

The Ins and Outs of Adolescent Brain Development



... You can make a difference!

Objectives



At the end of today's webinar, participants will be able to:

- Define “executive function” and give examples
- Describe the development of the prefrontal cortex during adolescence
- List behaviors that indicate immature brain development in adolescents
- Describe strategies adults can use to help adolescents improve decision-making skills

The Adolescent Brain: An Example

Last weekend, **Jacob** celebrated his birthday with a sleepover party that included four male friends. The five boys were in the basement playing video games. Jacob's mom received a call about 9:30 pm from the police, asking her to come down to the local laundromat. When Jacob's mom arrived, she learned from the officer that the five boys had slipped out of the basement, gone down to the laundromat, and were taking turns drying each other in the large industrial clothes dryers. A customer at the laundromat flagged down the officer, who asked the boys why they were playing in the dryers.

Why did Jacob and his friends do this?

About how old do you think Jacob is?



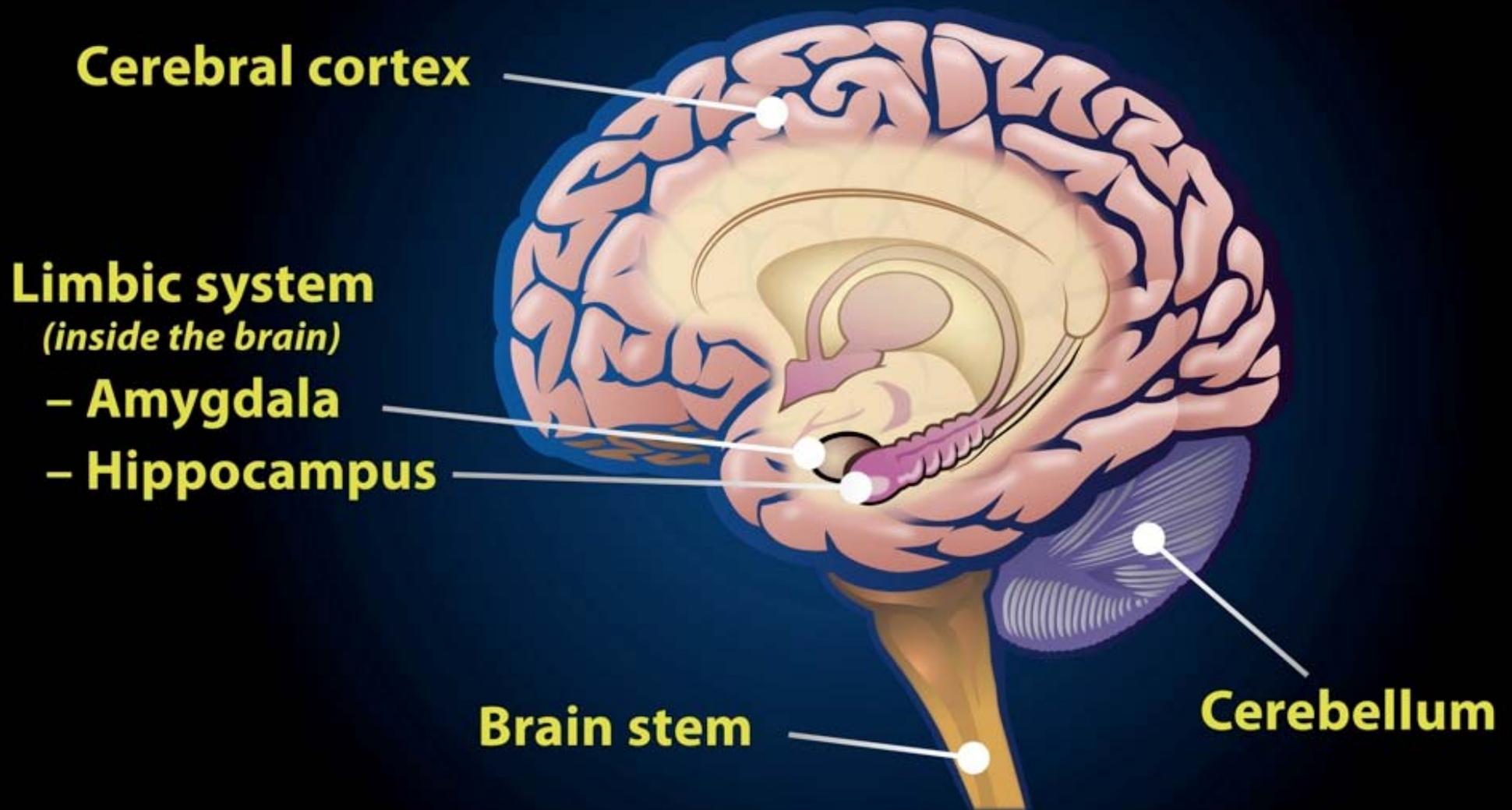
Why is it so important to study the brain?

Recent brain research tells us...

- *The brain is not fully developed at birth*
- *Important foundations are formed before age 3*
- *Early, positive interactions with nurturing adults are vital to healthy brain development*
- *Sensory experiences affect early brain development*



Parts of the Brain

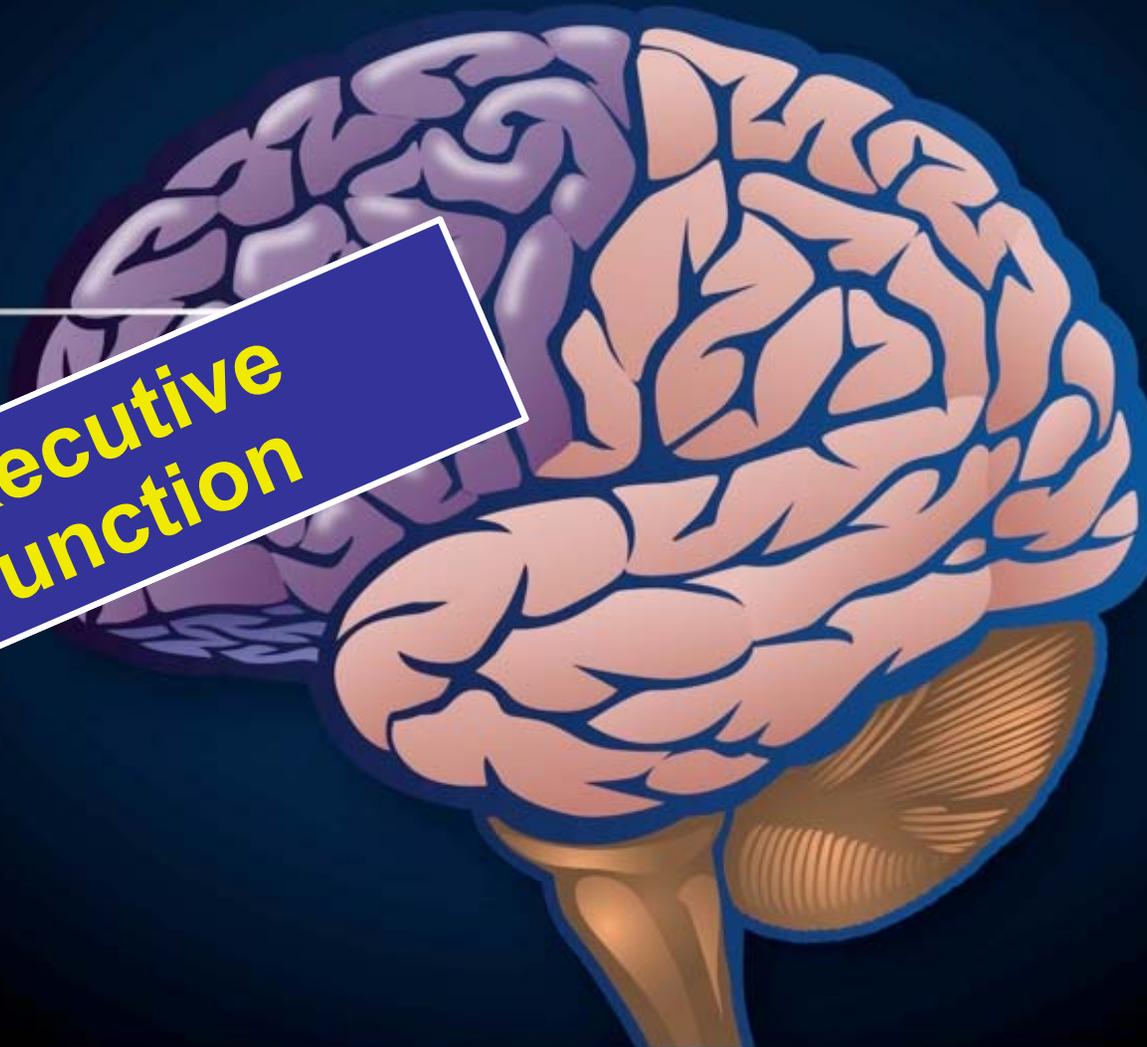


Lobes of the Brain

- ▶ Four lobes in each hemisphere

Frontal

Executive
Function



What Is Executive Function?

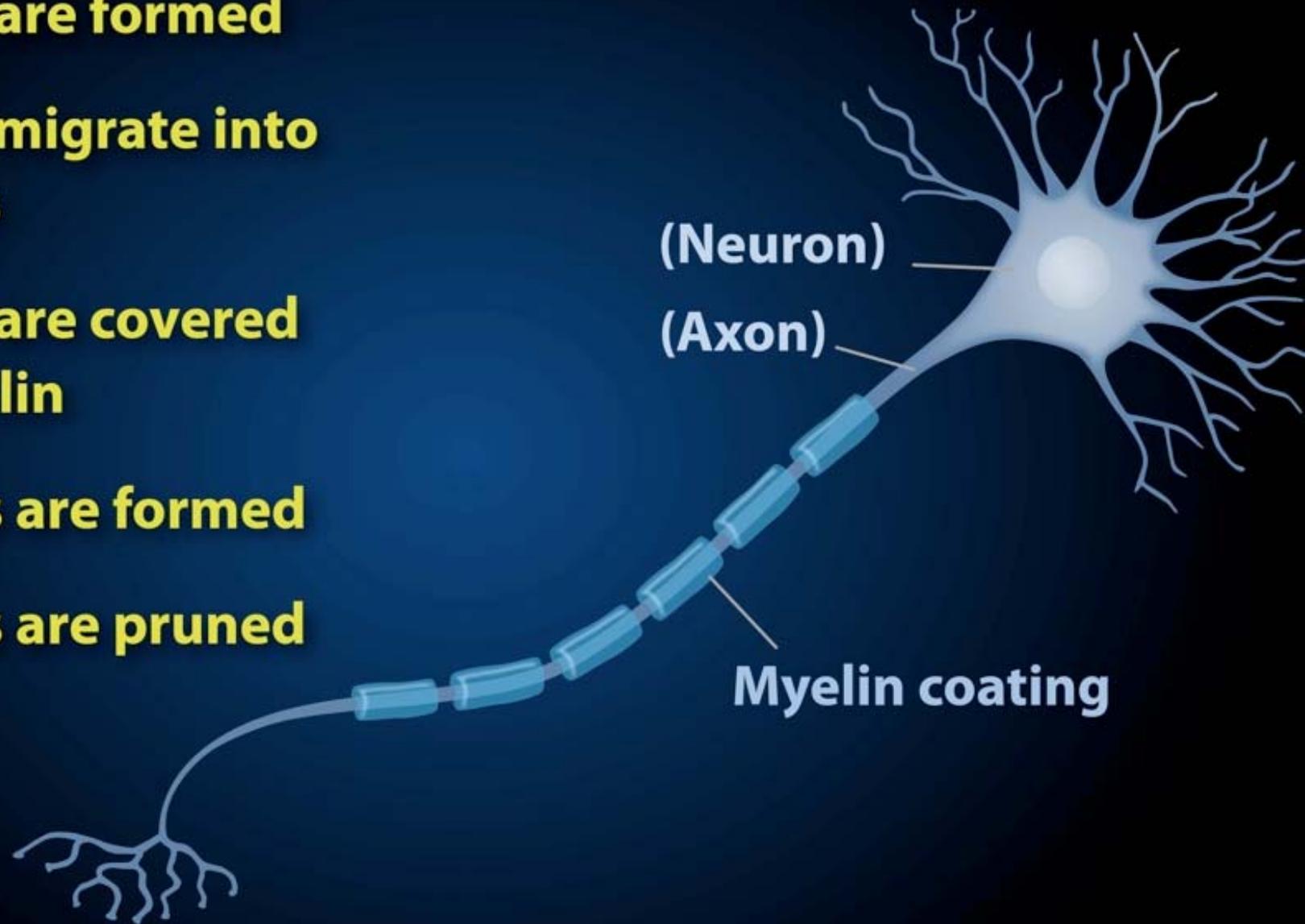
- **Higher-order thinking skills that enable complex problem solving and goal-directed behavior**
 - * **Planning**
 - * **Focused attention and filtering distractions**
 - * **Remembering instructions even when interrupted**
 - * **Appropriate multi-tasking**
 - * **Prioritizing tasks and setting goals**
 - * **Evaluating progress toward goals**
 - * **Controlling impulses and self-regulation**

Executive Function and the Brain

- Largely controlled in the prefrontal cortex
- Last part of the brain to finish developing
- Depends on three types of brain function
 - * Working memory
 - * Cognitive flexibility
 - * Inhibitory self-control
- Foundations begin developing early
- Development depends on practice in supportive environments that scaffold progress

How the Brain Develops

1. Neurons are formed
2. Neurons migrate into positions
3. Neurons are covered with myelin
4. Synapses are formed
5. Synapses are pruned



Adolescent Development

- ▶ **Myelination continues in frontal lobes**
- ▶ **Pruning and some synapse formation continue**
- ▶ **Areas for planning and judgment finish developing last**



Key Changes in the Adolescent Brain

- Increase in gray matter
- Quicker reaction time
- Better reasoning abilities
- Hormone changes affect social behavior and responses to stress
- Continued improvements in impulse control
- Parts of the brain responsible for emotional responses are better-developed than parts responsible for self-control



Some Issues Related to Teen Brains

- Continuing challenges with impulse control
- Changes in sleep patterns
- Increase in risk-taking behaviors
 - Drinking alcohol
 - Smoking
 - Using drugs
 - Sexual experimentation
- Driving a car



Sleep and the Adolescent Brain

- Adolescents require as much sleep time as younger children, but don't always get it
- Sleep patterns change with puberty
- Differences in weekday and weekend sleep-wake patterns
- Common adolescent sleep problems include too little sleep, trouble falling asleep or awakening, and poor quality sleep
- Consequences may include increased risk of injury, poor school performance, negative mood, and increased stimulant use



Sleep and Teens: What Adults Can Do

- Structure and encourage regular sleep schedules
- Create effective sleep environments
- Adjust high school start times to accommodate adolescents' sleep patterns
- Limit the hours and times of day adolescents are allowed to work for pay
- Teach about the dangers of drowsy driving
- Encourage balance in teens' schedules
- Be alert to signs of sleep deprivation



Alcohol and the Adolescent Brain

- The teen brain processes alcohol differently than the adult brain
 - * Adults tend to drink more overall
 - * When teens drink, they are more likely to binge
- Regular alcohol use can cause long-term impairments in brain functioning
- Risk of alcohol dependence is higher in
 - * Younger drinkers
 - * Binge drinkers

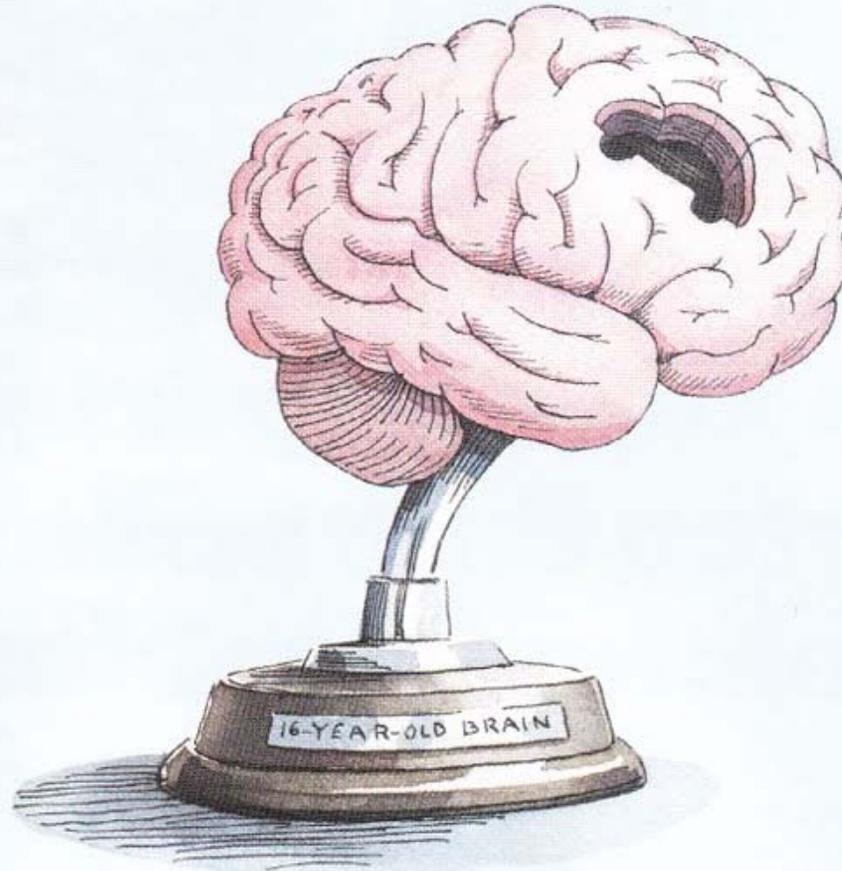


Driving and the Adolescent Brain

Why do most 16-year-olds drive like they're
missing a part of their brain?



BECAUSE THEY ARE.



Driving and the Adolescent Brain

- Motor vehicle crashes are the leading cause of death for 15 – 20 year olds
- Teens tend to take more risks when driving
- Risk-taking is higher when other teens are in the car
- Time and experience needed to build complex skills required for safe driving



Georgia's Graduated Driver Licenses

- Step 1: Instructional Permit (age 15)
- Step 2: Intermediate License (ages 16 – 17)
 - Driver Education and road experience requirements
 - Stricter limits on cell phone use while driving
 - Restrictions on passengers
 - First 6 months: Immediate family only
 - Next 6 months: No more than one non-related passenger under 21
 - After first 12 months: No more than three non-related passengers under 21
 - Limits on driving hours
- Step 3: Full License (age 18)



Risk-Taking in Adolescents: What Adults Can Do

Set the stage for adolescent decision making

- Build solid relationships with children
- Provide opportunities for independence and decision making (*beginning before adolescence*)
- Maintain open communication; and LISTEN
- Be an “askable” adult

Have appropriate expectations

- Set limits, and explain them
- Be specific about appropriate behavior
- Create safety plans



Risk-Taking in Adolescents: What Adults Can Do

Respond appropriately to risk-taking

- Follow through on safety plans
- Use consequences of decision-making as teaching opportunities
- Don't "rescue" teens from every case of bad judgment
- Continue to provide support
- Be patient – recognize that the brain is still developing!



Some Resources on the Adolescent Brain



- *Key Concepts: Executive Function: Harvard Center on the Developing Child - <http://bit.ly/execfunction>*
- *Building the Brain's "Air Traffic Control" System: How Early Experiences Shape the Development of Executive Function: Harvard Center on the Developing Child - <http://bit.ly/VG7Q3T>*
- *Adolescent Brain Development: Unlocking the Potential of Georgia's Youth - <http://bit.ly/BBBadolbrainbrief>*

Some Resources on the Adolescent Brain



- *The Teen Brain: Still Under Construction:* National Institute of Mental Health - <http://bit.ly/NIMHteenbrain>
- *Adolescent Sleep Needs and Patterns: Research Report and Resource Guide:* The National Sleep Foundation - <http://bit.ly/1ojVGVI>
- *The Teen Brain:* Harvard Magazine - <http://bit.ly/1ojXpdp>

Brain Development

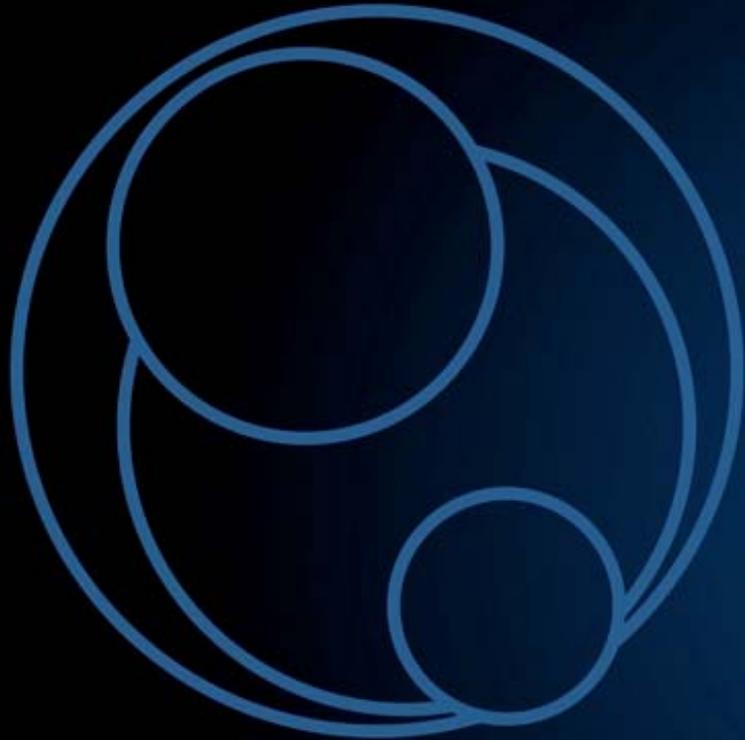
Society cannot continue to ignore the laws of biology. The more we learn about early brain development, the more responsibility we have to act on that knowledge.

—Bruce D. Perry, M.D., Ph.D.

...you can make a difference!



Contact Us



Learn more about
Better Brains for Babies at
www.bbbgeorgia.org



Find us on Facebook

Contact Better Brains for Babies at
info@bbbgeorgia.org or
706-542-7566

...you can make a difference!

This project was supported in part by the Governor's Office for Children and Families through the U.S. Department of Health and Human Services, Administration for Children and Families, Community Based Child Abuse Prevention and Treatment Act (CFDA 93.590). Points of view or opinions stated in this document are those of the author(s) and do not necessarily represent the official position or policies of the Governor's Office for Children and Families or CBCAP. The total dollar amount for this project is \$50,000 and 100% of the cost is Federal funds.



Governor's Office for
Children and Families

