Executive Function Related Interventions to Improve Self-Regulation for Students with Behavior Problems

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Advance Organizer

- Self-regulation (SR) & executive function conceptual framework
- SR curricular examples
  - Tools for Getting Along (grades 4-5)
  - Social-Emotional Learning Foundations (K-1)
  - I Control & I Control Brain Training Lab (middle school)
- Discussion
Students with Behavior Problems: Self-Regulation Failure

- Successful accomplishment of developmental tasks requires SR.

- Many students develop patterns of serious and chronic failure to regulate cognition & emotion.

- Poor SR has even been called the “hallmark” of psychopathology!

Beauchaine, Gatzke-Kopp, & Mead (2006)
Self-Regulation Skills

Learning to
  o manage thoughts & emotions
  o inhibit impulsive reactions & use self-talk to guide behavior (Stop & Think!)
  o act responsibly, even when parents or teachers aren't around
Interconnected Domains of Self-Regulation

- Regulating Cognition (Problem-Solving)
- Regulating Emotion (Emotion Control)
- Regulating Motivation (Goal-Setting)
By teaching SR skills, social-emotional learning (SEL) can be strengthened to help students:

- Achieve success in learning
- Form positive relationships
- Solve everyday problems
- Adapt to changing social & emotional demands

Elias et al (1997)
Basis of Self-Regulation: Executive Function

Ability to regulate emotion, motivation, & cognition based on neurocognitive capacities -

- *Holding and using* information (Working Memory)
- *Shifting thinking* (Cognitive Flexibility)
- *Stopping* automatic responses (Inhibition)

Collectively referred to as “Executive Functions” (EF)

Miyake et al (2001)
Teaching Self-Regulation: Cognitive-Behavioral Interventions (CBI)

- The child is the primary change agent
- Verbalization (self-talk) is the primary component
- Modeling is a key instructional procedure
- Self-regulation is the focus
Tools for Getting Along:
A tier 1 (Universal) CBI for students in grades 4-5

An Efficacy & Replication (Goal 3) study funded by the National Center for Special Education Research, Institute of Education Sciences, U.S. Department of Education R324B06029
Tools for Getting Along

To prevent or reduce students’ aggressive responses to anger provoking situations using:

- 6-step social problem-solving framework
- 21-lesson core curriculum with 6 booster lessons
- Integrated review, modeling, rehearsal (role-play)

Features

- Paired or small group instructional options
- Tool Kit as a self-monitoring device
- On-the-Spot Assessment to promote generalization
The Problem-Solving Steps in TFGA

1. ... know I’m angry or frustrated.
2. ... calm down.
3. ... think about the cause.
4. ... think about what I could do.
5. ... try a solution.
6. ... think about how it turned out.
Findings to Date

(Daunic, Smith, Brank, & Penfield, 2006)

HLM analysis of multiple measures on 165 at risk for EBD students in general education classrooms

- Increase in curriculum related problem solving knowledge \( (g = 6.842, p = .000) \)
- Decrease in teacher rated reactive and proactive aggression \( (t = 3.441, p = 0.002); t = 3.490, p = 0.002) \)
Findings to Date

(Daunic, Smith, Garvin, Barber et al., 2012)

- HLM analysis of multiple measures on 1,296 students in general education classrooms:
  - More curriculum related problem solving knowledge ($F = 8.35, p < .01$)
  - More positive approach to problem solving ($F = 2.77, p < .05$)
  - More rational problem-solving style ($F = 2.77, p < .05$)

- For students with relatively higher baseline risk:
  - Better teacher-rated behavior regulation & metacognition ($F = 0.12, p < .01$)
  - Lower teacher-rated proactive aggression ($F = 0.11, p < .05$)
  - Lower self-reported trait anger and outward expression of anger ($F = 0.17, p < .01; F = 0.17, p < .01$)
Findings to Date

(Smith, Daunic, Barber, Aydin, Van Loan, & Taylor, in press)

- HLM analysis on 720 students in general education classrooms one year post treatment:
  - More curriculum related problem solving knowledge (F = 1.50, p < .05)
  - Lower self-reported trait anger & anger control (F = 0.665, p < .05; F = 0.447, p < .05)

- For students with relatively higher baseline risk:
  - Better teacher-rated behavior regulation (F =0.11, p < .05)
  - Lower teacher-rated proactive aggression (F =0.106, p < .10)
  - Lower teacher-rated externalizing & internalizing behavior (F = .092, p < .05; F =.102, p < .05)
Social-Emotional Learning Foundations (SELF): A tier ½ intervention for students in grades K-1

A Development Research (Goal 2) study funded by the National Center for Special Education Research, Institute of Education Sciences, U.S. Department of Education R324A100020
SELF Curriculum Structure

- Teaches **self-regulation** through literacy instruction within a social-emotional learning framework.

- Instructional units parallel 5 social-emotional learning competencies.

- 3 lesson types for each selected storybook:
  - Whole group interactive storybook reading
  - Small group dialogic reading & targeted vocabulary development
  - Small group application activities
Based on 3 principles:

1. Encouraging the child to become an active learner during shared book reading

1. Providing feedback that models sophisticated language (using targeted vocabulary)

1. Challenging child’s knowledge and skills by raising conversation to a level just above current ability

Lonigan & Whitehurst, 1998; Whitehurst et al., 1999
Self-Regulation Skill Focus

Helps students at risk for emotional & behavioral problems use language to:

- manage thoughts and emotions
- inhibit impulsive reactions and use self-talk to guide behavior (Stop & Think!)
- act responsibly (self-regulate), when parents or teachers aren't around.
SELF Links Social-Emotional Learning & Literacy

**Literacy**
- Comprehension
- Listening
- Reading
- Vocabulary

**Social-Emotional**
- Identifying Feelings
- Empathy
- Perspective Taking
- Problem Solving

Self-Regulation
Preliminary Pilot Data

- 24 K-1 classrooms in 2 large, ethnically diverse elementary schools in N. Central Florida
- Target students selected with SSBD gates 1 & 2
- Pre-post assessments of self-regulation & behavior
  - SELF Vocabulary Assessment (researcher developed)
  - Behavior Rating Inventory of Executive Function (BRIEF)
  - Clinical Assessment of Behavior (CAB)
  - Standardized measures of language (CELF) and reading comprehension (WRMT-R)
- Data collected over 2 years
Preliminary Findings

- Positive effects on social-emotional learning related vocabulary (Kindergarten: $F[91] = 21.72$, $21.20$, & $15.49$ for definition, use, & receptive, respectively, $p < .01$; First grade ($F[91] = 6.81$ & $26.80$ for definition & use, $p < .01$)

- Positive effects on overall self-regulation (BRIEF) and specifically, metacognition (MI), for internalizing kids in SELF vs. controls ($t[121] = 2.16$, $p = .033$; ($t[121] = 1.67$, $p = .097$)

- Positive effects on overall self-regulation and on metacognition for children in SELF with relatively poor pretest scores vs. controls ($t[121] = 1.80$, $p = .074$; $t(121) = 1.69$, $p = .093$)

- Positive effects on social skills (CAB) for 1st graders in treatment compared to controls ($t(76) = -1.978$, $p = .052$)

- No significant effects on standardized reading/language measures
I Control: A tier 3 (selected) CBI for students in grades 6-8

A Development & Innovation (Goal 2) study funded by the National Center for Special Education Research, Institute of Education Sciences, U.S. Department of Education R324A110182
I Control

• To develop an intervention focused on building EF and self-regulatory skills for middle school students with EBD

• Combines direct instruction of EF skills (working memory, inhibition, cognitive flexibility) & instruction in contextualized self-regulation (goal setting, emotion regulation, problem solving)
I Control Curriculum Overview

• Year-long intensive program
  o 46-core curriculum lessons & 4 boosters
  o Uses modeling, rehearsals, activities

• Implemented 3x per week
  o 2:1 ratio of lessons to computerized training

• Lessons progress through skill development in:
  o Goal-Setting
  o Emotion Regulation
  o Problem Solving

• Knowledge & skill instruction integrated with direct EF practice using computerized “gaming” regimen
Unit 1: Introduction to I Control

- I Control curriculum introduction

- 3 EF Skills areas
  - Working memory
  - Shifting
  - Impulse control

- Instruction & guided practice in EF skill areas linked to self-control
Unit 2: I Control My Goals

• Goal Commitment
  o Values
  o Value based goals

• Goal planning
  o Resources & Barriers
  o If-then plans
  o Prioritizing

• Goal Completion
  o Revised, ongoing, or terminal goals
Unit 3: I Control My Emotions

• Understanding Emotions
  o Why we have emotions
  o Emotions and feelings
  o Labeling emotions
  o Identifying emotion triggers
  o Emotion intensity

• Strategies for Emotion Control
  o Situation Strategies
  o Focus Strategies
  o Think strategies
  o Act strategies
Unit 4: I Control My Problem Solving

• Recognizing and Defining Problems
  o Identifying a problem exists
  o Being positive & realistic

• Generating and Evaluating Solutions
  o Think of solutions
  o Evaluate solutions
  o Respond with a plan

• Carrying out and evaluating plans
  o Communication
  o Evaluating the results
Mnemonic

C - Check for a Problem
O - Name the Problem and the Goal
N - Think of Solutions
T - Respond with a Plan
R - Look at How You Did
Brain Training Lab (BTL): A Direct Training Component of the I Control Curriculum
Direct Training of Executive Function Skills: A Conceptual Framework

Direct Training of EF Skills that Underlie Self Regulation

<table>
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<tr>
<th>Working Memory (WM)</th>
<th>Cognitive Flexibility (CF)</th>
<th>Inhibitory Control (IC)</th>
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Proximal Outcomes

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<th>Improved WM</th>
<th>Improved CF</th>
<th>Improved IC</th>
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Distal Outcomes

- Improved Self-Regulation of Behavior and Learning
- Improved Social, Emotional, Behavioral, and Academic Outcomes
BTL Overview

Computerized tasks designed to strengthen EF skills required for deliberate SR:
- Working Memory
- Cognitive Flexibility (Shift)
- Impulse Control

Improvements in underlying EF mechanisms should improve students’ ability to:
- Control Emotions
- Set and Achieve Goals
- Solve Problems

Partner with direct instruction component of I Control to directly train EF skills
BTL Components

Brain Training Lab
- Brain Training Games
- Student Self-Monitoring

I Control Curriculum
- I Control Reward System
- 4 Units of Teacher-Led Instruction
Self-monitoring:

• Students record their scores immediately after playing a game.

• Students meet with teachers periodically to review progress, record level points and set new goals.

• Teachers help students determine when they have mastered a task and can move on to a new challenge.
Reward System

Built on a leveling design based on gaming theory that motivates students to engage by increasing task difficulty and choice.

- Students earn points until they complete a level.
- Students receive a reward (based on existing classroom reward system) for completing a level.
- Students continue through progressively more difficult levels.
Reward System

When students complete a level they receive 3 rewards:

- Certificate/note sent home
- Access to new games
- Reinforcer from teacher

Certificate/note:

- Updates parent on what I Control is teaching
- Explains ways parents can help
- Provides opportunities for positive parent communication and encouragement for students
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