Executive Function in Pediatrics - The Secret to Success

Colorado Department of Education
Exceptional Student Services Unit

Heather Hotchkiss, MSW

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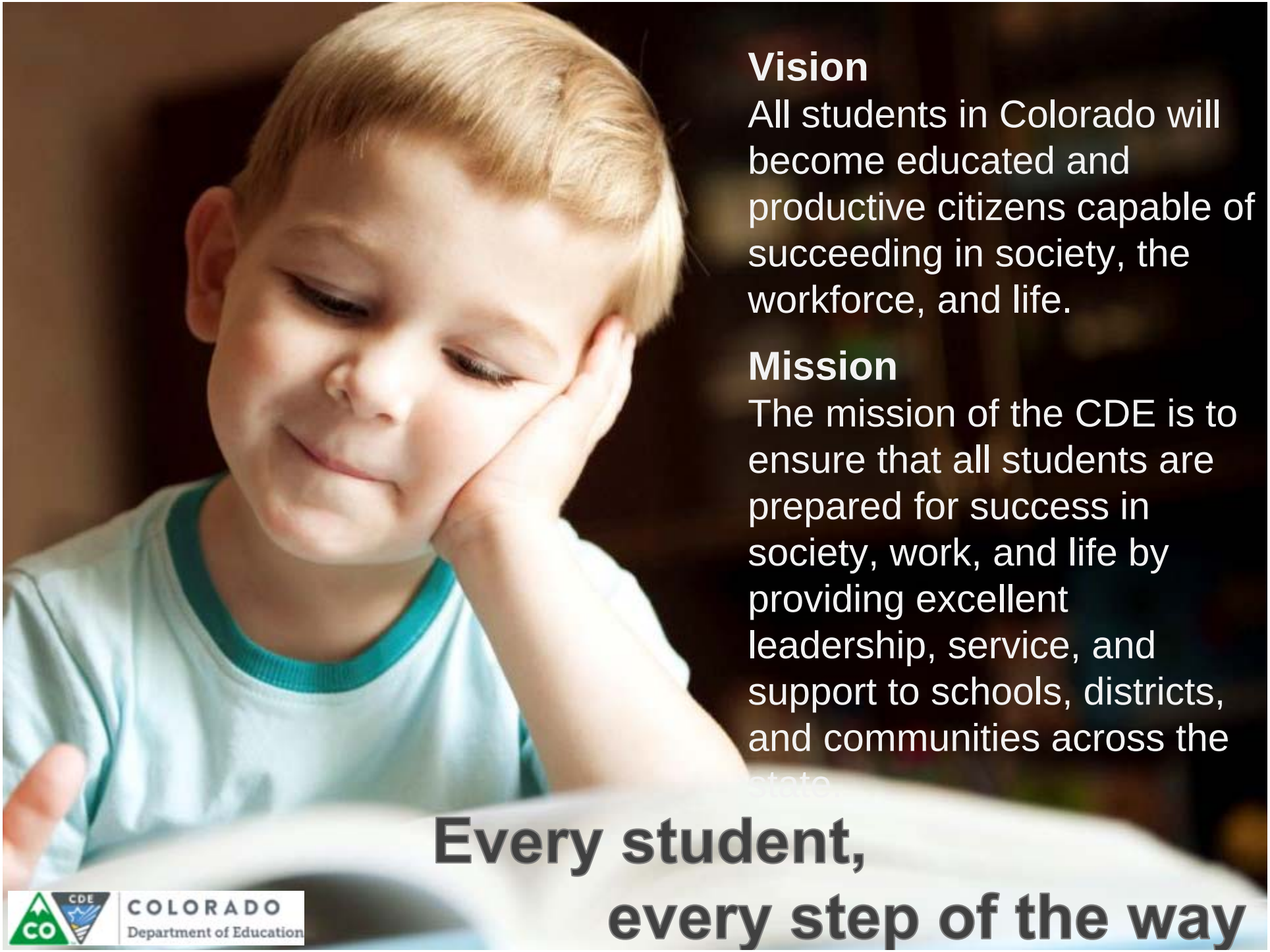

Vision

All students in Colorado will become educated and productive citizens capable of succeeding in society, the workforce, and life.

Mission

The mission of the CDE is to ensure that all students are prepared for success in society, work, and life by providing excellent leadership, service, and support to schools, districts, and communities across the state.

Every student,
every step of the way

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Executive Function – the Secret to Success! Objectives:

- *The What: Understand the Building Blocks of Brain Development Framework*
- *The Why: Executive function disruptions associated with acquired brain injury*
- *The How: How to address issues*
- *What's Next: Resources*

Brain Architecture

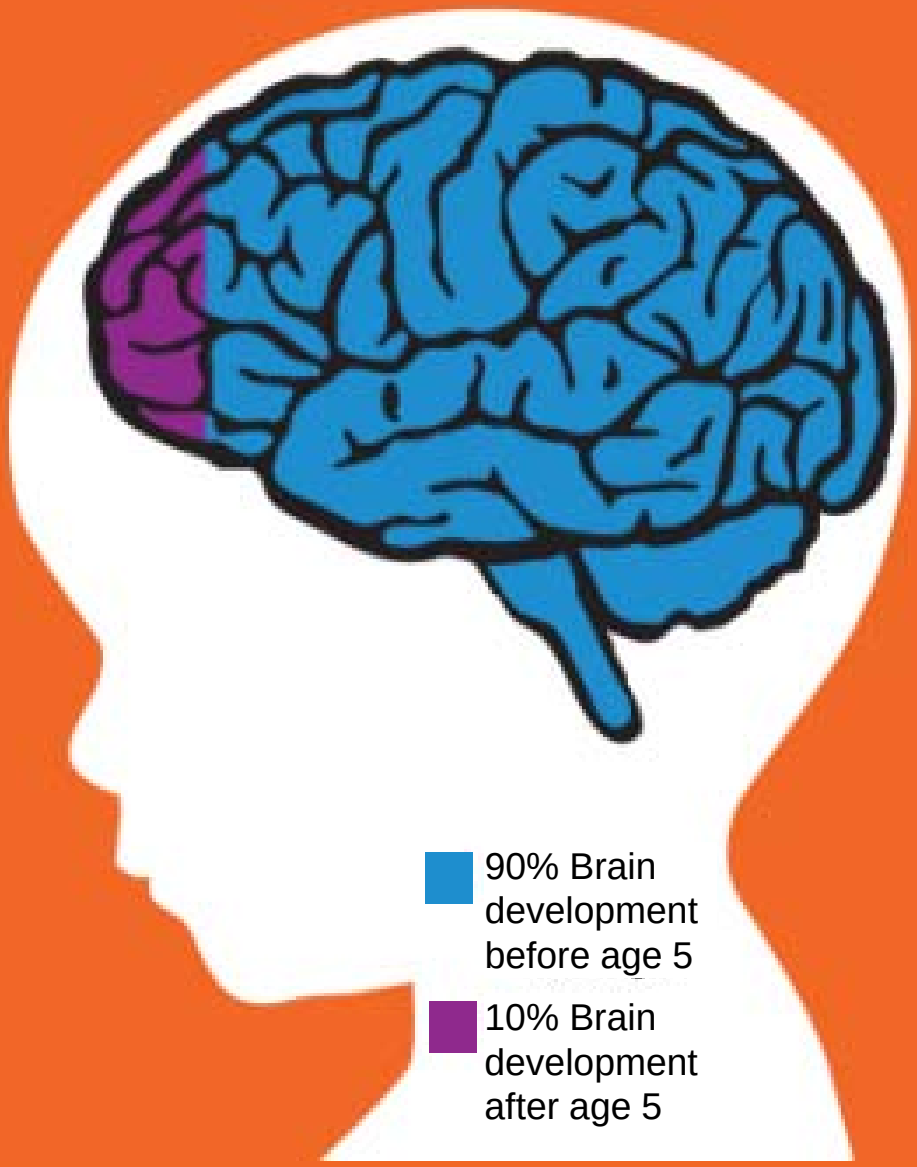
Early experiences affect the development of **brain architecture**

- provides the foundation for all future learning, behavior, and health.
- adverse experiences early in life can impair brain architecture, with negative effects lasting into adulthood.

Source: Harvard Center for the Developing Child

90%

of a child's brain development happens before age 5



Source: Harvard Center for the Developing Child

BRAINS ARE BUILT OVER TIME, FROM THE BOTTOM UP

- An ongoing process that begins before birth and continues into adulthood.
- Simpler neural connections and skills form first, followed by more complex circuits and skills.
- In the first few years of life, 700 to 1,000 new neural connections form every second.
- After this period, connections are reduced through a process called pruning, which allows brain circuits to become more efficient.

Source: Harvard Center for the Developing Child

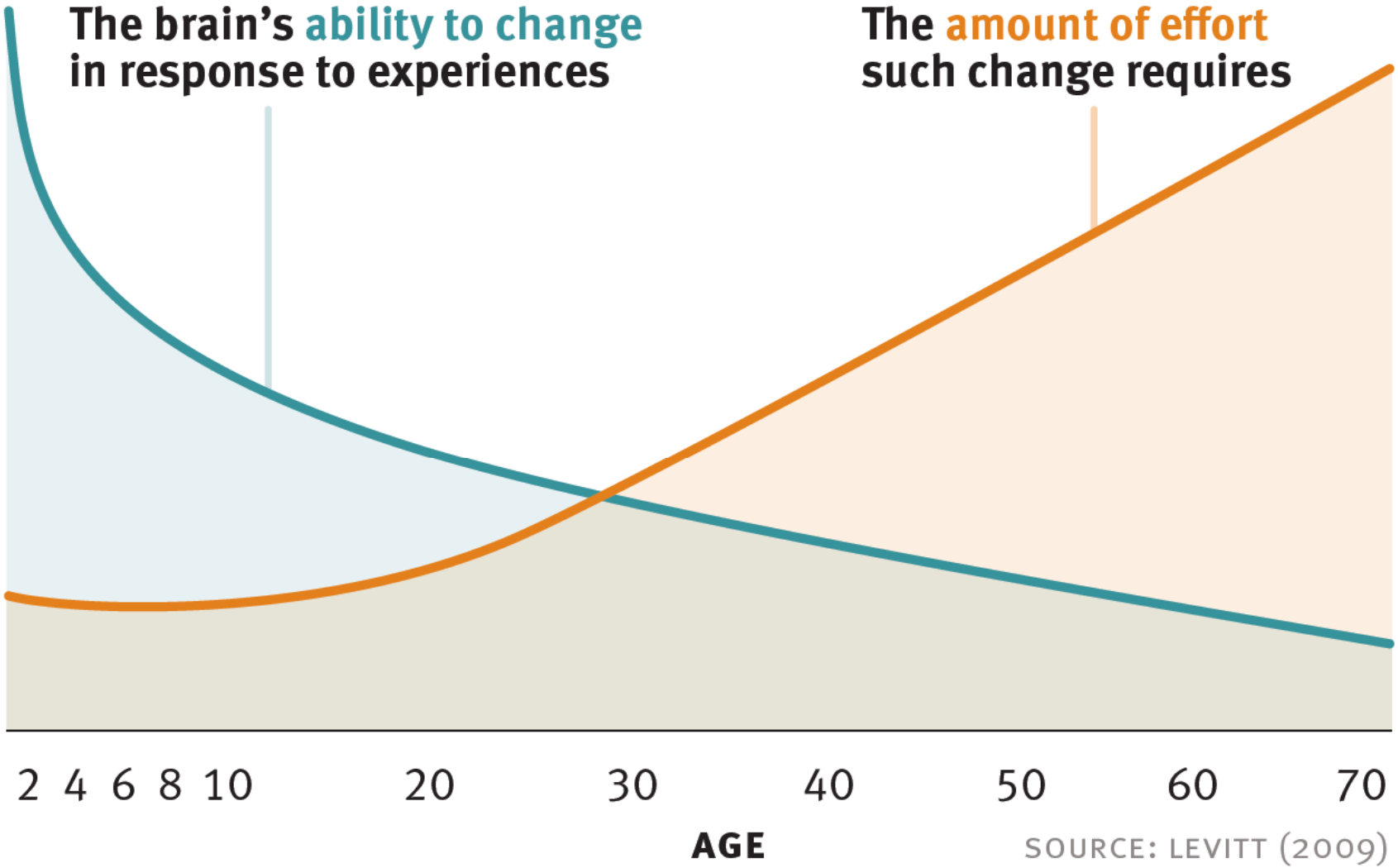
BILLIONS OF CONNCETIONS

Brain architecture is comprised of billions of connections between individual neurons across different areas of the brain.

- Enable lightning-fast communication among neurons that specialize in different kinds of brain functions.
- The early years are the most active period for establishing neural connections, but new connections can form throughout life and unused connections continue to be pruned.
- The connections that form early provide either a strong or weak foundation for the connections that form later.

Source: Harvard Center for the Developing Child

The Importance of Early Childhood



Center on the Developing Child HARVARD UNIVERSITY

www.developingchild.harvard.edu

COGNITIVE, EMOTIONAL, AND SOCIAL CAPACITIES ARE INTERTWINED

- The brain is a highly integrated organ and its multiple functions operate in coordination with one another.
- Emotional well-being and social competence provide a strong foundation for emerging cognitive abilities, and together they are the bricks and mortar of brain architecture.

Source: Harvard Center for the Developing Child

TOXIC STRESS WEAKENS THE ARCHITECTURE

- Experiencing stress is an important part of healthy development.
- Toxic stress can “reset” the body’s response system.
- This can lead to lifelong learning, behavior, physical and mental health issues.
- This can impair the development of neural connections, especially in the areas of the brain dedicated to higher-order skills.

Source: Harvard Center for the Developing Child

Complex Problem Solving Machine

COMPETENT LEARNER

EFFECTIVE COMMUNICATOR

ADAPTABLE

BORN SURVIVOR

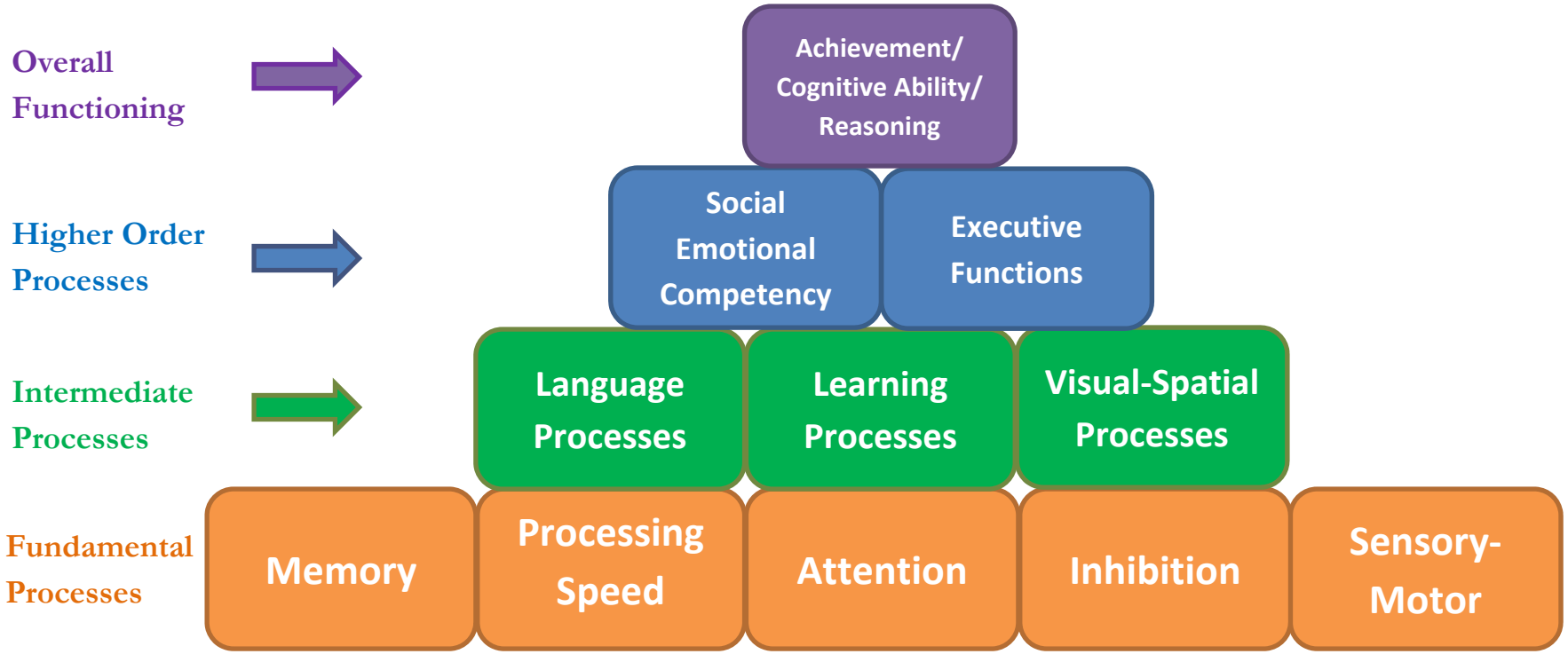
Survival by Adoption, Adaption and Maturation

Source: Harvard Center for the Developing Child

WHAT?

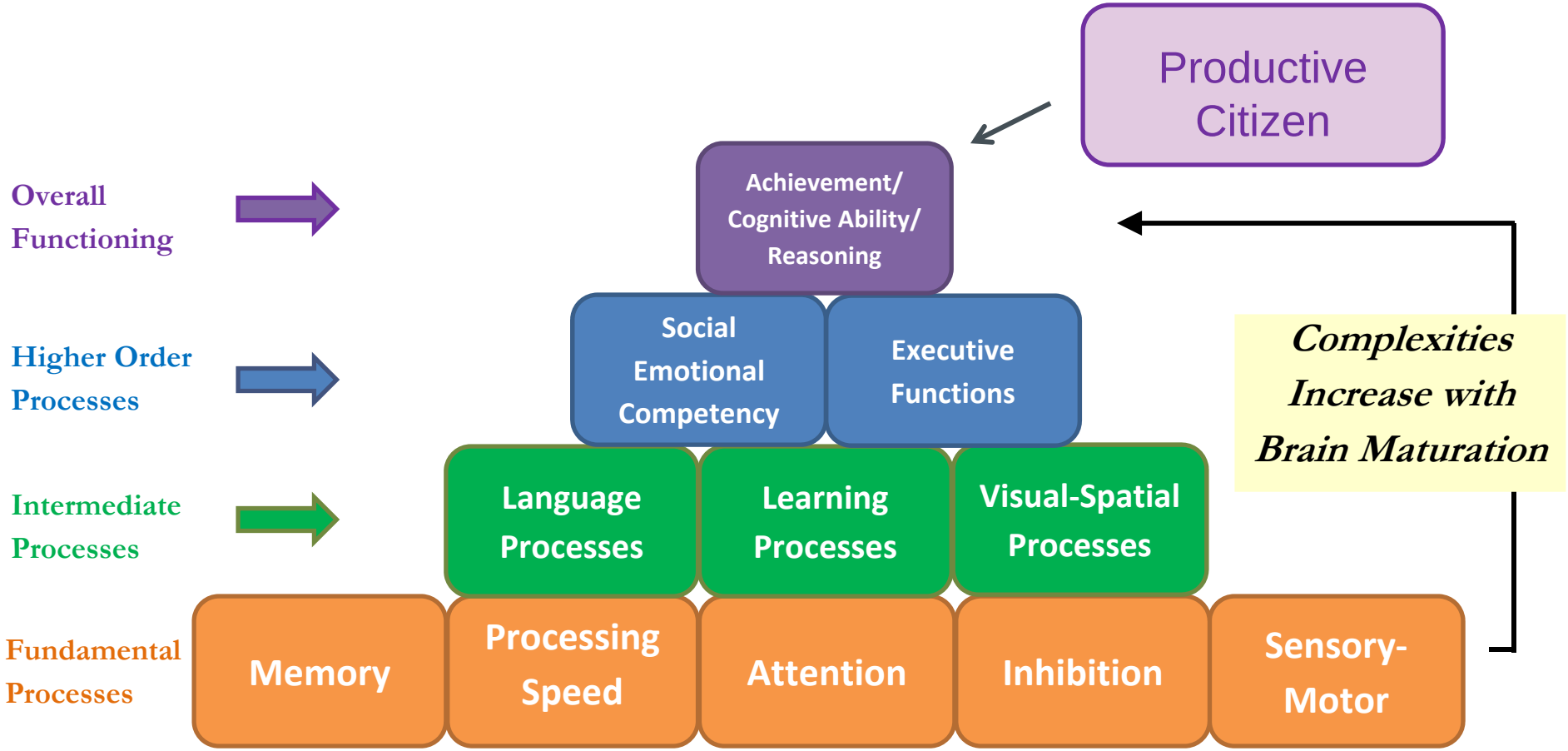
What does typical brain development look like?

Building Blocks of Brain Development



CO Brain Injury Steering Committee: Adapted from Miller, 2007; Reitan and Wolfson, 2004; Hale and Fiorello, 2004

Building Blocks of Brain Development



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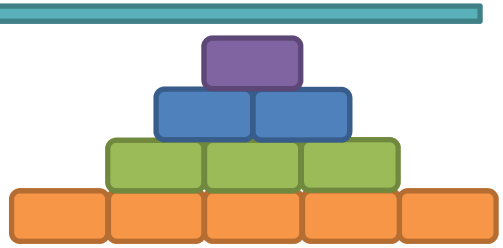
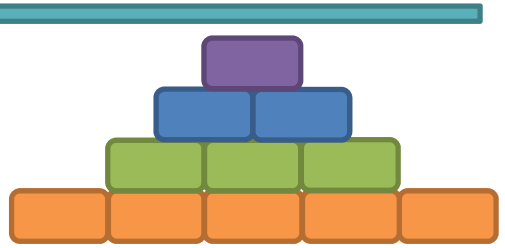
Foundational Building Blocks



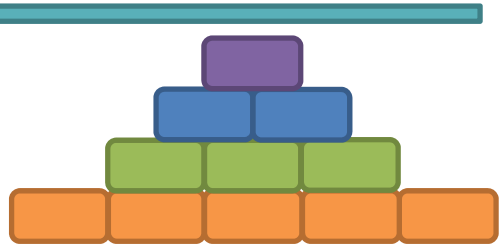
- Attention: *The ability to sustain focus on the information necessary for learning or completing tasks*
- Inhibition: *The ability to inhibit, block or hold back an impulse.*
- Processing Speed: *How quickly information is received, processed, and/or outputted.*
- Memory: *The mental ability to store and retrieve words, facts, procedures, skills, concepts and experiences.*
- Sensory Processing: *Perceiving and responding to what is seen, heard, smelled, tasted, felt and touched, as well as our sense of balance (vestibular) and our "position sense" (proprioception).*

Intermediate Building Blocks



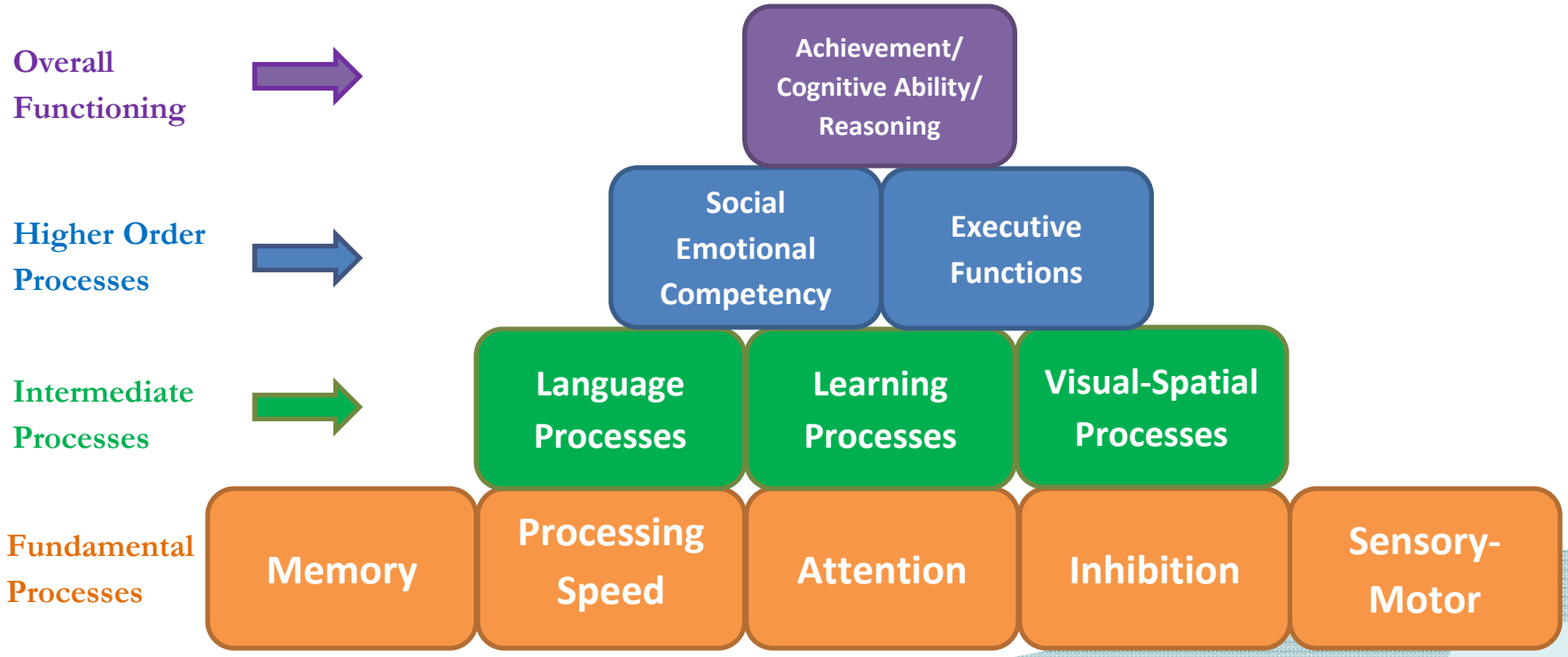
- Language:
  - *Receptive: The ability to understand language.*
  - *Expressive: The ability to express one's thoughts and feelings into words and sentences.*
  - *Social Pragmatic: The verbal and nonverbal rules of social language and interactions.*
- Learning: *The ability to learn new concepts and information.*
- Visual-Spatial: *The ability to generate, retain, retrieve and transform well-structured visual images.*

Higher Order Building Blocks



- Social Emotional Competency: *The awareness of social issues and one's emotional status. Behavioral self-regulation, control and self-monitoring are also part of this domain.*
- Executive Function: *deliberate and controlled mental functioning*
  - ***Planning -*** *The ability to set a goal, identify a sequence of actions to reach the goal and carry out that sequence of steps.*
  - ***Organization -*** *The ability to create and maintain orderliness in thoughts, activities, materials and the physical environment.*
  - ***Initiation*** *- The ability to independently start an action or activity.*
  - ***Mental Flexibility -*** *The ability to easily shift from one idea, train of thought, activity or way of looking at things.*
  - ***Reasoning*** *- The use of deliberate and controlled mental operations to solve novel and on the spot problems*

Building Blocks of Brain Development



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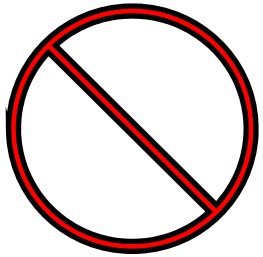

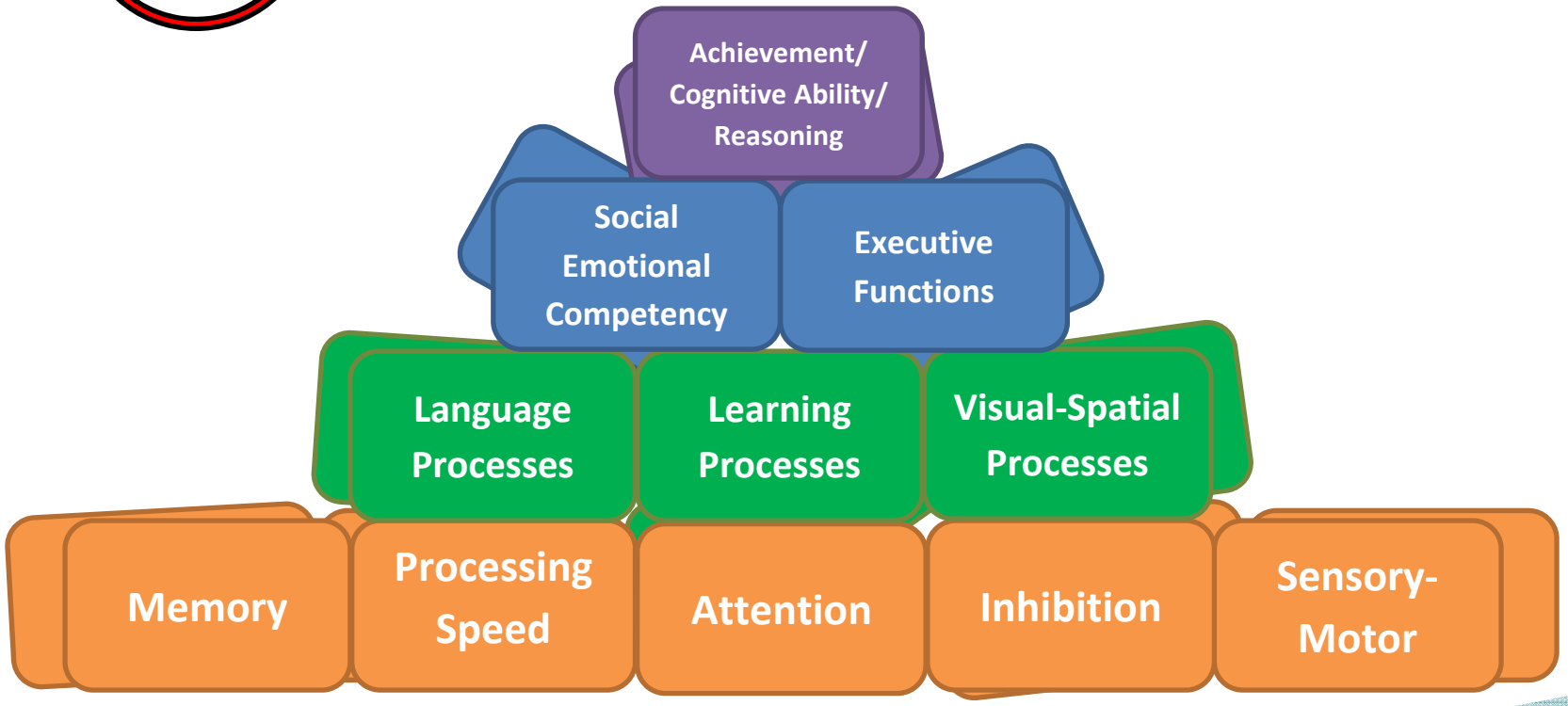

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ATTENTION

Fundamental Processes

Attention: *The ability to sustain focus on the information necessary for learning or completing tasks*

- There are numerous types of attention: selective, sustained, shifting and divided attention. Being able to attend to a task, to shift from task to task and to ignore competing distractions so that one can stay focused on the original task at hand, explains why attention is a fundamental skill necessary for all levels of learning.
- Inhibition is associated with this process in the brain – the inability to inhibit an impulse is often the underlying issue with ADHD

INHIBITION

Fundamental Processes

Inhibition: *The ability to inhibit, block or hold back an impulse.*

- Inhibition is associated with the attention process in the brain – it is the ability to inhibit an impulse, long enough to consider multiple thoughts and behavioral options so that a more adaptive behavioral choice can be made.
- Inhibition – the inability to inhibit an impulse is often the underlying issue with ADHD
- This process may be referred to as “mental brakes”, “a filter” or the ability to “think before you act”.

MEMORY

Fundamental Processes

Memory: *The mental ability to store and retrieve words, facts, procedures, skills, concepts and experiences.*

- The general memory process is complex and entails memory creation, storage of information and retrieval. Additionally, there are several types of memory. For example, some primary types of memory are short-term, working, visual, auditory, procedural and declarative memory.
- Damage to any brain area that assists in the formation, storage or retrieval of information can degrade overall memory performance. Due to the number of areas associated with the memory system, it is important to emphasize there are also numerous ways to impair or damage this process.

PROCESSING SPEED

Fundamental Processes

Processing Speed: *How quickly information is received, processed, and/or outputted.*

- A common consequence of a brain injury is the slowing of information processing. Slowed information processing impacts a person's ability to think efficiently and may hinder the effectiveness of other abilities such as memory. Although there are different reasons for slowed processing after an injury, one major reason is that the "wires" of the brain (neurons) can no longer communicate with each other efficiently.
- Another reason for slowed processing speed is that the brain might have to re-route signals around the damaged area (takes longer).

Sensory Motor

Fundamental Processes

Sensory Processing: *Perceiving and responding to what is seen, heard, smelled, tasted, felt and touched, as well as our sense of balance (vestibular) and our "position sense" (proprioception).*

- Generally speaking, the parietal lobe of the brain (top brain area) processes most sensory information and integrates it to construct a picture of one's environment. Damage to the parietal lobe may interfere with body awareness, cause attention problems, and degrade the accurate processing of auditory, olfactory, taste, tactile, and visual information.
- Fine Motor: Involves the use of small muscles of the hands to make smooth, coordinated or fine motions.
- Gross Motor: Involves the coordinated use of the large muscles of the body.

Learning Processes

Intermediate Processes

New Learning: *The ability to learn new concepts and information.*

- Receiving and processing new information to create *learning* is a remarkably complex neurological phenomenon. A novel academic task requires several brain areas working in concert to produce understanding. Once new information is processed, the new information is sent to other areas of the brain so the information can be comprehended on a deeper level.

VISUAL-SPATIAL PROCESSES

Intermediate Processes

Visual-Spatial: *The ability to generate, retain, retrieve and transform well-structured visual images.*

- Visual-spatial processes are largely associated with the occipital lobe of the brain, which is located at the back of the brain. When visual information is processed in the occipital lobe, it divides the information and sends it to the lower left part of the brain (temporal lobe) or to an upper part of the brain called the parietal lobe. Damage to the back and left side of the brain can degrade a person's ability to process images of known objects. Injury to the back to upper regions of the brain may cause problems with spatial and location tasks.

Language Processes

Intermediate Processes

Language-Receptive: *The ability to understand language.*

- Understanding spoken language is typically associated with the left hemisphere of the brain. Young children typically understand what is told to them (receptive language) before they can express themselves, but damage to the left side of the brain hinders their ability to understand language.

Language-Expressive: *The ability to express one's thoughts and feelings into words and sentences.*

- The ability to speak logically and express oneself using language involves the left hemisphere of the brain.

Social Pragmatics: *Pragmatics are the verbal and nonverbal rules of social language and interactions.*

- The ability to follow social rules and using or altering communication for social purposes.

Social Emotional Competency

Higher Order Processes

Social and Emotional: *The awareness of social issues and one's emotional status. Behavioral self-regulation, control and self- monitoring are also part of this domain.*

- The ability to interact successfully with other people and control one's emotions involves a higher order cognitive skill set. There are two primary areas associated behavioral and emotional regulation.

  1) The frontal cortex is implicated in pro-social behaviors. Specifically, the front part of the brain, near the eyes, assists with impulse control.

  2) The limbic system. The limbic system is made of several smaller parts that are associated with creating all emotions. When these deep brain structures are damaged, it is common that the person develops severe emotional difficulties.

Executive Functions: Initiation

Higher Order Processes

Initiation: *The ability to independently start an action or activity.*

- Since the frontal regions of the brain are largely responsible for action and movement, it is not surprising these same areas are responsible for initiation. It is also not surprising that emotions help start actions, so the deeper emotional centers of the brain are implicated in initiation. A child's inability to get tasks completed may be related to problems with initiation within the brain.

Executive Functions: Mental Flexibility

Higher Order Processes

Mental Flexibility: *The ability to easily shift from one idea, train of thought, activity or way of looking at things.*

- Controlling the thoughts and actions of the brain falls under the function of the frontal lobe. Although there are different brain areas that also help with initiation, organization, planning and flexibility, these four "executive functions" are primarily regulated by the upper brain areas located behind the forehead. People with damage to the frontal lobe may become more rigid in their thinking and less adaptable to change.

Executive Functions: Organization

Higher Order Processes

Organization: *The ability to create and maintain orderliness in thoughts, activities, materials and the physical environment.*

- The upper frontal region of the brain, behind the forehead, controls planning and organization of thoughts and activities. The ability to sequence thoughts in a logical fashion and translate those thoughts into action to organize a person's environment involves communication between the frontal cortex and left hemisphere of the brain. Damage to the front and/or the left hemisphere of the brain may cause disorganized thinking and ordering of materials.

Executive Functions: Planning

Higher Order Processes

Planning: *The ability to set a goal, identify a sequence of actions to reach the goal and carry out that sequence of steps.*

- Planning is a future oriented process requiring forethought, estimation and problem solving. Similar to the same neurological structures involved with regulation, organization, and problem solving, the upper frontal lobe is intimately tied to planning.

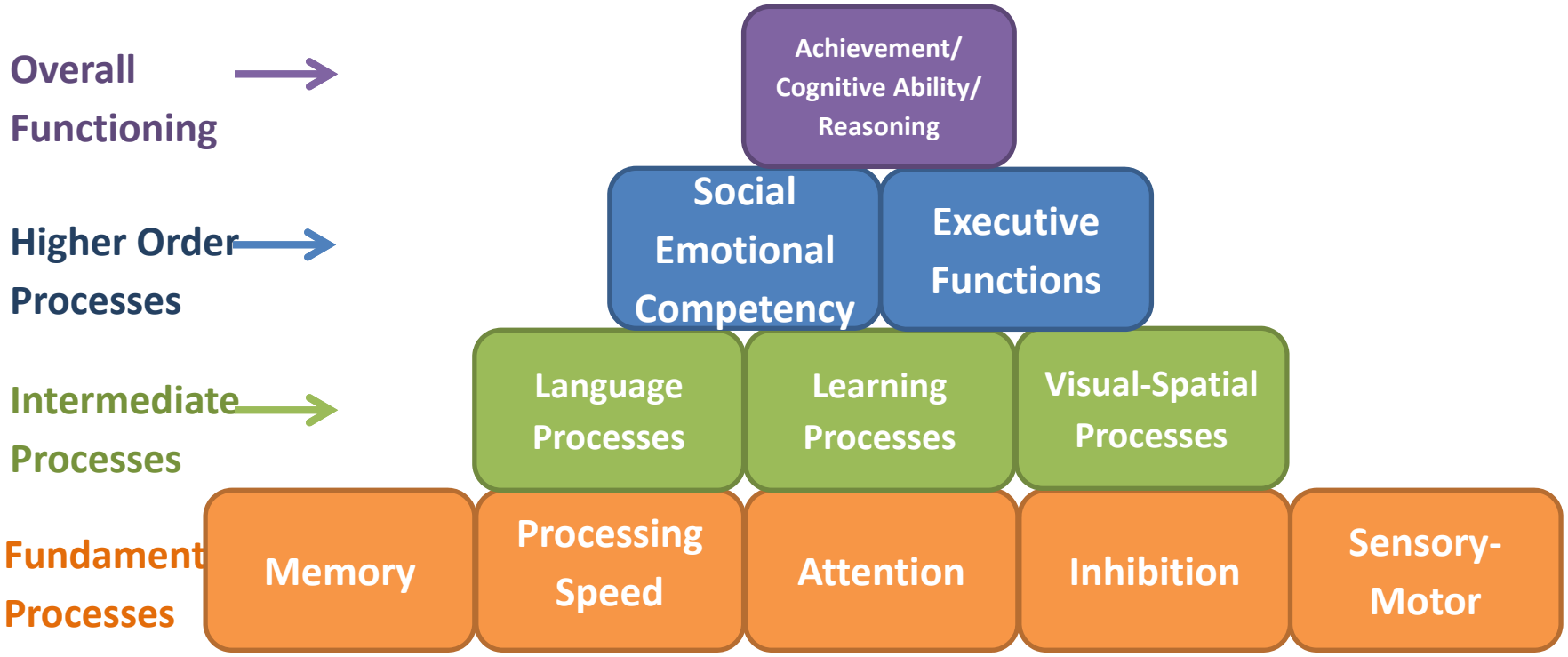
Executive Functions: Reasoning

Higher Order Processes

Reasoning: *The use of deliberate and controlled mental operations to solve novel and on the spot problems*

- Many aspects of reasoning are similar to the process of new learning. Reasoning is the foundation for problem solving and ultimately overall intelligence. Higher order reasoning involves the effective integration and processes of the entire cerebral (brain) structure. Since the frontal cortex is considered the "manager" of the brain, this region is typically needed in reasoning as it orchestrates how information is processed. However, many areas of the brain are needed for deep thinking.

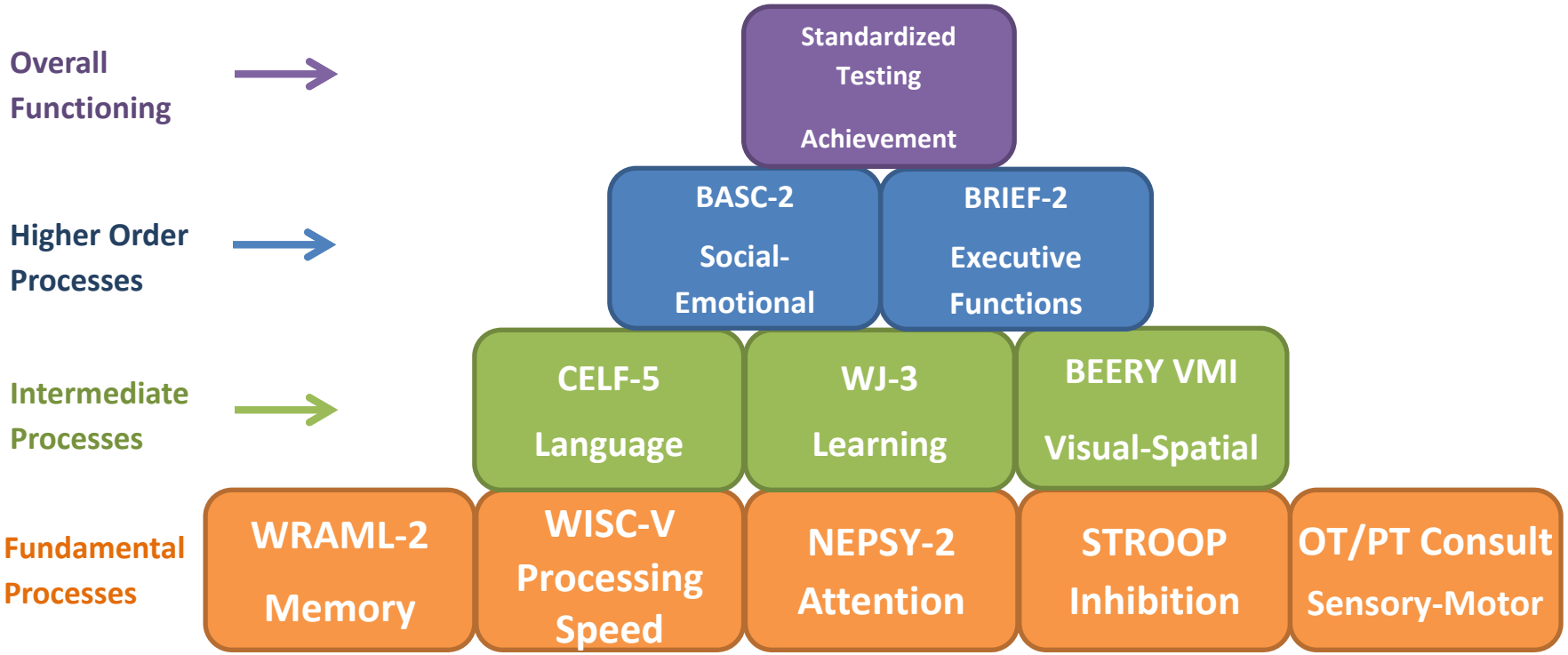
Building Blocks of Brain Development



CO Brain Injury Steering Committee: Adapted from Miller, 2007; Reitan and Wolfson, 2004; Hale and Fiorello, 2004

Building Blocks of Brain Development

ASSESSMENTS



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www.cokidswithbraininjury.com

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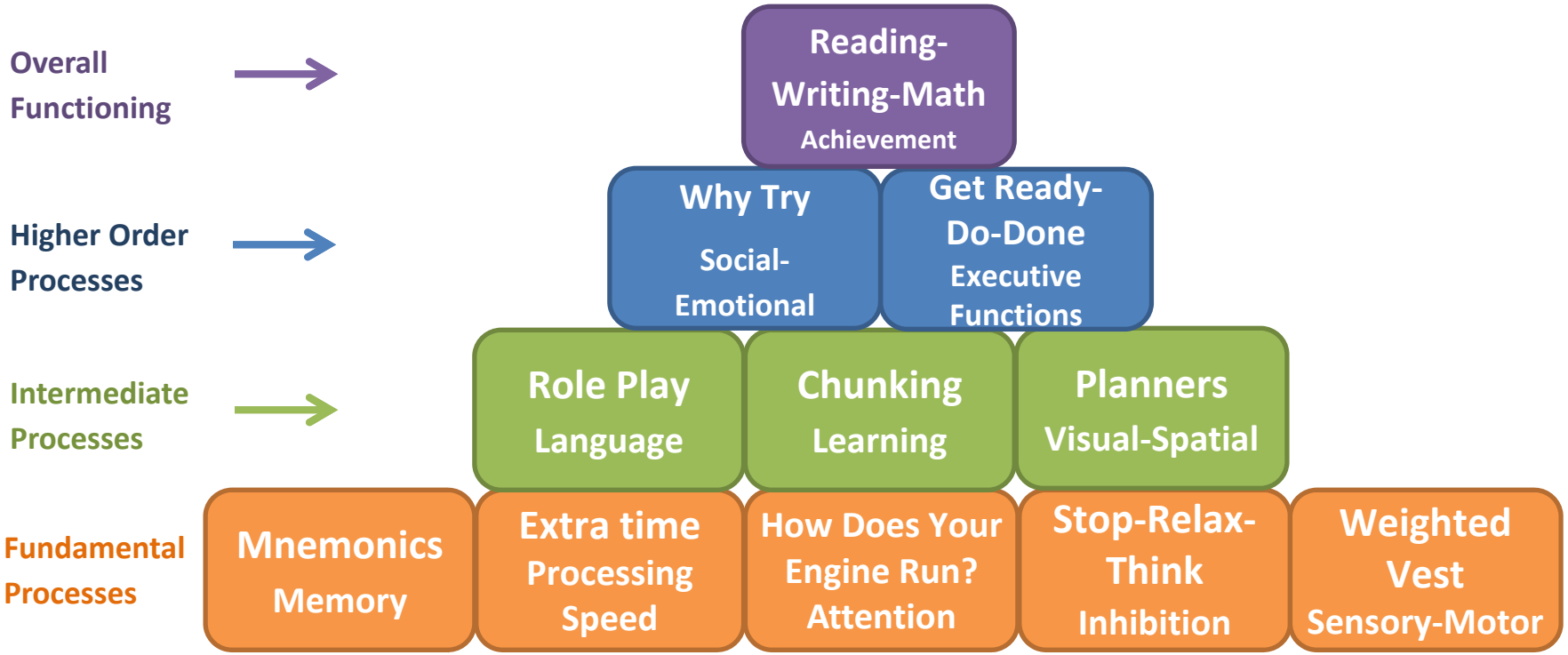
Building Blocks of Brain Development

STRATEGIES/INTERVENTIONS



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www.cokidswithbraininjury.com

http://www.cde.state.co.us/cdesped/sd-tbi

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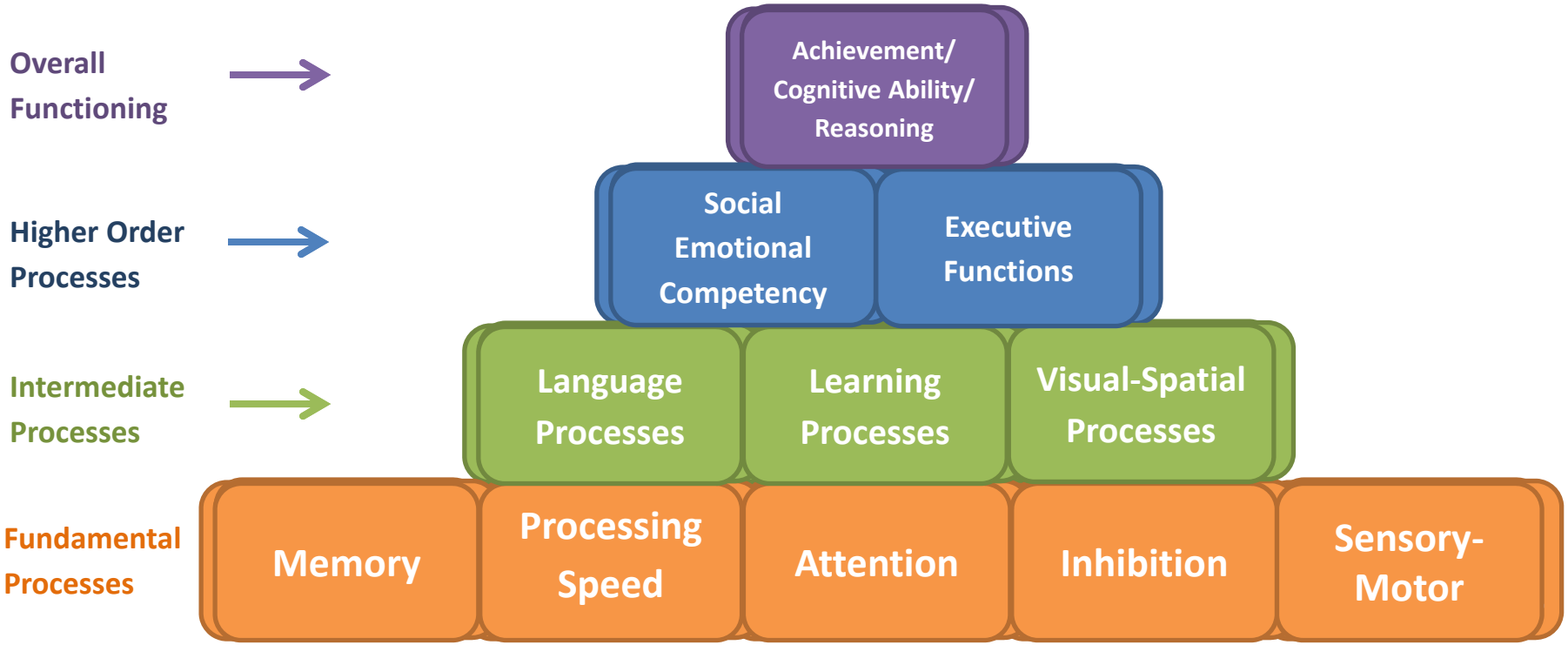
Building Blocks of Brain Development



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HALLMARKS

SPECIFIC TO BRAIN INJURY & OTHER CONDITIONS

1. Unevenness

2. Fatigue

3. Transitions

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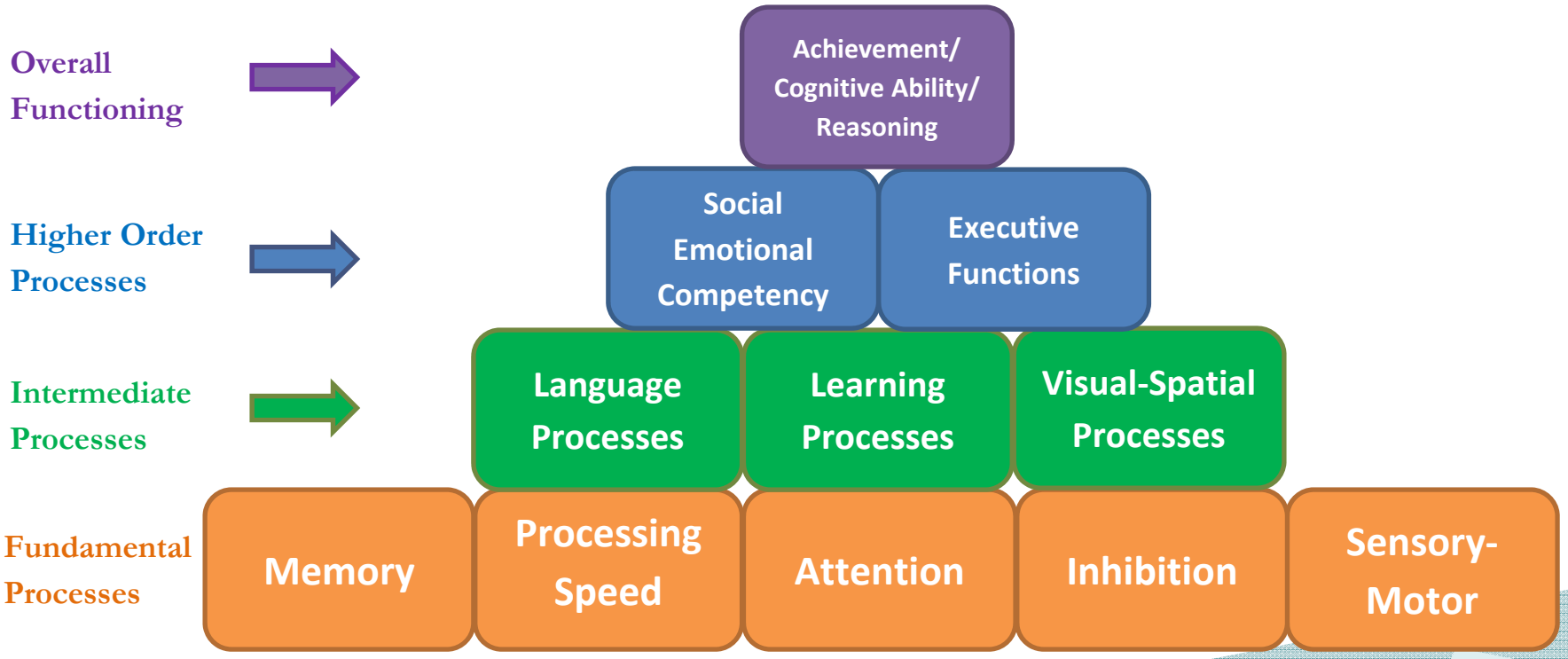
Building Blocks of Brain Development



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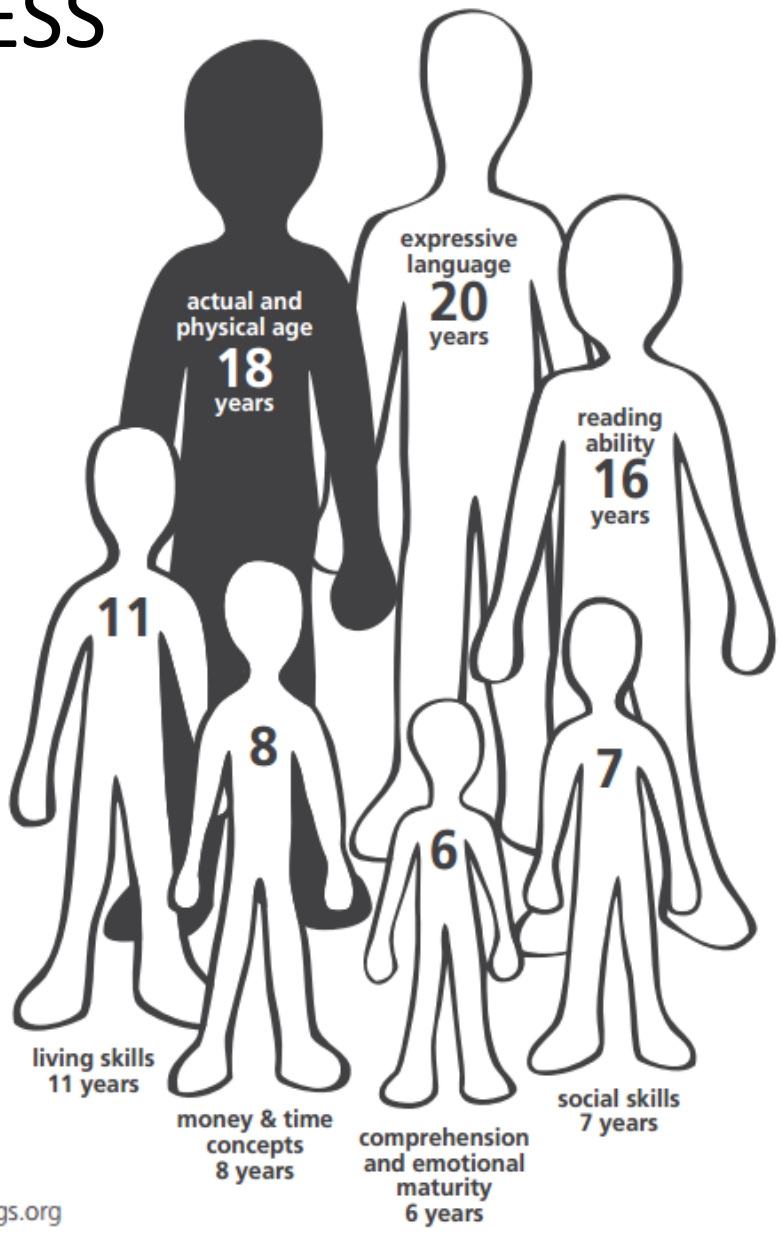
UNEVENNESS

The hallmark of a brain injury on a child's performance is an "unevenness" in abilities across different settings, over time, and across different content areas.

- Examples:
  - Across domains – a 10 year old may have typical abilities in fine and gross motor areas but have the social-emotional regulation of a 5 yr. old.
  - Within domains – Average abilities in expressive language and difficulties with receptive language
  - Across time – a student knows material on Tuesday but cannot retrieve the same information later that same week
- Can produce invalid/poor results on standardized assessments

UNEVENNESS



Source: Jodee Kulp
http://www.betterendings.org

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Fatigue & Endurance

- The primary source of fatigue is cognitive fatigue and is the direct result of disrupted pathways in the brain.
- Thinking, movement, and speech may take longer and be less accurate.
- The brain tires much more quickly and is less able to process the stimulation.

Strategies:

- Incorporate brief breaks throughout the day to rest or quiet the brain
- Reduce stimulation in the environment

Transition Issues

Transitions can be:

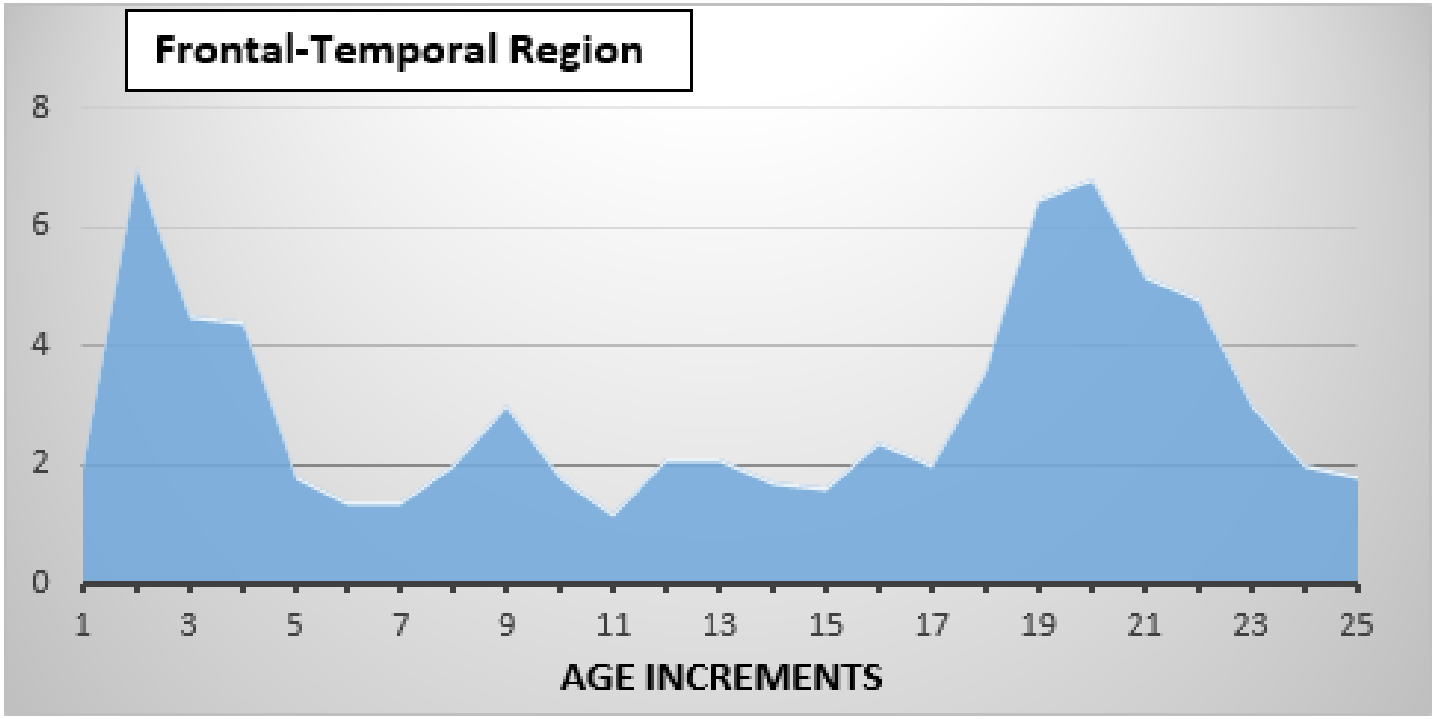
- Unpredictable
- Unexpected (fire drills)
- Unfamiliar

Many of the domain areas are challenged during transitions

- Processing Speed – slower shift
- Sensory overload – changes in noise level
- Visual-spatial – crowded or chaotic surroundings
- Mental flexibility – transition, may be outside of routines
- Other domain areas…

The Why: Disruptions Associated with Acquired Brain Injury

1. Maturation & Foundation



(Adapted from Savage, 1999)

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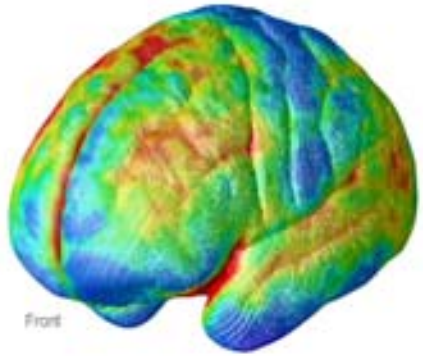
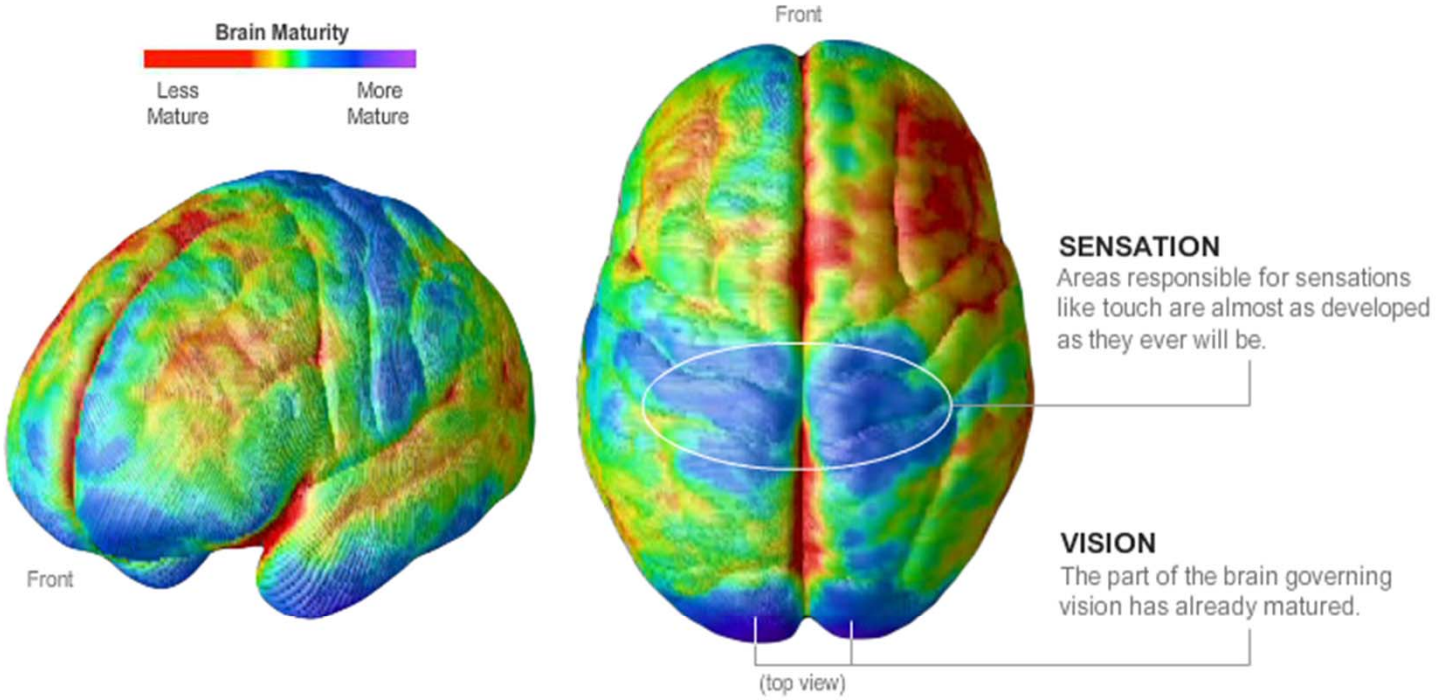
The Child's Developing Brain

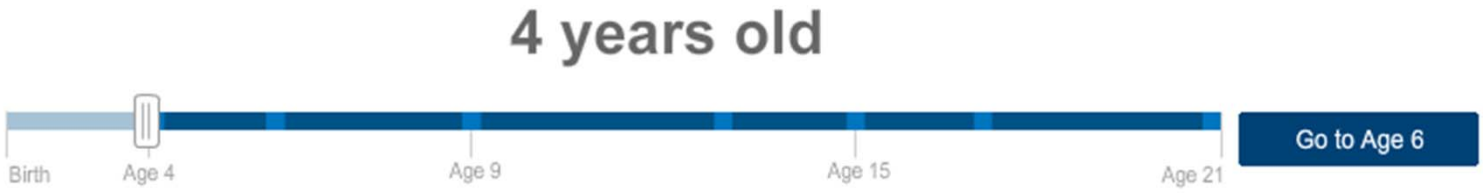
http://www.nytimes.com/interactive/2008/09/15/health/20080915-brain-development.html?_r=1&



EARLY DEVELOPMENT

In the first few years of life, areas of the brain devoted to basic function change at a rapid pace. By age 4, primary senses and basic motor skills are almost fully developed. The child can walk, hold a crayon and feed himself.





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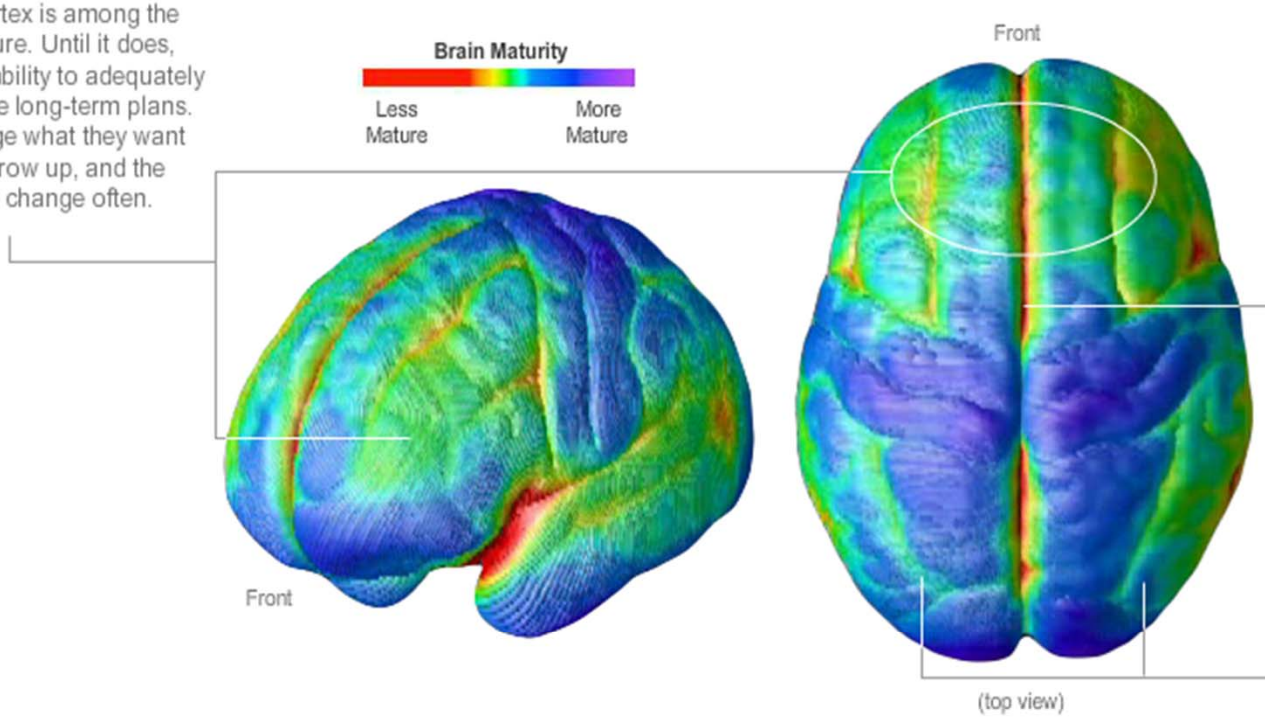
JUDGMENT

The prefrontal cortex is among the last areas to mature. Until it does, children lack the ability to adequately judge risk or make long-term plans. Ask kids at this age what they want to be when they grow up, and the answer is likely to change often.



EMOTION

Deep in the limbic system, a capacity for creating emotion increases. As yet, this capacity is unrestrained by the prefrontal cortex, which lags behind. That's why some teens can seem emotionally out of control.

LOGIC

The parietal lobes are developing rapidly at this age, as shown here in blue. The child's intelligence and analytical abilities are expanding.

13 years old

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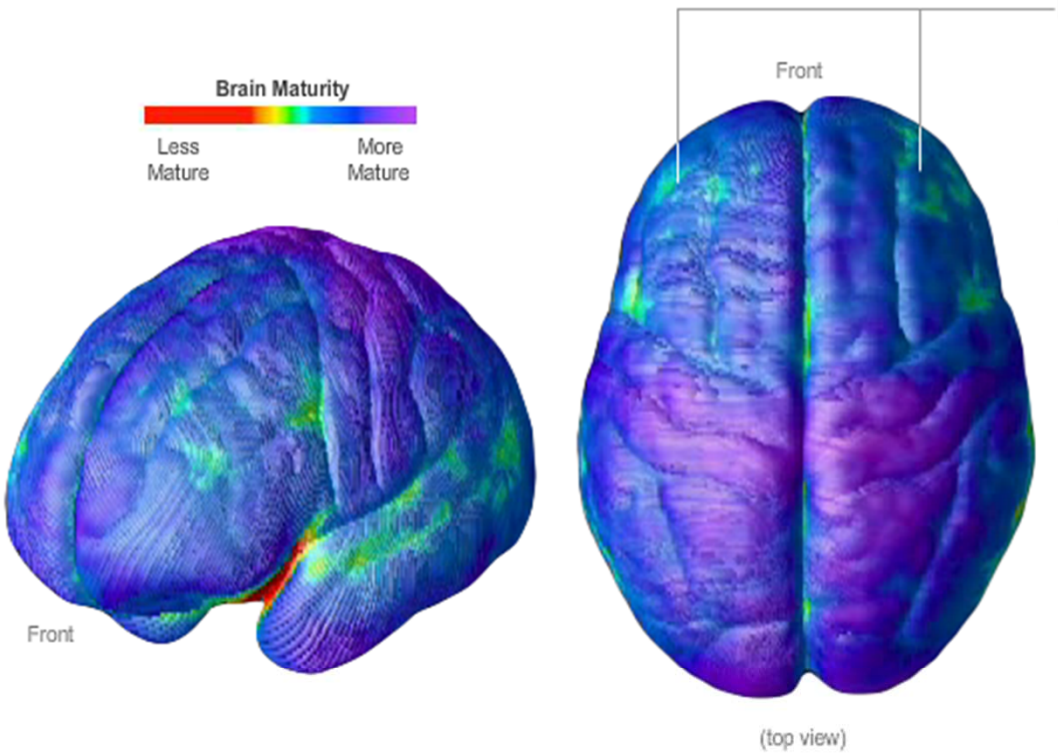
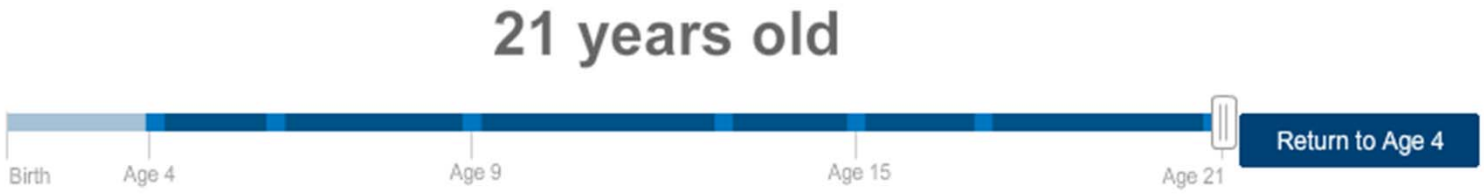
EXECUTIVE FUNCTIONS

Although the brain appeared to be almost fully developed by the teen years, the deepening blue and purple areas here show that tremendous gains in emotional maturity, impulse control and decision-making continue to occur into early adulthood.



MATURATION

The 21-year-old brain is mostly mature, but the areas of green show that even at the threshold of legal adulthood, there is still room for increases in emotional maturity and decision-making skills, which will come in the next few years.



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2. Stress Interrupts the Foundation

- Early experiences effect the “architecture” of
- the developing brain
- Building a solid foundation in the earliest years provides a base for a lifetime of good mental function and overall health
- Eustress – good stress (e.g., communication, touch, signing, safety, support, meeting new people, studying for a test)
- Distress – toxic stress (e.g., neglect, abuse, parental addiction)
- Solid brain architecture has to be built – kids & families can’t do it on their own

https://www.youtube.com/watch?v=LmVWOe1ky8s

WHY FOCUS ON CHILDREN'S STRESS?

Because too much stress:

- Makes it **more difficult for children to get along** with others
- Interferes with children's **ability to focus**, **think and learn**
- Has a **profound effect on children's physical, emotional and mental health**

And by helping children learn positive coping strategies to deal with stress, you can help:

- build their **resiliency** and,
- **prevent** escalation to distress, anxiety and meltdowns.

www.psychologyfoundation.org/Public/Public/Programs/Kids_Have_Stress_Too/Kids_Have_Stress_Too_.aspx

Stress in Children and Youth

- Good Stress:
  - Builds strong neurons/networks
  - Resiliency
  - Coping strategies

- Bad/Toxic Stress:
  - Shrinks brain neurons/networks
  - Renders higher order thinking inaccessible
  - Perceived threat - flight or fight mode
    - Self-centered
    - No ability for empathy

3. Developmental Stages

- Abilities that are just developing, or have not yet emerged, are the most sensitive and most likely to be disrupted.
- These areas are likely to be the "Achilles heel" for a child with an acquired brain injury, even after he/she grows up.

Development Questions

- What is “typical” for their developmental level?
- What skills has the brain injury impacted?
- Was the child “typically” developing before the injury?

INFANCY STAGE: BIRTH TO 3 YRS

Developing:

- Refinement of sensory and motor systems
- Language acquisition
- Basic understanding of cause and effect
- Regulation of sleep-wake cycle
- Beginning awareness of self and others
- Emotions and emotional regulation

Disruptions:

- Poor sleep and self-regulation
- Lack of understanding of cause-effect relationships
- Impulsivity & uninhibited behaviors (e.g. biting, hitting)
- High reliance on structure, supervision; difficulty with transitions
- Emotional reactions are unpredictable, "irrational," and extreme.

Dise-Lewis, J., 2002

PRESCHOOL STAGE: 3-6 YRS

Developing:

- Self-control
- Emotional regulation
- Inhibition – think before acting
- Friendship skills
- Ability to see another person's perspective
- Ability to accept change in plans
- Ability to judge right from wrong

Disruptions:

- Delay or regression in toilet training
- Disruption in the connections among thinking, emotion, behavior systems
- Emotional dysregulation
- Difficulty with change, temper tantrums and rigid behavior
- Aggressive behaviors (e.g. kicking, hitting)
- Poor acquisition of preschool concepts (same/different, some/all)
- Play is disorganized

Dise-Lewis, J., 2002

ELEMENTARY SCHOOL STAGE: 6 TO 12 YRS

Developing:

- Robust understanding of cause and effect relationships
- Academic skills
- Focus on effort as important
- Recognition of intention of acts as important

Disruptions:

- In reading, spelling , math skills
- Poor performance despite hard work
- School failure/avoidance
- Behavior problems during unstructured time
- Depression, social isolation or withdrawal from peers
- Sleep disturbance/ fatigue

Dise-Lewis, J., 2002

EARLY ADOLESCENCE: 12 TO 16 YRS

Developing:

- Abstract reasoning
- Autonomy and identity development
- Social competencies and understanding of the world
- Responsibility: self care, baby sitting, pet care

Disruptions:

- Unevenness in cognitive profile
- Slower rate of mental processing
- Difficulty organizing complex tasks over time
- Judgment and reasoning difficulties
- Increased frustration response
- Depression
- Fatigue

BrainSTARS, Dise-Lewis, J., 2002

LATE ADOLESCENCE: 16 YEARS TO 19 YRS

Developing:

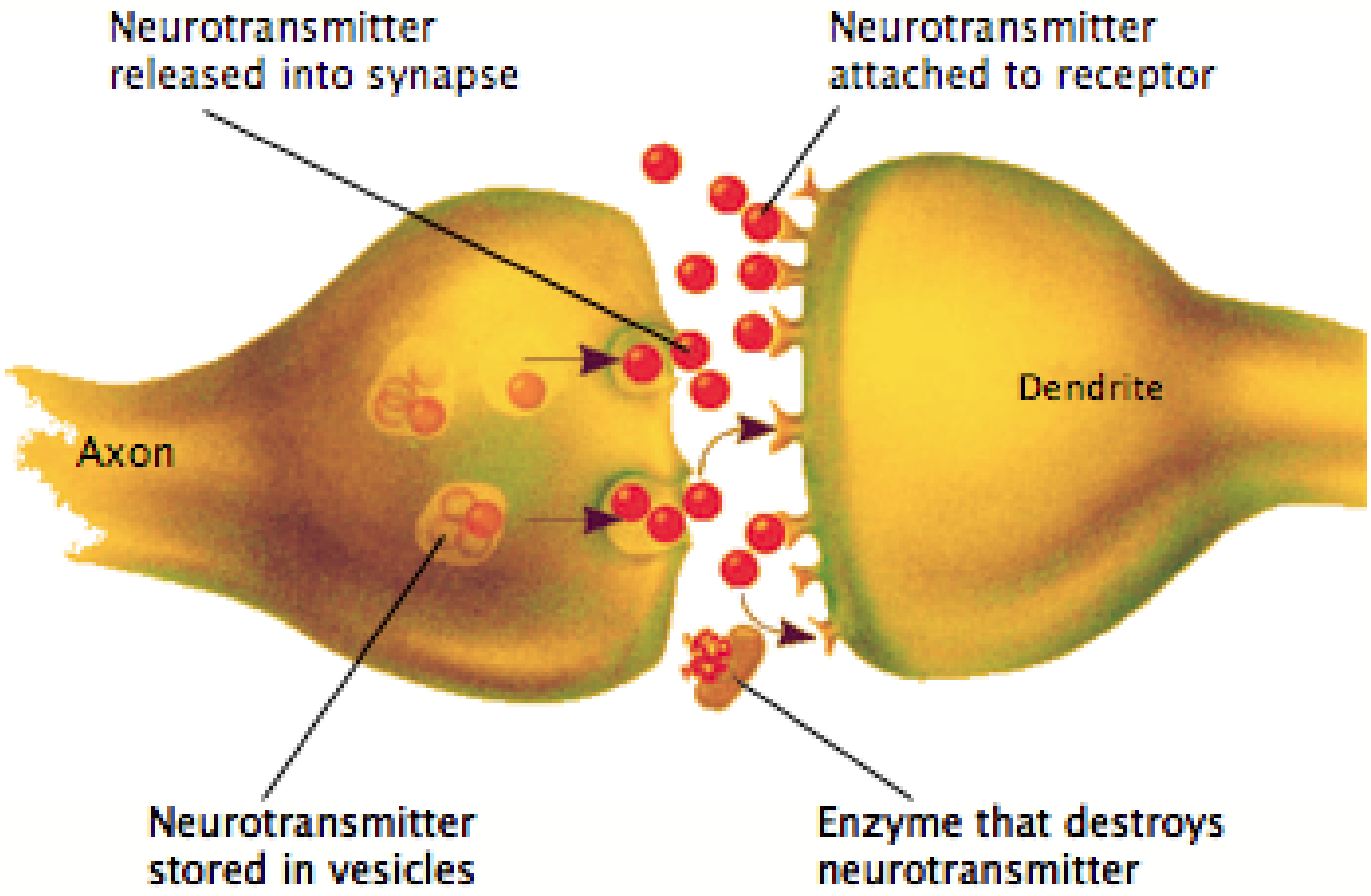
- Complex reasoning and judgment
- Ability to plan and execute complex projects over time
- Solid sense of own identity based on positive identifications
- Social sophistication
- Capacity for altruism

Disruptions:

- New learning deficits (e.g., memory for numbers)
- Conflict between specific challenges and career goals
- Social awkwardness
- Inability to organize complex tasks
- Mental processing speed deficits
- Body image/social image
- Depression

BrainSTARS, Dise-Lewis, J., 2002

4. BIO-CHEMICAL

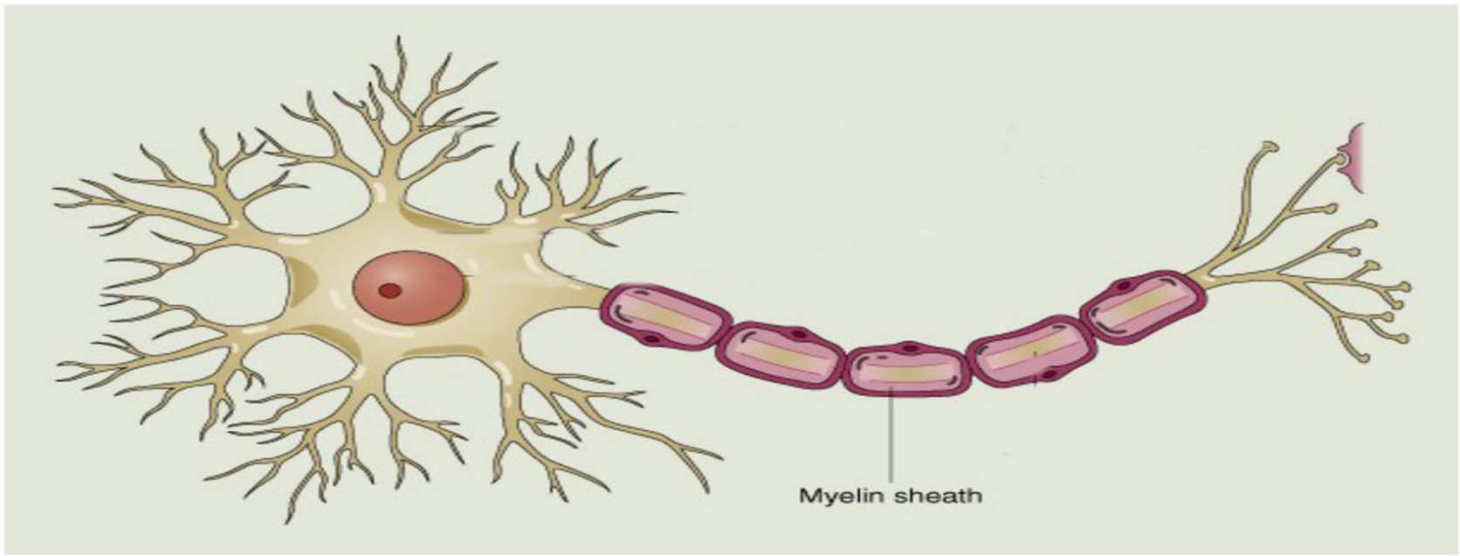


Mental Health

- ADHD
- Trauma or PTSD
- Depression
- Anxiety
- Toxic stress
- Substance abuse (adolescence, young adulthood)
- Changes in bio-chemistry response

How Do Skills Develop

- Myelination: Myelin acts as insulation, increasing the speed with which nerve impulses are transmitted. The faster the impulse, the better the skill.



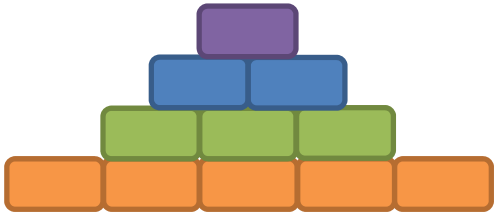
PRACTICE

- The more you practice your executive skills, the better you get and the less effortful the task.
- Repetition builds better brain circuitry
- “Practice makes PERMANENCE”

Guare and Dawson

Executive Function and Self-Regulation

- Provide critical supports for learning and development
- Allow us to retain and work with information
  - Focus our attention
  - Filter distractions
  - Switch mental gears
- Self Regulation (Marshmallow Test)
  - This is a social emotional skill
  - Begins at 18 months of age (Dr. Dan Siegel)
  - Kids who can wait do better in every aspect of life



Strengthening the Building Blocks for Children

Intentional through Everyday Activities

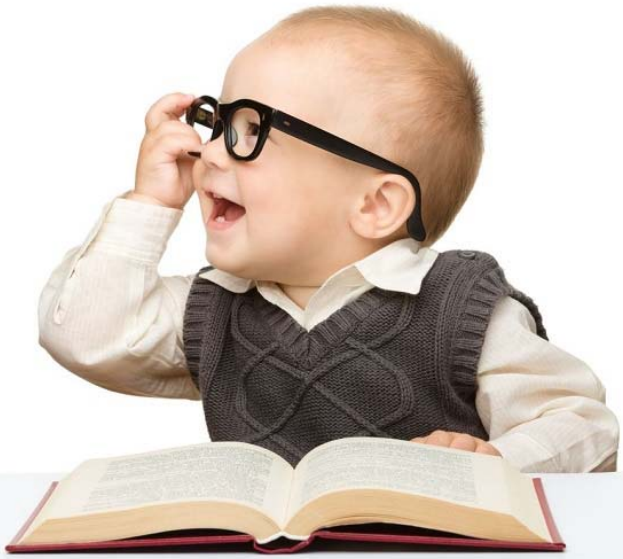
COLORADO
Department of Education

Building Blocks of Brain Development
INTERVENTIONS

CO Brain Injury Steering Committee: Adapted from Miller, 2007; Reitan and Wolfson, 2004; Hale and Fiorello, 2004

COLORADO
Department of Education

KEY TO STRATEGIES



- Modify the Environment
  - Room/Area
  - Child Specific
- Explicitly Teach the Deficit Skill
  - Teach
  - Practice
  - Reinforce
  - Generalize

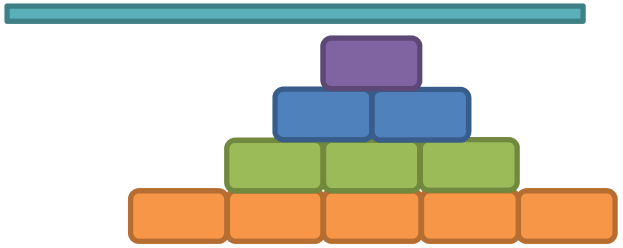
Dawson, 2011

Strengthening Building Blocks in Everyday Life

Center on the Developing Child
Harvard University

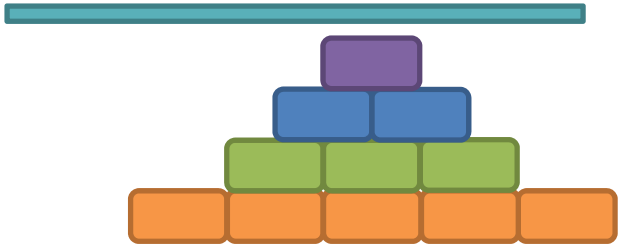
http://developingchild.harvard.edu/resources/activities-guide-enhancing-and-practicing-executive-function-skills-with-children-from-infancy-to-adolescence/

Building Block Activities – 6 to 18 month-olds



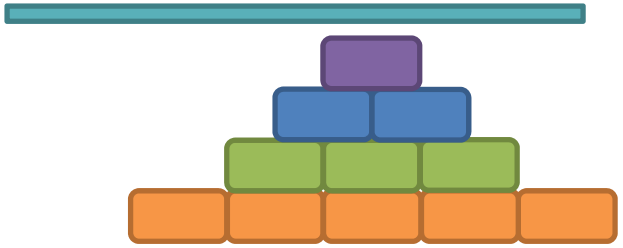
- Peekaboo
- Pat-a-Cake (Patty-Cake)
- Hiding toys under a cloth or in a different location
- Hiding themselves-older infants
- Imitation or copying games
- Simple role plays
- Eensy Weensy Spider or Itsy Bitsy
- Conversations

Building Block Activities – 18 to 36 month-olds



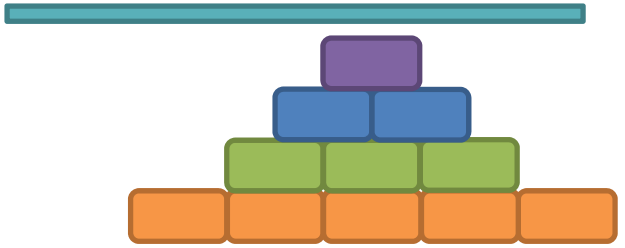
- Follow the Leader and other imitation games
- Freeze Dance
- Songs with Movement
  - Hokey Pokey
  - I'm a Little Teapot
  - Head, Shoulders, Knees and Toes
- Finger plays or Songs with hand gestures
- Watching and narrating their play
- Telling stories about shared events
- Talking about and labeling feelings
- Matching/Sorting Games
- Imaginary Play

Building Block Activities – 3 to 5 year-olds



- Imaginary Play
- Read books
- Go on field trips
- Provide varied props and toys
- Make their own props and toys
- Story telling
- Play music
- Songs that repeat or add on
- Cooking
- Quiet games and activities
  - matching and sorting games
  - puzzles
- Physical activities that require quiet control
- Story telling
  - child tells stories
  - group story telling
  - acting out stories they have written
  - families tell stories in their home language
- Physical activities that require quiet control - Yoga poses, balance beam

Building Block Activities – 5 to 7 year-olds



- Card Games and Board Games
  - Memory Games
  - Matching Games
  - Fast Responses
  - Require Strategy
- Physical Games
  - Attention Games
  - Fast Moving Ball Games
  - Simon Says
  - Organized sports
  - Calming physical activity
- Movement/Song Games
  - Imitation games
  - Songs that repeat or build on
  - Singing in rounds
  - Complicated clapping and rhythm
- Quiet activities requiring strategy and reflection
  - Puzzles, mazes, word finds
  - Logic and reasoning games
  - Guessing games – 20 Questions
  - I Spy

BUILDING EXECUTIVE FUNCTIONS
7 TO 12 YEAR-OLDS

- Card Games and Board Games
  - Hearts, Spades, Bridge
  - War- monitoring and fast response
  - Chess and Checkers
  - Minecraft
- Physical Activities and Games
  - organized sports
  - Jump rope games
  - Tag, Capture the Flag, etc.
  - Laser Tag and Paintball
- Music, singing and dancing through classes and lessons
- Brain Teasers

BUILDING EXECUTIVE FUNCTIONS ADOLESCENTS

- Goal Setting
- Developing and carrying out plans
- Taking on larger social issues
- Teach Self- Monitoring
  - Self-Talk
  - Mindful of Interruptions (cell phones, social media)
  - Understanding motivation of others
  - Writing personal journal
- Study Skills
- Stress Management

BUILDING EXECUTIVE FUNCTIONS ADOLESCENTS

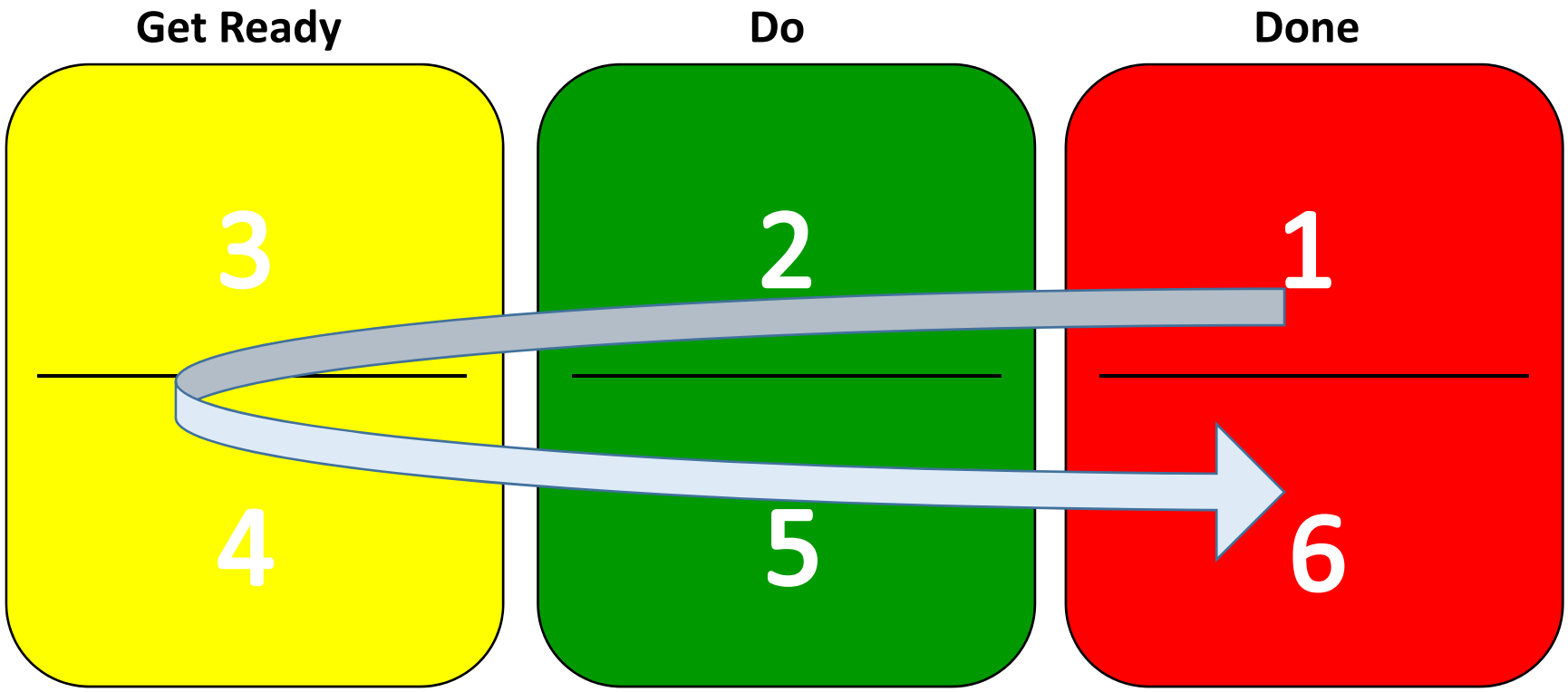
- Sports
- Yoga and Meditation
- Music, Singing or Dancing
- Theater
- Strategy Games

STRATEGIES:
ORGANIZATION AND INITIATION

Higher Order Processes

- Establish a daily routines
- Assist with cleaning out pack, desk on regular basis
- Use picture schedules or checklists, to help them organize their day
- Visual schedules for preparing for transitions
- Use a “check-in/check-out” system to ensure that child knows what to expect and has needed materials

Get Ready, Do, Done (Sarah Ward, 2014)

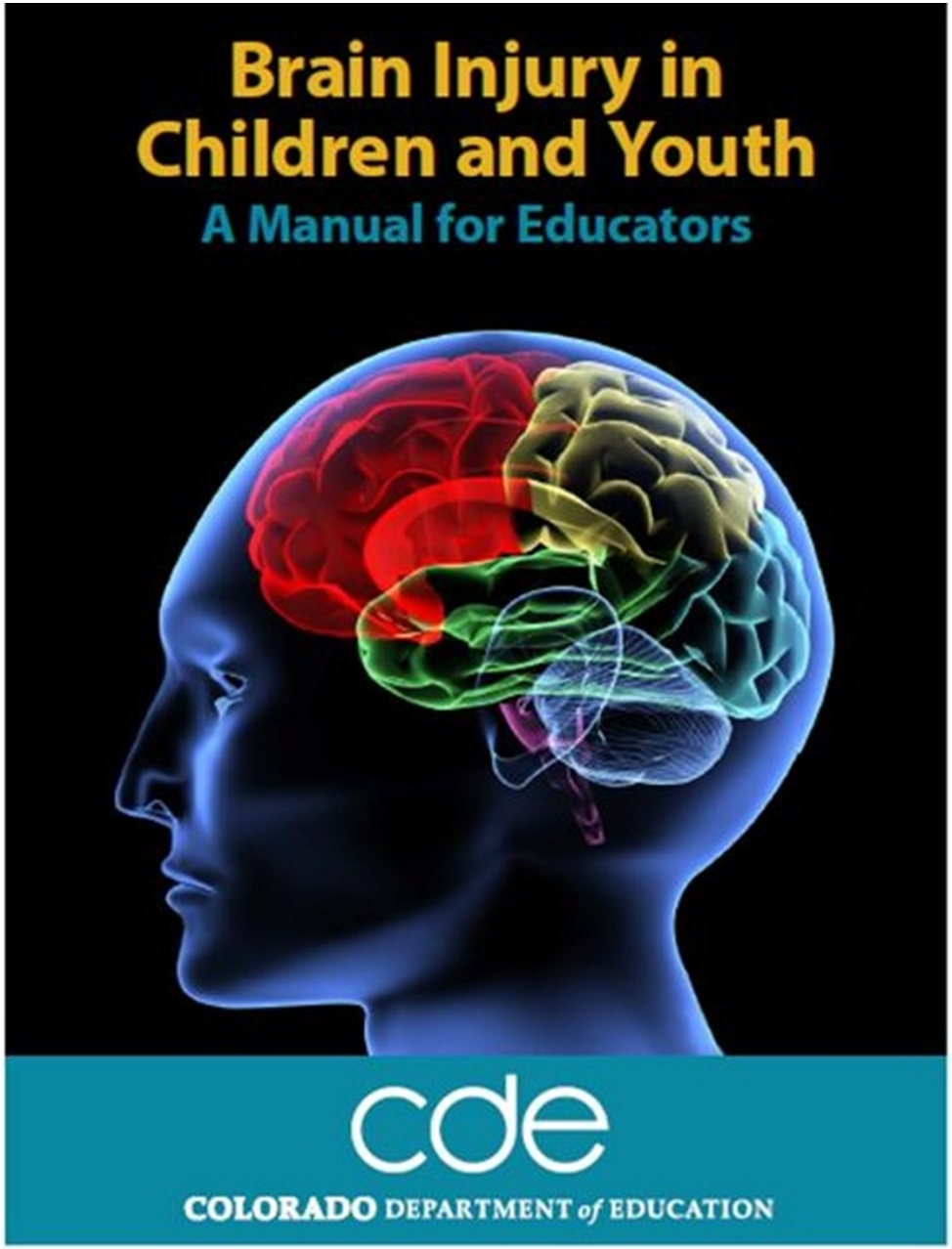


Steps 1-3: Task Planning

1. Done – what will it/I look like?
2. Do – what do I need to do?
3. Get Ready – what materials will I need?

Steps 4-6: Task Execution

4. Get Ready – gather materials
5. Do – create time markers/check points
6. Done – stop and review



http://www.cde.state.co.us/cdesped/SD-TBI.asp

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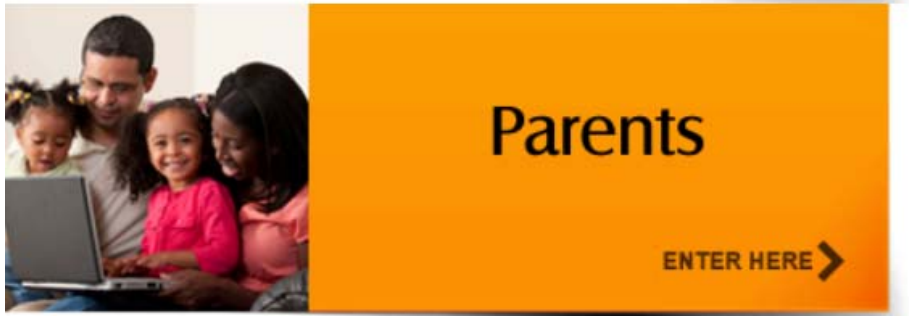


WELCOME TO THE COLORADO KIDS BRAIN INJURY RESOURCE NETWORK

The website was designed through funding from the Colorado Kids Brain Injury Resource Network. This website should serve as a tool for educators, school administrators, school psychologists, related services professionals, and families. Feel free to join in the discussion and learn more about how to support our kids in Colorado with brain injuries.

ANNOUNCEMENTS & UPDATES

Check out the revised Building Blocks of Brain Development – click here

Brain Injury in Children and Youth: A Manual for Educators. Click here to view manual.

Brain Injury Alliance of Colorado

The go-to resource for help and services for survivors of an injury to the brain, their families, and providers.

BIAC is a statewide **nonprofit** dedicated to helping all persons with a brain injury thrive in their community

- Core service is **case management** for all ages – this is free, with no income or insurance eligibility criteria
- Brain injury specific **conferences & workshops**
- Online **educational materials** for survivors, family, & professionals
- Statewide brain injury **professional networking** groups
- Adaptive **recreation programs, music & art therapy classes**
- Emergency **utility assistance** through Energy Outreach Colorado
- Online **resource directory** specific to brain injury providers
- Statewide **support groups**
- Member of **United States Brain Injury Alliance**

Brain Injury Alliance COLORADO

Provides these Services and MORE!

Case Management

- Team approach
- A proactive mindset
- Local Presence
- Brain injury educational materials
- Free classes and workshops
- For youth still in the school system, we have a specialist on staff who provides support and consultation about school-related issues

Who is Eligible?

- Any resident of Colorado with a medically documented brain injury (If needed BIAC can assist in obtaining documentation)
- Age, time since injury, insurance, or income do not have an impact on eligibility

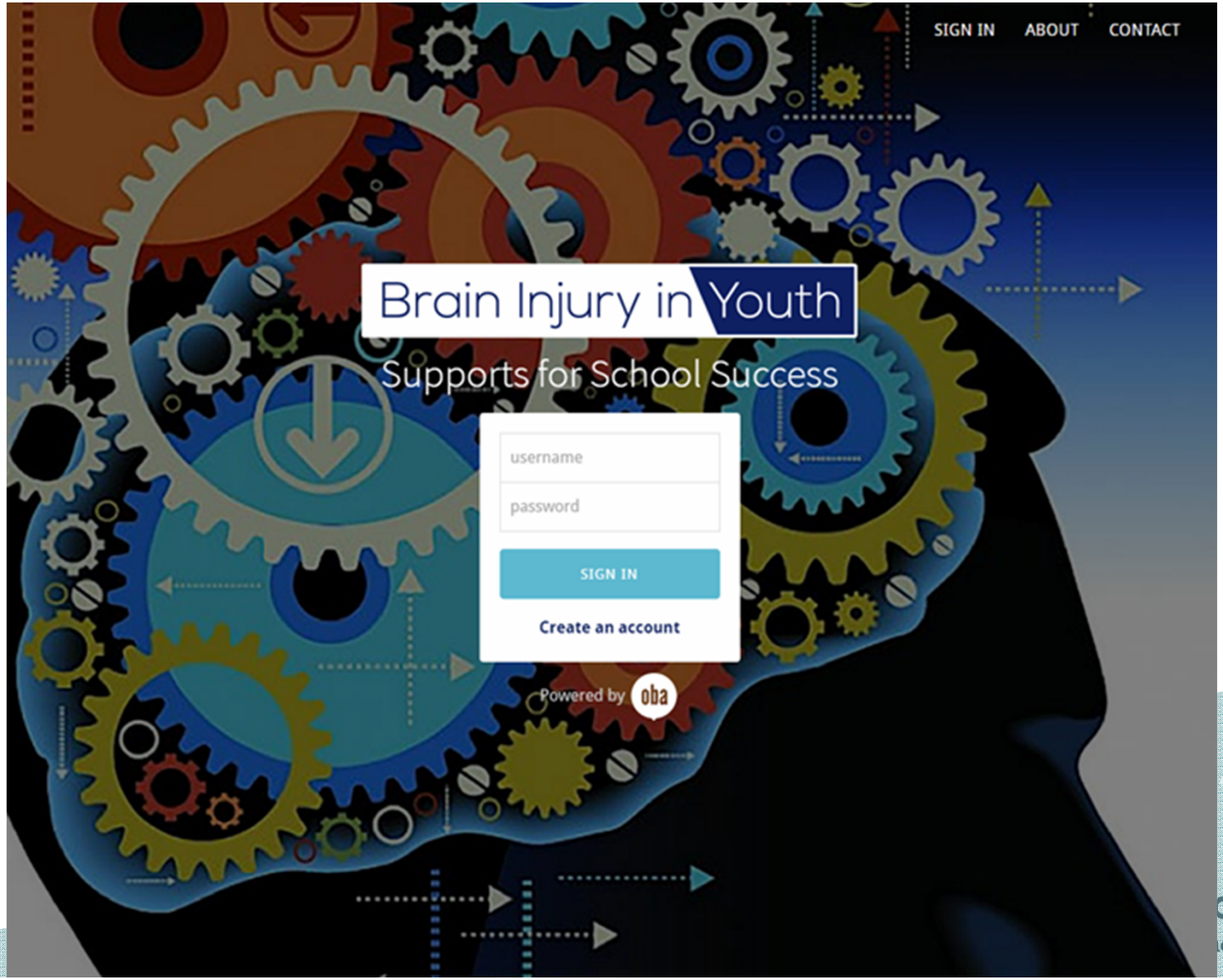
Education Support

- Specialized Education Consultation
  - Provide parent/guardian education of services and programing options available in schools
  - Assist in the partnership between parents and schools
  - Educate parents and school teams on how a student has been impacted by their brain injury
  - Collaborate with schools on intervention planning
  - Attend transition, IEP, MTSS, and other planning meetings
  - Help with transition from hospital to school

Cari Ledger, EdS, NCSP cari@biacolorado.org
(303) 562-3196

Brain Injury in Youth – Supports for School Success Community of Practice

https://youthbraininjury.obaverse.net/welcome/



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Executive Function skills develop over time

Working Memory	Inhibitory Control	Cognitive Flexibility
7-9 months: develops ability to remember that unseen objects are still there (toy hidden under a cloth); learns to put two actions together in a sequence (remove cloth, grasp toy)	6 months: Rudimentary response inhibition(able to not touch something instructed not to touch)	9-11 months: Develops ability to seek alternate methods to retrieve objects beyond directly reaching for what's in view
9-10 months: Can execute simple means-to-ends tasks and two-step plans; also able to integrate looking one place and acting (e.g., reaching) at another place	8-10 months: Begins to maintain focus despite distractions during brief delays in a task	2-5 years: Succeeds at shifting actions according to changing rules (e.g., takes shoes off at home, leaves on at school, puts on boots for rain)
3 years: Can hold in mind two rules (e.g., red goes here, blue goes there) and act on the basis of the rules	9-11 months: Able to inhibit reaching straight for a visible but inaccessible reward, such as a toy on the other side of a window, and will instead delay a moment to recognize the barrier and the detour around it	10-12 years: Successfully adapts to changing rules, even along multiple dimensions (okay to shout on playground, not okay in school, okay sometimes in theater rehearsal)
4-5 years: Comprehends that appearance does not always equal reality (e.g., when given a sponge that looks like a rock)	4-5 years: Reductions in perseveration (persisting with following a rule even when knowing that the rule has changed). Can delay eating a treat: also can begin to hold an arbitrary rule in mind and follow it to produce a response that differs from their natural instinct (sort colored cards by shape rather than color)	13-18 years: Continued improvement in accuracy when switching focus and adapting to changing rules
5-16 years: Develops ability to search varying locations, remember where something was found, then explore other locations (e.g., a game of Concentration or hiding a penny under one of three cups)	7 years: Perform at adult levels on learning to ignore irrelevant, peripheral stimuli (such as a dot on the side of a screen) and focus on the central stimulus (such as a picture in the middle of the screen)	Adult: Able to revise actions and plans in response to changing circumstances

Website Resources

- CDE TBI: www.cde.state.co.us/cdesped/sd-tbi
- CDE FASD: www.cde.state.co.us/cdesped/fasd
- Colorado Kids Brain Injury Resource Network ("CO Kids Website"): www.COKidswithbraininjury.com
- Brain Injury in Youth – Supports for School Success Community of Practice – https://youthbraininjury.obaverse.net/welcome/
- Center on the Developing Child: Harvard University - http://developingchild.harvard.edu/
- LEARNet - A Problem Solving System for Teachers, Clinicians, Parents, and Students (Brain Injury Association of New York State): www.projectlearnet.org
- CBIRT – In The Classroom - http://intheclassroom.cbirt.org/accounts/signup/
- Brainline & Brainline Kids - www.brainline.org/landing_pages/features/blkids.html

RESOURCES (CON'T)

- Heather Hotchkiss
  hotchkiss_h@cde.state.co.us
  303.866.6739
  http://www.cde.state.co.us/cdesped/sd-tbi
  - Manual, Online Learning Opportunities, Training, etc.
- Join the Brain Injury List Serve – send an email to zimmermann_j@cde.state.co.us