"What’s happening in the teenage brain and why does it matter"?
Open Classroom webinar
October 2021

Lorien Carter, MSW (She/Her/Hers)
Associate Professor of Practice in Social Work

Introduction

Lorien Carter is an Associate Professor of Practice at the Brown School at Washington University in St. Louis. She teaches graduate level Social Work Practice and Administration courses in Foundations and the Children, Youth and Family concentration. She is a 4-time recipient of the Excellence in Teaching Faculty Award.

An MSW graduate of the Brown School, Lorien has 10 years of direct Social Work practice with adolescents in public school and health care settings, spending the first 4 years of her career as a high school social worker followed by 6 years of program coordination and management experience at a hospital based teen pregnancy clinic.

Lorien continues to be actively involved in the professional Social Work field. She is a highly sought-after facilitator for workshops and trainings on topics related to adolescent development, reproductive and sexual health education, groupwork facilitation, self-care practices, logic models, conflict management strategies and professional teambuilding.
Our agenda for today

- Reflect on what we remember from our teenage years
- Introduce domains of adolescent development
- Deep dive into adolescent brain development
- Discuss how traumatic experiences impact brain development
- Throughout, discuss strategies that can help all of us understand and thus interact differently with the teenagers in our schools, on our caseloads, in our homes and in our lives.
Not “big kids”

Not “little adults”

ADOLESCENCE IS A PERIOD OF UNIQUE GROWTH & DEVELOPMENT

Teenagers are exquisitely sensitive, highly adaptable creature(s) wired almost perfectly for the job of moving from the safety of home into the complicated world outside.”

“This is the most difficult thing that humans do, as well as the most critical—not just for individuals but for a species that has shown an unmatched ability to master challenging new environments. In scientific terms, they are quite possibly the most fully, crucially adaptive human beings around. Without them, humanity might not have so readily spread across the globe.”

7 Strategies to Properly Engage the Teenage Brain
National Geographic article (Dobbs)
Adolescent brain development is happening in the context of other domains of adolescent development.

**Physical**

**Psychological**

**Cognitive**

**Social**

**Moral**

**Cognitive Development** (connected to brain development)

**Egocentric thinking**

Elkind’s Adolescent Egocentrism

*What it Looks Like...*

1. **The imaginary audience**
   - Everyone is looking at me!

2. **The mythological fable**
   - That won’t ever happen to me!

3. **The personal fable**
   - Nobody knows what it’s like to be me!
Cognitive Development (connected to brain development): Abstract Thinking

Abstract Thinking

Adolescent cognition shows greater abstract quality in ability to:
- Solve problems by verbal means alone
- Create make-believe or purely hypothetical situations
- Engage in extended speculation and test solutions systematically
- Engage in “hypothetical-deductive reasoning,” which involves formulating and testing possible solutions to problems.

Concrete thinking

Abstract thinking

You said I’d get ill if I missed my asthma inhalers. But I forgot them twice, and I stayed fine, so I don’t need them any more

I missed my inhalers a couple of times, but I think I got away with it because I wasn’t doing much exercise. I think I’ll still need them in the future if I’m doing lots of exercise or in cold weather

How to respond to adolescents in a developmentally appropriate manner

When working with a concrete thinker:

Give opportunities for them to experience the “closest proximity” to the actual outcome.

When adolescent egocentrism appears:

Say something like: “you’re right. I don’t know what that’s like for you. Can you tell me more about what you’re going through?”

When the “what if...” caused by emerging abstract cognition appears:

Explore further what they’re worried about and reassure them that no matter what happens, you’ll help them through it (even if what they’re worried about is very unlikely to happen).
What’s Happening In the Teenage Brain?

Neurotransmitters: Dopamine, Serotonin, Melatonin

Hormones: Estrogen, Testosterone

Brain Development Is Use-Dependent

brains like to create efficiencies

DNA triggers development
USE informs how it unfolds

Which neural pathways are created, used, & become strongest (myelinization)
Which neural pathways go unused (pruned)

In many ways, brains are custom built!
What promotes myelination?

What else promotes myelination?
In this series of brain scans taken from age 5 through age 20, blue areas indicate more mature and efficient networks within the brain. In mid-to-late adolescence, the brain rapidly matures. The front areas associated with critical thinking and planning continue to develop through the teenage years to the early 20s, and the temporal lobe, located in the bottom curve and associated with learning and memory, is among the last areas to fully mature.

—Source: "Dynamic Mapping of Human Cortical Development During Childhood Through Early Adulthood," Proceedings of the National Academy of Sciences
Amygdala Thinking = EAT
Emotion – Action – Thinking (EAT)

As brain develops:

Pre Frontal Cortex Thinking = ETA
Emotion – Thinking – Action (ETA)

---

Pre-Frontal Cortex (PFC)

“LOGICAL BRAIN”: controls the “mature” behaviors that we want teens to exhibit!

- Focusing attention
- Organizing thoughts
- Problem solving
- Identifying and considering consequences of behavior
- Considering the future; making predictions
- Strategizing & planning
- Balancing short-term rewards and long-term goals
- Impulse control
- Delaying gratification
- Managing intense emotions
- Inhibiting inappropriate behavior
- Initiating appropriate behavior
- Adjusting behavior when situations change
- Processing complex information in challenging circumstances
Immature Prefrontal Cortex + Cognitive Development + Social Developmental Influences = Adolescent Thinking Patterns

- Drawn toward risk taking
- Highly influenced by emotions
- Sensation seeking
- Impulsive
- Invincibility “not me…”
- Egocentric/Self-Focused
- Assign HIGH importance to peers

- Overestimate short term rewards, underestimate long term consequences
- Imaginary audience
- Misjudge emotions of others
- Difficulty seeing perspective of others
- Decisions based on peer influence

Hot Thought Cold Thought

<table>
<thead>
<tr>
<th>Hot Thought</th>
<th>Cold Thought</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affective arousal, time pressure, social pressure</td>
<td></td>
</tr>
<tr>
<td>Brain is over-stimulated, uncomfortable, Emotion is likely to take over.</td>
<td></td>
</tr>
<tr>
<td>Non-pressured, “ideal” conditions</td>
<td></td>
</tr>
<tr>
<td>Brain is comfortable, not stressed or overwhelmed. Easiest time to practice logic &amp; reason</td>
<td></td>
</tr>
</tbody>
</table>

Opportunities to practice in Cold Thinking

= Stronger PFC
= ability to handle increased stress & stimuli before emotion takes over
COLD Cognition

Teen is in a program with supportive adults and learns about harmful effects of alcohol. Teen makes a pledge to not drink while underage.

HOT Cognition

Peer begins to more heavily pressure teen. Peer says their older brother drinks beer often & nothing bad happens. Teen worried about how they look in front of peers if they say no. Peer says they have some beer. Teen is walking home with peers ...no adults around. Teen is in a program with supportive adults and learns about harmful effects of alcohol. Teen makes a pledge to not drink while underage.

What does Teen do?

COLD Cognition

HOT Cognition

What were you thinking?

COLD Cognition
“WHAT were you thinking”? should really be...
“with what part of your brain were you thinking?” and
“what was the temperature of your cognition”? 

---

**Tips**

- Stop asking “what were you thinking”?
- Have a conversation (or more than one) with the teenagers you live and/or work with about adolescent brain development and about hot and cold cognition.
- Information is power...
Trauma and the Impact on Brain Development

Survival Mode: Flight/Fight/Freeze
Frontal lobe (Prefrontal cortex) goes offline
Limbic system / mind and lower brain functions take over

How Trauma Affects a Developing Brain

Physical Brain Changes
Smaller brain structures, less brain cells, broken connections between brain cells

Lowers Emotional Control
Brain can’t process emotions, leads to mood disorders and behavior issues

Lowers Learning Ability
Causes trouble concentrating, learning, paying attention, and lowers creativity

Lowers Behavioral Control
Brain changes make it hard to control impulses, behavior, and form relationships
Childhood Trauma Leads to Brains Wired for Fear

NORMAL INFORMATION PROCESSING AND PTSD MALFUNCTIONS IN THE BRAIN

- **Prefrontal Cortex**
  - **Normal Brain**
    - Complex thinking, decision making, and appropriate behavior
  - **PTSD Brain**
    - Dysfunctional thought processes & decision making; inappropriate responses to situations

- **Hypothalamus**
  - **Normal Brain**
    - Releases hormones like cortisol to help manage and direct efforts to stressor
  - **PTSD Brain**
    - Overactive, which leads to imbalances in hormone levels and increases stress and anxiety

- **Amygdala**
  - **Normal Brain**
    - Sets off fight or flight in response to danger
  - **PTSD Brain**
    - Sets off fight or flight in response to memories or thoughts about danger

---

**Paper Tiger** is a literal English translation of the Chinese phrase *zhī lāohū* (Chinese: 紙老虎), meaning something which seems as threatening as a tiger, but is really harmless.
The Stress Response

Doing brain senses danger

The Stress Response

Thinking brain checks out situation

Doing brain senses danger
The Stress Response

Thinking brain checks out situation

If there is danger, the thinking brain shuts down, allowing the doing brain to act.

Doing brain senses danger

If there is no danger, the doing brain goes back to normal functioning.
“Doing brain” does one or more of these things:

**Fight, Flight or Freeze**

In order to protect itself, the body uses increased energy to respond to danger in 1 of 3 ways:

- **Fight**
- **Flight**
- **Freeze**

---

**The Stress Response**

Thinking brain checks out situation

Doing brain senses danger

the thinking brain shuts down, allowing the doing brain to act.
What does this look like behaviorally?

Instigators of “chaos”

Fighting

Substance use

Running away

“Neural Plasticity”

Defined as: the ability of neural networks in the brain to change through growth and reorganization.

These neurological changes result from learning a new ability, environmental influences and practice.
So many ways to help teens (and their brains) become more resilient!

The Mental Benefits of Mindfulness

- Fights PTSD
- Fights depression
- Fights anxiety
- Fights memory loss
- Improves academic performance
- Helps regulate emotions
- Reduces risk for mental health disorders

These are (or will be) available on the Open Classroom landing page for this webinar.

7 Strategies to Properly Engage the Teenage Brain

Blakemore, S.: The mysterious workings of the adolescent brain (TED talk)

Burke Harris, N.: How childhood trauma affects health across a lifetime (TED talk)


NPR Diane Rehm Show: Using brain science to understand the terrible teens

Siegel, D.: Myths of the adolescent brain
Thank you for your participation today!
Contact me: Lcarter@wustl.edu
314-935-7268