Little Deal	• Is this a big deal or a little deal? • How can we make this big deal into a little deal?
Choice/No Choice	• Do we have a choice about this? • Is this a no choice situation?

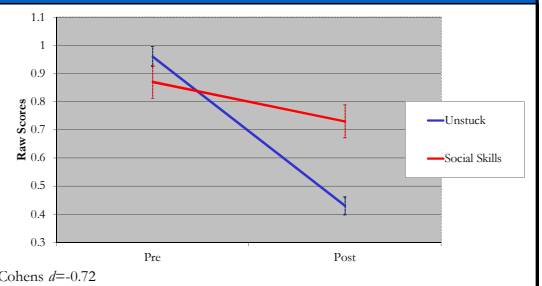
Goal – What do we want to do? → **Plan** – How will we do it? → **Do** – Let's try our plan → **Check** – How did it work?

"Real World," Well-Matched Methods

- 67 3rd-5th grade children in 14 schools randomized
- Children met full criteria for diagnosis and were already receiving services
- Existing school staff led interventions
- Interventions matched on number of sessions (28) and training:
  - Interventionists: Manual, 7 training sessions, 2 fidelity observations with feedback
  - Parents: Manual, 2 training sessions, visual supports
  - Mainstream Teachers: 1 training session, visual supports

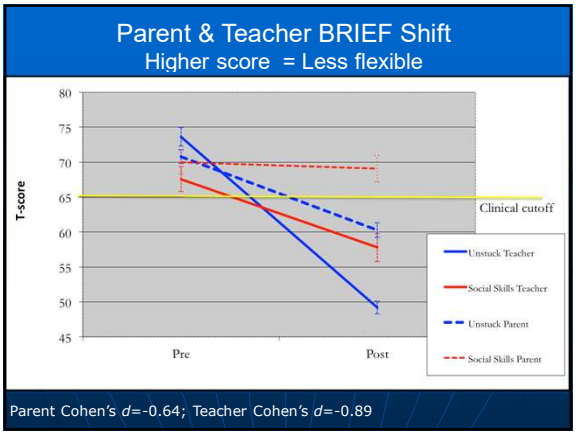
Mean Challenge Task Flexibility

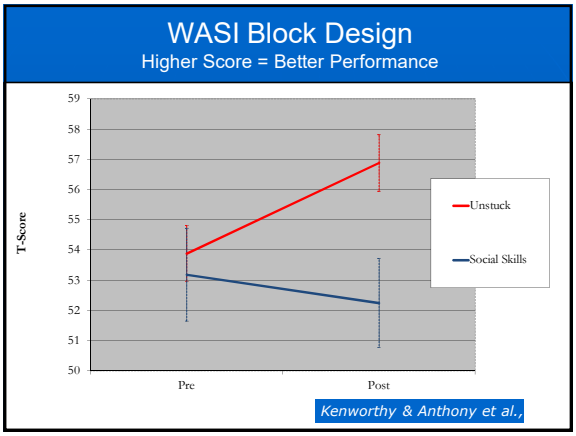
Higher score = Less flexible

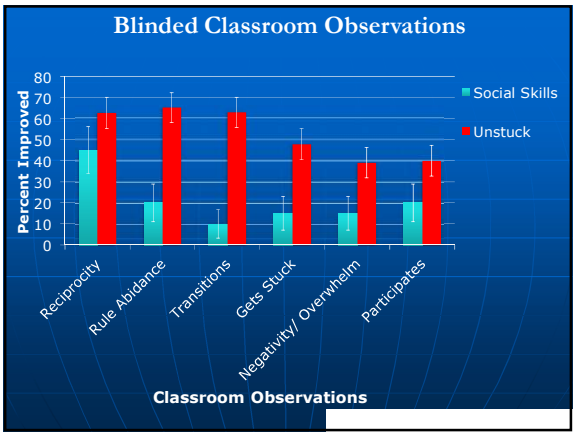


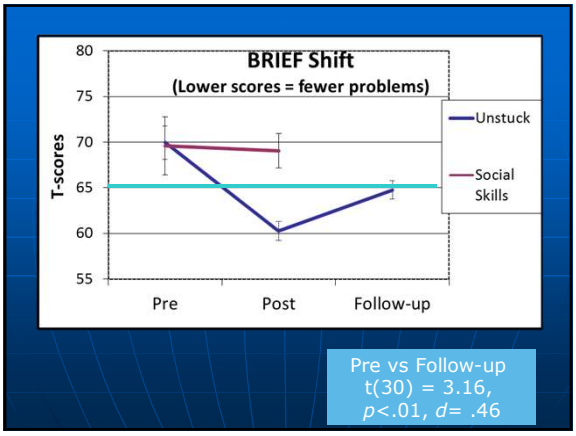
Cohens d=-0.72

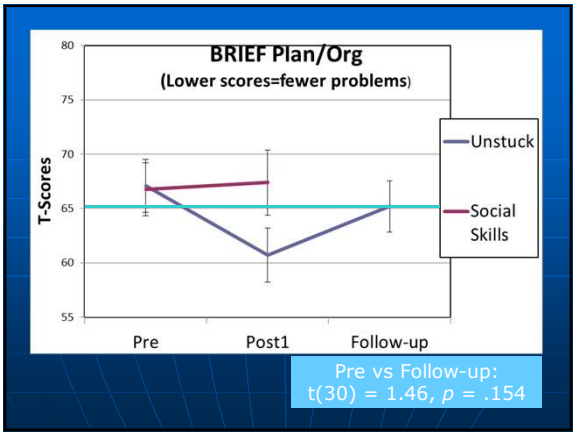
Kenworthy & Anthony et al, 2014

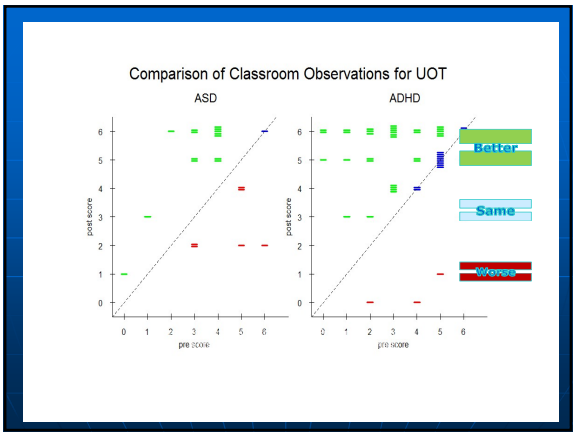

Parent & Teacher BRIEF Shift
Higher score = Less flexible
T-score
80
75
70
65
60
55
50
45
Pre
Post
Clinical cutoff
Unstuck Teacher
Social Skills Teacher
Unstuck Parent
Social Skills Parent
Parent Cohen's d=-0.64; Teacher Cohen's d=-0.89

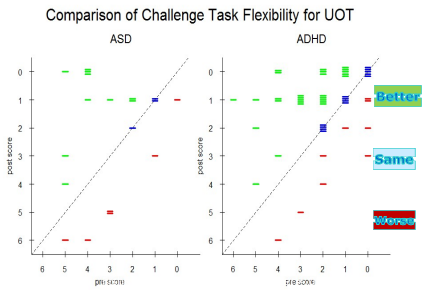

WASI Block Design
Higher Score = Better Performance
T-Score
59
58
57
56
55
54
53
52
51
50
Pre
Post
Unstuck
Social Skills
Kenworthy & Anthony et al.,


Blinded Classroom Observations
Percent Improved
80
70
60
50
40
30
20
10
0
Social Skills
Unstuck
Reciprocity
Rule Abidance
Transitions
Gets Stuck
Negativity/ Overwhelm
Participates
Classroom Observations


BRIEF Shift
(Lower scores = fewer problems)
T-scores
80
75
70
65
60
55
Pre
Post
Follow-up
Unstuck
Social Skills
Pre vs Follow-up
t(30) = 3.16,
p<.01, d= .46


BRIEF Plan/Org
(Lower scores=fewer problems)
T-Scores
80
75
70
65
60
55
Pre
Post1
Follow-up
Unstuck
Social Skills
Pre vs Follow-up:
t(30) = 1.46, p = .154


Comparison of Classroom Observations for UOT
ASD
ADHD
post score
pre score
Better
Same
Worse



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Enhancements to BRIEF2

Representative Standardization Sample

- A large standardization sample (1,400 Parent/Teacher; 803 Self-Report) matched by age, gender, ethnicity, parent education level, and geographic region to recent nationwide population figures. 50 states are represented.

Demographic Characteristics of the BRIEF2 Standardization Sample

	N (%) or *M* (*SD*)		
	Sample		
Characteristic	Parent	Teacher	Self-Report
n	1,400	1,400	803
Gender			
Male	49.1	48.6	49.3
Female	50.9	51.4	50.7
Age (years)			
M	11.51	11.51	14.50
SD	4.03	4.03	2.29
Range	5-18	5-18	11-18
Race/ethnicity (%)			
Caucasian	56.1	61.4	65.3
African American	14.1	11.6	11.6
Hispanic	18.9	18.4	15.7
Other	10.9	8.6	7.5
Parent education level (%)			
<12	10.5	11.5	11.1
12	26.6	27.9	26.3
13-15	28.7	26.6	27.3
16+	34.2	34.1	34.9

Note. Percentages may not sum to 100% due to rounding.

Concise Scales

More concise scales that reduce respondent burden (Approximately 10 minutes)

	BRIEF			BRIEF-2		
Scale	Parent	Teacher	Self-Report	Parent	Teacher	Self-Report
Inhibit	10	10	13	8	8	8
Self-Monitor	N/A	N/A	N/A	4	5	5
Shift	8	10	10	8	8	8
Emotional Control	10	9	10	8	8	6
Initiate	8	7	N/A	5	4	N/A
Task Completion	N/A	N/A	10	N/A	N/A	7
Working Memory	10	10	12	8	8	8
Plan/Organize	12	10	13	8	8	10
Task Monitor	N/A	N/A	N/A	5	6	N/A
Organization of Materials	6	7	7	6	5	N/A
Monitor	8	10	5	N/A	N/A	N/A
Additional Clinical Items	14	13	N/A	N/A	N/A	N/A
Infrequency	N/A	N/A	N/A	3	3	3
Total	86	86	80	63	63	55

Equivalence with BRIEF

- No new items on clinical scales, allowing for consistency of data collection between the BRIEF and BRIEF2.

Increased Sensitivity

- Items were selected for maximum performance in over 6000 clinical cases
- Increased sensitivity to executive function problems in clinical groups, such as attention-deficit/hyperactivity disorder (ADHD) and Autism Spectrum Disorders (ASD)

Parallelism in Item Content

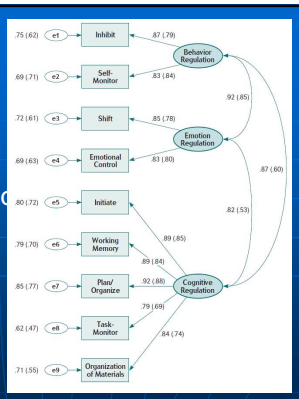
- Increased parallelism in item content and order with most items shared between the Parent Form and Teacher Form and approximately half of the items also shared with the Self-Report Form
  - easier to compare and contrast raters.
  - base rates of rater discrepancies provided

New to BRIEF2

Factor Structure

- Scales supported by factor analysis
- Three indexes consistent with accepted theory: Behavior Regulation, Emotion Regulation, and Cognitive Regulation

Parent Form
Confirmatory Fac
Analysis



Infrequency Scale

Helps identify unusual responding

Parent Form	Teacher Form	Self-Report Form
Forgets his/her name	Forgets his/her name	I forget my name
Has trouble counting to three	Has trouble counting to three	I have trouble counting to three
Cannot find the front door of home	Cannot find the front door of school	I cannot find the front door of my home

Infrequency Scale

- Infrequency items are indicated by an F in the margin of the scoring sheet. Circle the item number on the right for each Infrequency item with a score of 2 or 3.
- Count the number of circled items to determine the **Infrequency score**.
- Circle the appropriate protocol classification based on that score.

Infrequency score	Cumulative percentile	Protocol classification
0	99	Acceptable
≥1	>99	Questionable

Item no.
18.
36.
54.

Infrequency score (range 0 to 3)

Screening Forms

- New 12-item parallel Screening Parent, Teacher, and Self-Report Forms
- Quickly indicate whether executive function assessment is needed
- Correlate with Global Executive Composite scores < .90

Screening Forms (cont.)

- Cutoffs by normative gr

Light shading = potentially clinically elevated

Dark shading = clinically el

Executive Function Profile									
Boys %ile					Girls %ile				
Age (years)				Raw score	Age (years)				
5-7	8-10	11-13	14-18		5-7	8-10	11-13	14-18	
>99	>99	>99	>99	36	>99	>99	>99	>99	
>99	>99	>99	>99	35	>99	>99	>99	>99	
>99	>99	99	>99	34	>99	>99	>99	>99	
>99	99	99	>99	33	>99	>99	>99	>99	
99	99	99	98	32	99	>99	>99	99	
99	97	99	98	31	99	99	>99	97	
99	97	98	98	30	99	99	>99	97	
99	95	98	97	29	99	99	99	96	
98	95	97	96	28	98	98	97	95	
97	93	96	93	27	97	96	96	95	
95	90	94	91	26	95	95	95	94	
92	88	91	91	25	95	92	94	93	
91	84	88	87	24	93	88	92	91	
87	83	88	84	23	92	86	89	89	
80	81	82	79	22	90	86	88	87	
76	76	78	77	21	87	82	82	83	
71	70	69	76	20	84	78	74	81	
66	60	65	69	19	79	73	69	77	
58	55	61	63	18	71	66	63	71	
47	51	54	54	17	64	60	56	63	
39	43	48	48	16	58	50	48	56	
34	33	40	42	15	44	36	44	48	
27	25	33	33	14	35	32	31	39	
19	16	25	24	13	26	20	25	26	
8	8	14	16	12	14	9	14	14	

New Statistics that Support Interpretation

- Reliable change indexes
- Interrater agreement metrics
- Base-rate tables for standardization & clinical samples
- Contingency statistics (sensitivity/specificity, Likelihood ratios)

Base Rates – Clinical Samples

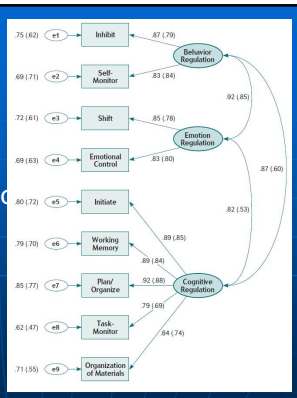
Clinical Groups		
ADHD-Combined	ADHD/Learning Disability	Tumor
ADHD-Inattentive	ASD	Epilepsy
ADHD-Sluggish Cognitive Tempo	Neurofibromatosis type 1	Diabetes
TBI	Acute lymphoblastic leukemia	Anxiety
Learning Disability		

BRIEF2 iConnect

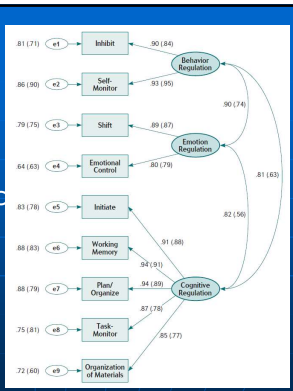
Full Forms	Screening Forms
Interpretive Report • Score report is an option	Score Report
Feedback Report	Screening Protocol Summary Report
Protocol Summary Report	

- Updated Intervention section in interpretive reports
- Contingency statistics for ASD and ADHD dx in Parent and Teacher Interpretive Reports
- Parent, Teacher and Self-Report now available in one Protocol Summary Report

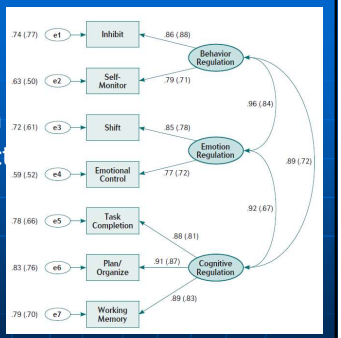
Parent Form
Confirmatory Fac
Analysis



Teacher Form Confirmatory Fac Analysis



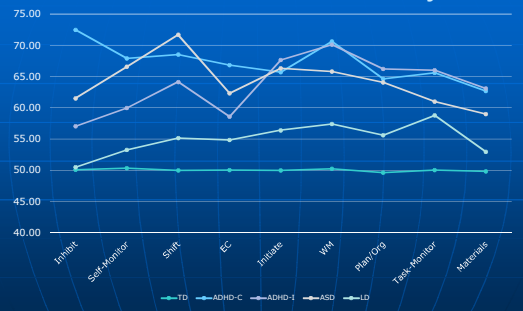
Self-Report Form Confirmatory Fact Analysis



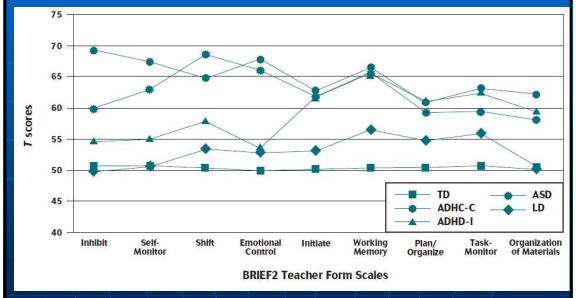
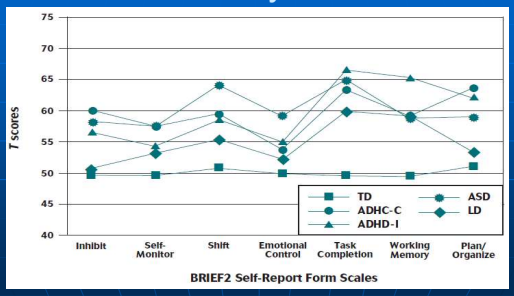
Clinical Validity

Clinical Groups		
ADHD-Combined	ADHD/Learning Disability	Tumor
ADHD-Inattentive	ASD	Epilepsy
ADHD-Sluggish Cognitive Tempo	Neurofibromatosis type 1	Diabetes
TBI	Acute lymphoblastic leukemia	Anxiety
Learning Disability		

Parent Form Profile Analysis



Teacher Form Profile Analysis



Self-Report Form Profile Analysis