

## Teen Brain Development

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## Overview

At the conclusion of this session, participants will be able to:

- Describe basic brain development in adolescents
- Describe basic adolescent development across physical, emotional and cognitive tasks
- Discuss normal adolescent risk taking and impulsive behavior

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## Brain Basics – Development

A message comes into a brain cell, the cell does its work and sends the message on to other brain cells.



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## Brain Basics – Development

- The brain is an amazing organ that controls most of the things we do. As the brain develops it focuses on different areas of functioning:
  - First – **Physical** life functions (breathing, heart rate, blood pressure)
  - Next – **Emotional** (happiness, anger, attachment)
  - Last – **Thinking** (planning, impulse control)

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## Brain Basics – Plasticity

- **Critical Periods** – for **some** aspects of brain development, timing is critical. Important abilities will be lost or diminished if they don't develop at the right time.
- Childhood experiences impact how the brain develops.
- Negative early childhood experiences can result in developmental delays.
  - Don't confuse a youth's age with his or her developmental level.

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## Brain Basics – Plasticity

- Activity-dependent changes:
- Experiences cause changes in the brain, for better or worse
  - This is why we practice behaviors – the more we repeat things the stronger the brain connections.
  - A single, powerful experience can affect our brain for life.
  - Repeated smaller experiences can also change our brain.
- This is why there is always hope that youth can get better with new, positive experiences.

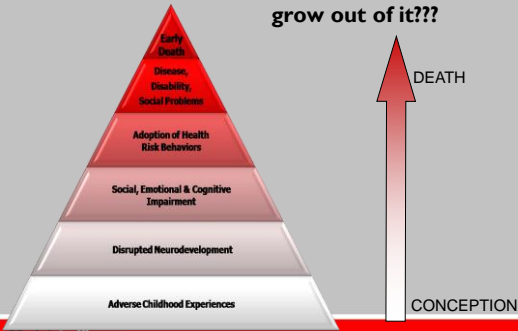
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## Adverse Childhood Experiences:

(Felitti, 2002)

It's just a phase, they'll  
grow out of it???



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## Teenage Brain Development

- Adolescence changes begin around ages 10-13.
  - Physical Appearance (puberty)
  - Emotions (feelings and identity)
  - Thinking (planning and impulse control)
- We usually identify adolescence as starting when we see physical changes. Though less obvious, these physical changes will be followed by changes in emotional expression and thinking.
- But the changes in thinking aren't in place until the early 20's.

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## What Science Tells Us About the Brain

- Functioning of the frontal lobes is not at adult levels.



- Why is that important?

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## Teenage Brain Development

- Adolescence is like giving a teenager a car with:
  - A new body with a lot of horsepower (physical);
  - A sensitive gas pedal that can go from 0-60 mph in a few seconds (emotional); and
  - A brake system that won't work completely for several years (thinking).



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## Cognitive Development

- Science has taught us that the part of the brain that develops most during adolescence is the prefrontal lobe, which controls:
  - Complicated decision-making
  - Thinking ahead
  - Planning
  - Comparing risks and rewards

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## Cognitive Development

- This new science has also taught us that the prefrontal lobe is still developing and maturing through adolescence and into the early 20's.
- What does this suggest?

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### Cognitive Development

- It suggests that
  - Because the brains of teenagers are not yet fully developed, some of their behaviors may result from immaturity.
  - Recall your teenage behavior: did you do anything that could have gotten you stopped by police?
  - Would you deal with that same situation differently now as an adult?

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### Cognitive Development

- If a four year old child doesn't follow signs posted on a bus do we hold them responsible?
  - No, because we realize they are not yet capable of reading.
- Even though teenagers start to look like adults, they are still limited by their cognitive development.
- Don't confuse physical development with emotional or cognitive development.

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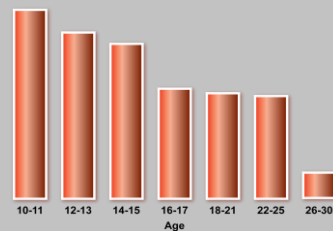
### Cognitive Development

- So, what are some of the types of thinking that will change between adolescence and adulthood?
  - Self-control
  - Short-sightedness
  - Susceptibility to peer pressure

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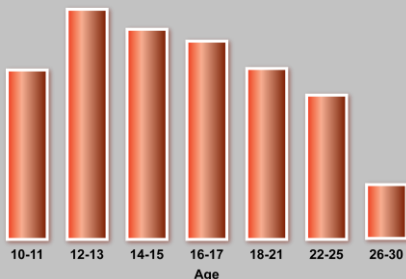
### Impulsivity Declines with Age



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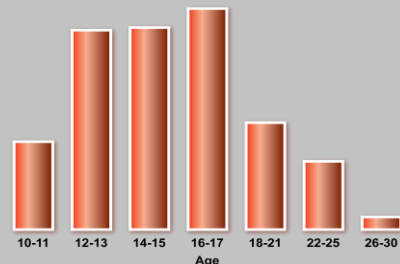
### Sensation-Seeking Declines with Age



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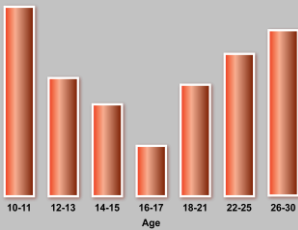
### Preferences for Risk Peaks in Mid-Adolescence



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### Risk Perception Declines and Then Increases After Mid-Adolescence



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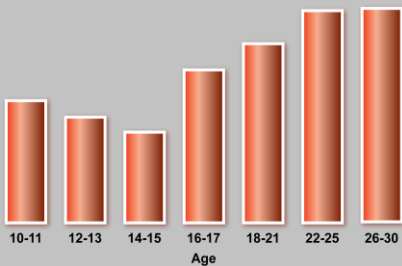
### Short Sightedness

- Teens focus
  - More on gains, and
  - Less on loss
- Teens focus
  - More on what they will get right now, and
  - Less on what might happen in the future
- But, we know from the new brain research that the teenage brain will continue to mature and that, over time, teens will begin to think more like adults.

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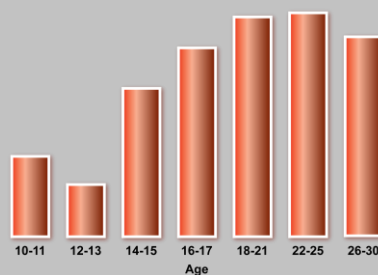
### Future Orientation Increases with Age



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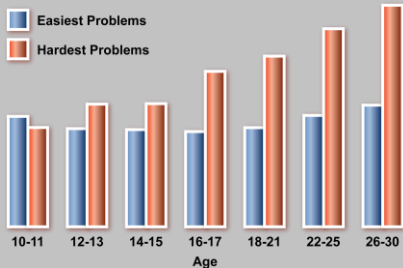
### Older Individuals Are More Willing to Delay Gratification



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### With Age, Longer Time Spent Thinking Before Acting



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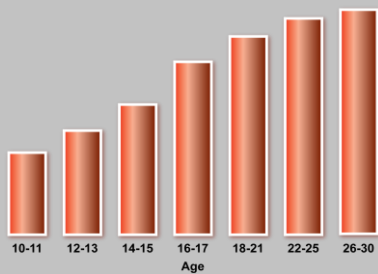
### Susceptibility to Peer Pressure

- Looking for affiliation
- Social approval and risk
- When you were a child, most of your world revolved around home and family. When did that start to shift to your peers?
- When did you stop telling your parents everything you did with your peers?

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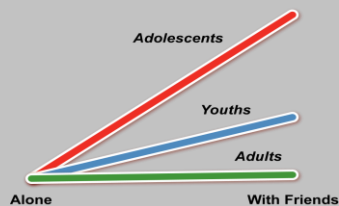
### With Age, Individuals Become More Resistant to Peer Influence



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### Peers Increase Risky Driving Among Teenagers and College Students but Not Adults



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### Summing Up Cognitive Development

- Adolescents are less able to control impulses and more driven by the thrill of rewards
- Adolescents are more short-sighted and oriented to immediate gratification
- Adolescents are less able to resist pressure from peers

(Steinberg 2007)

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### Trauma

- New field of research focusing on the impact of early adverse experiences on youth



- Disruption of normal child development

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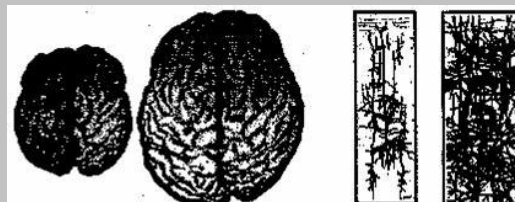
### Trauma's Impact on the Brain

- Disruption in Neural Development can include:
  - Failure to expose youth to appropriate experiences at the critical times (Neglect)
  - Overwhelming the brain's alarm system (Abuse)

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### Normal Brain Development



Newborn

6 Year Old

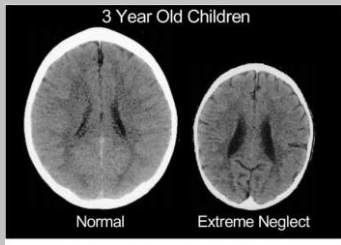
Newborn

6 Year Old

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## Disrupted Brain Development From Childhood Neglect



[www.childtrauma.org](http://www.childtrauma.org)

Bruce D. Perry, M.D., Ph.D.  
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## Trauma and Alarm



- Alarm System as a Survival Mechanism
- Extreme or frequent threats can damage the alarm system
- With trauma, the alarm system is too easily triggered and too slow to shut down



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## Traumatic Response Styles

- Fight
- Flight
- Dissociation
  - Nonresponsive
  - Self-Mutilation
  - Passing Out

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## Trauma and Triggers



- After Trauma
  - Youth is on Constant Alert
  - Youth may overinterpret signs of danger
  - Youth overreacts to normal situations



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## So, What Can Adults Do to Help Adolescents?

- Brain Plasticity – Youth brains develop based on what they experience
- Adolescence can be a time of positive experiences
- Adults can help teenagers develop strengths
  - Calming and self-regulation skills
  - Assertiveness rather than aggression
  - Problem-solving skills

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## System Responses

- Science doesn't tell us where to draw these age lines
- BUT the policies chosen should at least be compatible with the scientific evidence
- AND policies chosen should also reflect costs of erroneously severe reactions and punishments vs erroneously lenient ones

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