ADHD and Barriers to Learning:

Working Memory and Processing Speed and How to Compensate for these Weaknesses

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Our Vision

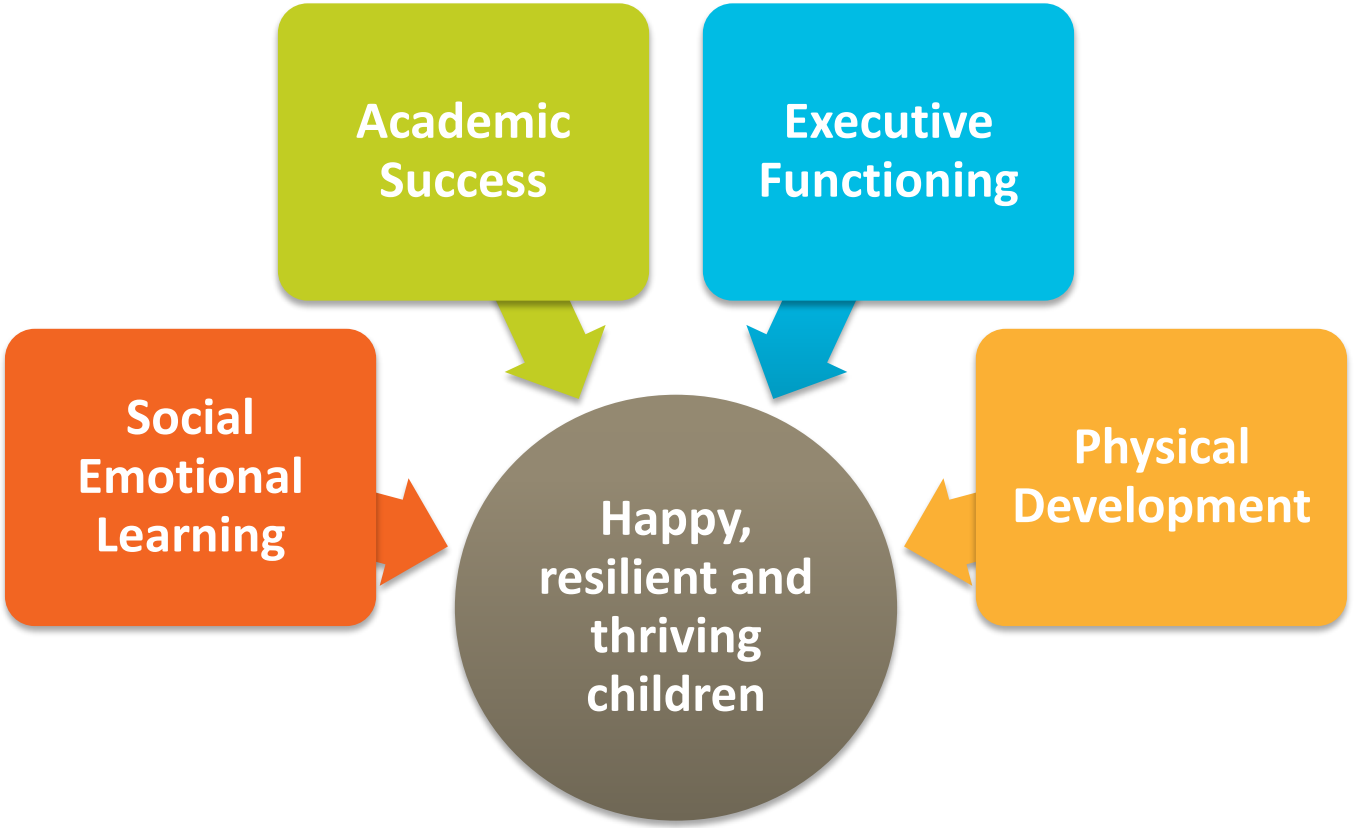
At Children's Health Council, we believe there is a world of promise and potential in every child.

Using a personalized approach, we help children become happier, more resilient and more successful.

Our Mission

Our mission is to help children with ADHD, LD, Anxiety & Depression and ASD thrive by promoting Social Emotional Learning, Academics, Executive Functioning and Physical Development.

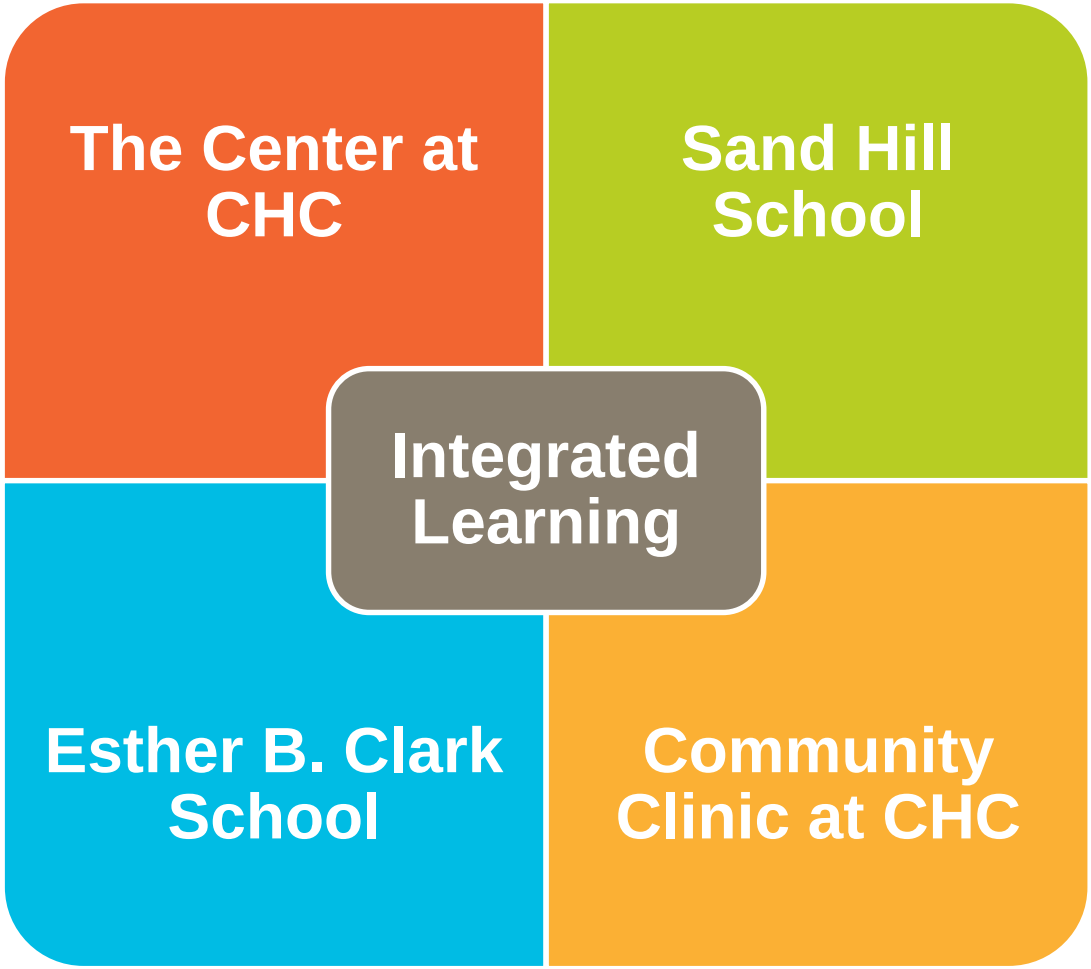
Our Framework for Learning & Life Success



Empowering Success through Four Divisions

Expert interdisciplinary assessments, treatments & programs

Transformative help for emotionally challenged children ages 7-16



Personalized learning for students in K-5, expanding to K-8

Nurturing care for families served by Medi-Cal

On the Agenda

- Diagnostic criteria of ADHD
- Defining Working Memory (WM) and Processing Speed (PS)
- Why WM and PS are so important
- Mental health conditions that impact WM and PS
- Signs of WM and PS deficits
- Strategies to Support Working Memory
- Strategies to Support Processing Speed

NOT on the Agenda

- How WM and PS are formally assessed
- Neural correlates of WM and PS
- Discussion of all EF skills
- Solving specific problems about specific individuals
- Computer "brain training" treatment approaches

Diagnostic Criteria of ADHD

Current Definition of ADHD

- Two broad symptom clusters
  - Problems with attention and distractibility
  - Problems with impulsivity and hyperactivity
- Symptoms must be present in at least two settings
- Some symptoms must be present before age 12 years
- Must be causing impairment

Inattention/Distractibility

Must have 6 or more symptoms for > 6 months

- Careless
- Poor sustained attention
- Doesn't listen
- No follow through
- Avoids/dislikes tasks requiring sustained attention
- Can't organize
- Loses important items
- Easily distracted
- Forgetful in daily activities

Hyperactivity/Impulsivity

Must have 6 or more symptoms for > 6 months

Hyperactivity

- Squirms and fidgets
- Can't stay seated
- Runs/climbs too much
- Can't play/work quietly
- "On the go"/"Driven"
- Talks excessively

Impulsivity

- Blurts out answers
- Can't wait in turn
- Intrudes/interrupts others

Subcategories per DSM-5

- **Combined Presentation (ADHD-C)**
  - Most common and best studied
  - Males predominate
  - Typically diagnosed in first or second grade, between ages 6-8
- **Predominantly Hyperactive/Impulsive Presentation**
  - Poorly researched
  - Males predominate
  - Largely diagnosed in preschoolers

Subcategories per DSM-5 (cont.)

- **Predominantly Inattentive Presentation (ADHD-I)**
  - Often diagnosed relatively late, often between ages 10-12
  - Male:female ratio closer to 1
  - Still relatively poorly understood
  - May involve slower processing speed

Defining Working Memory and Processing Speed

Working Memory Defined

System for temporarily storing and managing the information required to carry out complex cognitive tasks such as learning, reasoning, and comprehension

Our "mental workspace" that allows for manipulation of information so it's useful

Quick Facts about Working Memory

- Considered a core Executive Functioning (EF) skill
- Crucial for higher-order thinking, reasoning, learning, and achievement
- Prefrontal cortex is key brain region
- Attention is needed to funnel information to WM
- Crucial in process of storing information into long-term memory
- Key in retrieving previously learning information from memory

Processing Speed Defined

A measure of cognitive efficiency that involves the ability to automatically and fluently perform relatively easy or over-learned cognitive tasks

Pace at which you take in information, make sense of it, and respond

Quick Facts about Processing Speed

- Impacts both input and output
- Involves a complex network of different parts of the brain, any or all of which may result in slower processing
- Slow processing can make working memory less effective, and vice versa
- Output can be heavily impacted by fine motor weaknesses

WM and PS as Cognitive Proficiency

- Defined by WISC-V as a set of functions whose common element is the proficiency with which a person processes certain types of cognitive information
- Efficiency in cognitive processing facilitates learning and problem-solving by "freeing up" cognitive resources for acquiring more advanced skills

Why are WM and PS so important?

- Often part or much of the reason why children and adolescents struggle in school
- Impacts all academic areas
- Impacts social skills and relationships
- Often impacts how a child perceives him/herself
- Contributes to a child feeling "slow," "dumb," defective, and/or inferior to peers
- Often results in child being mislabeled by adults

WM, PS, and Mental Health

- WM and PS deficits are seen in a wide array of diagnoses and conditions
  - ADHD
  - ASD
  - LD
  - Executive Dysfunction
  - Anxiety
  - Depression

Signs of Working Memory Deficits

- Difficulty remembering facts and procedures
- Difficulty internalizing routines
- Slow retrieval of information
- Difficulty following instructions despite repetition
- Demonstrates poor attention to detail
- Makes careless errors
- Loses track of belongings

Signs of Processing Speed Deficits

- Excessive time to complete tasks
- Difficulty completing simple cognitive tasks fluently and automatically
- Needs more time to make decisions or give answers
- Worse performance on timed tasks
- Resistance, anxiety, or avoidance of timed tasks
- Fatigue and frustration
- "Boredom"

Strategies to Support Working Memory

Problem-Solve and Ask Questions

- Have student verbalize the steps in completing tasks they often struggle to complete
  - Provides information about where the breakdown is occurring and what supports are likely to work best
- Evaluate working memory demands of learning tasks
- More support is needed as tasks:
  - Get longer
  - Become more complex
  - Have unfamiliar content
  - Demand more mental processing

Reduce the Memory Load

- Break tasks into smaller chunks
- Reduce the amount of material to be completed
- Keep new information and instructions brief and to the point
- Repeat instructions in a concise manner as needed
- Provide written instructions for reference
- Increase meaningfulness of the material by providing relatable examples

Reduce the Memory Load (cont.)

- Simplify the amount of mental processing required by providing oral "clues" for a problem and writing key words down
- Provide information in multiple ways: speak it, show it, and create opportunities to physically work with it
- Develop routines, such as specific procedures for getting out the door in the morning and turning in completed assignments

Repeat and Review

- Repeat information as needed
- Use visual reminders of the steps needed to complete the task
- Provide opportunities to repeat the task
- Encourage practice to increase the amount of information encoded into memory
- Teach students to practice in short sessions, repeated throughout the day

Encourage Memory Aids and Tools

- Use visual posters, lists, sticky notes
- Provide instructions in written form
- Provide key words and outlines while teaching
- Use graphic organizers
- Use color-coding cues
- Use referents for key formulas, equations, and rules
- Encourage technology such as spell-check, smartpens, calculators, speech-to-text software

Pause, Paraphrase, Allow Time

- Pause during lessons and request a quick summary (e.g., What have we learned so far?)
- Requests students to paraphrase verbal instructions
- Allow time for rehearsal, processing and retrieval
- Avoid open-ended questions when possible

Get Active and Be Explicit

- Repeating, seeing, hearing, and manipulating information will help move it to long-term memory
- Move around and use hands-on material
- Try to get them to link new information to prior knowledge – make connections
- Teach them to listen for key words and write the key words down
- Connect concepts and lessons to real-world examples

Reinforce Learning Preferences

- Encourage self-reflection for yourself and your children
- Problem-solve out loud
- What worked for me?
- What could I do next time?
- If this strategy worked for this task, could I use it anywhere else?

Strategies to Support Processing Speed

Adjusting Time Constraints

- Allow extended time
- Eliminate timed drills
- Emphasize accuracy and not speed
- Reduce quantity of homework as appropriate
- Allow time to formulate thoughts before asking for responses

Language and Communication

- Decrease rate
  - Speaking more slowly and limiting the amount of information that needs to be taken in
- Reduce complexity
  - Use simple, easy to understand terms
- Monitor tone
  - Be aware of how information is being conveyed and could contribute to anxiety, confusion, etc.
- Provide prompts
  - Use prompts, cues, and reminders

Technology

- Word processors and computers
- Spell-check and grammar-check
- Calculators
- Smartpens
- Speech-to-text software
- Apps (e.g., to assist in time management, organization)

Preparation, Preview, and Review

- Help students understand the "big picture"
- Preview outlines and lesson plans in advance so that students have a framework for understanding
- Review chapter summaries and key words, before and after lesson plans
- Use CliffsNotes, SparkNotes and PinkMonkey as appropriate
- Students should know format of tests in advance

Additional Strategies

- Provide models of what successfully completed tasks or projects look like
- Use templates
- Teach students to skip harder questions and return to them after they complete easier ones
- Access copies of notes from teacher or peers
- Frequent breaks to limit fatigue

Active Problem-Solving

- Have students track estimated time per activity and have them record actual time
- Help students understand the challenges they face and how best to overcome them
- When a student finds a system that works for them, encourage them and allow them to use it
- Teach self-advocacy

Conclusions
And Coping Tips

Conclusions

- Children with WM and PS deficits are often labeled "not smart," "slow," "lazy," and/or "unmotivated"
- These learners can be well-addressed educationally
- Accommodations and advocacy are key
- Our increasingly fast-paced world is highlighting these areas of weakness
- Acceptance and appreciation of these learners is crucial to their success

Coping Tips

- WM and PS are often chronic difficulties
- Impairment takes many forms
- Issues change with time and environmental demands
- Trial and error is exhausting but key to the process
- Target your interventions
- Know your own limits and when to seek support

Questions?

Resources

- ***Taking Charge of ADHD* by Russell Barkley**
- ***Bright Kids who Can't Keep Up* by Ellen Braaten and Brian Willoughby**
- ***Late, Lost, and Unprepared—A Parents' Guide to Helping Children with Executive Functioning.* Cooper-Kahn, J. & Dietzel, L. (2008).**
- *Executive Function in the Classroom: Practical Strategies for Improving Performance and Enhancing Skills for All Students.* Kaufman, C. (2010).
- *Promoting Executive Function in the Classroom.* Meltzer, L. (2010).
- www.understood.org for learning and attention issues

Thank You for Coming

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