thinkSMARTer, not Harder: the keys to cultivating executive functioning at home and in the classroom

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Today’s Roadmap

• What are executive functions (EF)?

• Why do EFs matter?

• What can we do to change them?

• What skills have evidence to work?

• How can we overcome obstacles?
What are executive functions (EFs)?

- Control functions needed for the brain to accomplish and maintain goal directed activities
  - “the process of doing”
  - Higher order problem solver
  - “driver” of the brain

Schiltz, 2011; Diamond, 2013; Lundt et al., 2012; Diamond et al., 2012
“Steering wheel” of executive functions

- Planning
- Problem Solving
- Inhibition
- Organization
- Cognitive Flexibility
- Fluency
- Time Awareness; Management
- Emotional Control
- Working memory
- Task initiation

Executive Functions
EFs and the brain
Why are EFs important?

• Executive functioning has been associated with:
  • school and job success
  • Relationship success (marriage/friendships)
  • Mental and physical health
  • Quality of life
  • Self-reliance/Strong identity development

• From childhood to adulthood, EFs:
  • Worsen
  • Linked to lack of compensatory strategies
  • Operate on a linear trajectory

Diamond, 2011; Diamond, 2013 (for review); Moffitt et al, 2011; Galambos et al., 2005, Safren, 2006
What affects EFs in youth?

- **Neurodevelopmental disorders**
  - Attention deficit hyperactivity disorder (ADHD)
  - Autism
  - Learning Disorders

- **Psychological disorders**
  - Addiction
  - Conduct Disorder
  - Depression
  - Obsessive Compulsive Disorder
  - Schizophrenia
  - Anxiety

- **Environmental Stressors**
  - Sadness
  - Stress
  - Loneliness
  - Lack of physical fitness
  - Sleep deprivation

What can we do about it?

• Medications are first-line treatment (e.g., ADHD, bipolar disorder)
  • Clinical range impairments are typically still observed after stimulants
  • Many teens will discontinue ADHD meds before graduating high school

• Need to supplement with non-medication interventions specific to executive functioning

Langberg et al., 2008; Molina et al., 2009; Evans et al., 2014
What interventions work?

- **Computer based programs:**
  - Working memory
  - Cognitive flexibility
  - Inhibition

- **School-based programs:**
  - Planning
  - Organization

- **Alternative programs:**
  - Tae kwon do
  - Yoga
  - Mindfulness
  - Aerobics

Difficult to generalize outside of the specific domain

Teens have multiple teachers, so problems with consistency

Unclear mechanisms of how they impact EF

Klingberg et al., 2010; Diamond & Lee, 2011; Bergman, Nutley et al., 2011; Thorell et al, 2009; Karback & Kray, 2009; Lakes & Hoyt, 2004; Raver et al, 2008, 2001; Riggs et al, 2006; Flook et al., 2010; Evants et al. 2011; Langberg et al; 2012
I shouldn't have to reward my teen for doing something that he should be doing anyway.

Why should I try something new when my way is working…well, sorta working.

I tell her this over and over again. It's like she doesn't even care!

Ugh! I’m going to be up all night finishing this paper…again! I should have started earlier.

My child should be doing this on her own. Her classmates are doing it without help!

I just don’t want to…

He knows what he's supposed to be doing. He just needs to do it!

I’ll take the trash out after I finish playing this video game…
Why can’t some youth do it?

• Obstacles for youth (particularly with ADHD):
  ★ Skills Deficit
  ★ “Delay aversion”/Motivation deficit
  ★ Time estimation deficit

• Behavioral interventions can address these

Sonuga-Barke, 2003, 2010; Barkley, 2006
Why behavioral interventions?

• **Behavioral** manifestations of poor EF observed in lack of *skills* related to:
  - Organizing materials
  - Tracking assignments
  - Managing time/time awareness
  - Planning work
  - Delaying gratification

• EF weaknesses, day-to-day, associated with:
  - Reduced school performance/scholastic attainment
  - Increased conflict with parents and teachers
  - More difficulties with peer relationships

• Teens *do not* grow out of these problem areas.

Barkley & Fischer, 2011; Power et al, 2006; Barkley et al, 1997; Diamantopoulou et al., 2007 Langberg et al., 2008; Abikoff et al., 2009; Spear et al., 2011
Why behavioral interventions?

• What do they do?
  • Teach and improve specific EF skills
  • Focus on practice, practice, practice
  • Help with behavior management (e.g., rewards/reinforcements)
  • Contribute to reduction in symptoms

• Allow for skills to be taught across domains
  • Improves generalizability and transfer of skills

Boyer et al., 2014; Antshel et al., 2012; Sprich et al. 2016; Cortese et al., 2015; Dovis et al., 2015
Limitations to current interventions

- Only a few studies in teens, despite being a key development time
- Multiple sessions per week design
- All research in youth ADHD
- No non-ADHD interventions
Limitations to current interventions

- Inconsistent parent involvement
  - Parents play critical role in kids’ EF development
  - Parents may have similar EF weaknesses

- Roles v. Skills
  - Teen programs have less parent involvement
  - 2 sessions to 2/3 of sessions attended
  - Psychoeducation
  - Behavioral Management

- No programs teach EF skills to both parent and teen simultaneously…in every session.

Fay-Stammbach et al, 2014; Hughes et al., 2009; Evans et al., 2014; Boyer et al., 2014; Abikoff et al. 2013; Antshel et al., 2012; Sprich et al., 2016
What is thinkSMART®?

• **Format**
  • 12-Sessions (1x week)
  • Group intervention
  • Parents included
  • Groups for ages 12+
  • No diagnosis required
  • Cognitive-behavioral approach

• **Goals:** think SMARTER, not HARDER!
  • Psychoeducation on EF
  • Teach behavioral strategies
  • Increase independence of youth
  • Increase parent effectiveness
Keys to thinkSMART®

- **thinkSMART® must-haves:**
  - **Skills:** taught to adults and teens
  - **Practice:** practice creates habits
  - **Parents:** to prompt, model, reward, praise
  - **Emotions:** feelings and associated cognitions are important targets
  - **Group atmosphere:** increase positive modeling, social reinforcement and support

- **Session must-haves:**
  - Mindfulness
  - Didactic instruction on skill
  - In-session practice of skill
  - Discussion of obstacles
  - Problem solving
  - At-home skill building activity
  - Weekly reminders

Abikoff et al, 2013; Solanto et al, 2010; Diamond, 2012, Sprich et al., 2016; Shaui et al., 2017
# Targets of behavioral interventions

<table>
<thead>
<tr>
<th></th>
<th>Kids</th>
<th>Teens</th>
<th>Adults</th>
<th>thinkSMART®</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organization</strong></td>
<td>✓</td>
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<td><strong>Time Awareness</strong></td>
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<td><strong>Planning</strong></td>
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<tr>
<td><strong>Task initiation/Completion</strong></td>
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<tr>
<td><strong>Emotion Regulation</strong></td>
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<td><strong>Sleep Hygiene</strong></td>
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<td><strong>Mindfulness</strong></td>
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<td><strong>Communication</strong></td>
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thinkSMART® targets

- Planner use
- Time awareness
- Scheduling
- To-do lists
- Time management
- Breaking things down
- Task initiation
- Organization
- Increasing motivation & rewards
- Long-term planning
- Emotional control
- Effective communication
- Sleep Hygiene
- Study skills
EF changes following thinkSMART®

**p < .054
*p < .08

<table>
<thead>
<tr>
<th>EF Component</th>
<th>Pre</th>
<th>Post</th>
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<tbody>
<tr>
<td>Inhibit</td>
<td>50.00</td>
<td>75.00</td>
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<tr>
<td>Shift</td>
<td>55.00</td>
<td>70.00</td>
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<tr>
<td>ER</td>
<td>60.00</td>
<td>65.00</td>
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<td>Initiate</td>
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<td>75.00</td>
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<tr>
<td>Working Memory</td>
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<td><strong>75.00</strong></td>
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<tr>
<td>Planning</td>
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<td>Organization</td>
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<td>Monitor</td>
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<td>GEC</td>
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</table>
How does thinkSMART® do?

• How helpful was thinkSMART® for you and/or your teen?

• How appropriate and relevant was the session content?
Keys to success

• Parent involvement/engagement
  • “I feel like our relationship is better because we are going through this together! We talk about using the skills.” –Mom of 15 year old boy

• Improved communication
  • “The other day, my mom identified that I was on a thought train [mindfulness skill], which helped me recognize this.” –14 year old boy

• Social comparison
  • “Fine, I’ll write in my planner but only because you’re bringing us cookies if we all do it.”—13 year old girl

• Validation of struggles
  • “wait, you forgot your backpack this week, too?”—13 year old boy
Skills and Obstacles

Mindfulness
Time Awareness
Scheduling
To-Do Lists
Organization
Task Initiation
Planner Use
Task Completion and Motivation
Planner use

• Why use a planner?
  • It’s your brain’s dump!
  • Reduce working memory needs

• What makes a good planner?
  • Week view
  • Enough space
  • Notes section

• Obstacles to planner use:
  • Lazy
  • Don’t have it on me
  • Not enough time to write it down
  • I’ll remember it
  • It’s online
Write it down…

 ✓ Use abbreviations
 ✓ Raise your hand to slow down
 ✓ Ask for repetition
“I always have my phone on me, why can’t I just use that?”
Time Awareness and Scheduling

- Before you can manage time, you must be aware of time
  - Time estimation practice
  - Rule of thumb: Multiply your estimated time by 2!
  - Wear a watch
  - Have a regular schedule/routine

- Increase productivity with **Time Cracks!**
  - Little bits of time between activities that go unused
  - Build awareness of these and practice using them effectively

Solanto et al., 2010
To-Do Lists

• What goes on a to-do list?
  ✓ Activities that don’t have a set “time”
  ✓ Tasks likely to be forgotten
  ✓ Time crack activities
  ✓ Anything!

• Be SPECIFIC
  ✓ Tangible
  ✓ Concrete

• Be BRIEF
  ✓ Daily list v. weekly list
  ✓ Parts of bigger projects

• These are roadmaps!
Task Initiation

- The physics of EF
- 5-minute rule
- Size of the 1st step
**Break it down...**

**the thinkSMART® way!**

A thinkSMART® Step is any component of a project that can be completed in less than 30 minutes. If you estimate that a step will take longer than 30 minutes, it might be too big! Don’t worry, with motivation, you can complete many steps in the same day/sitting. We just want steps to be doable.

**Reminders:**
- You should break down the project within 3 days of when it is assigned, and aim to complete it 2 days before the due date.
- Put these steps directly into your planner!

<table>
<thead>
<tr>
<th>Step</th>
<th>Time Estimation: how long will this step take?</th>
<th>Materials: what materials do you need to complete this step?</th>
<th>Scheduling: by what date should this step be completed?</th>
<th>Checking: did you edit/proof your work for errors (yes/no)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Breaking down the project!</td>
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<td>Step 2:</td>
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Increasing Motivation and Rewards

• Self-Contingent Rewards
  • If-then contingencies
  • Using small “tasks” as rewards (e.g., snack)
  • Should have a clear end point

• Rewards from parents
  • Yes!
  • Consider rewarding the use of “good” skills, NOT the completed task

No fun until it’s done…unless you can make it fun to get it done!
Steps to successful organization

1. Identify
2. Categorize
3. Sort/Place

School Organization

- Binders
  - Action v. No Action
  - “Meat” goes in the middle

5-minute “clean up”
Mindfulness

• Empirically supported treatment for:
  • ADHD (kids and adults)
  • Mood
  • Parent-child interactions
  • Pain
  • Anxiety

• Three primary aspects to Mindfulness
  • Attention
  • Awareness
  • Non-judgmental

Segal et al, 2002; Zylowska et al, 2008; Khoury et al., 2013
Skill Building!

Distraction
Why is this so hard?
thinkSMART® obstacles

- Youth “buy-in”
- Parent commitment
- Effort needed
- Parent EF weaknesses
thinkSMART® “Do Nots”

✔️ write in your teens calendar
✔️ make to-do lists for your teen
✔️ save your teen at the last minute
✔️ nag
thinkSMART® tips for success…

• Creating new *habits* is the way to master the strategy and optimize effectiveness
  ✓ Pair a new strategy with something you already do every day!
  ✓ Don’t bite off more than you can chew!
  ✓ The earlier good habits begin, the better
  ✓ Be patient and observant of *any* steps in the right direction
thinkSMART® tips for success…

- Identify quicksand and AVOID
- Set expectations/boundaries—bad habits *can and should* be expected to change
thinkSMART® tips for success…

• The teen may need more support than you want to give

• Model good behavior

• Meet the teen where the teen is and push them slightly further
Conclusions

• Executive functioning difficulties are universal…not just in ADHD

• Executive functions can be strengthened…even in people with good ones

• Teens (and parents) can learn compensatory strategies

• Committing to behavioral change is hard, but worth it

• You can get your teen to finish line!
Special thanks to…

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