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- Please remember to MUTE yourself during our presentation.
- Questions can be asked in chat box.
- Today's session is being recorded and will be posted on the Mountain Plains ATTC website.
- Slides are available right now on the Mountain Plains ATTC website
- Instructions on how to obtain a Certificates of Attendance will be in an email following this session.
- After today's presentation we will be asking you to complete a survey

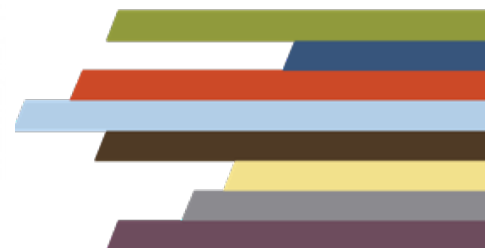


Mountain Plains ATTC (HHS Region 8)

ATTC

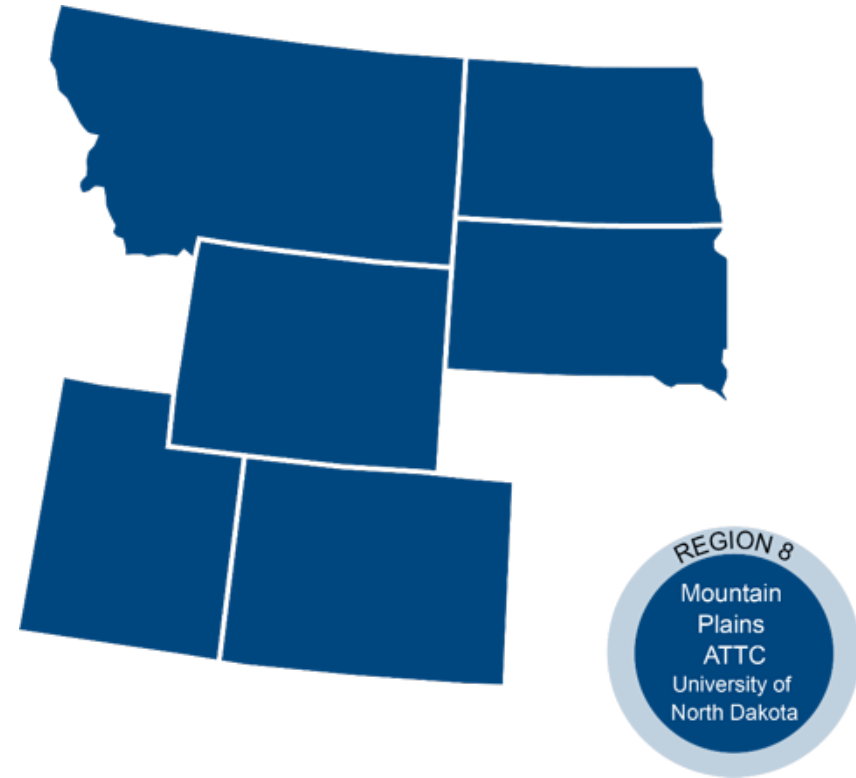
Addiction Technology Transfer Center Network  
Funded by Substance Abuse and Mental Health Services Administration

**SAMHSA**  
Substance Abuse and Mental Health  
Services Administration



# The Mountain Plains Addiction Technology Transfer Center

The Mountain Plains ATTC accelerates the adoption and implementation of evidence-based and promising addiction treatments and recovery-oriented practices and services; Heightens the awareness, knowledge, and skills of the workforce that addresses the needs of people with substance use or other behavioral health disorders; and fosters regional and national alliances among culturally diverse practitioners, researchers, policy makers, funders, and the recovery community



# Disclaimer

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At the time of this presentation, Elinore F. McCance-Katz, served as SAMHSA Assistant Secretary. The opinions expressed herein are the views of Dr. Karen McAvoy and do not reflect the official position of the Department of Health and Human Services (DHHS), SAMHSA. No official support or endorsement of DHHS, SAMHSA, for the opinions described in this document is intended or should be inferred.





Mountain Plains ATTC (HHS Region 8)

**ATTC**

Addiction Technology Transfer Center Network  
Funded by Substance Abuse and Mental Health Services Administration

# Neurodiversity in Youth Building Blocks of Brain Development

Karen McAvoy, PsyD

***SAMHSA***

Substance Abuse and Mental Health  
Services Administration





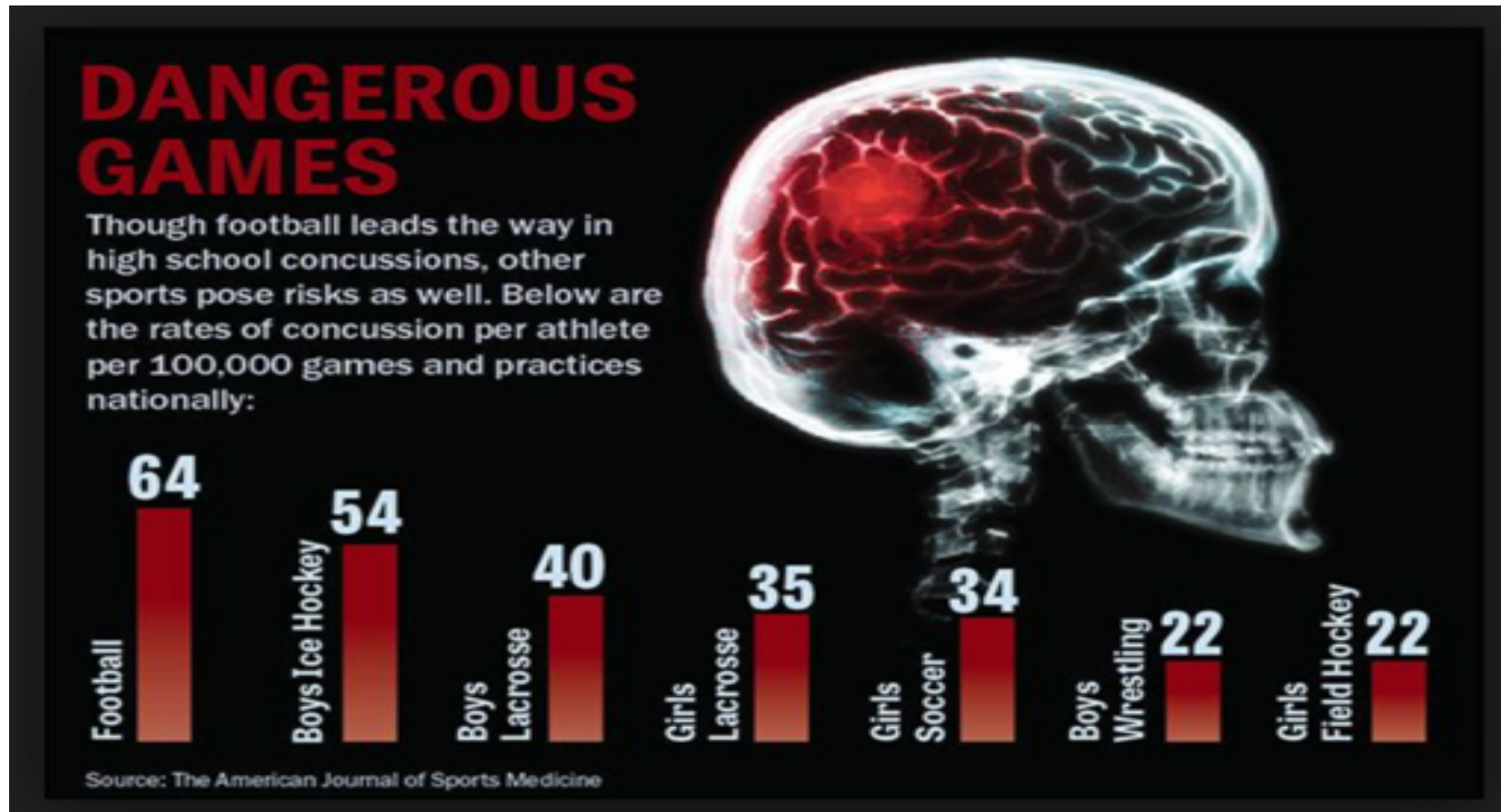
# Department of Defense

- One area of need among OEF/OIF Veterans is related to TBI and co-occurring mental health concerns. Military personnel serving in Iraq and Afghanistan are sustaining injuries while deployed (Terrio et al. 2009).
- In fact, TBI has been identified as a "signature injury" of the recent conflicts (Tanielian and Jaycox, 2008).
- Additionally, this cohort is reporting a variety of psychiatric symptoms as well, including those associated with posttraumatic stress disorder (PTSD), depression (Tanielian and Jaycox, 2008), and substance use disorder (Seal et al., 2011).



# Concussions happen in Sports

Sports as a Laboratory Assessment Model (SLAM) 2001



# Harry Potter Sustained An Astoundingly Dangerous Number Of Concussions

“Harry felt as if his head had been split in two.”

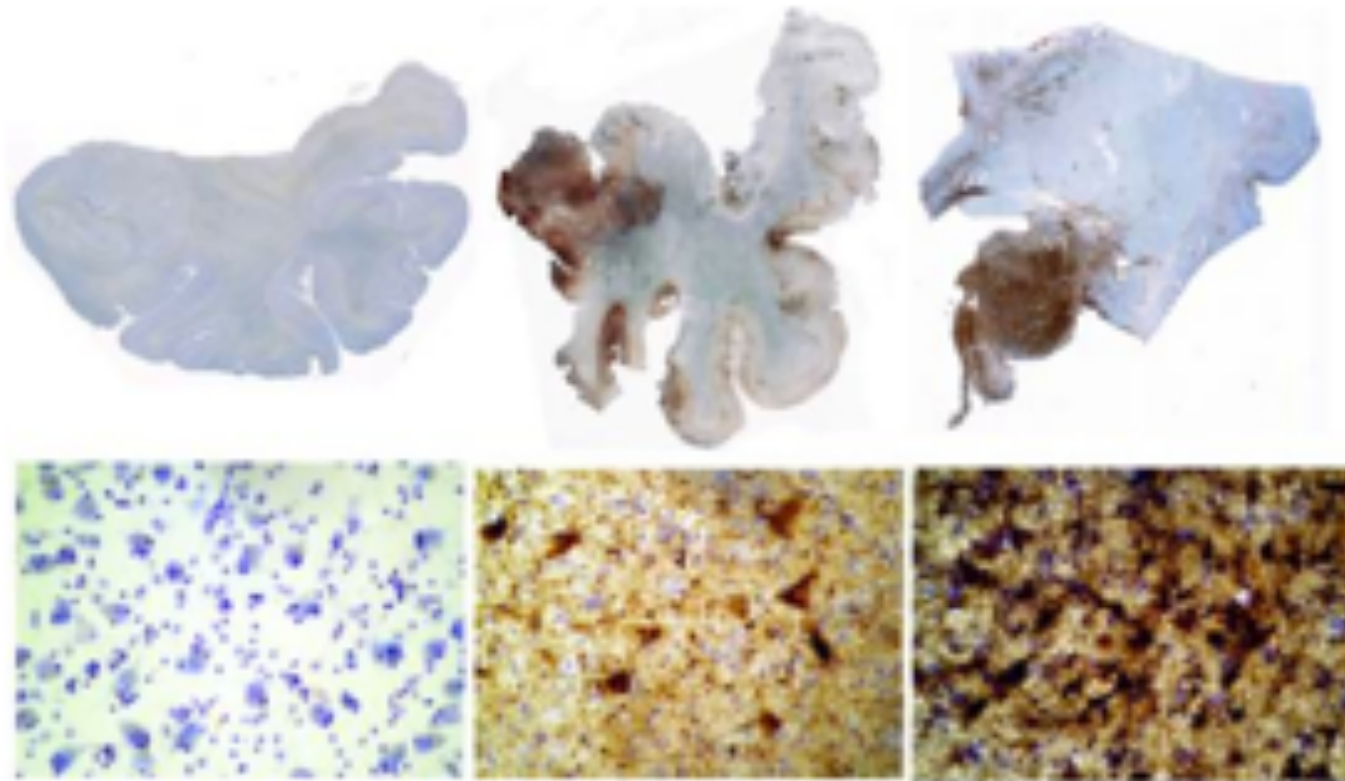


1 in 5 students may have a concussion at some point in their academic career (Veliz et al., *JAMA*. 2017;318(12):1180-1182. doi:10.1001/jama.2017.9087)

40% (plus) are getting concussions in non-sports related activities (Eagan-Brown, BrainSTEPS)

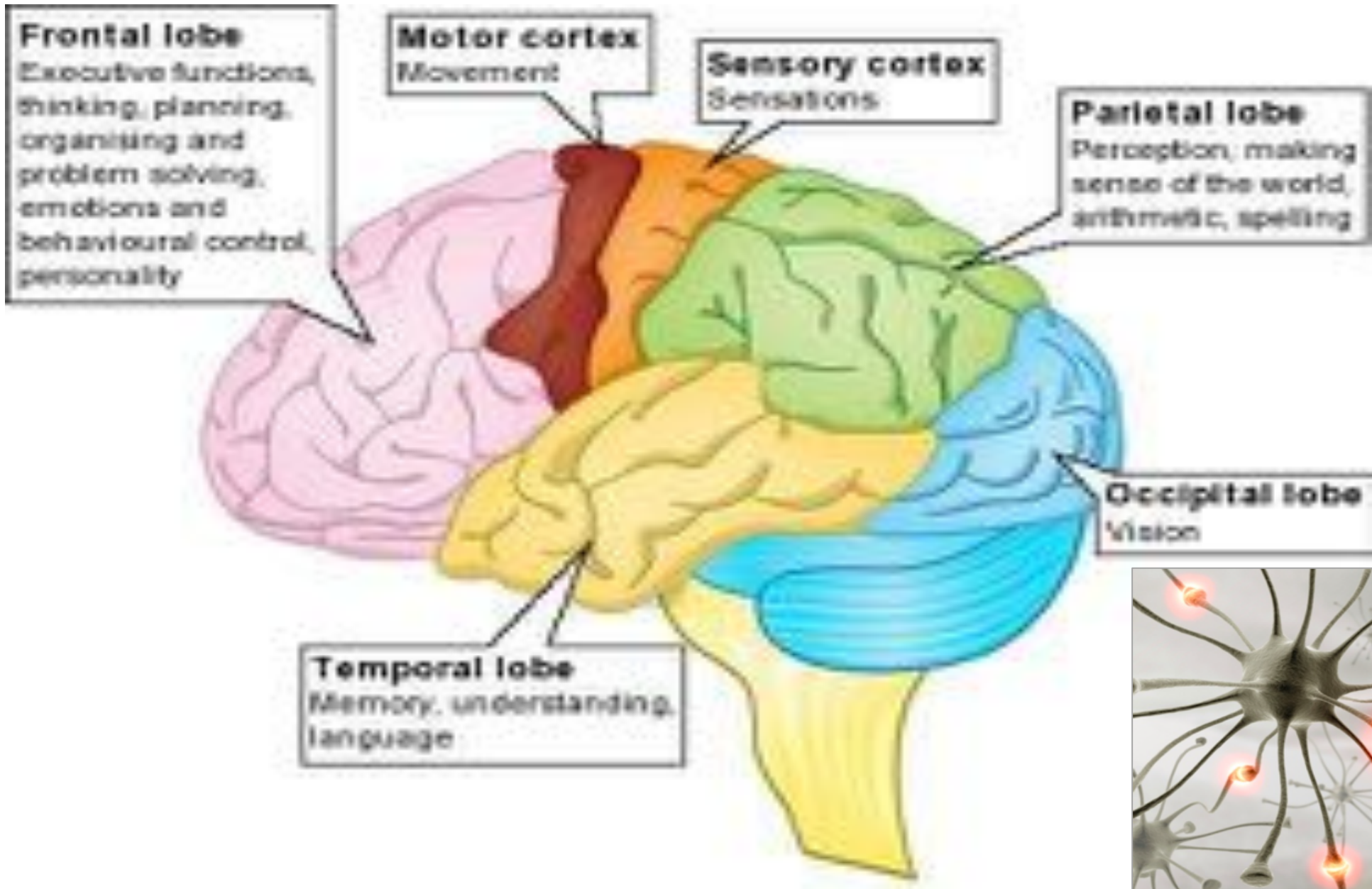


# CTE (Chronic Traumatic Encephalopathy)



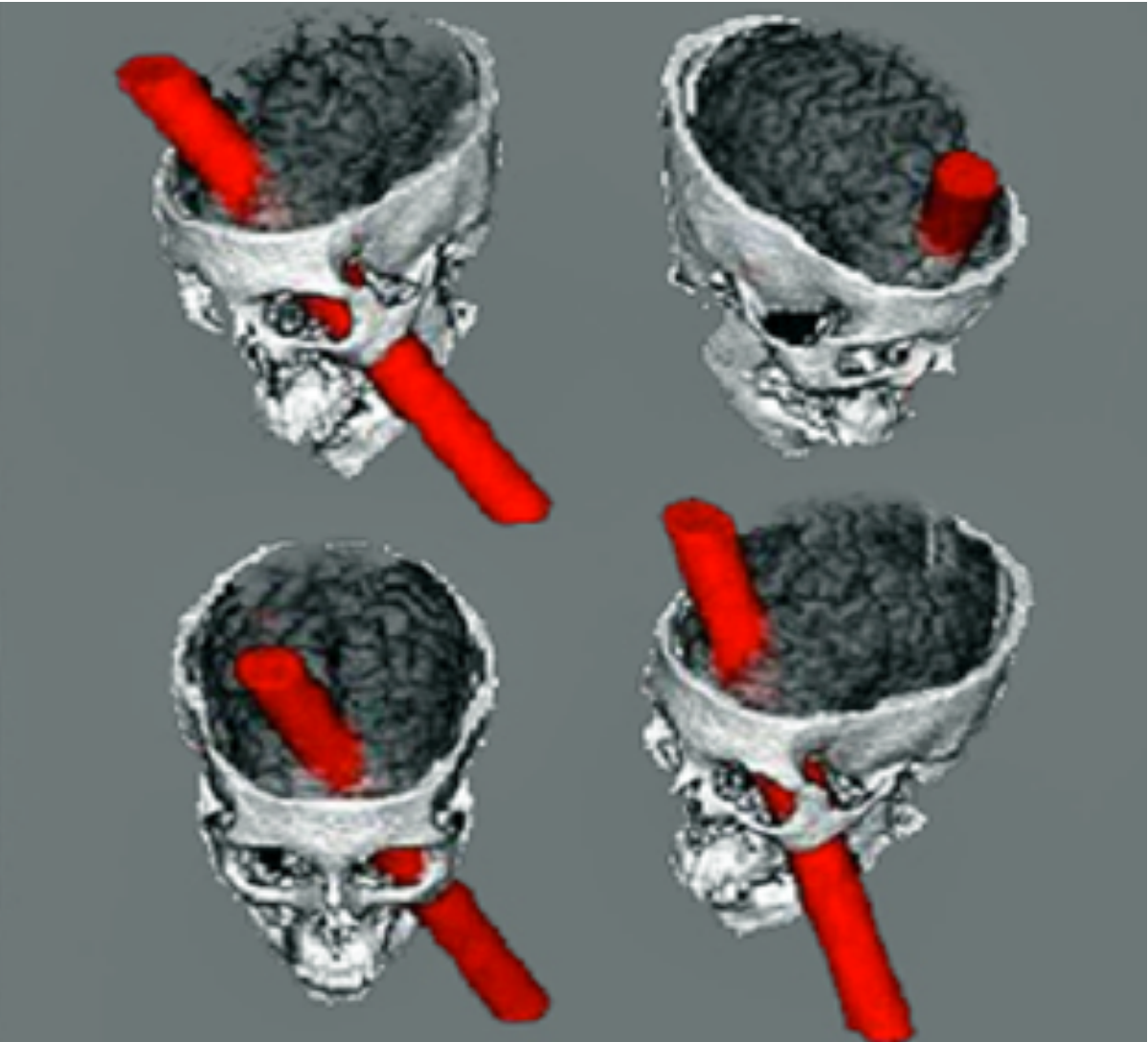
Boston University Brain Bank: Images from Website, Dr. Ann McKee











All rights reserved: © CDE/MINDSOURCE



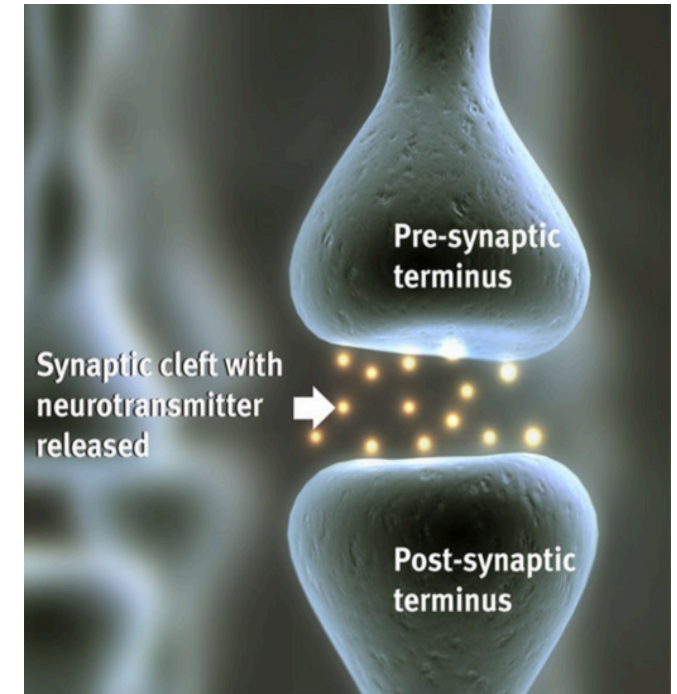
# Software, not hardware, problem





# Axonal Shearing and biochemical dysfunction

- Damage to individual nerve cells (neurons) and/or loss of connections among neurons which can lead to a breakdown of overall communication among neurons in the brain
- This damage contributes to the Metabolic Imbalance



**Not seen on an MRI or CT scan**

# Symptoms = Functional

## Physical:

- Headache
- Dizziness
- Nausea
- Light Sensitivity
- Noise Sensitivity

## Cognitive:

- Difficulty concentrating
- Difficulty remembering
- Slow Processing Speed
- Cognitive Fogginess

## Emotional:

- More emotional
- Sad
- Anxious
- Angry

## Sleep:

- Fatigue
- Drowsiness
- Sleeping too much
- Can't fall or maintain sleep

# Acquired Brain Injury:

An Acquired Brain Injury (ABI) covers ALL injuries to the brain that:

- occur after birth
- not heredity
- not congenital
- not degenerative

Includes:

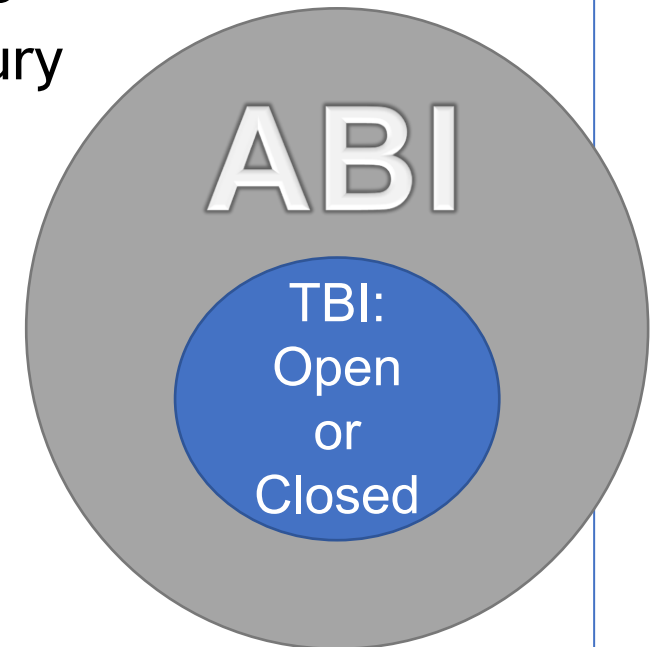
- non-traumatic
- traumatic

Regardless of the cause of the brain injury, consequences of brain injury may be similar and the interventions may be the same.

Brain Injury Association of America

A Traumatic Brain Injury, TBI” is a particular type of acquired brain injury; it is the result of an external blow to the head. A TBI can result in either an:

- open head injury
- closed head injury



# Types of Brain Injury or Impact

## Brain Impact/Injury

Acquired Brain Injury (acquired after birth)

Congenital (before birth/pre-natal)

Traumatic

Non-Traumatic

e.g., Fetal Alcohol Spectrum Disorder, etc.



# Acquired (Post-Birth) Brain Injury in children

## Traumatic – External Force

- Falls
- Motor Vehicle Accidents
- Bicycle/Pedestrian
- Assaults/Abuse (e.g., Abusive Head Trauma/Shaken Baby Syndrome)

It is estimated that 1,000 – 3,000 children in the US sustain Abusive Head Trauma each year.

Health.ny.gov

## Non-Traumatic – Internal Event

- Illness (e.g., high fever)
- Infections (e.g., meningitis, encephalitis)
- Anoxic injuries (lack of oxygen; e.g., airway obstruction, near drowning)
- Stroke or vascular events (lack of blood flow)
- Brain tumors, malformations
- Poisoning (e.g., ingestion, inhalation) – Substances?
- Metabolic disorders (e.g., insulin shock)





# Congenital Brain Injury

- Influences to the brain that occur during pregnancy or birth or as a result of genetic disorders
  - Prenatal substance exposure
  - Infections during pregnancy
  - Hydrocephalus
  - Microcephaly
  - Neural tube deficits
  - Chromosomal abnormalities
  - Injuries as part of the birth process



# Types of Traumatic Brain Injuries

- Mild TBI (LOC <30 min; PTA < 24 hours) => also commonly called a concussion (on average = 80-85%)
- Moderate TBI (LOC >30 min <24 hours; PTA 24 hours-7days) (on average = 13%)
- Severe TBI (LOC > 24 hours; PTA more than 7 days) (on average = 2%)

The severity of the injury does not solely determine the impact on functioning





60%+ (average) in prisons/jail

60% substance abuse



30% homeless

60% mental health

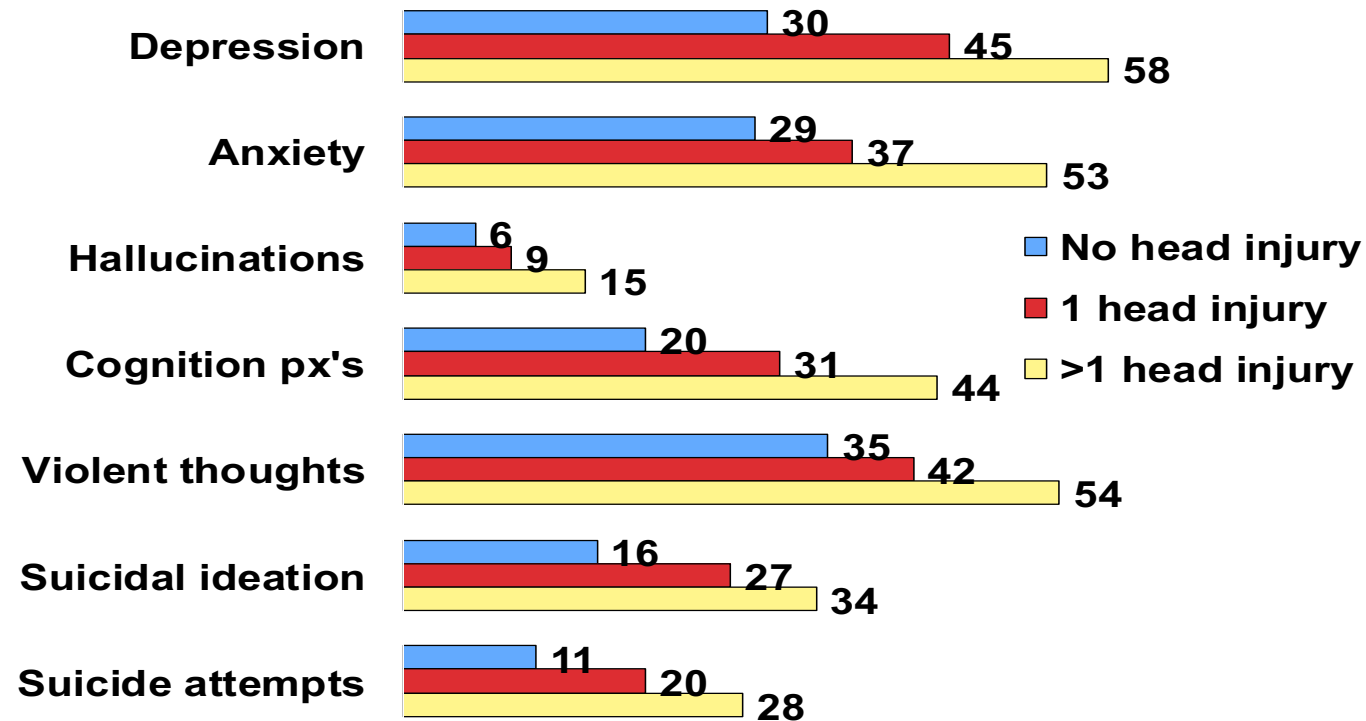


# Brain Injury & Criminal Behavior

- In a meta analysis, Shiroma (2010) found **60% of inmates report having experienced a head injury** or TBI as compared to **8.5% in a general population** reporting a history of TBI.
- Prisoners who have had head injuries may also experience **mental health problems** such as severe depression and anxiety, substance use disorders, difficulty controlling anger, or suicidal thoughts and/or attempts.
- Studies of prisoners' self-reported health indicate that those with one or more head injuries have **significantly higher levels of alcohol and/or drug use** during the year preceding their current incarceration.



# Behavioral Health Symptoms in Kentucky Prisoners (Walker, Hiller, Staton & Leukefeld, 2003)





# Brain Injury & Substance Use Abuse

Natural History of TBI to Age 25 from the  
Christchurch Birth Cohort

---

(McKinlay et al., 2008)

By age 25:

– Those hospitalized with 1st TBI before age 6,  
3 times more likely to have a diagnosis of either  
alcohol or drug dependence

– Those hospitalized with 1st TBI 16-21,  
3 times more likely to be diagnosed with drug  
dependence



# Brain injury in kids might lead to alcohol abuse

## Traumatic brain injuries in children and adolescents could lead to alcohol abuse in later life

- Children under 5 years of age who suffer a traumatic brain injury are over 3.6 times more likely to exhibit substance abuse as teenagers, compared with uninjured children.

### Journal Reference:

Zachary M. Weil, Kate Karelina. **Traumatic Brain Injuries during Development: Implications for Alcohol Abuse**. *Frontiers in Behavioral Neuroscience*, 2017; 11  
DOI: [10.3389/fnbeh.2017.00135](https://doi.org/10.3389/fnbeh.2017.00135)



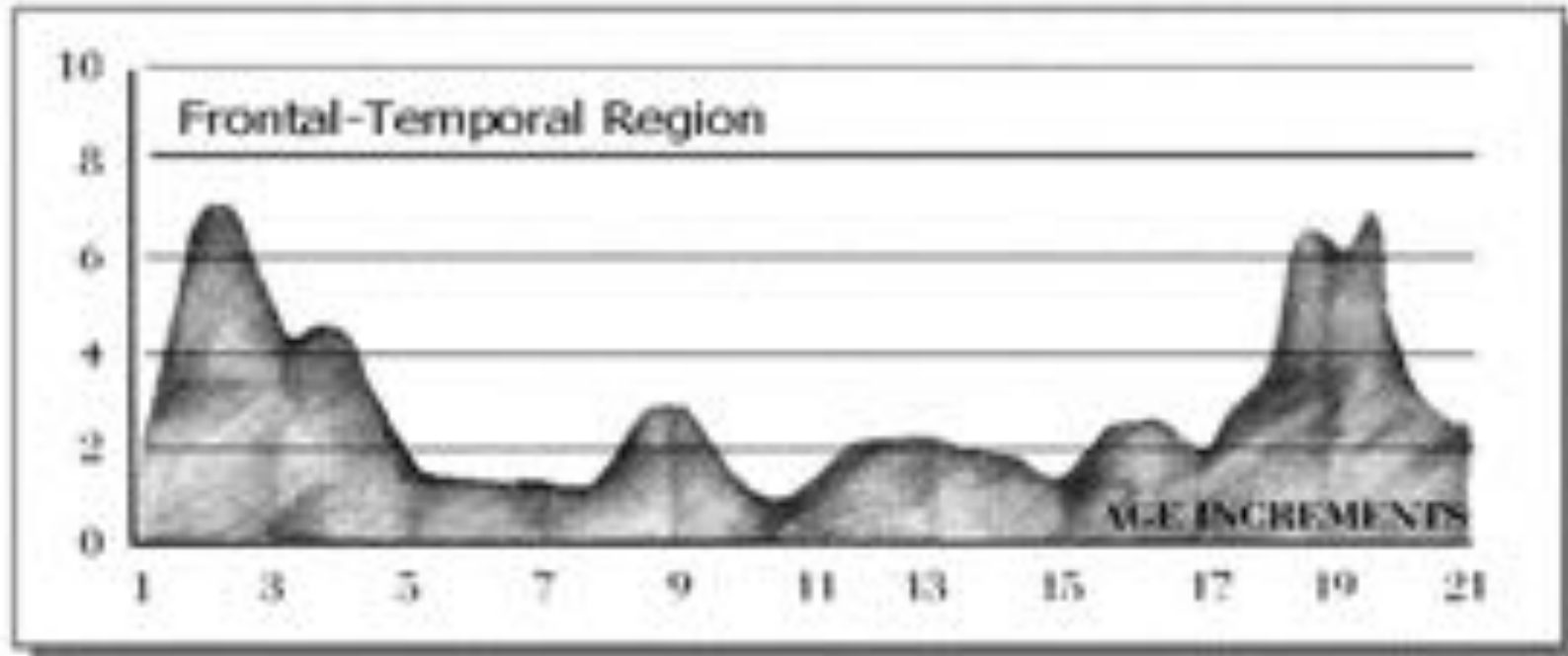
## **Mood and anxiety disorders following pediatric traumatic brain injury: a prospective study**

Luis CA, Mittenberg W. J Clin Exp Neuropsychol 2002;24:270-9.

- Children (aged 6-15y) hospitalized in a general hospital n= 42 with mTBI versus n=35 orthopedic controls.
- Prevalence of mood disorders at 6mo: mTBI group (35.7%), orthopedic group (11.4%).
- Prevalence of anxiety disorders at 6 months: mTBI group (21.4%), orthopedic group (2.8%)



CHART 2:



(Savage, 1999)

## Maturation and Development



# Executive Function

“The teenage brain is like a Ferrari: it’s sleek, shiny, sexy, and fast, and it corners really well. But it also has really crappy brakes.”

Dawson/Guare-May 2012



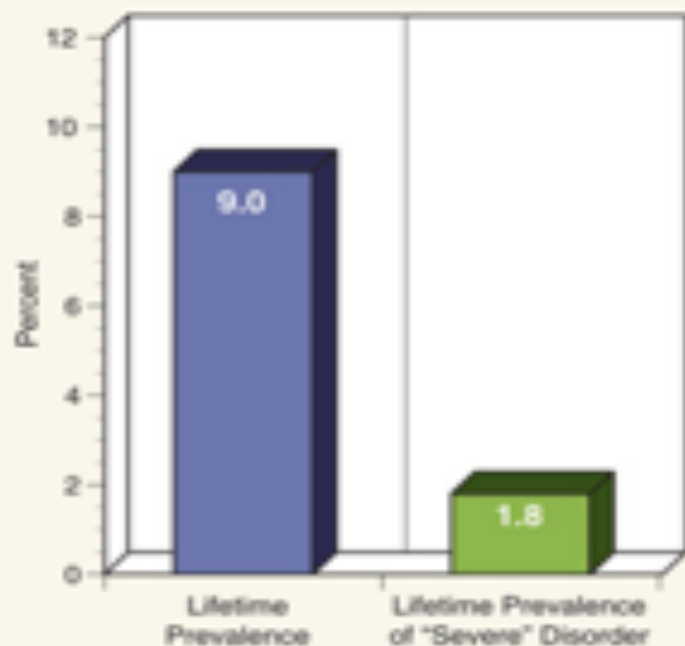




# Attention Deficit Hyperactivity Disorder

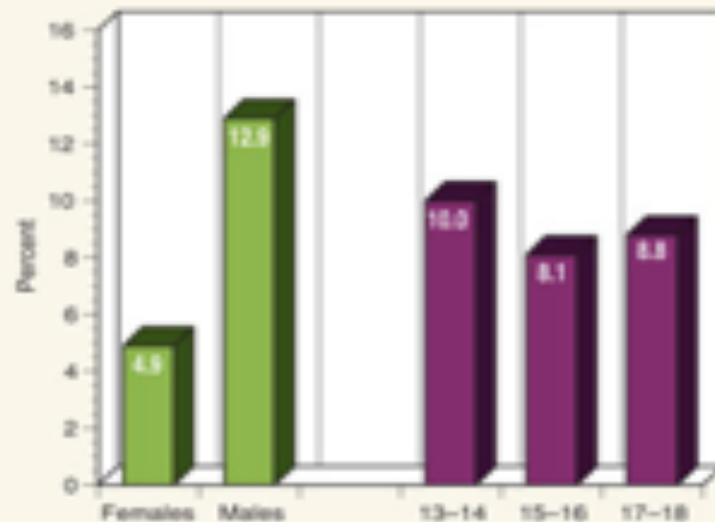
## Lifetime Prevalence of 13 to 18 year olds

- **Lifetime Prevalence:** 9.0% of 13 to 18 year olds
- **Lifetime Prevalence of "Severe" Disorder:** 1.8% of 13 to 18 year olds have a "severe" disorder



## Demographics (for lifetime prevalence)

- **Sex and Age**



- **Race:** Not Reported



National Institute of Mental Health

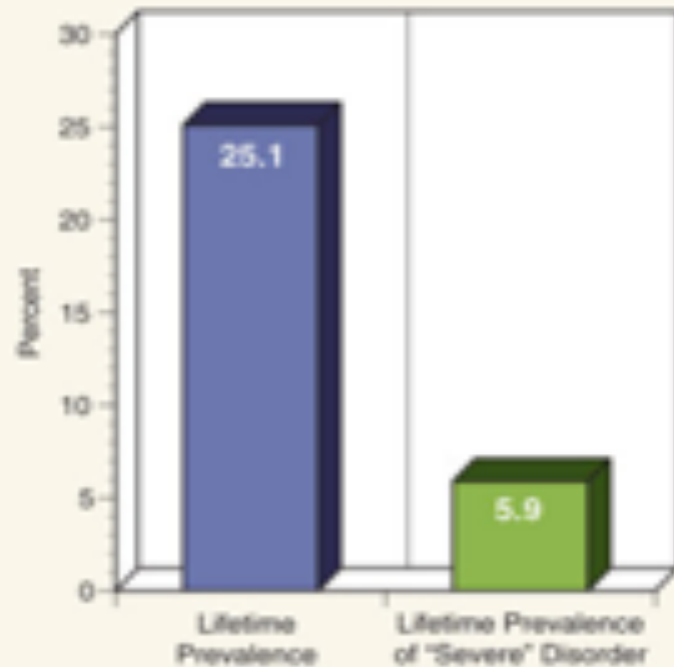
Transforming the understanding and treatment of mental illnesses.

Merikangas KR, He J, Burstein M, Swanson SA, Avenevoli S, Cui L, Benjet C, Georgiades K, Swendsen J. Lifetime prevalence of mental disorders in U.S. adolescents: Results from the National Comorbidity Study-Adolescent Supplement (NCS-A). *J Am Acad Child Adolesc Psychiatry*. 2010 Oct;49(10):980-989.

# ANXIETY

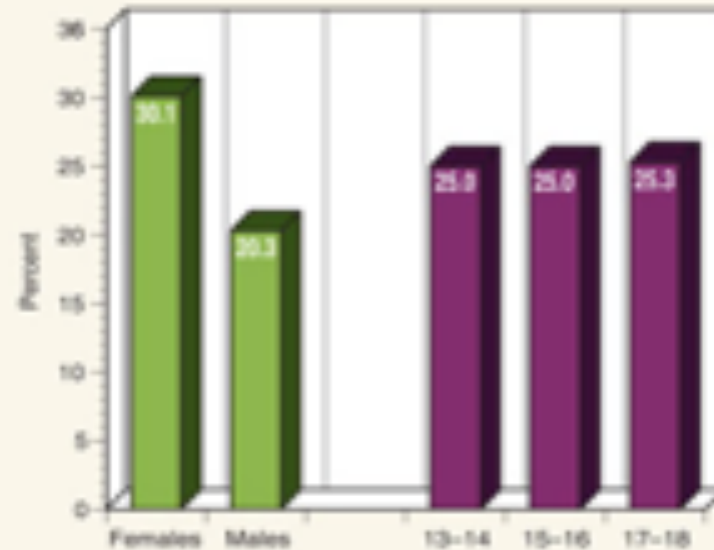
## Lifetime Prevalence of 13 to 18 year olds

- **Lifetime Prevalence:** 25.1% of 13 to 18 year olds
- **Lifetime Prevalence of "Severe" Disorder:** 5.9% of 13 to 18 year olds have "severe" anxiety disorder



## Demographics (for lifetime prevalence)

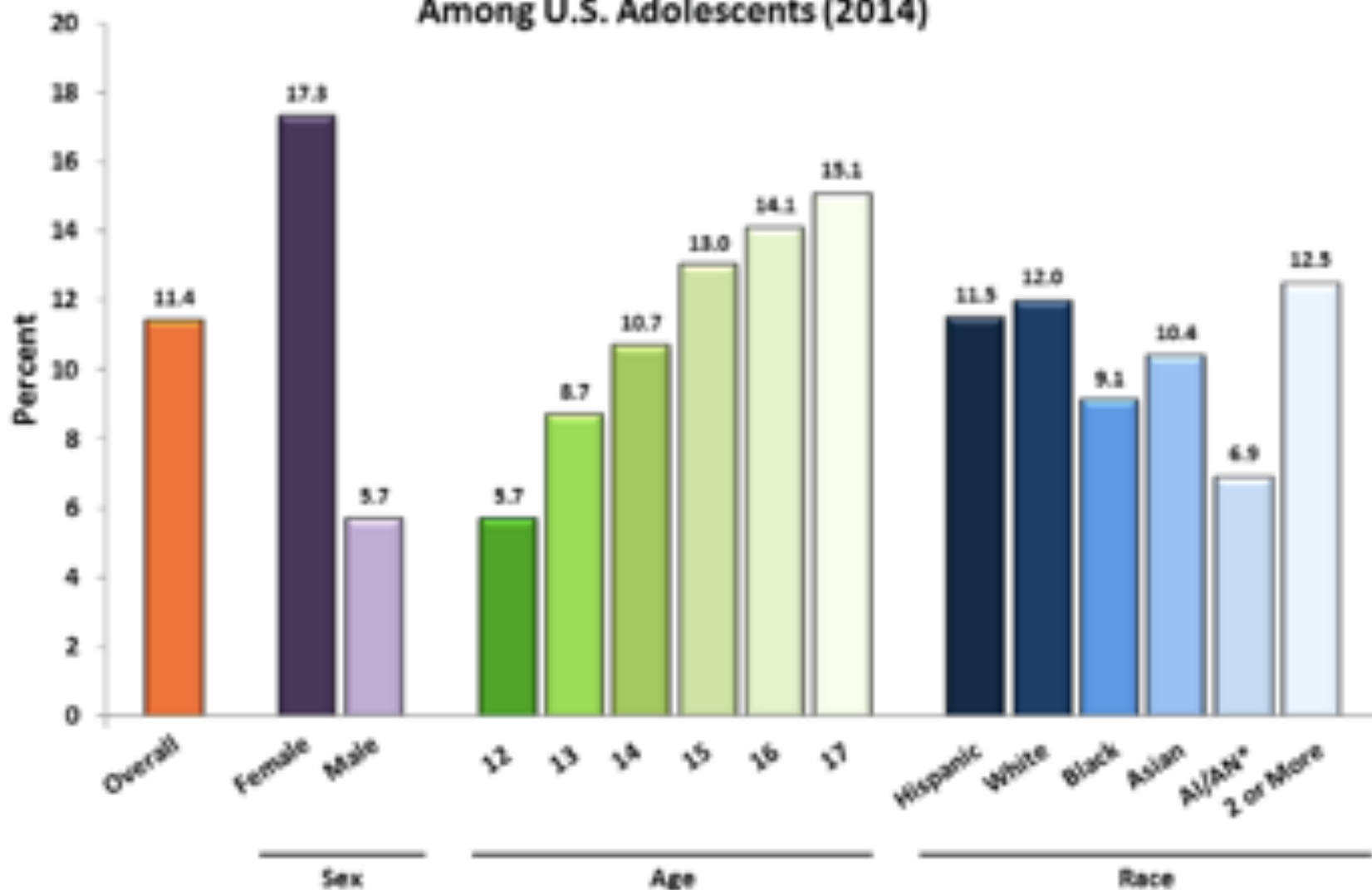
- **Sex:** Statistically different
- **Age:** Not statistically different



- **Race:** Statistically significant differences were found between non-Hispanic whites and other races

\*Merikangas KR, He J, Burstein M, Swanson SA, Avenevoli S, Cui L, Benjet C, Georgiades K, Swendsen J. Lifetime prevalence of mental disorders in U.S. Adolescents. Under review.

## 12-month Prevalence of Major Depressive Episode Among U.S. Adolescents (2014)



\*AI/AN = American Indian/Alaska Native

Data courtesy of SAMHSA



# Alcohol

- Alcohol is the drug of choice among youth, with:
  - 12% of 8th-graders
  - 22% of 10th-graders
  - and 29% of 12th-graders reporting heavy episodic drinking.
- Alcohol use during adolescence and young adulthood remains a prominent public health problem in the United States. National survey results indicate that:
  - 28.6 percent of 12th graders
  - 40.1 percent of college students reported binge drinking (i.e., consuming five or more drinks in a row).





## Anxiety/Depression

Problems sleeping

Fatigue/apathy

Physical pains/dizziness

Trouble  
concentrating/remembering

Stressed/Irritable

## Brain Injury

Problems sleeping/sleep  
too much or too little

Fatigue/drowsiness

Headache/light & noise  
sensitivity

Trouble  
concentrating/remembering

Lack of  
Filter/Lability/Impulsivity

## Alcohol/Marijuana

Problems sleeping/non-  
restorative sleep

Feel fatigued/hung over

Nausea/headaches

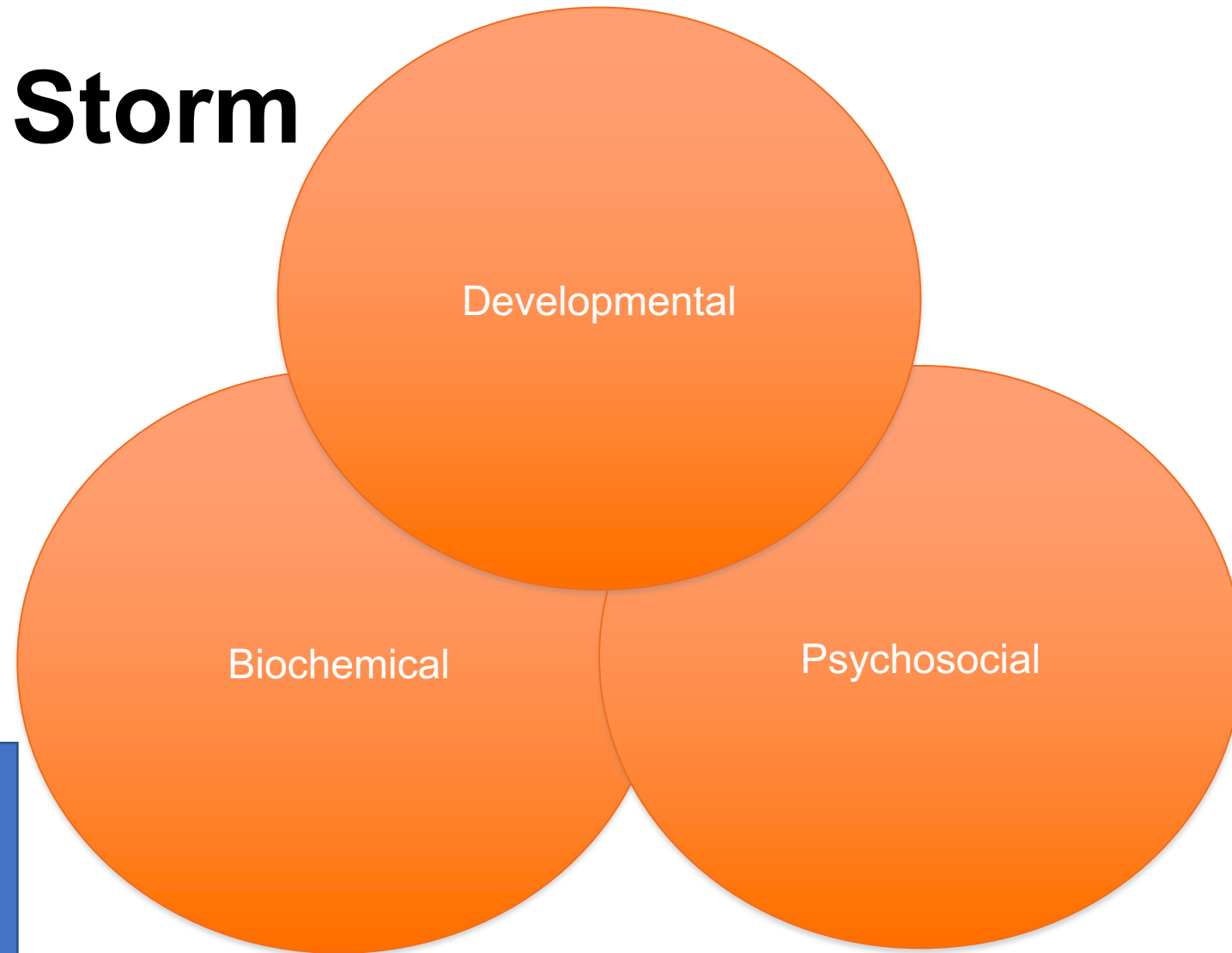
Trouble  
concentrating/remembering

Lack of filter/Impulsivity





# Perfect Storm



Brain injury, even a mild TBI like a concussion, is the great AMPLIFIER!



# Can't versus Won't

- Mitigating factors?
- Treatment implications
- TBI courts
- Mental Health Courts
- Problem-Solving courts



# Building Blocks of Brain Development<sup>©</sup>

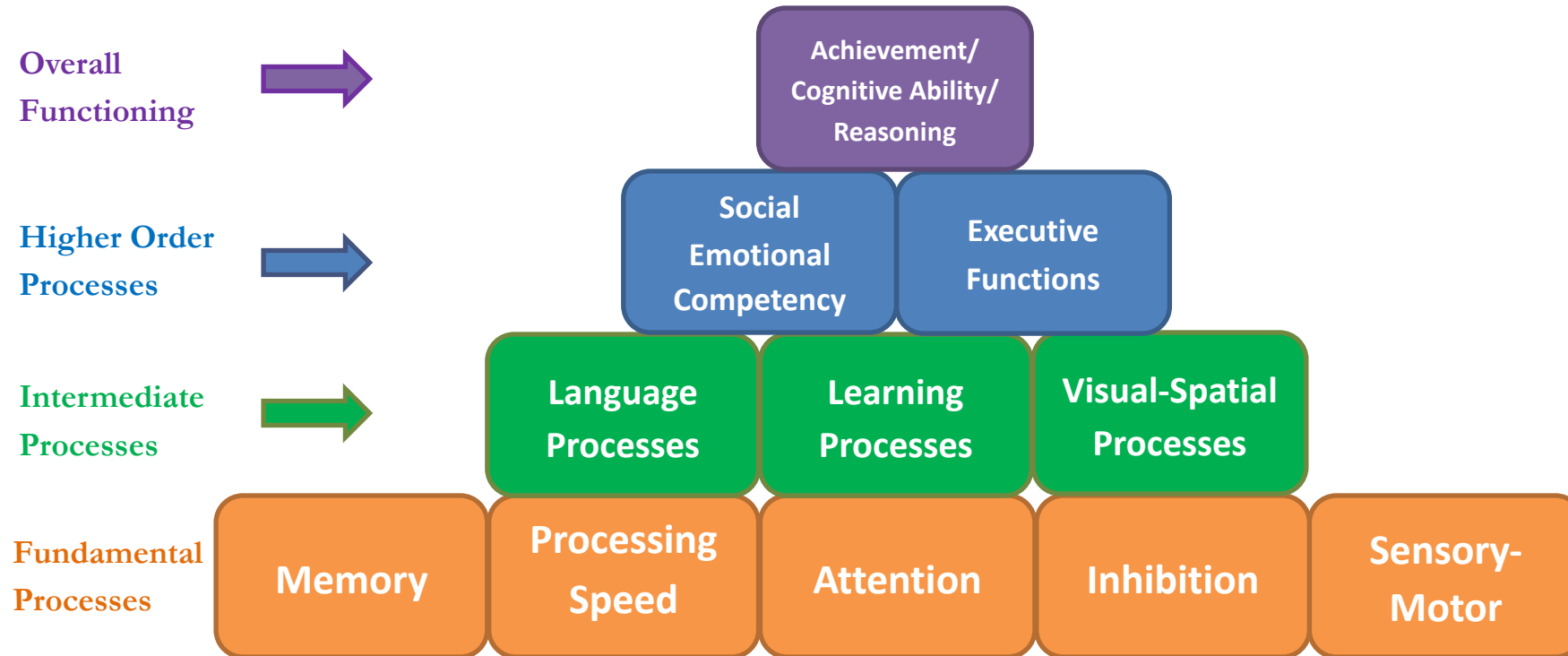
Colorado Brain Injury Steering Committee

Colorado Department of Education (CDE)

- Neuroscience, research, neuro-cognitive processes and assessment
- No ONE model of neurocognitive development
- Simplistic framework that describes the complexity of neurocognitive functioning and inter-relatedness.
- Simple way for parents and educators to understand the brain, and how learning and behavior can be affected
- Neuroeducational model – multidisciplinary teams CAN do this.
- If we understand the BRAIN, we understand learning and behavior



# Building Blocks of Brain Development<sup>©</sup>



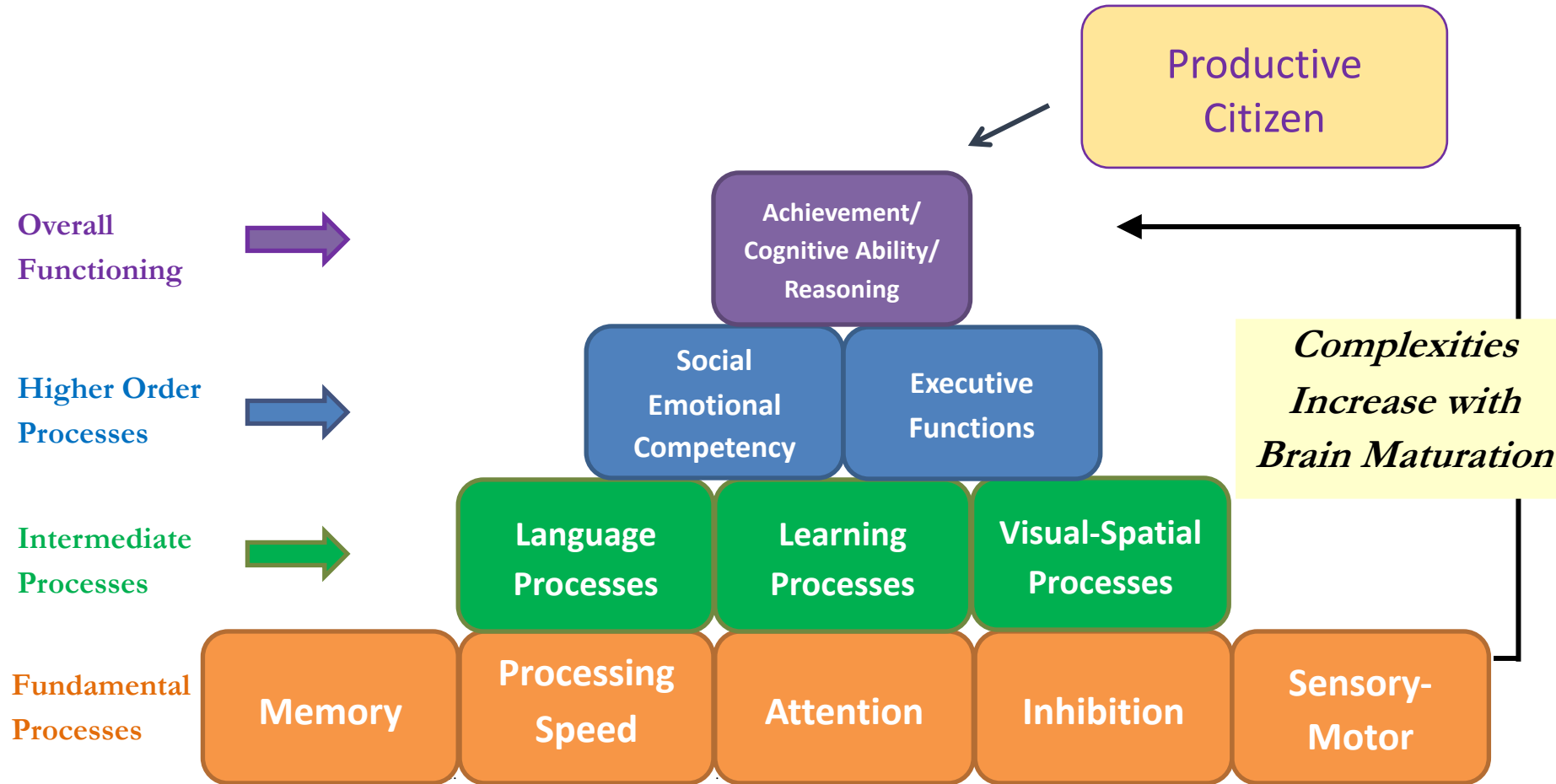
The Hierarchy of Neurocognitive Functioning © - created by Peter Thompson, Ph.D. 2013, adapted from the works of Miller 2007;

Reitan and Wolfson 2004; Hale and Fiorello 2004.

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# Building Blocks of Brain Development<sup>©</sup>



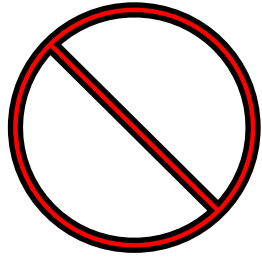
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# Building Blocks of Brain Development

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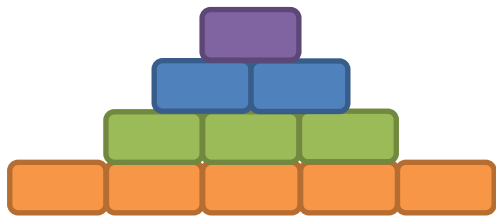
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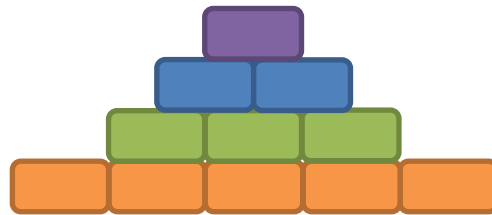
# Building Blocks of Brain Development<sup>®</sup>

## 3 Components:

1-Brain Processes  
(Building Blocks)



2-Assessments



3-Strategies



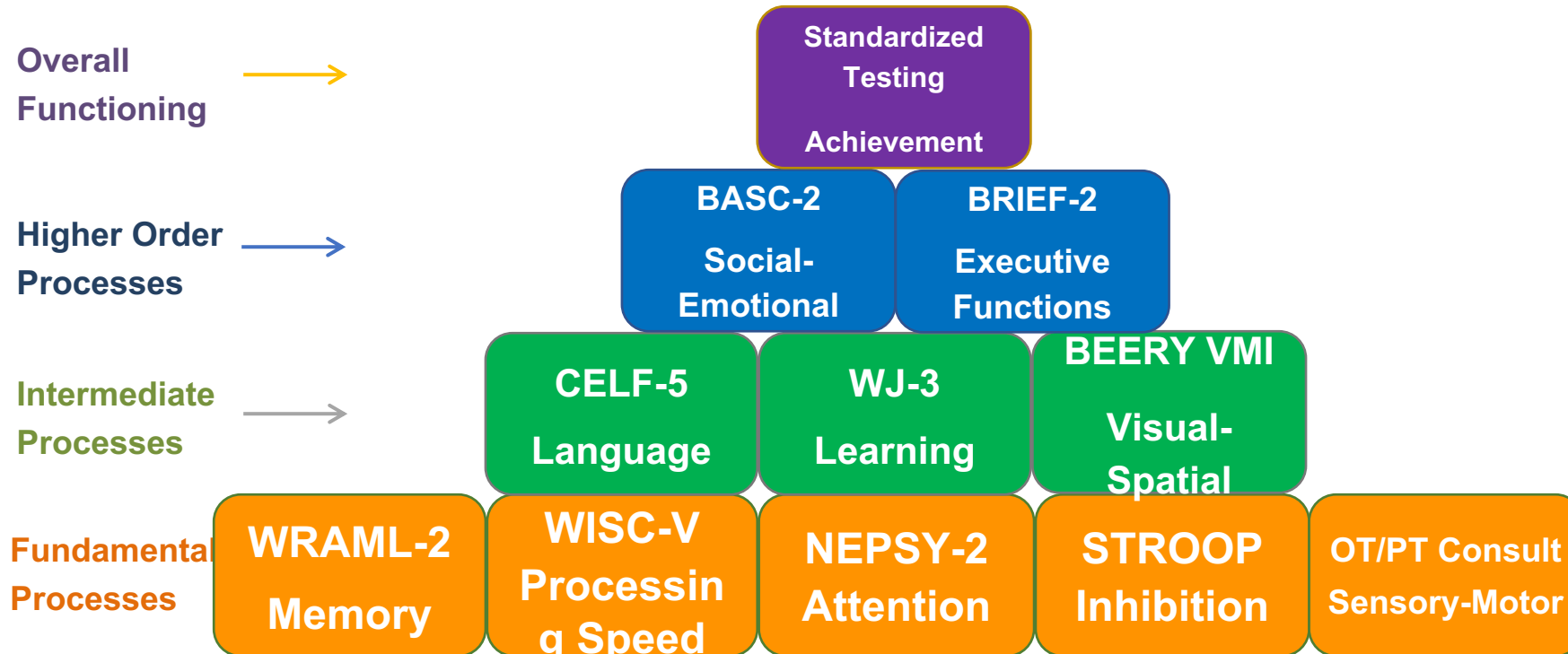
← ALIGNMENT →





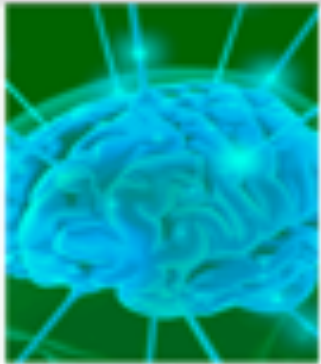
# Building Blocks of Brain Development

## ASSESSMENTS



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# COLORADO KIDS Brain Injury Resource Network



HOME

FOR EDUCATORS AND PROFESSIONALS

FOR PARENTS

UPCOMING EVENTS

KEY TERMS

CONTACT US



## Educators and Professionals

ENTER HERE >



## Parents

ENTER HERE >

## 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

**Brain Injury in Children and Youth: A Manual for Educators.** [Click here to view manual.](#)

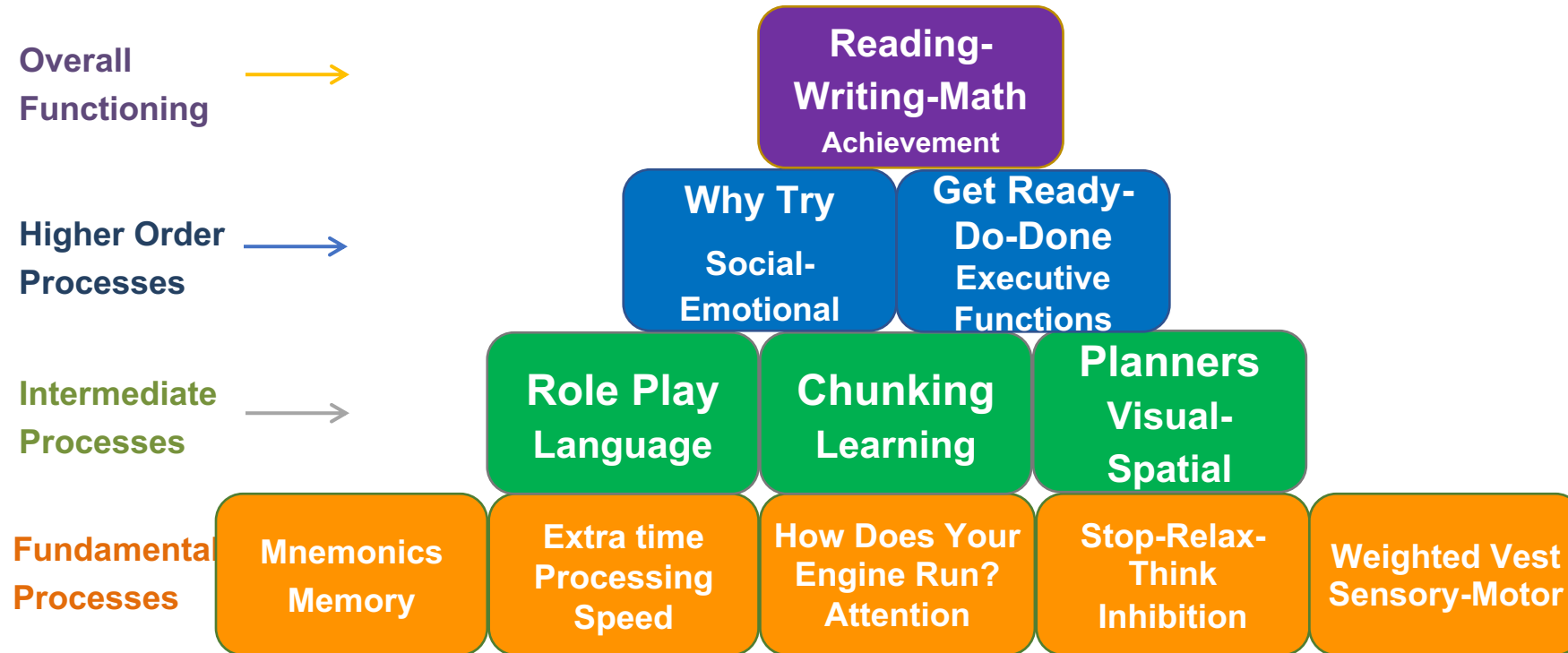
**Colorado Department of Education's Concussion Management Guidelines.** [Click here to view](#)

**Brain Injury Alliance of Colorado Case Management.** [Click here to view.](#)

**Brain Injury Alliance of Colorado Case Management Flyer.** [Click here to view](#)

# Building Blocks of Brain Development

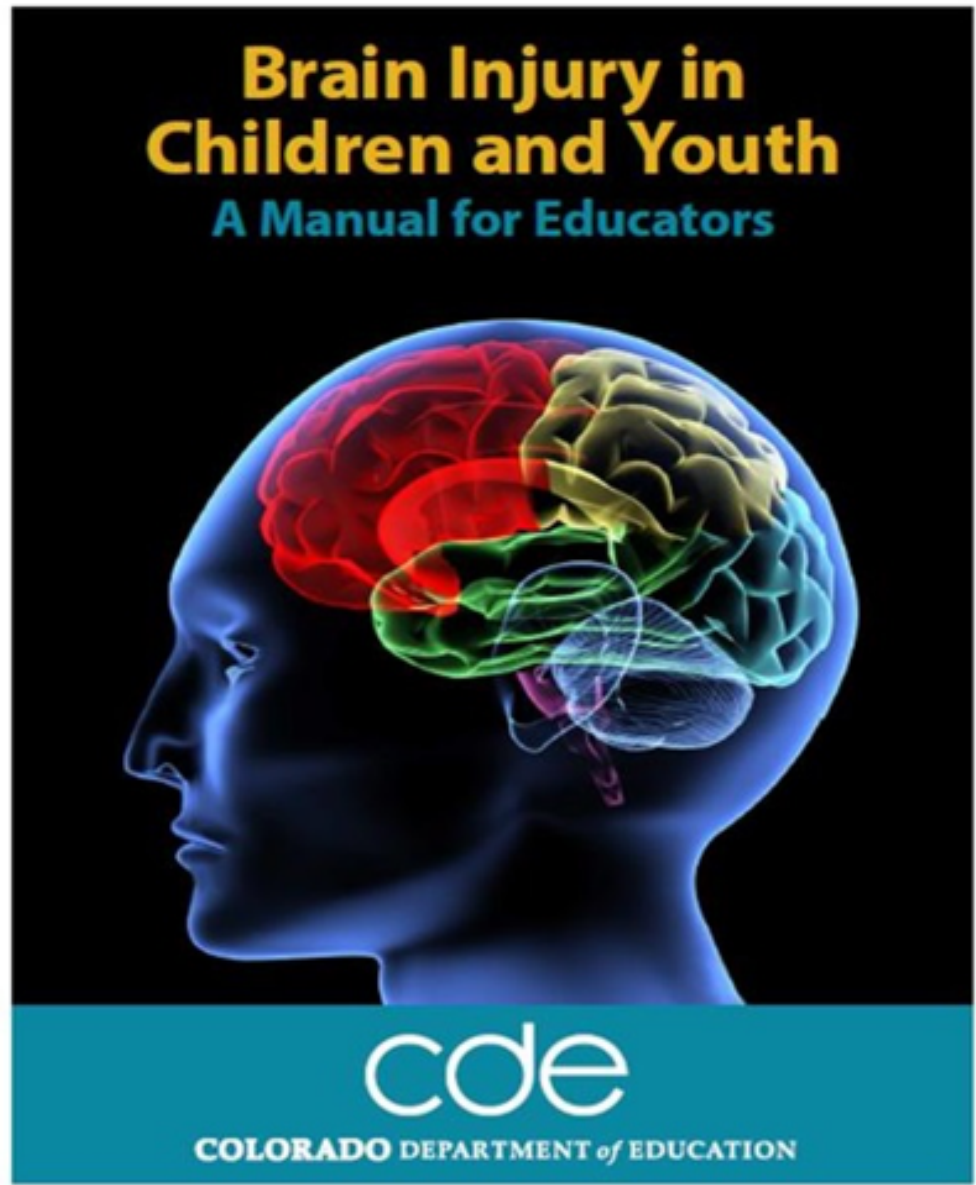
## STRATEGIES/INTERVENTIONS



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



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



# Attention

**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

**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

**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

**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

**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

**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

**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

**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: Planning

**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: Organization

**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: Reasoning

**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.



# The Influence of Substance Use on Adolescent Brain Development

[L. M. Squeglia](#), B.A., [J. Jacobus](#), B.A., and [S. F. Tapert](#), Ph.D.

[Clin EEG Neurosci. 2009 Jan; 40\(1\): 31–38.](#) doi: [10.1177/155005940904000110](#)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2827693/>

- The current literature suggests that heavy drinking during adolescence does have a subtle, but significant, deleterious effects on adolescent neurocognitive functioning. Studies have found that adolescent heavy drinkers exhibit decrements in **memory** [24](#), **attention** and **speeded information processing** [25](#), [26](#), and **executive functioning** [27–29](#).
- In a study comparing alcohol dependent and healthy control adolescents, Brown et al. [24](#) found that drinkers recalled **10% less verbal and nonverbal information** than controls, even after three weeks of monitored abstinence. A similar degree of reduction was found on attentional and speeded information processing tasks in abstinent adolescent drinkers [25](#).
- These findings are consistent with literature examining neurocognitive deficits in young heavy drinkers, which found similar decreases on **attention** and **information processing**, along with deficits in **language** competence and **academic achievement** [26](#). Deficits in **executive functioning**, specifically in future planning, abstract reasoning strategies, and generation of new solutions to problems, have also been found [27](#).

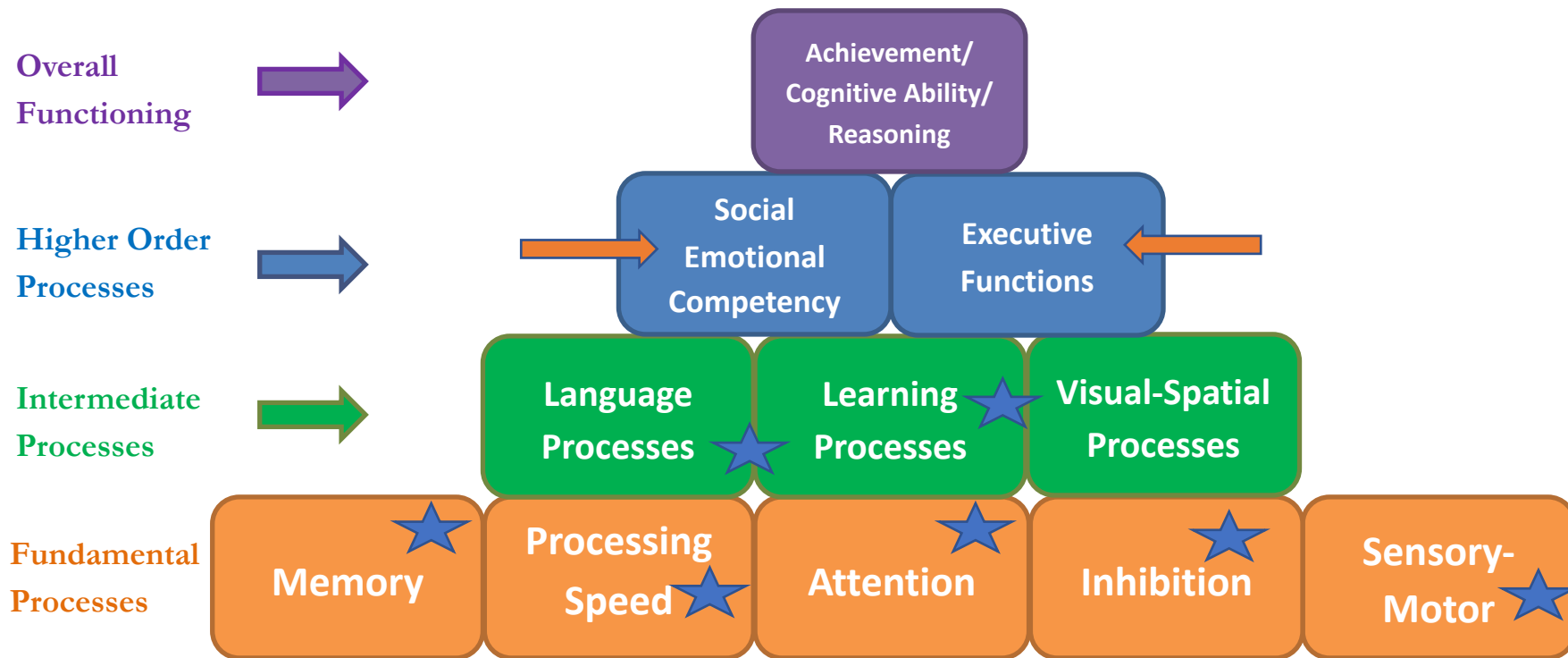


# Marijuana use

- While it has often been assumed that marijuana use is not linked to long-term cognitive deficits, recent data suggest that even after four weeks of monitored abstinence, adolescents who regularly smoke marijuana performed poorer on performance tests of **learning, cognitive flexibility, visual scanning, error commission, and working memory** <sup>30</sup>. Further, the number of lifetime marijuana use episodes was significantly related to overall poorer cognitive functioning, even after controlling for lifetime alcohol use.

Source: Medina KL, Hanson K, Schweinsburg AD, Cohen-Zion M, Nagel BJ, Tapert SF. Neuropsychological functioning in adolescent marijuana users: Subtle deficits detectable after 30 days of abstinence. J Int Neuropsychol Soc. 2007;13(5):207–220. [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]





The Hierarchy of Neurocognitive Functioning © - created by Peter Thompson, Ph.D. 2013, adapted from the works of Miller 2007; Reitan and Wolfson 2004; Hale and Fiorello 2004.  
 The Building Blocks of Brain Development © – further adapted by the CO Brain Injury Steering Committee, 2016.





# Neurocognitive Evaluation Form (NEF)

**Instructions:** The rater is asked to rank the student on several areas of functioning as compared to the student's **same aged** peers and/or classmates. A ranking of **Green** is considered an ability commonly observed in most (70%) students of similar age to the student and is not an area of primary concern for the student. A ranking of **Yellow** is an observed ability area that the student struggles, but the student can perform the task intermittently. A ranking of **Red** is a rarely observed or never observed ability area and signals a major area of concern. Areas ranked Red or Yellow are domains that may be targeted for further assessment.

Date: \_\_\_\_\_ Rater's Name/Title: \_\_\_\_\_

Student's Name: \_\_\_\_\_ Student's Age and Grade: \_\_\_\_\_

Class Observed: \_\_\_\_\_ Time of Day and Day of Week: \_\_\_\_\_

Less positive

More Positive

ATTENTION 3 SUBTYPES	Red	Yellow	Green	Grey	Blue
SELECTIVE/FOCUSED	Significantly Below Average	Slightly Below Average	Average	Slightly Above Average	Significantly Above Average
Focuses on teacher					
Attends to detail of task					
Orients to speaker/staff					
Focuses without daydreaming					
Looks at board					



# Medical Documentation

**NOTE:** Medical documentation simply confirms the **presence** of the TBI. It does not and cannot automatically establish the “impact” of the TBI.

Confirming that an injury has occurred does not shed light upon the **effect** of the injury on subsequent physical, educational, behavioral, emotional, social outcome.

Once medical documentation has been established, CDE requires that school teams continue to collect a **body of evidence** to establish “educational impact.”



# Structured Interview

- Structured Interview questions should include (for each incident):
  - Where
  - When
  - How
  - Medical intervention(s) sought at the time, later, through the recovery
  - Are answers medically plausible?

\*Be aware of assumptions – “scalp laceration” or “head injury” does not automatically mean a “brain injury”



Code: \_\_\_\_\_ Date Received: \_\_\_\_\_



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**Brain Check: Screening Tool Project**  
Parent/Guardian Survey

**Student Information**

Today's Date: \_\_\_/\_\_\_/\_\_\_

Child's Age: \_\_\_\_\_

Child's Date of Birth: \_\_\_/\_\_\_/\_\_\_

Child's Gender:  Male  Female

Child's race:  
(circle one or more)

- |                                              |                                                 |
|----------------------------------------------|-------------------------------------------------|
| 1: American Indian/Alaska Native             | 4: Black or African American                    |
| 2: Asian                                     | 5: White                                        |
| 3: Native Hawaiian or Other Pacific Islander | 6: More than one race<br>Please describe: _____ |

Child's ethnicity:  
(circle one)

- |                           |                            |
|---------------------------|----------------------------|
| 1: Hispanic or Latino     | 3: Unknown or Not Reported |
| 2: Not Hispanic or Latino |                            |

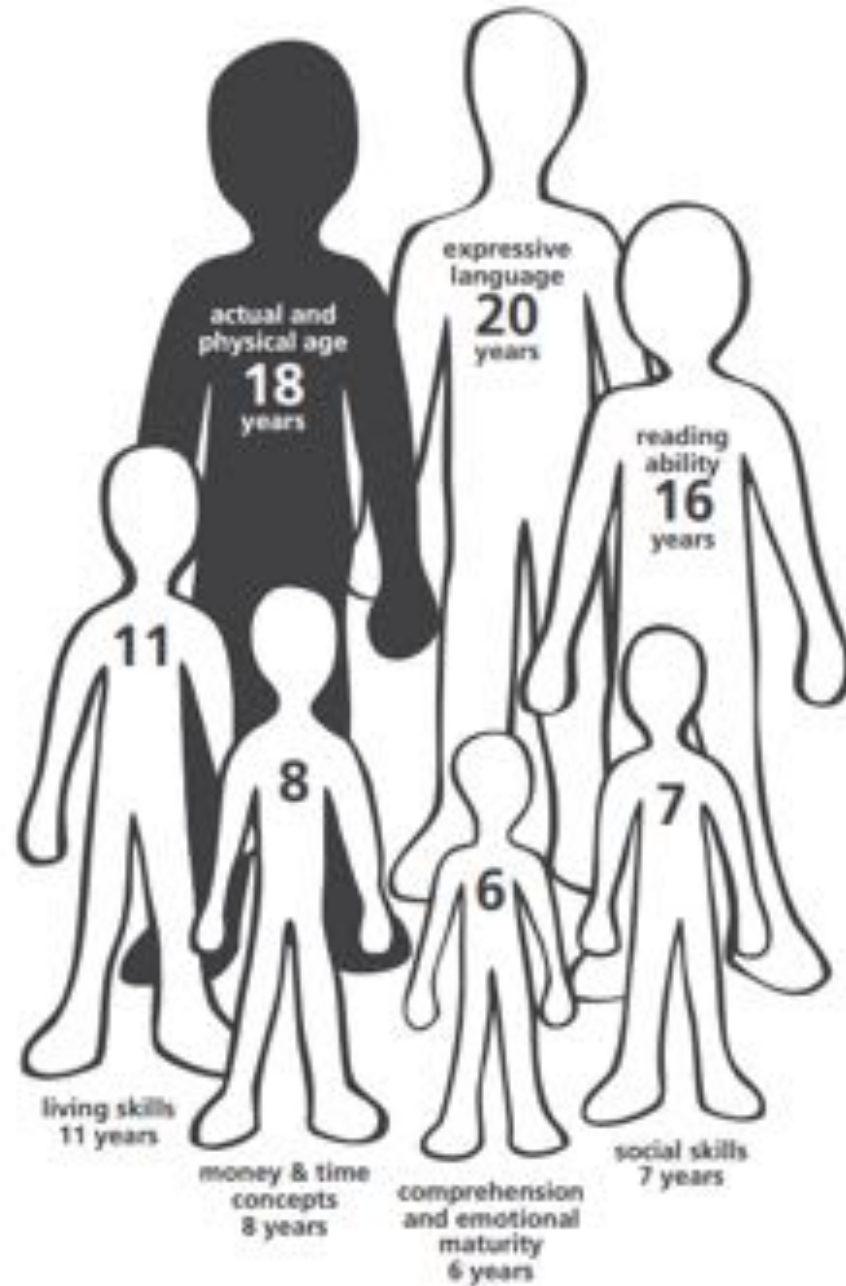


# Confirm Team Findings

- With a formal screen – recommend the Brain Check Survey - <http://www.lobi.chhs.colostate.edu/index.aspx>
- History of Injuries (All ABI's)
- Functional Changes – Learning, Behavior, Cognitive, Physical Symptoms



# Unevenness



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



# Can't versus Won't

Skill versus Will





# REFRAME THE BEHAVIOUR

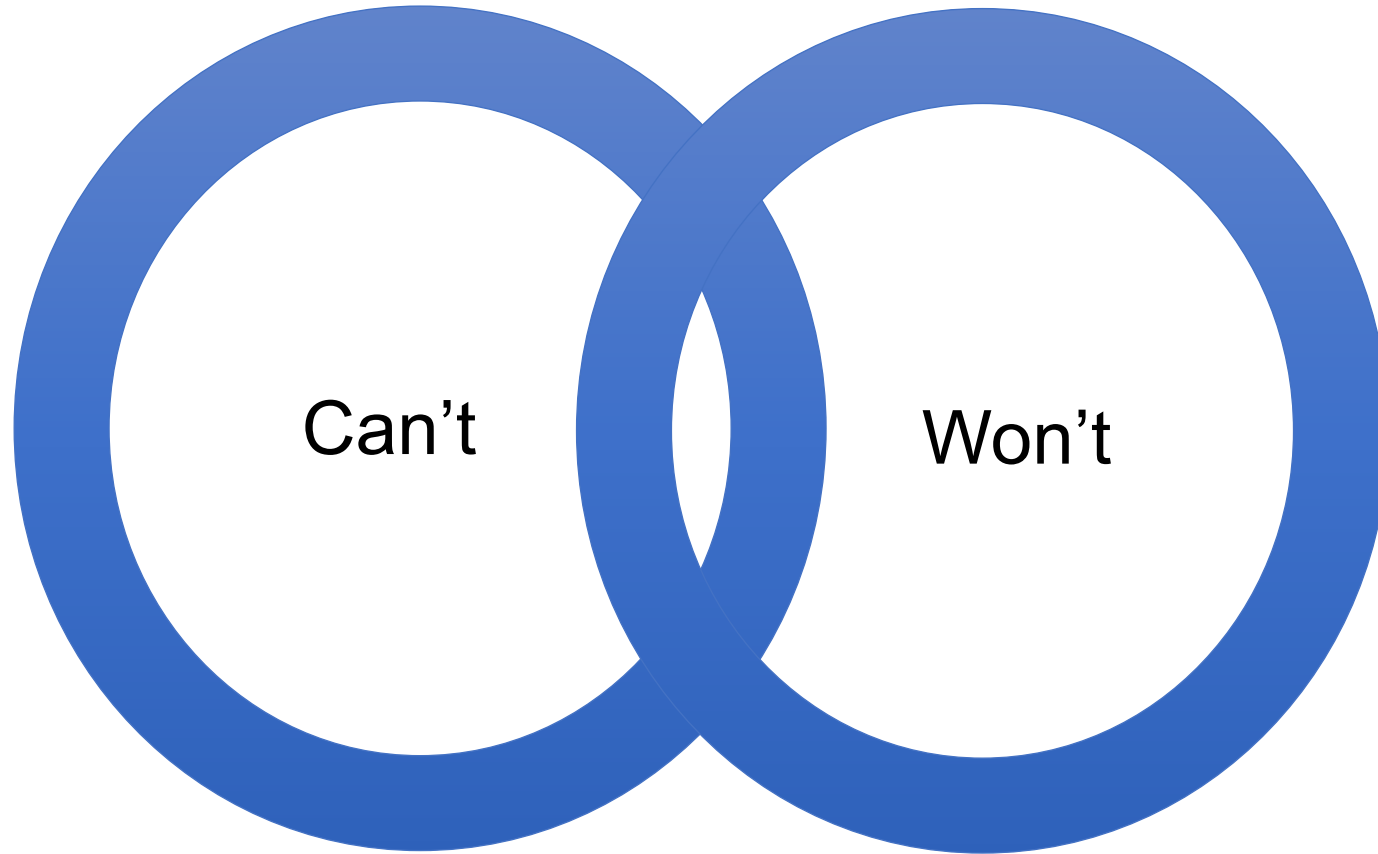
"KIDS DO WELL IF THEY CAN"  
~ROSS GREENE



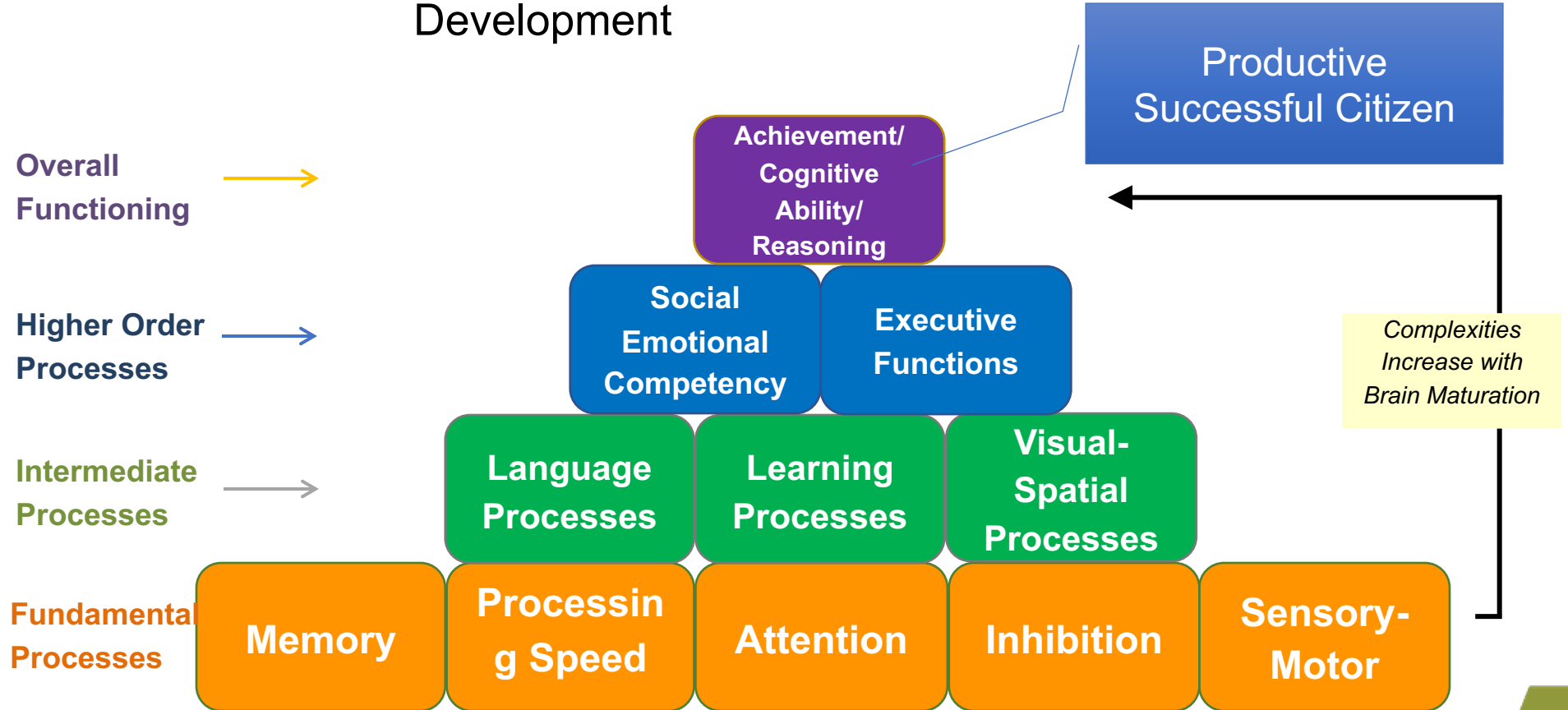
"SEE A CHILD DIFFERENTLY, YOU SEE A DIFFERENT CHILD"  
~Dr. Stuart Shanker

When kids exhibit challenging behaviour we can be "STRESS DETECTIVES"...finding and removing barriers.

- FIND STRESSORS → REDUCE THEM
  - FIND UNMET NEEDS → MEET THEM
  - FIND SKILLS DEFICITS → TEACH THEM
- @kwsn62



# Hierarchy of Neurocognitive Development



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



# Consequence-Based Strategies

Thus, behavior management techniques can be classified into two categories:

(1) antecedent strategies, which are used before a behavior occurs in an effort to prevent or elicit a behavior, and

**(2) consequent strategies, which are used after a behavior occurs in an effort to prevent the continuation and recurrence of a behavior or to reinforce a behavior.**



# Antecedent Management

Thus, behavior management techniques can be classified into two categories:

- (1) antecedent strategies, which are used before a behavior occurs in an effort to prevent or elicit a behavior, and**
- (2) consequent strategies, which are used after a behavior occurs in an effort to prevent the continuation and recurrence of a behavior or to reinforce a behavior.

Although both can be effective ... in their own way, when applied at the right times.

**Crisis Prevention instead of Crisis Management**



# Collaborative Problem-Solving CPS

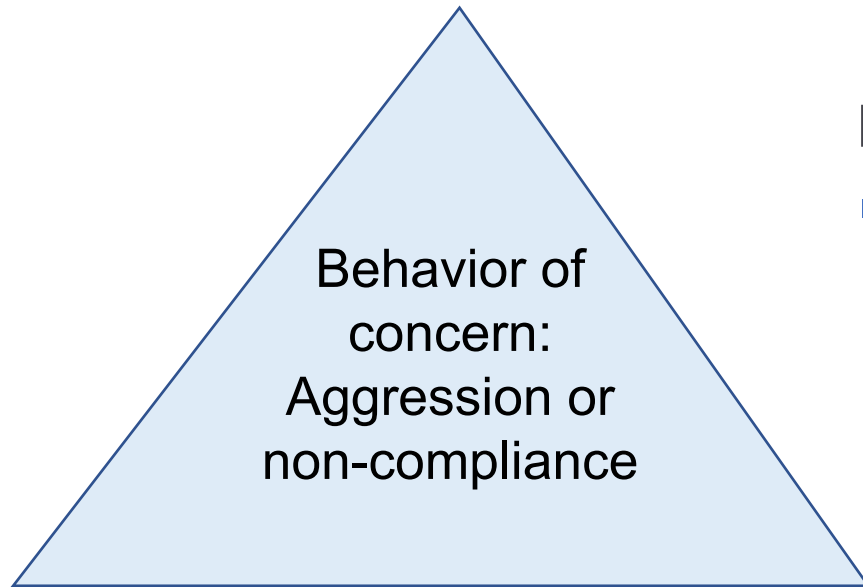
People Do Well If They Can This is the most important theme of Collaborative Problem Solving: **the belief that if a person *could* do well, they *would* do well**. In other words, if the person had the skills to exhibit adaptive behavior, he/she wouldn't be exhibiting challenging behavior. That's because doing well is always preferable to not doing well.

## What's Your Explanation?

Your explanation for challenging behavior has major implications for how you'll try to help. If you believe a person's behavior is challenging because of lagging skills and unsolved problems, then rewarding and punishing may not be the ideal approach. Solving those problems and teaching those skills would make perfect sense.



# Going Beyond FBA



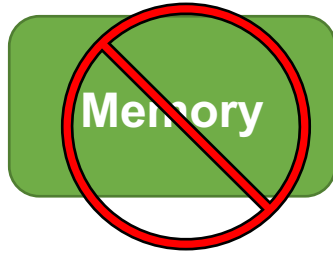
## Functional Behavioral Assessment (FBA)

- Behaviors serve a function and have a purpose, usually:
  - To get something (e.g., attention, money, good grades, power, control)
  - To avoid/escape something (e.g., punishment, embarrassment, out of work)

Presupposes “will”

## Function of the Behavior





- Lack of attention to feedback in environment = poor MEMORY & poor LEARNING = repetitive mistakes



**Executive DYSFUNCTION:**

- Inability to delay gratification (wait)
- Inability to manage time – no future thinking which results in poor planning, organization or initiation

**Social INCOMPETENCE:**

- Inability to make better behavioral or social decisions.

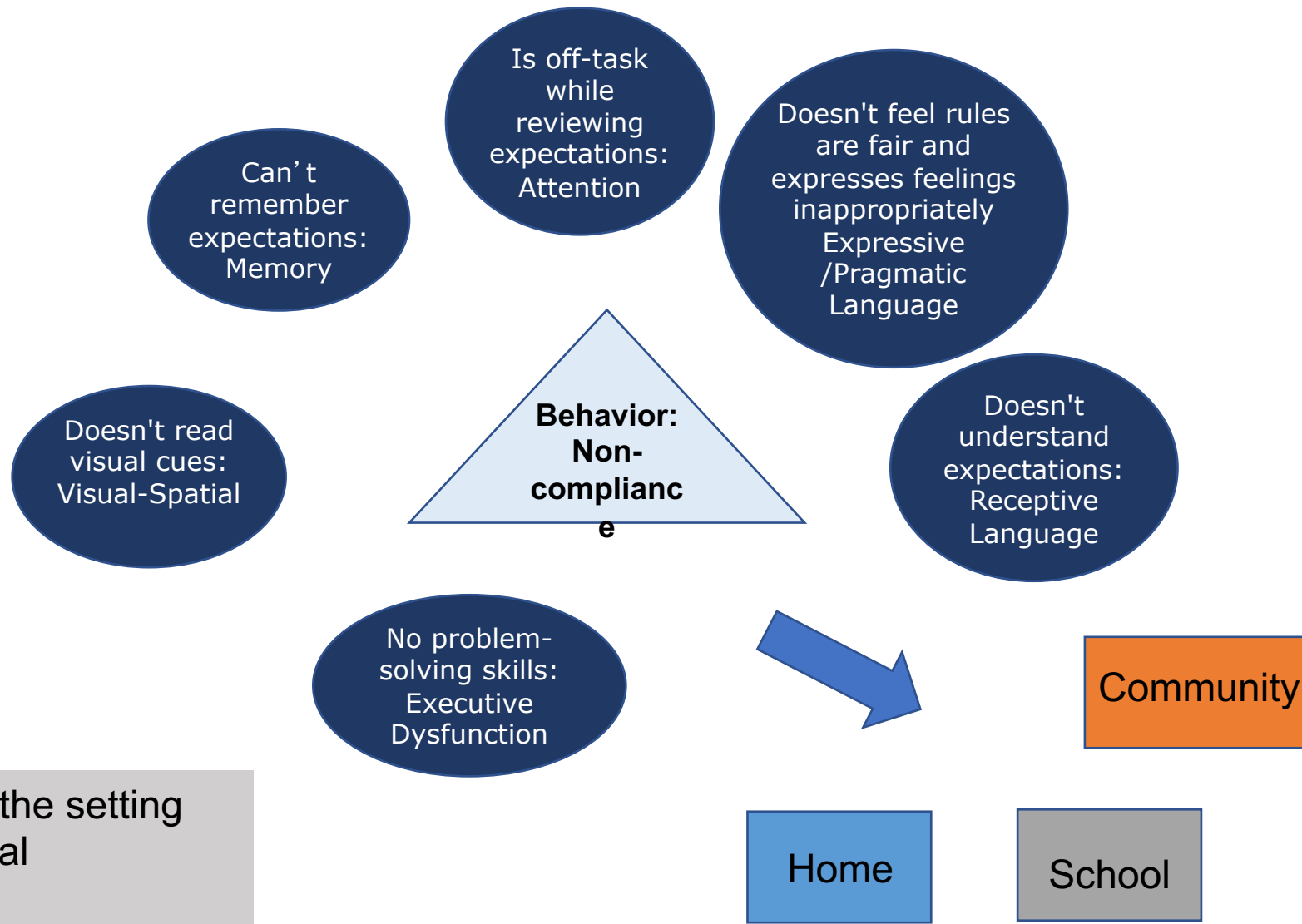




# What do you know (suspect) about your student?

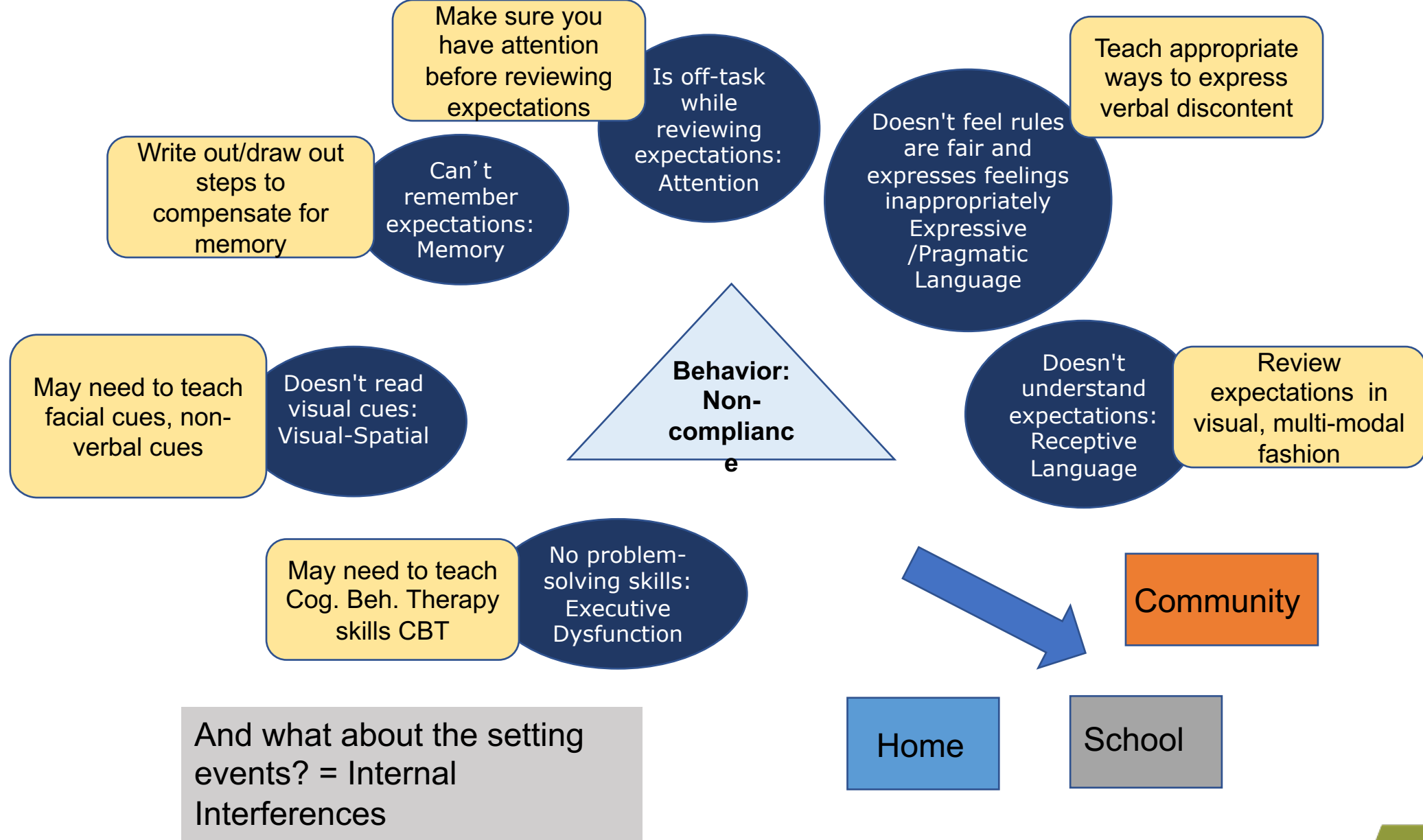
- Toxic stress?
- Mental health issues?
- FASD?
- Traumatic Brain Injury or Non-Traumatic Brain Injury? Assault? In a gang?
- Risky Behavior? Motor vehicle accident? Motorcycle accident? Falls?
- A victim of domestic violence? The abuser? The victim of child abuse?
- Substance Abuse?





# Function of the Behavior

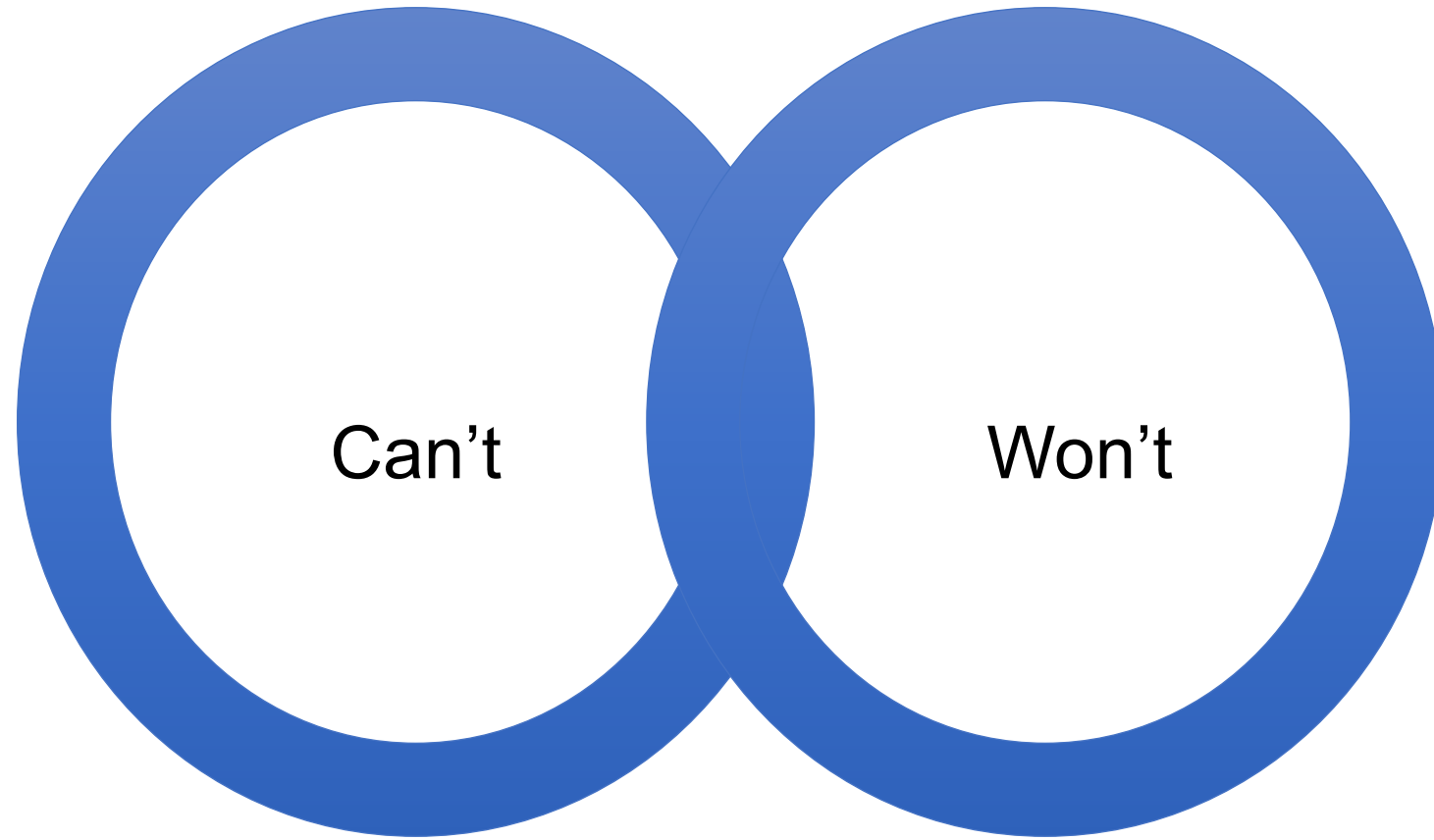




# Function of the Behavior



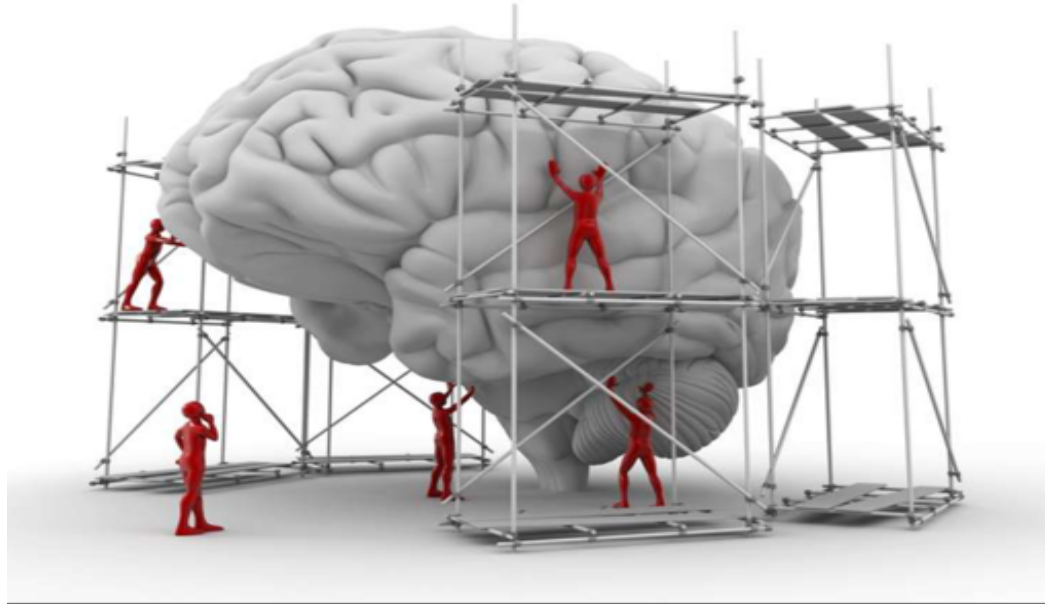




**Saving Face signifies a desire -- or defines a strategy -- to avoid humiliation or embarrassment, to maintain dignity or preserve reputation.**  
**Acknowledging a skill deficit requires courage – and trust of you and the system**



# Questions?



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Brain Injury Educational Consulting Colorado, LLC  
[Karen@GetSchooledOnConcussions.com](mailto:Karen@GetSchooledOnConcussions.com)



# Brain injury Resources

- Centers for Disease Control: <https://www.cdc.gov/traumaticbraininjury>
- Website for Parents and Professionals: [www.COKidswithbraininjury.com](http://www.COKidswithbraininjury.com)
- Brain Injury Manual for Educators: <http://www.cde.state.co.us/cdesped/SD-TBI.asp>
- Brain Check Survey: <http://www.lobi.chhs.colostate.edu/index.aspx>
- Brainline & Brainline Kids - [http://www.brainline.org/landing\\_pages/features/blkids.html](http://www.brainline.org/landing_pages/features/blkids.html)
- Greene (2016) Lost and Found: Helping Behaviorally Challenging Students (and, While You're At It, All the Others)
- Dawson and Guare (2012) Coaching Students with Executive Skill Deficits
- Dawson and Guare (2010) Executive Skills in Children and Adolescents



# Alcohol use Resources

- Brown SA, Tapert SF, Granholm E, Delis DC. Neurocognitive functioning of adolescents: effects of protracted alcohol use. *Alcohol Clin Exp Res*. 2000;24(2):164–171. [[PubMed](#)] [[Google Scholar](#)]
- Tapert SF, Brown SA. Substance dependence, family history of alcohol dependence and neuropsychological functioning in adolescence. *Addiction*. 2000;95(7):1043–1053. [[PubMed](#)] [[Google Scholar](#)]
- Tarter RE, Mezzich AC, Hsieh Y-C, Parks SM. Cognitive capacity in female adolescent substance abusers. *Drug Alcohol Depen*. 1995;39:15–21. [[PubMed](#)] [[Google Scholar](#)]
- Giancola PR, Mezzich AC, Tarter RE. Executive cognitive functioning, temperament, and antisocial behavior in conduct disordered adolescent females. *J Abnorm Psychol*. 1998;107:629–641. [[PubMed](#)] [[Google Scholar](#)]
- Giancola PR, Shoal GD, Mezzich AC. Constructive thinking, executive functioning, antisocial behavior, and drug use involvement in adolescent females with a substance use disorder. *Exp Clin Psychopharmacol*. 2001;9(2):215–227. [[PubMed](#)] [[Google Scholar](#)]
- Moss HB, Kirisci L, Gordon HW, Tarter RE. A neuropsychologic profile of adolescent alcoholics. *Alcohol Clin Exp Res*. 1994;18:159–163. [[PubMed](#)] [[Google Scholar](#)]





# Marijuana Resources

- Campolongo P, Trezza V, Cassano T, et al. Perinatal exposure to delta-9-tetrahydrocannabinol causes enduring cognitive deficits associated with alteration of cortical gene expression and neurotransmission in rats. *Addict Biol.* 2007;12(3-4):485-495. doi:10.1111/j.1369-1600.2007.00074.x
- Antonelli T, Tomasini MC, Tattoli M, et al. Prenatal exposure to the CB1 receptor agonist WIN 55,212-2 causes learning disruption associated with impaired cortical NMDA receptor function and emotional reactivity changes in rat offspring. *Cereb Cortex N Y N 1991.* 2005;15(12):2013-2020. doi:10.1093/cercor/bhi076
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- Rubino T, Realini N, Braida D, et al. Changes in hippocampal morphology and neuroplasticity induced by adolescent THC treatment are associated with cognitive impairment in adulthood. *Hippocampus.* 2009;19(8):763-772. doi:10.1002/hipo.20554
- Gleason KA, Birnbaum SG, Shukla A, Ghose S. Susceptibility of the adolescent brain to cannabinoids: long-term hippocampal effects and relevance to schizophrenia. *Transl Psychiatry.* 2012;2:e199. doi:10.1038/tp.2012.122
- Quinn HR, Matsumoto I, Callaghan PD, et al. Adolescent rats find repeated Delta(9)-THC less aversive than adult rats but display greater residual cognitive deficits and changes in hippocampal protein expression following exposure. *Neuropsychopharmacol Off Publ Am Coll Neuropsychopharmacol.* 2008;33(5):1113-1126. doi:10.1038/sj.npp.1301475
- Batalla A, Bhattacharyya S, Yücel M, et al. Structural and functional imaging studies in chronic cannabis users: a systematic review of adolescent and adult findings. *PLoS One.* 2013;8(2):e55821. doi:10.1371/journal.pone.0055821
- Filbey FM, Aslan S, Calhoun VD, et al. Long-term effects of marijuana use on the brain. *Proc Natl Acad Sci U S A.* 2014;111(47):16913-16918. doi:10.1073/pnas.1415297111
- Pagliaccio D, Barch DM, Bogdan R, et al. Shared predisposition in the association between cannabis use and subcortical brain structure. *JAMA Psychiatry.* 2015;72(10):994-1001. doi:10.1001/jamapsychiatry.2015.1054

