

# Understanding Executive Dysfunction in Students with Autism Spectrum Disorder and ADHD

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Mountain Plains (HHS Region 8)

**MHTTC**

Mental Health Technology Transfer Center Network  
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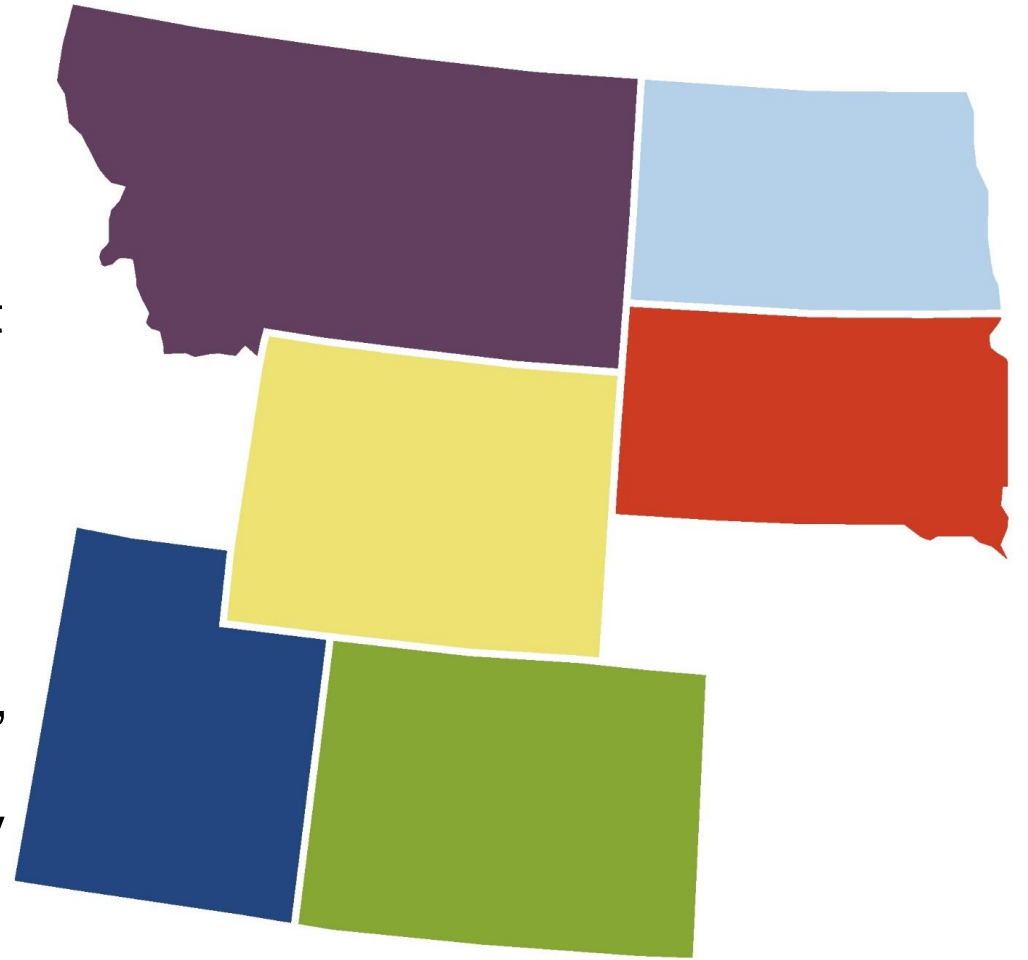
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The Mountain Plains Mental Health Technology Transfer Center (Mountain Plains MHTTC) provides training and technical assistance to individuals who serve persons with mental health concerns throughout Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming).

We belong to the Technology Transfer Center (TTC) Network, a national network of training and technical assistance centers serving the needs of mental health, substance use and prevention providers. The work of the TTC Network is under a cooperative agreement by the Substance Abuse and Mental Health Service Administration (SAMHSA).



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AND HOPEFUL**

**INCLUSIVE AND  
ACCEPTING OF  
DIVERSE CULTURES,  
GENDERS,  
PERSPECTIVES,  
AND EXPERIENCES**

**HEALING-CENTERED AND  
TRAUMA-RESPONSIVE**

**INVITING TO INDIVIDUALS  
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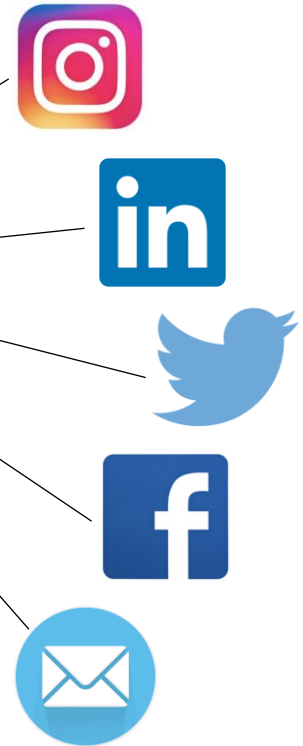
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# Understanding Executive Dysfunction in Students with Autism Spectrum Disorder and ADHD



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# Presenter Biography

Dr. Amanda Garrett is a Nationally Certified School Psychologist who has practiced School Psychology for the Department of Education (DOE) for over 16 years across New Jersey, Pennsylvania, and Hawai'i. After earning her Ed.S. in School Psychology at Rider University (NJ), she continued on to obtain her doctorate in School Psychology at Philadelphia College of Osteopathic Medicine (PA). Dr. Garrett's doctoral program had an emphasis in School Neuropsychology, which became an area of passion for her. In addition to working for the DOE, Dr. Garrett spent three years as the Southeast Delegate on the executive board of the Association of School Psychologists of Pennsylvania (ASPP), and she is currently in her sixth year as an executive board member of the Hawai'i Association of School Psychologists (HASP), where she has served multiple positions, including Past President.







# Agenda

- Case Studies (Introduction)
- What are Executive Functions & Why are They Important
- Understanding ADHD & Related Executive Dysfunction
- Understanding Autism Spectrum Disorder (ASD) & Related Executive Dysfunction
- Interventions for Executive Dysfunction
- Case Studies (Revisited)

# Case Studies: Jason & Samantha ADHD & Autism Spectrum Disorder (ASD)





# Case Study 1: Student with ADHD (Jason)

- Jason is a rambunctious 5<sup>th</sup> grade general education student who is struggling in school. He was referred for an evaluation with the following reason for referral:
- His academic work was behind grade-level. For writing, has good ideas, but cannot write them on paper.
- Difficulty sustaining attention during lectures, independent work, or reading assignments
- Inconsistent performance on tasks due to impulsivity and inattention
- Forgetfulness and disorganization leading to incomplete or misplaced assignments
- Struggles with time management and task prioritization
- Difficulty following multi-step instructions and organizing thoughts for written assignments
- Impulsivity leading to interruptions, blurting out answers, or difficulty waiting for turn
- Restlessness and fidgeting, especially during activities that require sustained attention
- Impulsivity impacting social interactions, such as interrupting peers or difficulty taking turns in conversations
- Struggles to remember previously taught concepts/lessons
- Inhibition difficulties leading to impulsive decision-making and challenges in self-regulation
- Planning and organization difficulties affecting the ability to manage assignments, materials, and time effectively



# Case Study 1: Jason

## Psychoeducational Evaluation Results:

- *Cognitive (WISC-V):*

- FSIQ **115 (High Average)**

- *Achievement (WIAT-4)*

- Basic Reading Skills **110 (Average);**
- Reading Comprehension **118 (Above Average);**
- Oral Reading Fluency **112 (Average);**
- Written Expression **105 (Average);**
- Math Calculation **109 (Average);**
- Math Problem-Solving **123 (Very High)**

- *Behavior/Social Emotional (Conners-4):*

- Inattention/Executive Dysfunction **88 (Very Elevated);**
- Hyperactivity **90 (Very Elevated);** Impulsivity **73 (Very Elevated);**
- Emotional Dysregulation **77 (Very Elevated);**
- Depressed Mood **56 (Average);**
- Anxious Thoughts **52 (Average)**



# BRIEF-2 Teacher Ratings (Executive Function Rating Scale)

Interventions Tried:

<b>Behavioral Regulation Index (BRI)</b>	Child's ability to regulate and monitor behavior effectively	78 ***
Inhibit	Control impulses/stop behavior.	75 ***
Self-Monitor	Awareness of the impact of one's own behavior on other people and outcomes.	76 ***
<b>Emotional Regulation Index (ERI)</b>	Child's ability to regulate emotional responses and to shift, set, or adjust to changes in environment, people, plans, or demands.	83 ***
Shift	Move freely from one activity/situation to another; transition; problem-solve flexibly.	79 ***
Emotional Control	Modulate emotional responses appropriately.	82 ***
<b>Cognitive Regulation Index (CRI)</b>	Child's ability to control and manage cognitive processes and to problem solve effectively.	75 ***
Initiate	Begin Activity; generate ideas.	73 ***
Working Memory	Hold information in one's mind for purpose of completing a task.	72 ***
Plan/Organize	Anticipate future events; set goals; develop steps; grasp main ideas.	77 ***
Task-Monitor	Check work; assess own performance.	63 *
Organization of Materials	Orderliness of work, play, and storage spaces (e.g., desks, lockers, backpacks, and bedrooms).	73 ***



## Case Study 2: Student with ASD (Samantha)

- Samantha is a 1st grade girl diagnosed with an autism spectrum disorder (ASD) at the age of 4. She presents with challenges in social communication, repetitive behaviors, and restricted interests. Samantha has been receiving special education services since her Kindergarten year.
- **Cognitive Flexibility:** Samantha struggles with transitioning between tasks and activities, often becoming upset when routines change unexpectedly. She exhibits rigidity in her thinking and has difficulty adapting to new situations or instructions.
- **Working Memory:** Samantha has difficulty retaining and organizing information, leading to challenges in following multi-step instructions, recalling academic content, and completing tasks that require holding information in her mind.
- **Emotional Regulation:** Samantha experiences heightened emotional responses to changes in her environment or academic demands. She often becomes overwhelmed and has difficulty managing her frustration and anxiety during challenging tasks or social interactions.
- **Social Understanding:** Samantha finds it challenging to interpret social cues, understand the perspectives of her peers, and engage in reciprocal social interactions. She often struggles to navigate social situations and express her own thoughts and emotions effectively.

# Understanding Executive Functions





# Executive Function Definitions

- The **CEO** of the brain (popular press)
- **Directive capacities** of the human brain (Goldberg, 2001)
- A **set of cognitive processes** that are responsible for managing, controlling, and regulating various mental functions. These processes enable individuals to plan, organize, strategize, pay attention, remember details, manage time and space effectively, and adapt to changing circumstances. Executive function also plays a crucial role in the regulation of emotions and behaviors, allowing individuals to set goals, monitor their progress, and adjust their actions based on feedback and situational demands. In essence, executive function encompasses a range of higher-order cognitive abilities that are essential for goal-directed behavior, problem-solving, and self-regulation. (School Psych AI)





# Executive Function Definitions

- **Directive capacities** that are responsible for a person's ability to engage in purposeful, organized, strategic, self-regulated, goal-directed processing of perceptions, emotions, thoughts, and actions. As a collection of directive capacities, executive functions cue the use of other mental capacities such as reasoning, language, and visuospatial representation. They give commands to engage in processing but do not carry out the commands themselves (McCloskey, et al., 2009).
- Executive skills are the **skills** that make goal-directed behavior possible (Dawson & Guare, 2009).
- Skills vs. Capacities: Skills can be explicitly taught, whereas capacities will develop over time. Where do EFs fall?
- EFs are not the frontal lobes performing the functions. They are the frontal lobes cueing the functions (i.e., cueing the brain) of the need to perform the functions (McCloskey, et al., 2009).



# Executive Functions Explained

- Don't think of EFs as a **unitary cognitive process or trait** (Denckla, 1996). This is implied by the “**orchestra conductor**” metaphor (Goldberg & Brown, 2005), which is meant to be an example of how one cognitive control process directs all behavior.
- Instead, EFs can be thought of as **co-conductors**, each responsible for a separate aspect of the overall production of the orchestra, but each working collaboratively with others (McCloskey, et al., 2009).



## Executive Functions:

Adapted & Modified from Dawson & Guare (2009) & McCloskey et al. (2009)

- **Response Inhibition**: The capacity to think before you act. This ability to resist the urge to say or do something allows us the time to evaluate a situation and how our behavior might impact it. In the young child, waiting for a short period without being disruptive is an example of response inhibition, while in the adolescent it would be demonstrated by accepting a referee's call without an argument.
- **Working Memory**: The ability to hold information in memory while performing complex tasks. It incorporates the ability to draw on past learning or experience to apply to the situation at hand or to project into the future. A young child, for example can hold in mind and follow 1-2 step directions, while the middle school child can remember the expectations of multiple teachers.
- **Emotional Regulation**: The ability to manage emotions in order to achieve goals, complete tasks, or control and direct behavior. A young child with this skill is able to recover from a disappointment in a short time. A teenager is able to manage the anxiety of a game or test and still perform.
- **Cognitive Flexibility**: The ability to revise plans in the face of obstacles, setbacks, new information or mistakes. It relates to an adaptability to changing conditions. A young child can adjust to a change in plans without major distress. A high school student can accept an alternative such as a different job when the first choice is not available.



## Executive Functions:

# Adapted & Modified from Dawson & Guare (2009) & McCloskey et al. (2009)

- **Sustained Attention**: The capacity to maintain attention to a situation or task in spite of distractibility, fatigue, or boredom. Completing a 5-minute chore with occasional supervision is an example of sustained attention in the younger child. The teenager is able to attend to homework, with short breaks, for one to two hours.
- **Modulate**: The Modulate function cues the regulation of the amount and intensity of mental energy invested in perceiving, feeling, thinking, and acting. Prompt example: “Let’s all use our indoor voices now.” “Please tone it down a bit.”
- **Task Initiation**: The ability to begin projects without undue procrastination, in an efficient or timely fashion. A young child is able to start a chore or assignment right after instructions are given. A high school student does not wait until the last minute to begin a project.
- **Planning/Prioritization**: The ability to create a roadmap to reach a goal or to complete a task. It also involves being able to make decisions about what’s important to focus on and what’s not important. A young child, with coaching, can think of options to settle a peer conflict. A teenager can formulate a plan to get a job.



## Executive Functions:

Adapted & Modified from Dawson & Guare (2009) & McCloskey et al. (2009)

- **Organization**: The ability to create and maintain systems to keep track of information or materials. A young child can, with a reminder, put toys in a designated place. An adolescent can organize and locate sports equipment.
- **Time Management**: The capacity to estimate how much time one has, how to allocate it, and how to stay within time limits and deadlines. It also involves a sense that time is important. A young child can complete a short job within a time limit set by an adult. A high school student can establish a schedule to meet task deadlines.
- **Goal-directed persistence**: The capacity to have a goal, follow through to the completion of the goal, and not be put off by or distracted by competing interests. A first grader can complete a job in order to get to recess. A teenager can earn and save money over time to buy something of importance.
- **Metacognition**: The ability to stand back and take a birds-eye view of oneself in a situation. It is the ability to observe how you problem solve. It also includes self-monitoring and self-evaluative skills (e.g., asking yourself, “How am I doing? or How did I do?”). A young child can change behavior in response to feedback from an adult. A teenager can monitor and critique her performance and improve it by observing others who are more skilled.

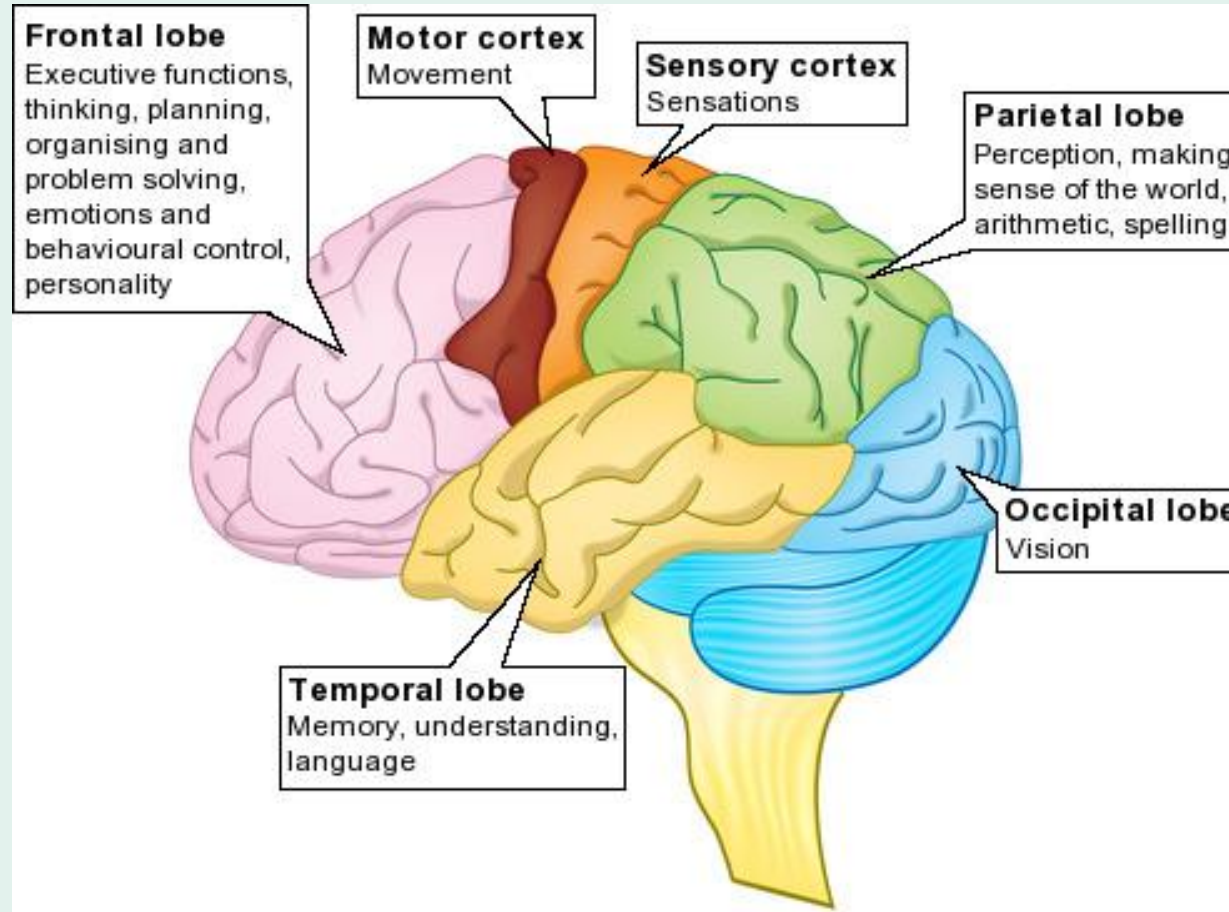


# Why Do Executive Functions Matter?

- 1. Academic Success:** Executive functions are critical for tasks such as organizing study materials, planning and completing assignments, managing time effectively, and maintaining focus during learning activities. Students with well-developed executive functions are better equipped to succeed academically.
- 2. Social Interaction:** Executive functions contribute to students' ability to regulate their emotions, understand social cues, and engage in effective communication. These skills are crucial for building and maintaining positive relationships with peers and adults.
- 3. Problem-Solving and Decision-Making:** Strong executive functions enable students to analyze situations, consider alternatives, make decisions, and solve problems effectively. These skills are valuable in both academic and real-life contexts.
- 4. Self-Regulation:** Executive functions play a key role in self-regulation, allowing students to manage their impulses, control their emotions, and adapt their behavior to different situations. This is essential for maintaining appropriate conduct in various settings.
- 5. Adaptability:** Students with well-developed executive functions are better able to adapt to changes, manage transitions, and cope with unexpected challenges, both in and out of the classroom.

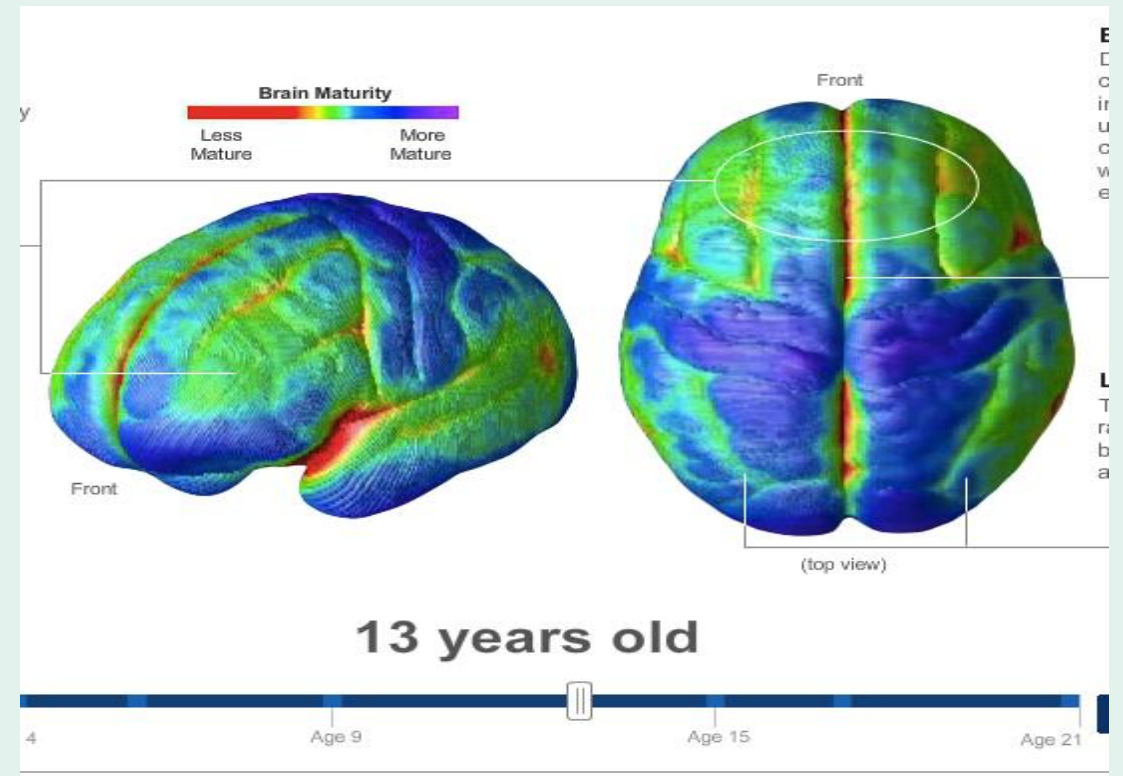
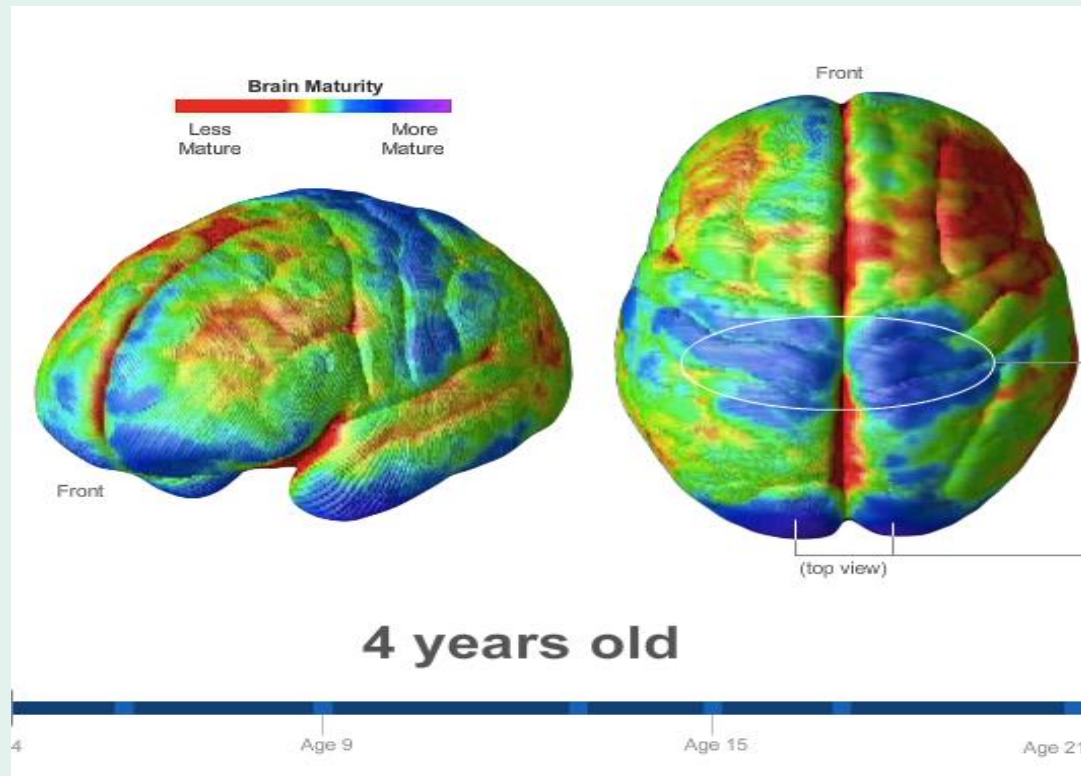


# Executive Functions & the Frontal Lobe





# EF Development: Peg Dawson & Richard Guare (Smart but Scattered: The Revolutionary “Executive Skills” Approach to Helping Kids Reach Their Potential) (2009)

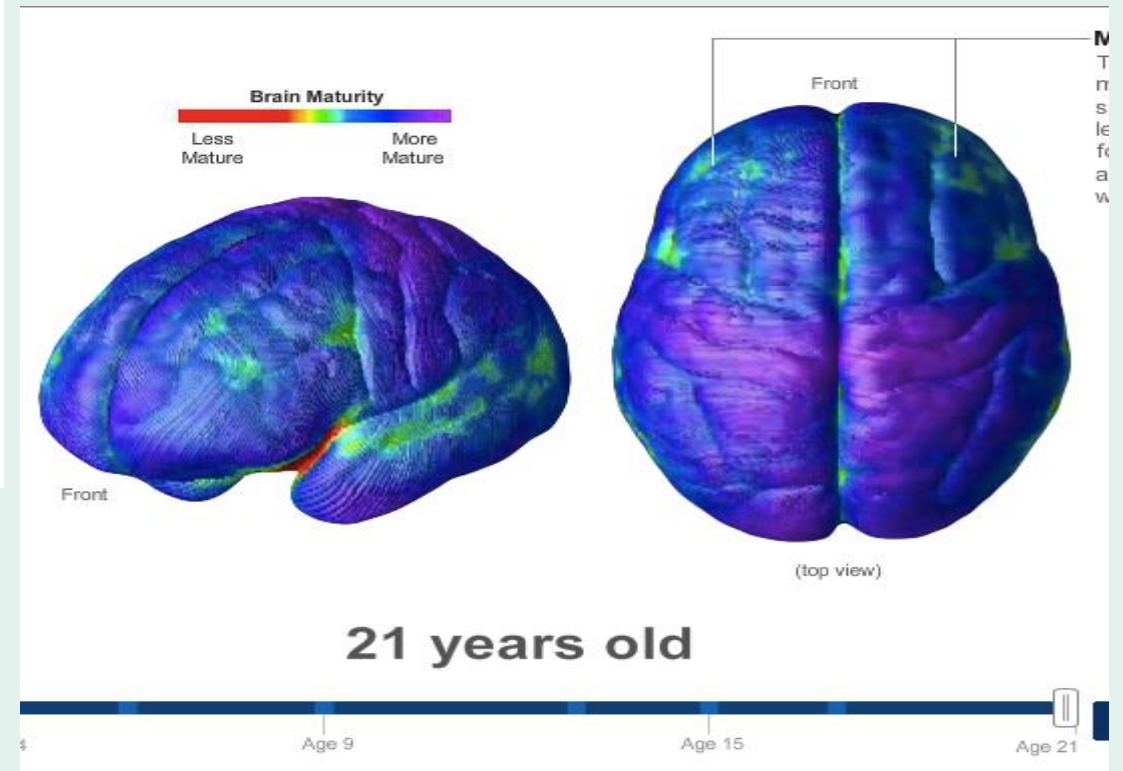
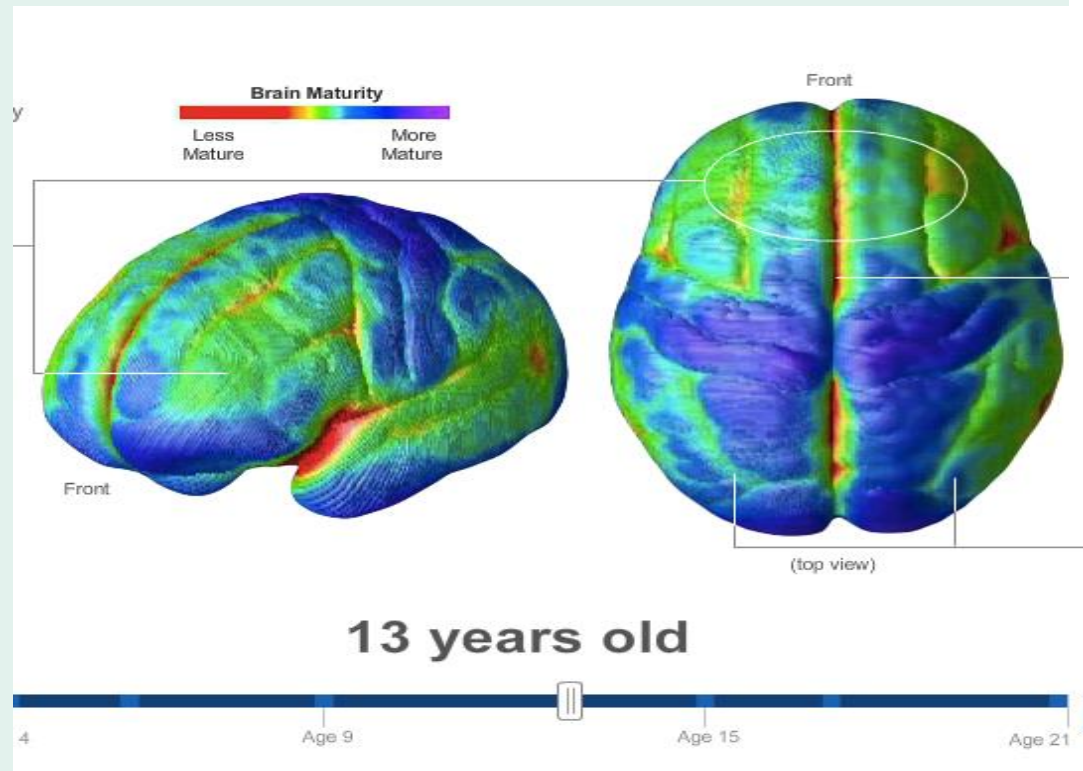


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# EF Development: Peg Dawson & Richard Guare (Smart but Scattered: The Revolutionary “Executive Skills” Approach to Helping Kids Reach Their Potential) (2009)



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# Executive Function Development

- **Self-regulation** executive functions are developing from the first years of life on throughout a person's entire lifetime (McCloskey et al., 2009).
- **Large developmental shifts** are noticeable, especially around adolescence (McCloskey et al., 2009).
- EFs fully develop on average by a person's **mid 20s**. Because EFs are developmental in nature, natural maturational delays are observed.
- Barkley (1998) estimates **developmental delays** of about 30% associated with various EFs, such as Focus, Sustain, Inhibit and Modulate, in children with ADHD.

(McCloskey, et al., 2009)

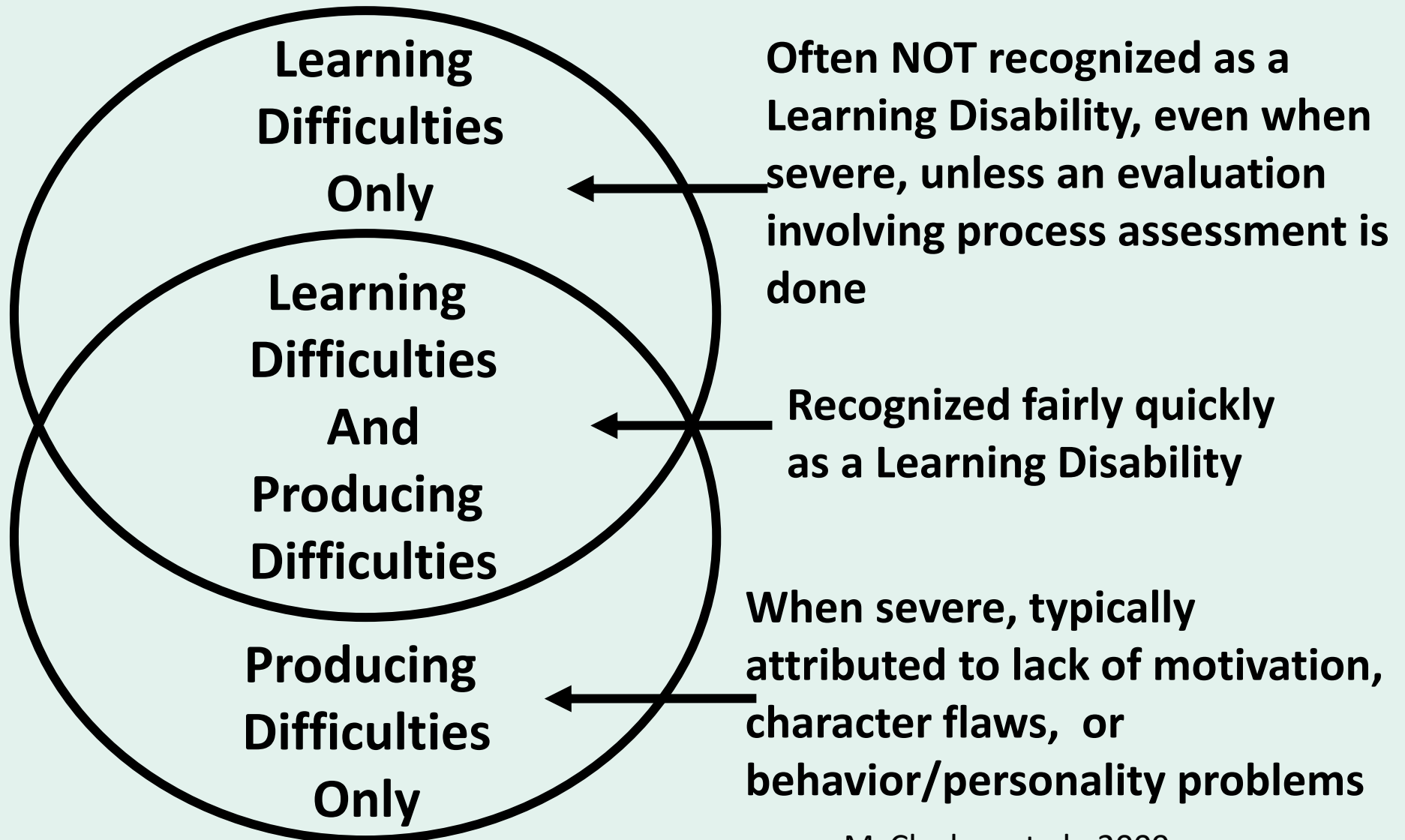


# 30% Maturational EF Delay in ADHD: Barkley (1998) & McCloskey et al. (2009)

- In school, more and more demands are placed on students at earlier and earlier ages. A student developing slower will look deficient in the classroom, compared to same-age peers. Educators may think something is wrong with the student, when in reality, they are not allowing the time necessary for that student's brain to mature, due to the maturational delay.
- 30% Maturational Delay: (McCloskey, et al., 2009)
  - At age 6, you look like you're 4 years old.
  - At age 9, you look like you're 6 years old.
  - At age 15, like you're 10 years old.
  - At age 21, you look like you're 14 years old.
  - At age 30, you look like you're 20 years old.
- Educators and parents need to be patient and flexible with the child and remember that these delays won't be there forever. We can't expect a child with an EF delay to perform as if the delay is not there. We don't do that with physical development, and we shouldn't do it with EF development either (McCloskey et al, 2009).



# George McCloskey's (2009) Model for Conceptualizing Learning and Producing Difficulties

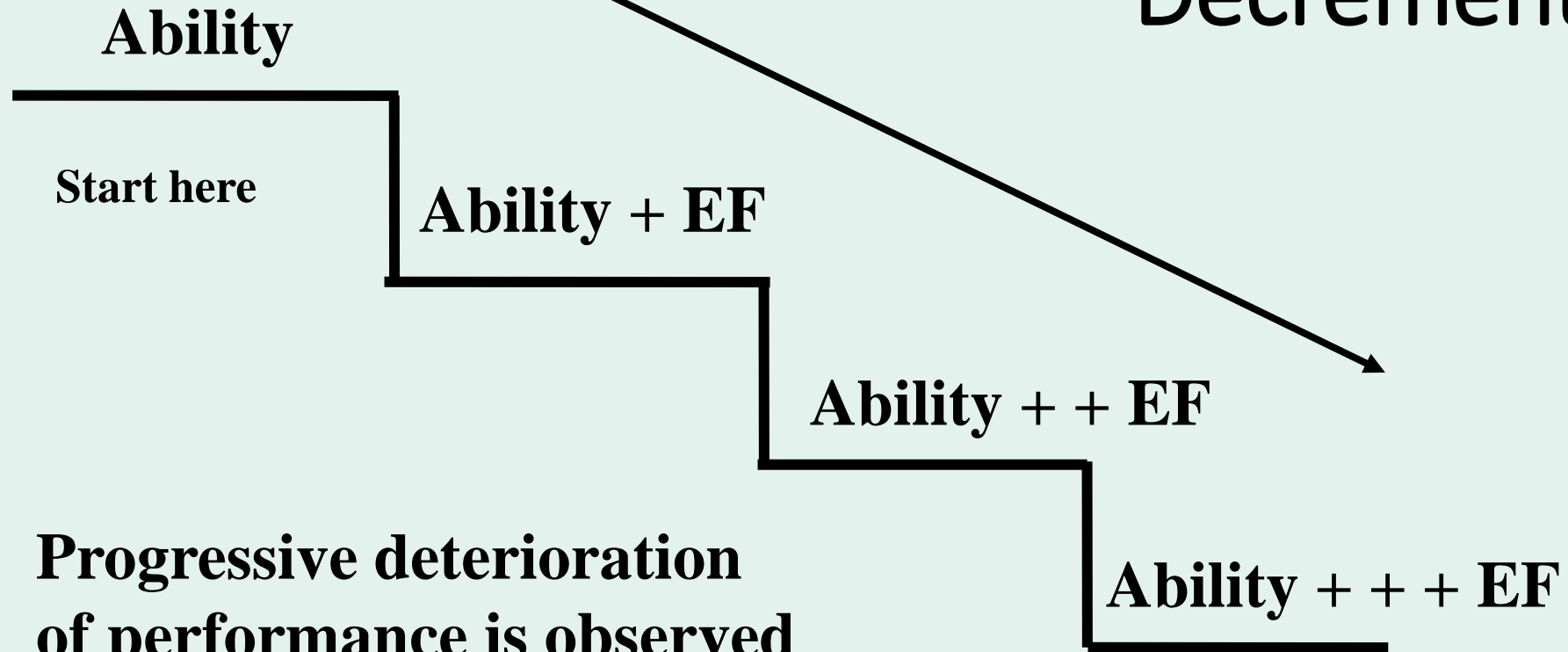




# Cascading

## Production

## Decrement



**Progressive deterioration  
of performance is observed  
as executive function demands  
(+ EF) become greater.**

(McCloskey, et al., 2009)



# Peg Dawson & Richard Guare (Smart but Scattered: The Revolutionary “Executive Skills” Approach to Helping Kids Reach Their Potential) (2009)

## **Instead of calling students this:**

- Lazy
- Unmotivated
- Not working to potential
- Disruptive
- Oppositional
- Messy
- Tardy
- Forgetful
- Absent-minded
- Lacking a work ethic

## **Describe them as having challenges in this:**

- Task initiation
- Sustained attention
- Response inhibition
- Emotional control
- Flexibility
- Organization
- Time management
- Working memory
- Goal-directed persistence



# Executive Function Assessment

- Executive functions are not the same thing as Intellectual abilities (IQ).
- EF standardized tests (i.e., NEPSY-II, D-KEFS, Wisconsin Card Sorting Task, or Rey Complex Figure), but there are limitations.
- Standardized rating scales: MEFS, BRIEF-2, CEFI
- Informal assessments: (i.e., Peg Dawson's ESQ Self-Report) <https://www.smartbutscatteredkids.com/esq/>
- Interviews & observations



# Digging Deeper to Determine True EF Difficulties

- Try cueing the student who is struggling to determine if she has a skill deficit or an EF deficit: If you tell the student when to do it, can she? If yes, then she has the “how”.
- Ex: Working Memory Difficulty: Working Memory is both a frontal lobe cognitive ability and a frontal lobe EF. Her **Working Memory ability** is her ability to hold rote information in her immediate memory, while mentally manipulating that information.
- Her **Working Memory EF** is when and how she cues or activates her frontal lobe to use her Working Memory. Does she know when to cue or activate the network to use Working Memory? She might have a great Working Memory, but if she’s not cueing it, she won’t be able to use it when needed.
  - If the student does not seem to be able to hold information in her Working Memory, try cueing her when information is being presented to let her know that she needs to remember this information to see if this prompt helps her to hold the information in her Working Memory.

(McCloskey et al., 2009)





# Overview of ADHD and Autism Spectrum Disorder (ASD)

- Neurodevelopmental disorders that can impact an individual's behavior, social interactions, and cognitive functioning.
- While ADHD and ASD are distinct conditions, they can co-occur in some individuals, leading to unique challenges and considerations.
- Understanding the characteristics and impact of each disorder is essential for providing effective support and intervention for individuals with ADHD and ASD.
- There is overlap between EF dysfunction found in ADHD & ASD.

# Understanding ADHD & Related Executive Dysfunction





# What is ADHD?

- Characterized by persistent patterns of inattention, hyperactivity, and impulsivity that interfere with functioning or development.
  - **Inattention** may manifest as difficulty sustaining attention, making careless mistakes, or being easily distracted.
  - **Hyperactivity** can present as excessive fidgeting, restlessness, or difficulty engaging in quiet activities.
  - **Impulsivity** may lead to interrupting others, difficulty waiting turns, or acting without considering consequences.



# Common Challenges Found in ADHD

- **Inattention:**

Inattention involves difficulty sustaining focus, being easily distracted, and overlooking details. In individuals with ADHD, inattention can lead to:

- Difficulty maintaining attention on tasks or play activities
- Frequently making careless mistakes in schoolwork or other activities
- Being forgetful in daily activities, such as forgetting to turn in homework or complete chores
- Avoiding or disliking tasks that require sustained mental effort, such as homework or lengthy reading assignments

- **Hyperactivity:**

Hyperactivity refers to excessive and inappropriate levels of activity and restlessness. In individuals with ADHD, hyperactivity can present as:

- Fidgeting, tapping hands or feet, or squirming in one's seat
- Difficulty engaging in quiet activities or leisure activities
- Excessive talking or difficulty engaging in activities quietly
- Feeling restless or constantly on the go



# Common Challenges Found in ADHD

- **Impulsivity:**

Impulsivity refers to acting without thinking or considering the consequences. In individuals with ADHD, impulsivity can manifest as:

- Difficulty waiting for one's turn
- Blurting out answers before questions are completed
- Interrupting or intruding on others' conversations or activities
- Making hasty decisions without considering long-term outcomes
- Engaging in risky behaviors without considering potential dangers

- These specific challenges can impact various aspects of an individual's life, including academic performance, social interactions, and daily functioning.



# Executive Dysfunction in ADHD

- **Inhibition** (closely linked to impulsivity):
- *Inhibition* is the capacity to think before you act. This ability to resist the urge to say or do something allows us the time to evaluate a situation and how our behavior might impact it. Inhibition is the main EF lacking in impulsive behavior.
- *Impulsivity* refers to acting without thinking or considering the consequences. In the context of executive function difficulties, impulsivity can manifest as:
  - Difficulty inhibiting immediate responses or actions
  - Acting on impulse without considering potential outcomes
  - Making quick decisions without fully evaluating the situation
  - Interrupting others in conversations or activities
  - Difficulty waiting for one's turn

Difficulties with inhibition and impulsivity can lead to challenges in self-regulation, social interactions, and decision-making, impacting various aspects of an individual's life.



# Executive Dysfunction in ADHD

- **Emotional Regulation:**

Emotional regulation involves the ability to manage and respond to emotions in a constructive and adaptive manner. Difficulties in emotional regulation can manifest as:

- Intense emotional reactions to situations or stimuli
  - Difficulty calming down after becoming upset or agitated
  - Challenges in recognizing and labeling emotions
  - Impulsive emotional responses, such as outbursts or tantrums
  - Difficulty shifting from one emotional state to another
- 
- Difficulties in emotional regulation can impact social relationships, self-control, and the ability to cope with stress and frustration.
  - When a student struggles with both inhibition and emotional regulation, this can contribute to challenges in self-control, decision-making, and social interactions.



# Executive Dysfunction in ADHD

- **Sustaining Attention:** Students with ADHD often struggle to sustain attention on tasks that require prolonged focus, such as reading, listening to lectures, or completing assignments. Their ability to maintain attention over time is compromised, leading to frequent shifts in focus and reduced task persistence.
- **Shifting Attention:** Difficulty in shifting attention from one task to another can result in a lack of flexibility when transitioning between activities. This inflexibility can lead to frustration and inefficiency when attempting to adapt to changing demands in the classroom.
- **Resisting Distractions:** Students with ADHD may have heightened susceptibility to environmental and internal distractions, making it challenging for them to filter out irrelevant stimuli and maintain focus on the task at hand.
- **Working Memory Impairments:** Working memory deficits in students with ADHD can contribute to inattention and distractibility, as they struggle to hold and manipulate information in their mind while engaging in cognitive tasks.
- These difficulties can significantly impact academic performance, as students may miss important instructions, overlook details, or struggle to complete tasks within expected timeframes.





# EF Deficits in ADHD

- In almost all cases, ADHD involves core EF deficits in:
  - **Focus/Sustained Attention, Inhibit, Modulate**
- Some other common EF difficulties can be found in the areas of **Cognitive Flexibility, Planning, Emotional Regulation, and Working Memory.**
- Many students with ADHD also experience a constellation of additional EF deficits, that can vary tremendously from student to student (McCloskey et al., 2009).



# Possible Additional EF Difficulties in ADHD

- **Organization:**

- Difficulty with organization involves challenges in arranging and structuring information, materials, or tasks in a systematic and orderly manner.
- Individuals with executive function difficulties in organization may struggle with keeping track of belongings, maintaining tidy workspaces, and categorizing information effectively.
- This difficulty can lead to disorganization, forgetfulness, and difficulty locating important items or information when needed.

- **Planning:**

- Challenges with planning encompass difficulties in setting goals, developing strategies, and sequencing actions to achieve desired outcomes.
- Individuals with executive function difficulties in planning may struggle with time management, initiating tasks, and breaking down complex tasks into manageable steps.
- This difficulty can result in procrastination, poor task initiation, and difficulty completing tasks within expected timeframes.



# EFs & ADHD

- EF and ADHD are not synonymous. Students with ADHD will have EF dysfunction; however, having EF dysfunction does not mean a student has ADHD.
- Medication of ADHD usually only addresses the problems associated with the core EFs specific to ADHD (Inhibit, Modulate, Focus/Sustained Attention) (McCloskey et al., 2009).
- Most student with ADHD will require additional interventions to assist with their non-core self-regulation difficulties that medication does not address (McCloskey et al., 2009) .



# Stroop Test Example

BLUE	RED	YELLOW	ORANGE
GREEN	BLUE	PURPLE	RED
PURPLE	YELLOW	RED	BLUE
ORANGE	BLUE	YELLOW	RED
RED	GREEN	ORANGE	BLUE
PURPLE	YELLOW	BLUE	ORANGE

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ORANGE

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# Understanding Autism Spectrum Disorder (ASD) & Related Executive Dysfunction





# What is an Autism Spectrum Disorder?

- To meet diagnostic criteria for ASD according to the DSM-5, a child must have persistent deficits in each of three areas of **social communication and interaction**, plus at least two of four types of **restricted, repetitive behaviors**.
- Challenges with social communication may include difficulty with nonverbal communication, challenges in developing and maintaining relationships, and atypical use of language.
- Restricted and repetitive behaviors may manifest as adherence to routines, intense interests in specific topics, sensory sensitivities, and repetitive movements or speech.



# Common Challenges and Executive Dysfunction in Autism Spectrum Disorder (ASD)

- **Social Communication Difficulties:**

- Students with ASD may struggle with social communication, including challenges in understanding nonverbal cues, maintaining reciprocal conversations, developing a mature Theory of Mind, and interpreting social nuances.

- *Intersection with Executive Functions:* These difficulties can stem from challenges in cognitive flexibility, inhibitory control, emotional regulation, and working memory, impacting the student's ability to adapt to social expectations, regulate their behavior in social contexts, and maintain attention during social interactions.

- **Repetitive Behaviors:**

- Repetitive behaviors, such as repetitive movements, rigidity, adherence to routines, and intense interests in specific topics, are common in students with ASD.

- *Intersection with Executive Functions:* These behaviors may reflect difficulties in cognitive flexibility and planning, as students may struggle to shift attention from their preferred routines or interests, leading to challenges in adapting to new activities or changes in their environment.





# Common Challenges and Executive Dysfunction in Autism Spectrum Disorder (ASD)

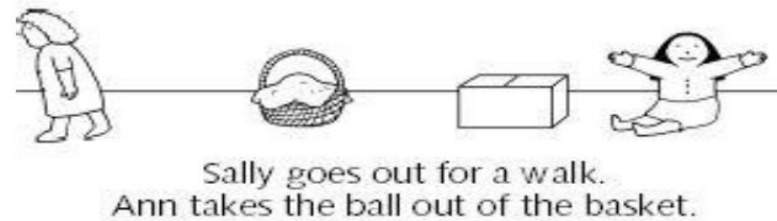
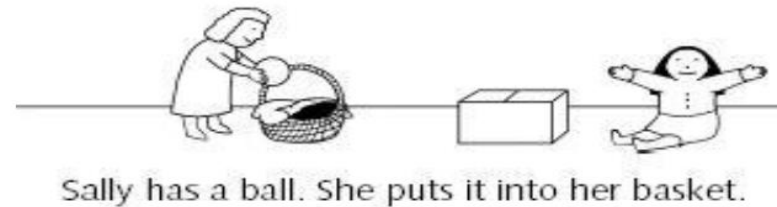
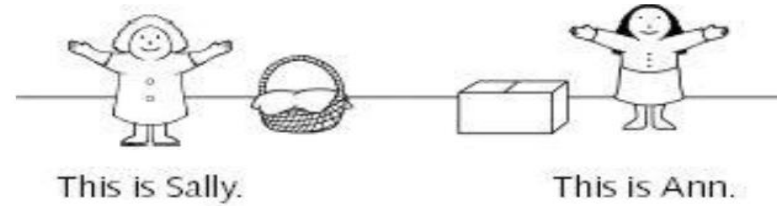
- **Sensory Sensitivities:**
    - Many students with ASD experience sensory sensitivities, including heightened or diminished responses to sensory stimuli such as sound, touch, taste, or smell.
    - *Intersection with Executive Functions:* Sensory sensitivities can impact attention, emotional regulation, and task initiation, as students may become overwhelmed or distracted by sensory input, affecting their ability to focus, regulate their emotions, and engage in learning activities.
  - **Adaptability:**
    - Adaptability encompasses the capacity to adjust to new conditions, handle unexpected events, and cope with transitions effectively.
    - Difficulties in adaptability can lead to heightened stress in response to changes, difficulty regulating emotions during transitions, and resistance to new routines or expectations.
    - Individuals with executive function difficulties in adaptability may experience challenges in managing transitions, coping with uncertainty, and regulating their emotional responses to unexpected events or changes in plans.
- *Intersection with Executive Functions:* Cognitive flexibility, emotional regulation, and planning/organization



# Theory of Mind (ToM) (Sally & Ann Test)

EFs Required for ToM:

- Cognitive Flexibility
- Inhibition
- Working Memory
- Planning
- Emotional Regulation



Where will Sally look for the ball?



# EF Difficulties That Commonly Overlap Across ADHD & ASD

- Cognitive Flexibility
- Emotional Regulation
- Sustained Attention
- Inhibition
- Working Memory
- Planning/Organizing
- EF interventions are different than typical evidence-based interventions targeted toward ADHD & ASD, as they will specifically focus on the areas of EF difficulties, and therefore, may overlap dramatically.
- EF interventions need to be **individualized** based on the student's areas of executive dysfunction. Addressing only the core EF difficulties found in ADHD or ASD alone is not enough. The additional constellation of EF difficulties for the individual also needs to be addressed. Therefore, EF interventions may look very different across students with the same disability; differently, they may also look very similar across students with different disabilities, due to the varying nature of these deficits.
- EF interventions need to be implemented simultaneously with other ADHD or ASD interventions to be successful.

# Understanding Executive Function Interventions





# Understanding EF Interventions

- Try to shift your perspective from believing the student is being **oppositional** or unmotivated to understanding the child likely does not yet have the executive capacity to carry out the demand being asked of her. Although there certainly are students who have oppositional behaviors, this is most often not the case with students who struggle with executive dysfunction. Especially in the younger grades, most students want to succeed.
- Very little research has been conducted specific to EF dysfunction in populations of students who have disabilities, such as ADHD or ASD. **The majority of the research overwhelmingly suggests that EF interventions that will likely be successful for these students are the same EF interventions used for students without disabilities who experience executive dysfunction.**



# Supporting Executive Functions (Dawson & Guare, 2009 & McCloskey et al., 2009)

- **Modeling:** People working with the child need to have adequate executive function capacities to be able to model them.
- **Coaching:** Until these capacities are fully mature, it's the job of parents and teachers (and adults who work with kids) to act as surrogate frontal lobes for the child.
- **Teaching:** It is also the job of parents and teachers to ensure that kids grow their own executive skills.
- Find a balance between providing external support and teaching internal self-regulation strategies. The goal is to move from external to internal support.
  - If a student has not yet developed his EF capacity, then teaching the EF skill will be slower and more uneven than if a student has developed the EF capacity, but has not learned to cue it when needed (McCloskey, 2009). This is an important distinction to make in order for intervention to be successful.



# Executive Function Coaching

- During **early elementary** years, teachers act as their student's frontal lobes.
  - First, **cue the student by asking questions**. “What do you have to do? When are you going to do it?” Asking those two questions tackles a number of executive function challenges that students with ASD and ADHD may present with, including task initiation, planning, time management, and maybe even goal-directed persistence.
  - If this is not successful:
  - Verbally mediate or **tell the student** what to do, how to do it, when to do it. This will help the student to do better work and gain confidence. Often, students with EF deficits may have the skill mastered, but may be unable to produce it without assistance, such as verbal mediation.

(Dawson & Guare, 2009 & McCloskey et al., 2009)



# Executive Function Coaching

- In **late elementary, middle & high school, and college or beyond**, it is usually effective for teachers to provide executive function **prompts** and **model** good executive function use.
  - This type of coaching might include providing reminders to stay on-task, prompts to begin a task, repetition of directions, assistance with organization of materials, and check-ins on projects.
  - Make directions and steps more **explicit** (i.e., list steps as a checklist on a sheet of paper for math problem-solving). Children with ADHD and ASD need explicit instruction and directions.

(Dawson & Guare, 2009 & McCloskey et al., 2009)





# Example of Explicit Directions: Teaching a Student How to Listen (Adapted from Dawson & Guare, 2009)

LISTENING	
Face Speaker	
Pay Attention & Show Interest	
Keep Body Still	
Do not Interrupt	



# Modify the Environment

- Students with ASD especially benefit from this because typical school environments often overwhelm them. Use their behavior (i.e., meltdowns & tantrums) as a barometer to alert you to when environmental modifications need to be made (Dawson & Guare, 2009).
  - Allow the student alternatives to highly stimulating environments (i.e., cafeteria, playground) (Dawson & Guare, 2009). Allow them a quiet place to work.
  - Build social interactions that work for them (i.e., structured settings where the activity drives the interaction or supervised lunch/recess) (Dawson & Guare, 2009).
  - Closed-ended tasks/minimize choice; provide scripts; make steps more explicit; alternate between preferred/non-preferred activities (“First work, then play”) (Dawson & Guare, 2009).



# Make Students Aware

- If a student is not aware that he is not meeting expectations, then he will not be able to make the necessary corrections.
  - Ex: During groupwork, students are told they may talk with their partners. A student with ADHD begins speaking so loudly and yelling excitedly with his partner that his teacher comes over and tells him he is no longer allowed to talk. The student is confused, because in his mind, he was following the teacher's directions. He was **not aware** that he was speaking too loudly or yelling.
  - **Modulation** is adjusting the intensity (i.e., volume of voice). This has to be taught to a student who doesn't know how to modulate his voice or doesn't have the awareness that he's yelling.

(McCloskey et al., 2009)



# Teaching Executive Functions

- When teaching EF skills to students with ADHD, remember that the **30% maturational delay** is natural. However, if we educate the student's brain, we may be able to speed this up somewhat, but it will still be delayed (McCloskey, et al., 2009).
- **Consistent, daily practice** is key to teaching EF skills. It will take a very long time for them to learn these skills because of the natural maturational delay. We often want to see results immediately when doing an intervention. The reality is that over time, development is very choppy. It's not nice and steady. Our goal is to see the EF capacity flipped on more than it's off over time. It's not going to be perfect. There will be times when the switch will be off, and it could be off for weeks. But we're always looking at trying to get it back on. Patience is critical (McCloskey et al., 2009).
- Implement **EF MTSS**: Tier 1 classroom-wide interventions can include whole class homework assignment book checks at the end of each day (planning & organization) (Dawson & Guare, 2009).
- EF interventions (especially Tier 2) will take much longer than the typical 8 – 10 week window given for academic interventions because of the slow rate that EFs develop in people. EFs are “habits” that need to be practiced day in and day out, and it still may take a very long time to see improvements. (Dawson & Guare, 2009).



# EF MTSS (Tier 1 – Classwide Routines): Adapted from Dawson & Guare (2009)

- End class 5 minutes before the end of the period or day and make sure students write down homework assignments and put necessary materials in backpacks

EXECUTIVE SKILLS: **working memory, organization, planning**

- Begin the school day with a class check-in (How are you feeling on a scale of 1 to 5?)

EXECUTIVE SKILL: **emotional control**

- Have a homework collection routine

EXECUTIVE SKILLS: **working memory, organization**

- Write grade goal on desk with dry erase marker

EXECUTIVE SKILL: **goal-directed persistence**



# Executive Function Interventions (Dawson & Guare, 2009)

- **Response Inhibition:** Teach wait and stop (set a timer to teach them to wait)
- **Working Memory:** Provide cues, prompts, and reminders to remember things. Don't rely on verbal (pair with a visual list, checklist, etc. Use visual cues to help students understand schedules (i.e., a middle school schedule that changes daily).
- **Emotional Control:** Teaching students to talk to themselves (talk back to their anxiety). Talking to yourself underlies CBT, based on the premise that your feelings are not caused by external events. They are caused by what you tell yourself about those external events. If you change what you tell yourself, you can change those feelings. Mindfulness and meditation help students to notice how their body feels when relaxed vs. stressed.
- **Cognitive Flexibility:** Students with ADHD are usually strong with flexibility (have go with the flow mentality), but kids with ASD usually struggle with this. This is best taught by using a curriculum, such as *Unstuck and On Target*. Also, provide accommodations such as advanced warning of transition or change in schedule.



# Executive Function Interventions (Dawson & Guare, 2009)

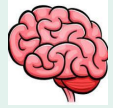
- **Sustained Attention:** It's not that the student can't pay attention. It's that the student has trouble making herself pay attention (i.e., cueing the brain to attend). To intervene, start with where the student is at. If she has 10 min attention span, then start there.
- Chunk and break down each task to what she can handle. A 30 minute independent seatwork period can be broken down into choices of 3 different 10 min tasks for students. Therefore, one student who has an attention span of 10 minutes might choose 3 different 10 minute tasks, while another student who has the ability to focus for 30 minutes might choose to work on one task for 30 minutes. To gauge a student's maximum attention span, try asking the student how long she can work before taking a break.
- Build movement breaks for students into the school day or let the student stand while working.



# Collaborative & Proactive Solutions (CPS) (Greene, 2008)

- For younger students who have attention difficulties in the classroom, the teacher should start by having a conversation with the student to address the issues with him:
  - “I noticed you move around a lot during instruction and aren’t always paying attention, but when you are attending, you seem to absorb a lot of instruction. Why is that? What can we do together to make sure you get what you need to out of the classroom?” (example of Ross Greene approach; McCloskey et al., 2014).
    - Collaborative & Proactive Solutions (CPS) is Ross Greene’s evidence-based approach of collaboratively solving problems that cause a behavior with the student, rather than modifying the behavior. This approach can be applied to any executive skill deficit. It is not specific to difficulty with sustained attention.
    - <https://drrossgreene.com/lost-at-school.htm>





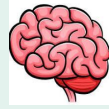
# Executive Function Interventions (Dawson & Guare, 2009)

- **Task Initiation:** This is the last and hardest EF to acquire. Ask student to make themselves a plan with a start time, and make sure he follows it. You need to be there to make sure he starts the plan at the time he said he would.
- **Planning:** Adult can plan for the student, but also work with her to plan a project to help her learn. Have her help decide what she needs to accomplish, and what she needs to do to get it done. Start by having her help you plan something fun before planning a more tedious long-term task.
- **Organization:** To teach this EF, start small. Pick one thing to work on organizing and then work on maintaining the organization.
- **Time Management:** Time management includes the combination of task initiation, sustained attention, and planning. Need time estimation ability to be successful with this EF. Many students typically underestimate how long an effortful task will take and need to practice this to improve.



# Executive Function Interventions (Dawson & Guare, 2009)

- **Goal directed persistence:** Most middle school students don't yet have the ability to decide on long-term goals, such as what they want to do after high school. They can't see far enough ahead to know that their grades in 8<sup>th</sup> grade may affect their ability to get into college because they can't yet picture their lives 4 years from now. To work on this skill, don't focus on academics. Instead, pick something fun and of interest to the child (i.e., sports goal, driver's license, first job, saving up money for something they want). This is a higher level EF that involves many other EFs.
- **Metacognition:** (the ability to see the big picture and understand how the pieces fit together). Encourage this by encouraging self-reflection, self-awareness. Don't just do this after students did something wrong, but also do it after they did something well. (i.e., "What strategies did you use to do so well in math?")
  - Teach the student specific metacognitive strategies, such as self-questioning, self-monitoring, and reflection, through direct instruction and guided practice.



# Using Self-Reflections to Encourage Metacognition (Adapted from Dawson & Guare, 2009)

## Weekly Sustained Attention Work Report

### Week 1:

<b>Task:</b>	<b>Effort Rating</b> (1- easiest task, 10- hardest task):	<b>Sustained Attention Rating</b> (1- very distracted, 10- totally focused):
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If you were distracted during this task, what could you have done better to maintain focus?

If you were totally focused during this task, what did you do or why do you think you were so focused?



# Dawson & Guare (2009) Environmental Modifications and Teaching Strategies for Executive Skills

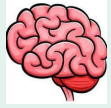
Environmental Modifications and Teaching Strategies for Specific Executive Skills

Executive Skill	Environmental Modification	Teaching Strategy
Response Inhibition	<p>Increase external controls</p> <p>Restrict access</p> <p>Post home or classroom rules and review regularly</p> <p>Wristband reminder (e.g., to raise hand to talk)</p> <p>Talking stick (cue to talk)</p> <p>Sticky notes to write something down rather than interrupting</p> <p>Use a nonsense word to cue self-control</p> <p>Quiet body signal (thumb on chest)</p> <p>Paperclips—once they spend them, no more talking</p> <p>Proximity to teacher</p> <p>Make boundaries concrete</p> <p>Prompts in advance about expected behavior</p> <p>Read aloud: <i>Interrupting Chicken</i></p>	<p>Prompt the child (external to internal)</p> <p>Teach wait/stop</p> <p>Teach delayed gratification (apps: Token Board)</p> <p>Discourage “multi-tasking”—e.g., build in technology breaks rather than having kids combine homework with technology use</p>
Working Memory	<p>Agenda books/calendars</p> <p>To do lists (paper, white board to post prominently)</p> <p>Electronic devices &amp; apps (Wunderlist, Nudge, BugMe!)</p> <p>Colored wristbands to remind students of homework assignments</p> <p>Post-it reminders</p> <p>Laminated lists (e.g., by door at home) to remind kids what they need to take with them</p> <p>Checklists</p> <p>Have student repeat info or directions</p> <p>Break instructions into small pieces; feed one at a time</p> <p>Smart Pen</p> <p>Personal schedules</p> <p>Create resource guide</p> <p>Criteria or success rubrics</p> <p>Songs and rhymes as memory aids</p>	<p>Directions/Past experience (prompt them to access it)</p> <p>Generate options for reminders and have them choose (or elicit options from student)</p> <p>Mentally rehearse association between cue and working memory</p> <p>Teach Principle of “off-loading”</p> <p><b>Off-loading:</b> This refers to the idea that the brain doesn’t have to work as hard when you can find a way to “off-load” some of the tasks we’re asking it to do. Examples: the brain doesn’t have to allot space to remembering homework assignments when we write them down. It doesn’t have to work at remembering something we have to do after school if we build an alarm into our smart phone to remind us...</p>



# Dawson & Guare (2009) Environmental Modifications and Teaching Strategies for Executive Skills

Executive Skill	Environmental Modification	Teaching Strategy
Emotional Control	<ul style="list-style-type: none"><li>Reduce or eliminate triggers</li><li>Give child a script to follow</li><li>Remove child from problem situation</li><li>Have a “cooling off” space</li><li>Prepare student by asking them to predict what will happen/how they will handle it</li><li>Review expectations in advance</li><li>Teach students to label emotions</li><li>Teach kids: “respond don’t react”</li></ul>	<ul style="list-style-type: none"><li>Teach kids to recognize situations or early signs</li><li>Graded exposure/guided mastery</li><li>Teach coping strategy</li><li>Rehearse the strategy repeatedly until it is internalized</li><li>Use Hard Times Board</li><li>Teach mindfulness meditation (<a href="http://thehawnfoundation.org/mindup/">http://thehawnfoundation.org/mindup/</a>)</li><li>Teach growth mindset</li><li>Zones of regulation</li><li>Teach social pragmatics (Michelle Garcia Winner)</li><li>Self-talk to plan in advance (If/Then: If this happens, then I will....)</li></ul>
Flexibility	<ul style="list-style-type: none"><li>General rule: Limit flexibility demand</li><li>Reduce novelty</li><li>Highlight similarities</li><li>Provide a template</li><li>Put in place a default strategy</li><li>Turn open-ended tasks into closed-ended tasks</li><li>Other strategies:<ul style="list-style-type: none"><li>Make steps more explicit</li><li>“Normalize” errors</li><li>Preview changes in schedule</li><li>Give kids “controlled choice”</li><li>Praise kids for being flexible</li><li>Use language to show case flexibility (stuck/unstuck; big deal/little deal; Plan B)</li><li>Reframing perceptions of change</li></ul></li></ul>	<ul style="list-style-type: none"><li>Increase support</li><li>Present expectations</li><li>Walk them through the task</li><li>Give plans or rules for managing situations</li><li>Think aloud</li><li>Teach error factor</li><li>Social stories to teach flexibility</li><li>Change tolerance by gradual exposure</li><li>Introduce change (lightning bolt-preferred to non-preferred)</li><li>Introduce new situations</li><li>Share personal stories involving flexibility</li><li>Do It Later folder (for kids who have trouble leaving a task undone)</li></ul>



# Dawson & Guare (2009) Environmental Modifications and Teaching Strategies for Executive Skills

Executive Skill	Environmental Modification	Teaching Strategy
Sustained Attention	Reduce distractions (seating arrangements, white noise) Prompt to attend (look, listen, respond) Modify/limit task length or demand (end in sight) Clear beginning/end Build in variety/choice Choose best time of day Immediately reinforce (pay attention to them <i>while they're paying attention</i> ) Use sand timers and/or fidget toys such as stress balls Movement breaks Flexible seating/U-shaped seating Wiggle cushions/study carrels; dead headphones; listen to iPod; quiet desk/noisy desk/stand up desk; <u>theraband on front two legs of chair to allow movement</u> <u>App: Lckety Split, Chore Monster, iRewardChart, Motivaider, Chore Pad HD, Forest</u> Time Timer (make time visible) Sand timer (real or app) Identify distractors	Have the child identify something to look forward to doing after work is done Teach mindfulness meditation Teach to track time on task using index card or sticky note "Whole Body Listening Larry" Use "Personal Bests" Have students set goals (how long can you go before you need a break?)
Task Initiation	Provide cues/prompts Reduce perceived effort/task demand Walk through first step—build behavioral momentum Make help readily available—Help card to signal to teacher student needs help Cut worksheets into smaller strips Time how long it takes student (or whole class) to get started—challenge to beat yesterday's time Establish set time to do non-preferred tasks <u>Apps: Lckety Split, Good Habit Maker, FTVS (First Then Visual Schedule), Chore Pad HD, ChoreMonster</u> Make a list and break into bite-sized chunks Play music signaling time to start/stop tasks Reduce visual distractions Reinforce wait time Write down answer before saying it Verbal cue to start, countdown to action	Have the child select cueing system Help the child limit initial demand Help the child select reinforcer Help the child make a plan for doing the task and include the start time Figure out what's preventing them from getting started and design an appropriate strategy (perfectionism vs. too hard vs. too effortful) Have student make plan for unstructured time



# Dawson & Guare (2009) Environmental Modifications and Teaching Strategies for Executive Skills

Executive Skill	Environmental Modification	Teaching Strategy
Planning	Demonstrate what a plan is Help child design a plan/template Start with big picture; plan backwards Provide planning tools (calendar, agenda book, apps – e.g., <u>Choiceworks</u> , <u>CanPlan</u> ) Break task down with a visual (e.g., dividing reading assignment into pages per day) Use “snooze alarm” on phone to break down a large task into smaller pieces Make a road map Put each step of a project on a separate index card Graphic organizers	Walk through the planning process (use a template) Have them apply plan to a simple task and gradually prompt to do more of the planning themselves Ask questions to get child to prioritize (What do you need? What should you do first?)
Organization	Demonstrate principle of off-loading with example from their lives Work with them to create scheme, template or picture/photograph Show organizational tools and have them try them out (e.g., Inspiration) Structure the environment to promote organization Limit what is allowed on the desktop Making cleaning up a game Take picture of what it should look like Levels of cleaning (based on available time) Include in classroom jobs Provide examples of organizational models Check-ins Give them tools/supplies	Help them walk through the process. Have them motorically practice it (a long-term process, requiring that they put a system in place that’s monitored, initially on a daily basis). Give them choices of organizational systems and have them choose/modify the one they like best. Model organizational strategies throughout the school day Ask students to evaluate current systems and challenge them to improve them. Teach concept of “touch it once”



# Dawson & Guare (2009) Environmental Modifications and Teaching Strategies for Executive Skills

Executive Skill	Environmental Modification	Teaching Strategy
Time Management	<ul style="list-style-type: none"><li>• Make schedules and time limits explicit</li><li>• Work with kids to make a schedule to follow and prompt each step of the way<ul style="list-style-type: none"><li>○ Picture schedules</li><li>○ Clocks, alarms</li><li>○ Tablet/phone apps (<u>Choiceworks</u>, Pomodoro)</li><li>○ Timers (app: Sand Timer; <a href="http://www.timetimer.com">www.timetimer.com</a>)</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Show them ways to mark time and let them practice.</li><li>• Practice estimating how long it takes to do something.</li><li>• Help them to follow schedules (daily events to homework plans).</li><li>• Build in mid-point check-in to encourage self-assessment of pacing</li><li>• Teach to use a calendar that includes all tasks and responsibilities so they can see what time is actually available for work</li><li>• Write each task on a post-it and place it on a large dry erase calendar so that it can be moved as needed.</li></ul>
Goal-Directed Persistence	<p>Establish goals with kids</p> <p>Reward kids for persistence (sticking with difficult tasks)—use verbal reinforcers as much as possible</p> <p>Make sure the goal or benchmark is in sight—post it visually</p> <p>Apps: Token Board</p> <p>Two jars (or other visuals) to show progress</p> <p>Use charts with stickers</p> <p>Model goal setting</p> <p>Personal best goals</p>	<p>Point out to kids how they already set goals but they may not know what they are. Define goals as something that people want to get better at or to change.</p> <p>Ask kids to set small, achievable goals, or a goal for something they want to do outside of school or set class goals.</p> <p>Help kids track progress toward goal/self-assess periodically</p> <p>Teach growth mindset</p> <p>Teach how to make SMART goals</p>





# Dawson & Guare (2009) Environmental Modifications and Teaching Strategies for Executive Skills

<b>Executive Skill</b>	<b>Environmental Modification</b>	<b>Teaching Strategy</b>
Metacognition	<ul style="list-style-type: none"><li>• Specify what is to be evaluated and how (goal or objective)</li><li>• Evaluate performance for the student</li><li>• Provide sample to match or error-monitoring checklist</li><li>• Embed metacognitive questions into instruction/conversations—build in wait time</li><li>• Responsive Classroom</li><li>• “My favorite mistake”</li></ul>	<ul style="list-style-type: none"><li>• Help child decide on how performance will be evaluated</li><li>• Have the child evaluate her performance</li><li>• Model thinking aloud to solve problems</li><li>• Use different strategies—ask kids to evaluate which worked best</li><li>• Compare evaluations</li><li>• Teach students to ask questions<ul style="list-style-type: none"><li>○ What’s my problem?</li><li>○ What’s my plan?</li><li>○ Am I following I my plan?</li><li>○ How did I do?</li></ul></li></ul>

# Case Studies Revisited (Jason & Samantha)



# Questions?





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