



# **Children's Emotions from a Neuropsychological Perspective**

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Presented by

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# What Are Emotions?

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“...emotions must be considered as a multicomponent adaptive system spanning from very primitive and hard-wired survival-related behavioral schema to much more complex and learned behavioral patterns, highly integrated with the cognitive system.”

Gianotti, **2000**, page 220.

# Key Concept

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Emotions are generated/ processed by two distinct brain systems: The emotional and the cognitive.

# **Emotions: Two Systems**

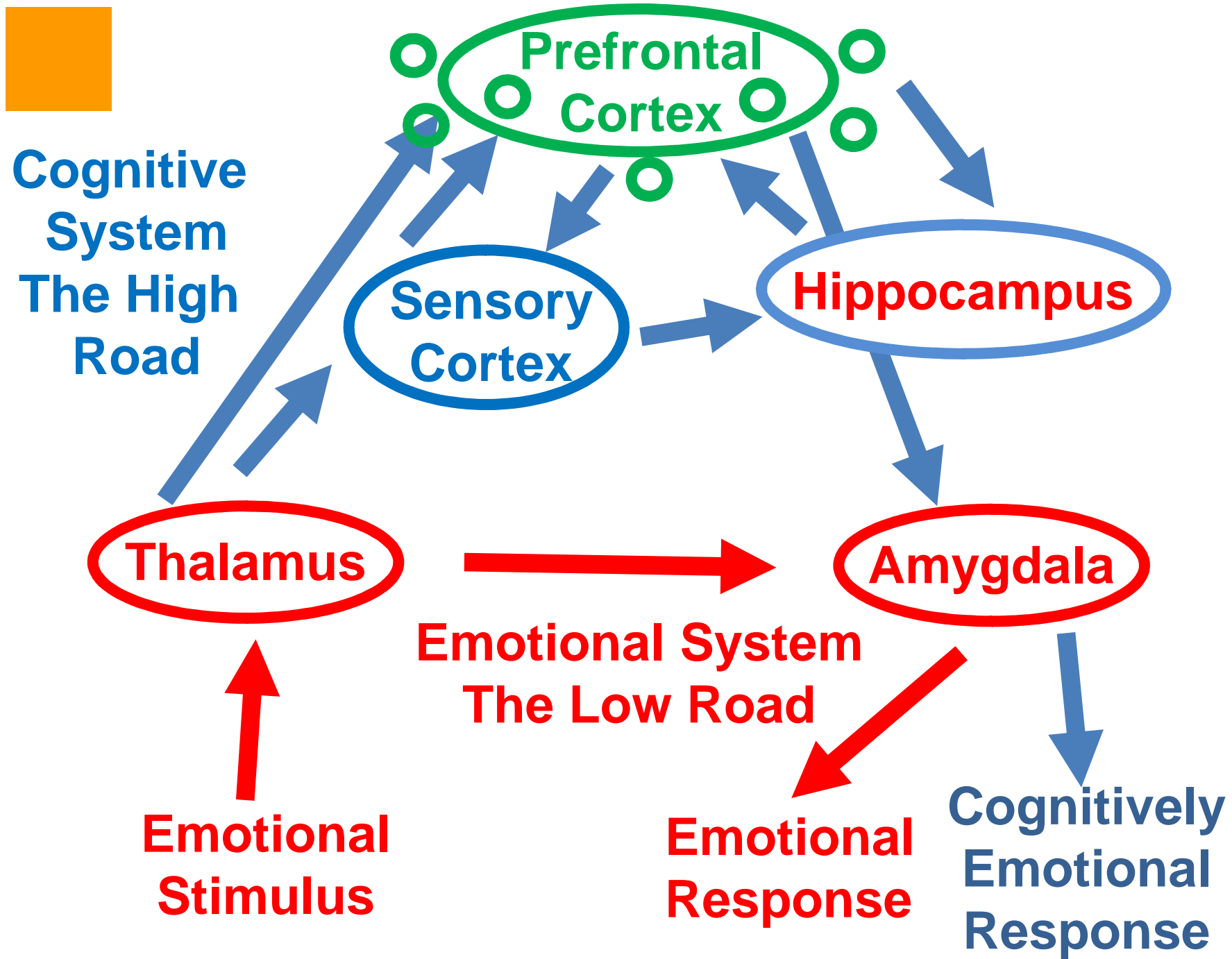
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**The emotional system is a quick processing system based on a perceived need for urgent action. This system rapidly identifies and automatically processes a restricted set of stimuli from the environment and triggers an immediate response.**

## **Emotion: Two Systems**

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**The cognitive system is engaged much more slowly, allowing for conscious, controlled analysis of stimuli and conscious, controlled selection of appropriate strategies for managing emotionally-laden situations.**



# **Emotion and Cognition**

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**Examining the relationship between emotion and cognition through a neuropsychologically-based information processing model:**

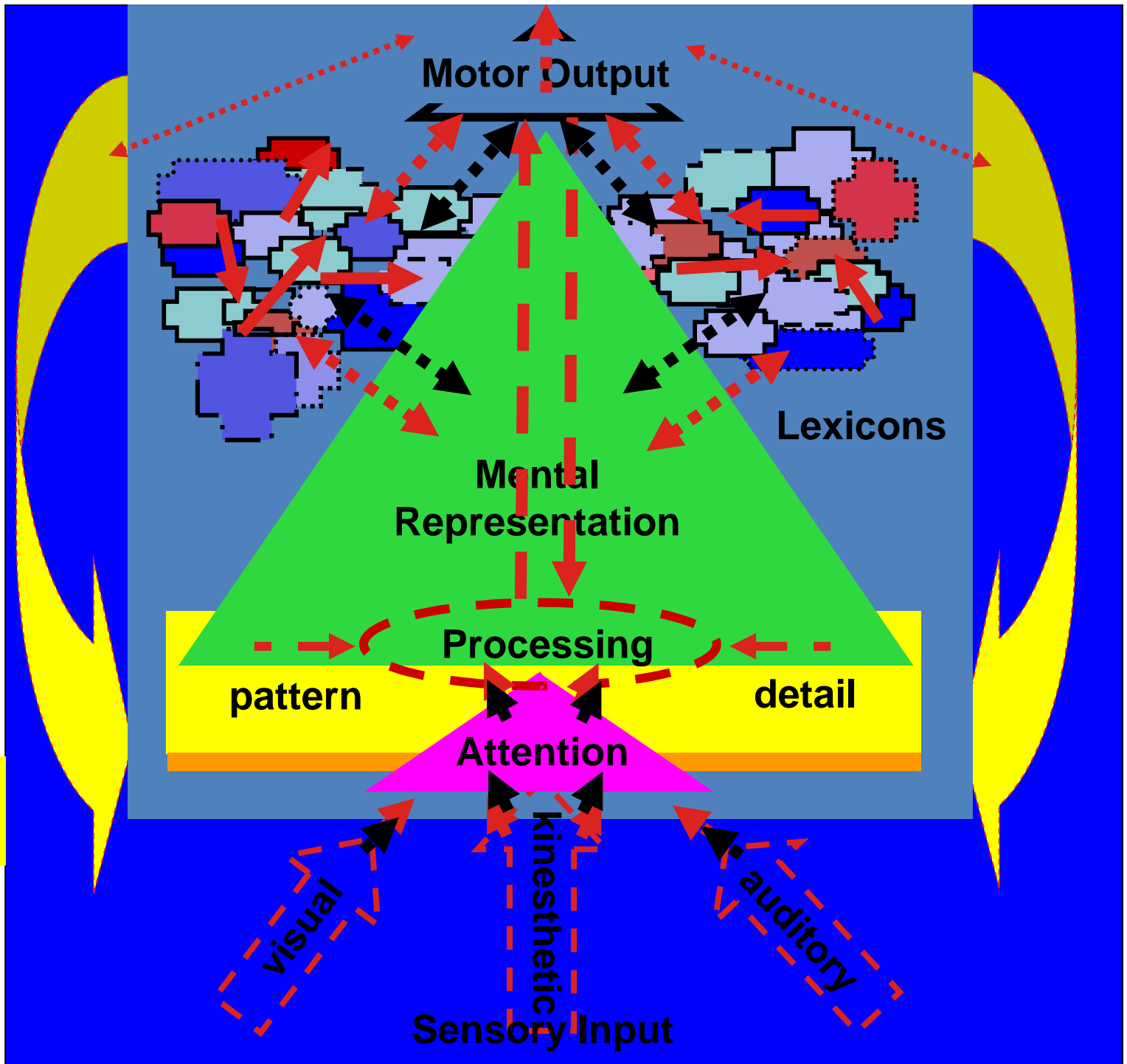
◄.....►  
indicate  
Executive  
Functions  
at work

Long-Term  
Memory

Active  
Working  
Memory

Initial  
Registration

Sensory  
Memory

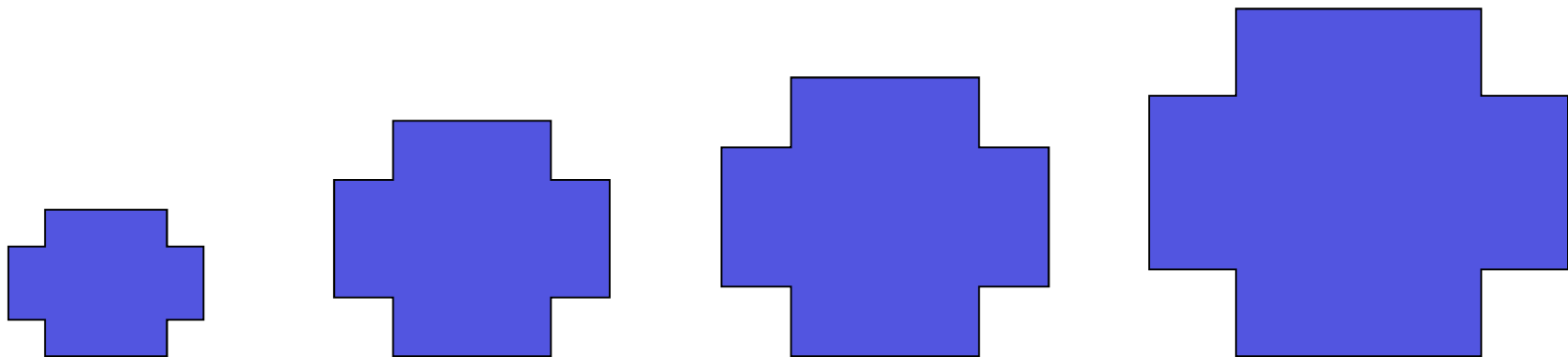




# Lexicons

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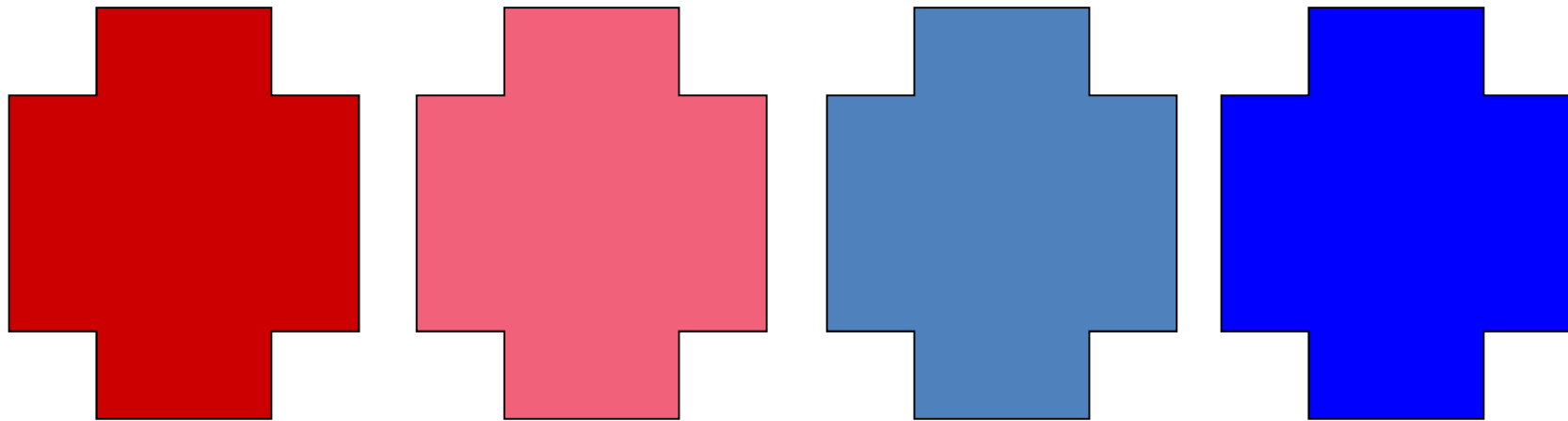
Lexicons are knowledge stores that can vary in size, i.e., in amount of stored information;



# Lexicons

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Lexicons can vary in terms of emotional tone and intensity.



# Levels of Emotion

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**System 2**  
**Effortful**  
**Cognitively**  
**Emotional**  
**Functioning**

**Cognitively Directed**  
**Emotional Receptivity &**  
**Emotional Responsiveness**

**Cognitively Mediated**  
**Emotional Receptivity &**  
**Emotional Responsiveness**

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**System 1**  
**Automatic**  
**Emotional**  
**Experiencing**

**Emotional Reactivity**

**Emotional Tenor**  
**Feelings - Mood**

# **Emotional Regulation**

**Self-Generated  
Self-Determined**

**Cognitively Directed  
Emotional Receptivity &  
Emotional Responsiveness**

**Self-Realized  
Self-Regulated**

**Cognitively Mediated  
Emotional Receptivity &  
Emotional Responsiveness**

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**Unregulated  
Emotional  
Experiencing**

**Emotional Reactivity**

**Emotional Tenor  
Feelings - Mood**

# What Are Executive Functions?

“Despite the frequency with which it is mentioned in the neuropsychological literature, **the concept of executive functions is one that still awaits a formal definition.** Research efforts aimed at exploring the different aspects of this construct have often yielded contradictory evidence, resulting in a lack of clarity and even controversy regarding the true nature of executive abilities.”

Jurado & Rosselli, **2007**, page 213.

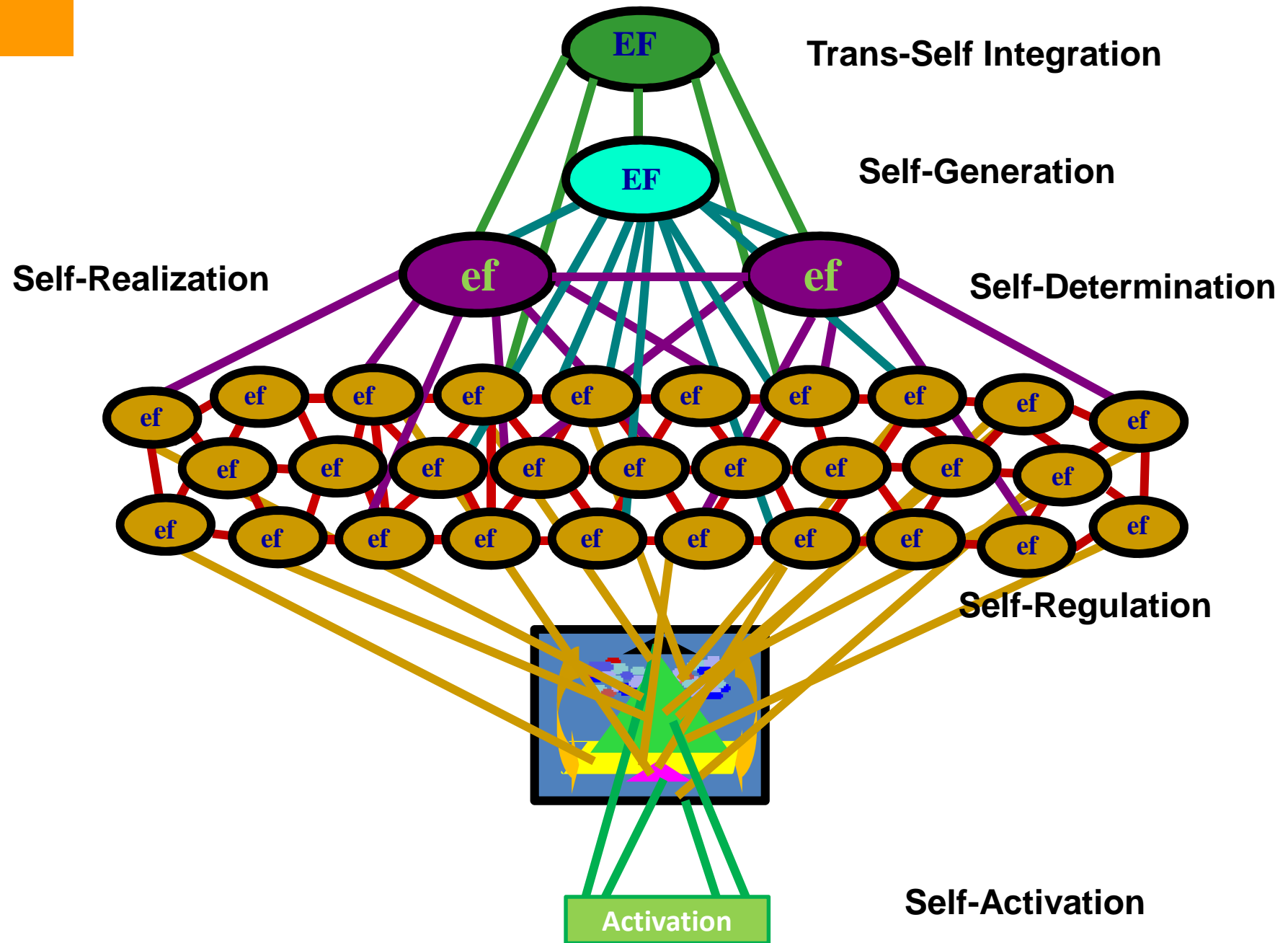
# **What Are Executive Functions?**

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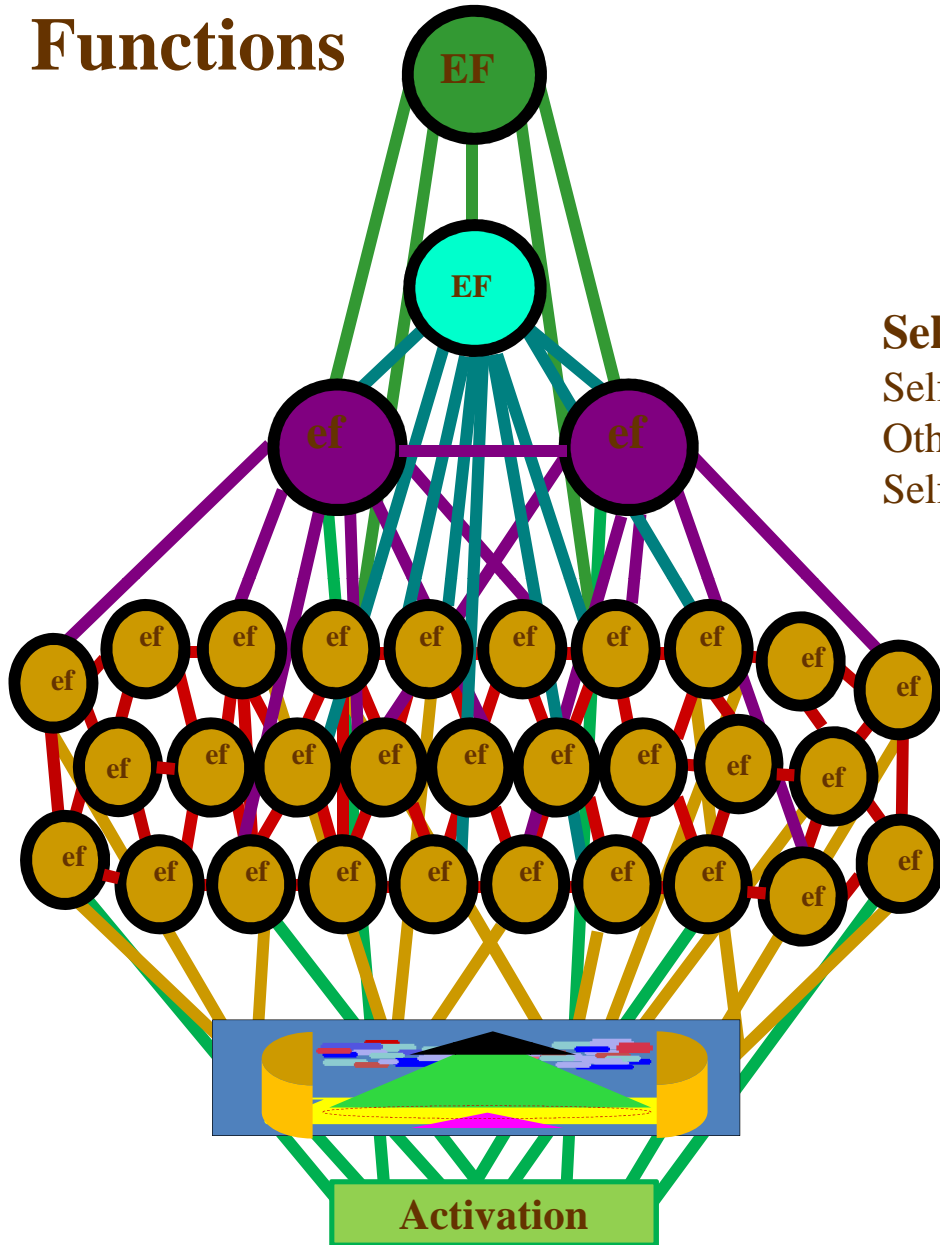
- Directive capacities of the mind
- Multiple in nature, not a single capacity
- Cue the use of other mental capacities
- Direct and control perceptions, thoughts, actions, and to some degree emotions
- Part of neural circuits that are routed through the frontal lobes



# Co-Conductors in a Holarchical Model of EF



# EF Tiers within the Holarchical Model of Executive Functions



**Trans-Self Integration**

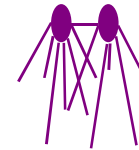


**Self-Generation**



**Self-Realization**

Self-Awareness  
Other-Awareness  
Self-Analysis



**Self-Determination**

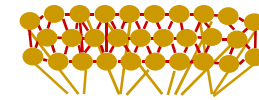
Goal setting  
Long-range Planning &  
Foresight

**Self-Regulation**

Perceive  
Focus  
Sustain  
Energize  
Initiate  
Inhibit  
Stop  
Interrupt  
Flexible  
Shift  
Modulate

Monitor  
Correct  
Balance  
Gauge  
Anticipate  
Estimate Time  
Analyze  
Generate  
Associate  
Organize  
Prioritize

Plan  
Evaluate/Compare  
Decide  
Sense Time  
Pace  
Sequence  
Execute  
Hold  
Manipulate  
Store  
Retrieve



**Self-Activation**





# **Key Concept**



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Executive Functions  
are responsible for  
the regulation of  
emotions during  
System Two  
Emotional/Cognitive  
processing

# **Self Regulation EFs**

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- **A set of control capacities that cue and direct functioning across the domains of sensation/perception, emotion, cognition, and action**
- **The current model posits 33 self-regulation executive functions**



# 33 Self-Regulation EFs

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- Perceive
- Focus
- Sustain
- Energize
- Initiate
- Inhibit
- Stop
- Interrupt
- Flexible
- Shift
- Modulate
- Balance
- Monitor
- Correct
- Gauge
- Anticipate
- Est Time
- Analyze
- Generate
- Associate
- Plan
- Organize
- Prioritize
- Compare/Eval
- Decide
- Sense Time
- Pace
- Sequence
- Execute
- Hold
- Manipulate
- Store
- Retrieve

# **Key Concept**

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**Self-regulation  
Executive Functions  
can be organized  
into 7 basic clusters.**

# **SREF “Clusters”**

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- The 33 self-regulation executive functions can be grouped based on “Clusters” in which several srefs are used in an integrative manner.
- There are seven primary clusters to consider.



# **SREF “Clusters”**

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- **Attention**
- **Engagement**
- **Optimization**
- **Efficiency**
- **Memory**
- **Inquiry**
- **Solution**

# Attention Cluster

“What’s going on out there?”

- Includes: Perceive, Focus/Select, Sustain

# ■ Engagement Cluster

“Get to it – or not”

- Includes: Energize,  
Initiate, Inhibit,  
Stop/Interrupt, Flexible,  
Shift



# Optimization Cluster

“How am I doing?”

- Includes: Monitor, Modulate, Balance, Correct

# ■ Efficiency Cluster

“The Smooth Operator”

- Includes: Sense Time, Pace, Sequence, Execute,

# Memory Cluster

“You CAN get there  
from here”

- Includes: Hold,  
Manipulate, Store,  
Retrieve

# **Inquiry Cluster**

**“Inquiring minds need to know”**

- **Includes: Anticipate,  
Gauge, Analyze,  
Estimate Time,  
Evaluate/Compare,**

# **Solution Cluster**

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**“I’m the Decider”**

- **Includes: Generate, Associate, Prioritize, Plan, Organize, Choose/Decide**

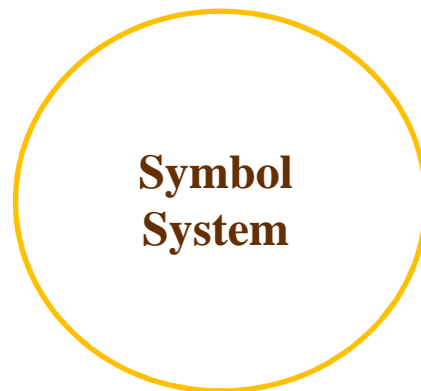
# **Arenas of Involvement**

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Executive control also varies depending on the Arena of Involvement

- **The Four Arenas of Involvement are**
  - **Intrapersonal** (Control in relation to the self)
  - **Interpersonal** (Control in relation to others)
  - **Environment** (Control in relation to the natural and man-made environment)
  - **Symbol System** (Control in relation to human made symbol and communication systems)

# Executive Functions within Arenas of Involvement



**Intrapersonal**  
Control of Self in  
Relation to Self



**Interpersonal**  
Control of Self in  
Relation to Others



**Environment**  
Control of Self in  
Relation to Surroundings



**Symbol System**  
Control of Self in Relation  
to Culturally Determined  
Modes of Communication  
including Reading, Writing,  
Mathematics, and Communication  
Technologies



# **What is Emotional Intelligence?**

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**“Emotional intelligence involves the ability to perceive accurately, appraise, and express emotion, the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth.”**

**Salovey & Sluyter, 1997, p. 10**



# **What is Emotional Intelligence?**

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**Emotional intelligence is a construct that focuses on the use of executive functions to regulate emotions (and the perceptions, thoughts and actions associated with emotions) within the interpersonal, intrapersonal, environment and symbol system arenas of involvement.**

# Emotional Regulation and Motivation

**Self-Generated**  
**Self-Determined**  
**Self-Realized**  
**Self-Regulated**

**Motivation**

**Intentionally Directed**  
**Emotional Receptivity &**  
**Emotional Responsiveness**

**Cognitively Mediated**  
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**Unregulated**  
**Emotional**  
**Experiencing**

**Emotional Reactivity**

**Emotional Tenor**  
**Feelings - Mood**

# Key Concept



Executive Functions  
and the Nucleus  
Accumbens both  
influence emotional  
states.

## **Internal versus External Control**

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**The neural circuits for executive function activation are routed differently depending on whether the activation is based on an internally driven desire or command versus an external demand.**

# Internal versus External Control

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Because internally driven production is much easier to accomplish than externally demanded production for children with “producing difficulties” their lack of production on demand often stands in stark contrast to their seemingly effortless production “when the spirit moves them.”

# Internal versus External Control

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The on-demand deficiencies observed by others are often attributed to negative personal characteristics such as lack of responsibility, apathy, passive aggressive stance, or oppositional defiance.

# **Key Concept**

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A positive growth mindset is necessary to help students develop and use executive functions in the classroom.

# **Executive Function Difficulties**

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- **Are they the result of:**
- **Disuse through  
Conscious Choice**
- **Innate Deficiency**
- **Maturational Delay**
- **Disuse through  
Nonconscious Choice**





# **Executive Function Intervention**

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**For intervention purposes, it is best to assume that EF deficiencies are the result of disuse through nonconscious choice. The general intervention goal then becomes education to make the child conscious of the EFs needed and how to engage them.**

# Key Concept

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Improving students' executive functions starts with increased awareness and goal setting and progresses from external control to internal self-regulation



# **Development of Interventions for EF Difficulties**

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**Requires keeping in mind:**

- **The need to increase awareness and provide goals.**
- **The need to move from external control to internal control through bridging strategies.**
- **The environment in which intervention is happening: Requires those close to child to have reasonable EF capacities and be able to model those capacities.**

# **EF Intervention Strategies**

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- **Orienting Strategies**
- **External Control Strategies**
- **Bridging Strategies**
- **Internal Control Strategies**

# EF Intervention Continuum

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**Orienting Strategies**



**External Control Strategies**



**Bridging Strategies**



**Internal Control Strategies**

# **Key Concept**

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**Tools of the Mind  
(Bodrova & Leong) is  
an effective preschool  
/kindergarten  
curriculum that helps  
young children  
improve executive  
functions.**



## **Developing Emotional Control in Young Children**

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- Children participating in *Tools of the Mind* classrooms had higher rates of self-regulation than matched controls; self-regulation levels correlated with achievement in literacy and mathematics (Diamond, Barnett, Thomas, & Munroe, 2007).
- Early self-regulation has a stronger association with school readiness than IQ or entry-level pre-reading or pre-math skills (Blair, 2002, 2003; Normandeau & Guay, 1998).



# **Techniques Used in Tools of the Mind**

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## **Self-Regulation Activities**

- Children practice self-regulated learning throughout the day by engaging in a variety of specifically designed developmentally appropriate self-regulation activities.
- Children learn to regulate their own behaviors as well as the behaviors of their friends as they enact increasingly more complex scenarios during imaginary play activities as well as during briefer activities.



## **Techniques Used in Tools of the Mind**

The TOM Kindergarten Manual specifies 5 ways that TOM helps children learn to self-regulate:

- **Intentional make-believe dramatic play**
- **Positive classroom interactions**
- **Games & activities that target self-regulation**
- **Embedding self-regulation in all activities**
- **Specially constructed learning tasks**



# **Techniques Used in Tools of the Mind**

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## **Dramatic Play**

Structured dramatic play involves role-playing scenarios that are planned and agreed upon in advance. Engaging in sustained role-playing requires the inhibition of role-inappropriate behaviors, as well as sustaining attention and effort while using working memory to maintain the imaginative enactment of the selected role.



# **Techniques Used in Tools of the Mind**

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## **Positive Interactions**

TOM is structured to provide the opportunity for positive teacher-child and child-child interactions. Teachers interact with all students every day and all students participate in activities with other children. Even large group activities are structured in a way that maximizes participation by all students and the use of self-regulation at the same time.



## **Techniques Used in Tools of the Mind**

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### **Activities Targeting Self-Regulation**

TOM makes use throughout the day of game-like activities that build self-regulation. The general format of these games is to have the students practice doing an activity, then inhibiting the doing of that activity on command for a specified period of time, then resuming on command the doing of the activity.



## **Techniques Used in Tools of the Mind**

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### **Activities Targeting Self-Regulation**

For example, during an activity called Graphics Practice (part of the Scaffolded Writing Instruction component of Literacy Instruction), students draw different kinds of marks to music, then must stop drawing when the music stops, and then resume drawing when the music starts again.



## **Techniques Used in Tools of the Mind**

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### **Embedding S-R in all activities**

The manner in which skills are taught ensures that self-regulation is being practiced during skill development. For example, students are required to slow their speech while drawing lines corresponding to their speech thereby inhibiting the natural flow of speech and coordinating speech with graphomotor functioning.



## **Techniques Used in Tools of the Mind**

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### **Embedding S-R in all activities**

Practicing S-R during skill development: During math activities, one student counts while the other student checks the accuracy of the first student's counting, requiring inhibition for taking turns and the careful monitoring of task performance.



## **Techniques Used in Tools of the Mind**

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### **Embedding S-R in all activities**

Practicing S-R during transitions:  
when students are required to move from one place to another, they are told to engage in a pretend activity. For example, “go quietly, quietly like a mouse to your cubby so the cat won’t hear you.”





## **Techniques Used in Tools of the Mind**

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### **Specifically constructed learning tasks**

- Students engage in learning games
- Students use learning plans
- Students work in pairs
- Make-believe is part of school
- Teacher guided other-regulation
- Teacher weekly conference



# **Techniques Used in Tools of the Mind**

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## **Scaffolding**

- The strategy of providing, and gradually removing, external support during learning and producing activities. During scaffolding the task itself is not changed but what the learner initially does is made easier with support. As the learner takes more responsibility for performance of the task, less assistance is provided.
- Scaffolding attempts to move the child further along the continuum of self-regulation from being externally regulated by others to engaging in "shared" regulation to eventually becoming self-regulated.

# **Techniques Used in Tools of the Mind**

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## **Example of the Use of Scaffolding:**

- If a child needs support to approach writing as a task that is performed from left to right, the teacher may begin shaping the behavior by explaining to the child that writing begins on the left and progresses across the page. Verbal prompts may be used several times, then a mediator (a visual prompt such as an asterisk) is placed on the left side of the page to remind the child of where to start writing. Once the child follows the visual prompt without difficulty or hesitation, the asterisk is no longer placed on the page.

# **Techniques Used in Tools of the Mind**

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## **Development/Learning Sequence: Scaffolded Writing**

- **Plan:** Student has an idea of what to draw/write in advance
- **Picture:** Student represents ideas in a picture
- **Message Matches Teacher's Lines:** child dictates idea at a pace that matches teacher's writing of the words

# **Techniques Used in Tools of the Mind**

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## **Scaffolded Writing Development Sequence**

- **Lines:** Student makes lines to represent words with voice to line matching
- **Initial Sounds:** Students writes a letter to represent the initial sound of the spoken word
- **Ending Sounds:** Student writes a letter to represent the final sound of the word after correctly identifying initial sound

# **Techniques Used in Tools of the Mind**

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## **Scaffolded Writing Development Sequence**

- **Medial Sounds:** Student writes a letter to represent the medial sound of a spoken word
- **Alphabetic Principle:** Student accurately represents each consonant and some vowel sounds in the order in which they appear in the written version of the spoken word.

# **Techniques Used in Tools of the Mind**

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## **Scaffolded Writing Development Sequence**

- **Word Pattern: Conventional spelling of many of the words being used in the student's writing**
- **Drops lines but maintains the quality of writing: Student no longer uses lines to represent each word but still uses the alphabet principle and correct word patterns**

# **Techniques Used in Tools of the Mind**

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## **Self-Regulation in Pretend Transitions: Development Sequence**

- Mimics the pretend transition actions and private speech when sitting and not yet moving
- Starts the transition with correct movements but gets distracted and stops making the movements
- Does a part of the transition or movements and speech all the way



# **Techniques Used in Tools of the Mind**

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## **Self-Regulation in Pretend Transitions: Development Sequence**

- Does the movements and the private speech all the way without losing focus
- Does the movements and private speech outside classroom without losing focus

# **Techniques Used in Tools of the Mind**

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## **Self-Regulation in Pretend Transitions: Development Sequence**

- Does the movements and internalized private speech outside the classroom without losing focus
- Starts a pretend transition on own in situations where the teacher would have suggested using one

# **Techniques Used in Tools of the Mind**

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## **Reflective Thinking**

- Refers to thinking about how you arrived at an answer or how you are thinking about something. Reflective thinking involves the use of metacognition (the ability to think about thinking).
- During activities, children are asked to think about how they arrived at an answer or how/what/why they are thinking about something. Teachers model their use of reflective thinking by explaining to children what/how they are thinking about something.



# **Techniques Used in Tools of the Mind**

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## **Using Props to Enhance Attention and Working Memory**

- Physical props are used as reminders of what the child should be doing during an activity.
- For example, during an activity where children read to each other. The reader holds a picture of lips and the listener holds a picture of an ear. The pictures are exchanged when the roles are switched.

# **Techniques Used in Tools of the Mind**

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## **Using Props to Enhance Attention and Working Memory: Continuum of Outcomes**

- Students learn to transition from both wanting to read and neither wanting to listen, to one listening while holding the ear and one reading while holding the lips, to not needing the physical props to engage in the reciprocal roles, to changing the passive role of listening into an active role of listening and asking questions of the reader to a final state where active listening becomes an internalized process for enhancing the listener's comprehension.



# **Techniques Used in Tools of the Mind**

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## **Self-Regulatory Speech**

- Activities involve teaching children how to internally regulate speech and use internal speech to monitor external events.
- For example, children pair off and collaborate in counting objects; one child counts aloud, and the other monitors the oral counting of the first child. The child doing the monitoring learns to inhibit the desire to count for themselves and instead to listen to the counting of the other child and to think metacognitively about the accuracy of the other child's counting.

# **Key Concept**



The language of Cognitive Behavior Therapy is being used to help teachers improve their ability to engage specific neural networks during classroom instruction.

# **Executive Functions Interventions**

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**Cognitive Behavior Therapy (CBT).**

**CBT teaches strategies for improving the use of executive functions to cue and direct effective perceiving, feeling, thinking and acting. Techniques have shown good results at the adult and adolescent levels and some early indications that the techniques can be applied effectively with children in the elementary grades.**





# **Evidence Based Intervention: Cognitive Behavior Therapy**

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Cognitive Behavioral Therapy (CBT) emphasizes collaborative reality-testing and the monitoring and modification of automatic perceptions, feelings, thoughts, and actions that cause difficulties for the child.



# **Evidence Based Intervention: Cognitive Behavior Therapy**

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## **CBT with children and adolescents:**

- Reduces the use of thought logs
- Focuses on internal experiences such as monitoring perceptions, feelings, thoughts and actions
- Works toward affective shifts to illustrate the cognitive model
- Summarizes session content frequently
- Keeps abstractions to a minimum, focusing instead on concrete examples based on personal experience



# **Evidence Based Intervention: Cognitive Behavior Therapy**

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Outcomes of CBT with children and adolescents:

- Increased ability to monitor perceptions, feelings, thoughts and actions
- Increased engagement in positive problem-solving strategies
- Increased capacity for self-regulating perceptions, feelings, thoughts and actions



# **Evidence Based Intervention: Cognitive Behavior Therapy**

CBT has been used with children and adolescents to deal with:

- Depression
- Anxiety
- Bipolar Disorder
- Eating Disorders



# **Evidence Based Intervention: Cognitive Behavior Therapy**

CBT has been used with children and adolescents to deal with:

- **ADHD**
- **Disruptive Behavior Problems**
- **Obsessive-Compulsive Disorder**
- **Social Skills Deficits**

# **Evidence Based Intervention: CBT for Depression**

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“Since depression is most often an episodic disorder, it usually improves over time. With young children, CBT has been shown to be more effective than 'watchful waiting' and more effective than traditional school counseling as a treatment for depression. With adolescents, CBT has also been shown to be more effective than 'watchful waiting' and more effective than nondirective supportive therapy.” [www.abct.org](http://www.abct.org)



# **Evidence Based Intervention: CBT for Depression**

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“For moderately to severely depressed adolescents, the most effective treatment at this time is the combination of CBT and an SSRI medication. In the NIMH-sponsored Treatment for Adolescents with Depression Study (TADS), this combination led to the best outcomes in terms of both reduced depression and reduced risk of suicidal events.” [www.abct.org](http://www.abct.org)



## **Evidence Based Intervention: CBT for Substance Abuse**

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“Support for CBT was found in a recent review of the quality of evidence in support of outpatient interventions for adolescent substance abuse (Becker & Curry, 2008). Across 31 randomized controlled trials, CBT was the outpatient intervention supported by the highest proportion of methodologically stronger studies.”

[www.abct.org](http://www.abct.org)





# Cognitive Behavior Therapy

## Resources for Practice

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- Friedburg, R. D., & McClure, J. M. (2002). *Clinical practice of cognitive therapy with children and adolescents: the nuts and bolts*. New York: Guilford Press.
- Mennutti, R. B., Freeman, A., & Christner, R W. (Eds.) (2006). *Cognitive-behavioral interventions in educational settings*. New York: Routledge.



# **Cognitive Behavior Therapy**

## **Resources for Practice**

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- Reinecke, M.A., Dattillo, F.M., & Freeman, A. (Eds) (2003). **Cognitive Therapy with Children and Adolescents: A Casebook for Clinical Practice.**
- Kendall, Philip C. (Ed) (2005). *Child and Adolescent Therapy: Cognitive-Behavioral Procedures* (3rd ed.). Guilford Press.

# Executive Functions Interventions

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CBT variants such as Jeffrey Schwartz's "Brain-Lock: Free Yourself from Obsessive-Compulsive Behavior; subtitled as "a four-step self-treatment method to change your brain chemistry." This method uses CBT oriented techniques to strengthen self-regulation capacities and decrease unproductive perceptions, feelings, thoughts and actions.

# **Key Concept**

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**Problem-solving approaches are intended to increase students' use of executive functions to find better solutions to personal difficulties.**

## **Executive Functions Interventions**

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**Ross Greene's Collaborative Problem-solving approach featured in his books on Treating Explosive Kids. Although Greene does not specifically use the concept of executive functions, his intervention approach teaches parents techniques for improving both external control and building internal self-regulation capacities.**

## **Executive Functions Interventions**

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**Myrna B. Shure's I Can Problem-Solve techniques for teaching young children increased self-control and improved cueing of appropriate problem-solving routines.**

## **Executive Functions Interventions**

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**Michelle Garcia Winner's Social Thinking Curriculum Superflex. Uses cartoon characters to teach about self-regulation concepts (e.g., Rock Brain represents inflexible thinking). Intended for upper elementary age children diagnosed with Asperger's, but the techniques and ideas appear to have wider application.**

# **Key Concept**

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**Mindfulness practices are one of the most effective ways to increase access to and use of executive functions. These practices are being adapted for school-age children.**



## **Executive Functions Interventions**

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**Mindfulness-based CBT improves Self-Awareness and Self-Analysis capacities through the incorporation of meditative techniques along with teaching strategies for regulating perceptions, feelings, thoughts and actions, making it more likely that learned CBT strategies will be cued when needed.**

# **Executive Functions Interventions**

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**Mindfulness-based Physical Exercise Programs such as Yoga and Thai Chi are likely to have generalized effects on a number of self-regulation executive functions.**