Teenage Brain 101

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For Prevention Works! A Community Coalition of Clallam County
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A word from Prevention Works!
Let’s start with an Activator...

- What connection might you make between this photo and humans in the teenage years?
- Take a few minutes to reflect individually.
- At the signal, share with a table partner.
- Anyone want to share with the large group?

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Let’s make sure we are all on the same page...

"Just a darn minute — yesterday you said that X equals two!"
Perspective is important.
Flexibility is important
Parents Matter - Caregivers Matter - Responsive Relationships Matter

https://www.nap.edu/download/21868
Session Norm:
Presume positive intentions

There are no personal or professional indictments here.

Keeping an open mind and thinking flexibly is pivotal in moving this conversation, and our work with children and families, forward.

Watching one’s air time and encouraging others to share ideas is optimal.
Session Norm: Use professional behaviors with devices

Monitor your actions so others can stay focused on the professional learning.

Ask me or table partners for assistance if needed.

Thank you for keeping learning as the purpose for our time together.
Five important messages for keeping high engagement of all learners:

I CARE ABOUT YOU AND WHAT YOU THINK
I TEACH AND MODEL THE BEHAVIORS I WANT TO SEE IN A LEARNING SPACE
WE ALL CAN GROW AND IMPROVE WITH HARD WORK
WE CAN ALL MEASURE OUR GROWTH IN SOME WAY
LEARNING IS THE MOST IMPORTANT OUTCOME IN OUR CLASSROOMS OR LEARNING SPACES.
Thinking about information is time well spent.

Today, I would like participants will think about:

- Current information about the teenage brain from the fields of cognitive science and neuroscience
- Applying this information to a variety of professional and personal contexts
- Using this information to help humans navigate the 21st Century
I would like some help from the folks who were in attendance yesterday.
What were your big takeaway ideas from yesterday? What should folks who join us today know about our session yesterday?

Look in your folder.

- You will find some blank Sticky Notes.
- Please think about three or four ideas/pieces of information that are important to you.
- Write one idea on each Sticky Note.
- Place the Sticky Note on the most appropriate piece of chart paper.
Would anyone like to share thoughts?
Here are my big takeaway points.

In order to discuss the brain of 21st Century children and teenagers, we need to consider our socio-cultural and historical context.

We need to stay connected to neuroscience and cognitive science as each advances.

Developmental milestones can be affected by the environment a brain lives in.

Certain skills, like Executive Function skills, are foundational, so are dependent on the results of former experiences.

A brain is shaped by its experiences. Positive inputs tend to produce positive outcomes and negative inputs can produce problematic outcomes.

The human brains birth - 5 y/o (ish) are built to learn about the world through exploratory play.

The brains of older children begin to transition from exploratory to exploitative learning.
I would also highlight this graph.
Some Points to Remember:

- We need to look at each student from a strength-based model.
- Each student is good at some skills and needs help with others.
- Snapshots are less informative than full-length movies.
- Challenging behaviors tend to surface when and where the most unexpected things tend to happen.
Bio Break for 10 minutes...

Time for a break!
Bio Break for 10 minutes...

Time for a break!
Teen brains are different than adult brains...
Just as the bodies of children mature as they age...
...brains mature too. But, not all parts of/functions the brain mature at the same time.
Critical discovery reported in 2008...

“The Adolescent Brain”
B.J. Casey, Rebecca M. Jones, and Todd A. Hare
Operational definition of adolescence...

“Adolescence is a developmental period characterized by suboptimal decisions and actions that are associated with an increased incidence of unintentional injuries, violence, substance abuse, unintended pregnancy, and sexually transmitted diseases.”

Look at Hand-out # 11

What do you see here?

Think individually and then talk to a human near you.

Anyone want to share?
Look at Handout #11

The limbic system matures before the cortical system.
14 is the riskiest age for a human in our society.

Why is that?
We know that:

- The human newborn is totally dependent on others, and that the period of protracted childhood is necessary to allow brains to mature.
- Our youngest humans have the most brain plasticity, and quickly make new neural connections based on experiences.
- Our youngest humans learn most from exploring the world through play - Play produces chemicals that make brain more sensitive to more play-based and exploratory experiences.
- Early childhood is a period of innovation and change.
- Brain growth uses a great deal of energy - 66% of calories by age four.
- The entire brain is used in learning and connections happen across multiple areas.
Age 6 to Adolescence

We know that:

- plasticity decreases from previous levels
- synaptic pruning begins to delete connections that are not reinforced
- exploratory learning begins to shift to **exploitative** use of what has been learned - mastery learning
- exploratory learning is more autonomous, and schools manage the transition from exploratory to exploitative learning
- age 7 seen as “Age of Reason” in many cultures
- Areas of the brain are becoming more specialized
Adolescence (without trauma)

We know that:

- the brain begins a period of renewed plasticity - innovation and independence are hallmarks of this period - foundations in a focused skill have benefits.
- the brain’s reward system (limbic system) is at its peak - foundations in self-control are critical here.
- the focus of rewards shifts from family and caregivers to peers.
- the brain processes events and plans while considering the uber-intense feelings generated by the fully mature limbic system.
- this is the time when many cognitive and mood disorders emerge.
- the brain continues to change as the frontal lobe and the cortical system mature; decision-making skills begin to be recognizable.
- the cortical system and frontal lobes are fully developed by 30 (40 as an outlier).
We also know that adolescents will generate new theories of physical and social interactions

- Renewed drive to explore (fueled by reward-seeking), in addition to exploit (Risk-taking increases)
- Increased emphasis on Learning from Testimony (from peers over caregivers)
- Adolescents demonstrate the flexibility humans need to be adaptable to an unpredictable and changing culture and environment. (Gopnik 2016:22)
- Remember “Somamma” from yesterday? Adolescents with more peer than adult relationships miss the opportunity to refine their theories...
- Social media provides unvetted information that can reinforce cognitive distortions
- Adolescents need practice making meaningful decisions
Executive Function skills are also affected...humans who seemed “fine” at 8 can be “off the rails” at 14...

These five thinking skills can be overridden by the limbic system in hyperdrive:

1. Self-regulation
2. Considering the outcome of an act
3. Understanding the impact of one’s actions on another
4. Having words to convey a feeling or thought, especially when there is an ongoing problem
5. Responding to change in a flexible manner

Please don’t take adolescent behavioral personally.
Adults need to nurture the teenage brain...

- Watch for a triggered state with an active amygdala
- Watch for any lagging social or thinking skills
- Provide framework of continuous improvement
- Make mistakes a part of learning
- Make meaningful connections to an adolescent’s plans for the future
- Provide practice for frontal lobe and cortical system to make informed decisions
- Provide practice and opportunities for developing frontal lobe and cortical system to positively link to limbic system
- Provide opportunities and practice for limbic system to link to appropriate rewards, recognition, and relevance
The teenage brain needs practice and opportunities to build positive connections...

- Allows for the development of critical thinking skills
- Allows for the development of negotiating and collaborative skills
- Allows self-regulation skills to be learned and managed
- Allows the cortical systems to get the practice needed to refine Executive Function skills (NEW finding in 2018)

MUST be done in the context of responsive adult relationships...
Now let’s talk about Adolescence affected by trauma

- What might one think that looks like?

Take a moment to talk to the humans around you...What are some of the risky behaviors you have observed?

Anyone want to share?
Trauma-generated adolescent behaviors show increased risk-taking, including consequences with legal systems or future opportunities...
Trauma-generated adolescent behaviors show increased risk-taking, including consequences with legal systems or future opportunities...

- Fighting
- Running away or walking out
- Substance abuse, including cigarettes
- Spacing out
- Self-injurious behaviors (cutting, promiscuity)
- Needing to have the last word; arguing
- Eating disorders, etc.
- Giving up easily or not engaging at all
- Promiscuity (and its associated negative outcomes)
- Criminal behaviors with a variety of levels of severity
Traumatized adolescents often feel (and remember these feelings are intense):

- Disconnected from large systems - the world is full of chaos, random events, and privilege
- Harassed and misunderstood
- Treated differently, and badly, when compared to others
- Paralyzed by fear and unable to take healthy risks
- Helpless to change problematic habits that are at the beginning of the addiction cycle
- Helpless to change problematic situations at home or with family/caregivers
- Oppositional to all adults as the default setting; must have the last word
Let’s look at what not to do... Know this character?
It is easy to escalate traumatized or behaviorally challenged kids...

https://www.youtube.com/watch?v=bTeYncx1xmI
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While you are at lunch:
1. What Executive Function skills does Bender lack compared to his peers?
2. What behaviors of Bender’s give you a clue that trauma might be involved?
3. How does this adolescent-adult interaction affect others in addition to Bender?
Enjoy your lunch...

Time for a break!
Any thoughts to share?
My thoughts...

- I saw an example of serve-and-return that reinforces trauma and the adolescent disconnect.
- I saw Bender make intelligent and correct observations about the strategies used by the adult, albeit delivered in a sarcastic and public manner.
- I saw multiple opportunities where Bender might have changed his behavior had the adult initiated an opportunity.
Trauma-informed Rule #1 - Have high expectations for all young humans

- High expectations must be established for all children, no matter the cultural/linguistic/economic background of the child.
- Graduating from high school with a plan for life after high school should be a goal for all young humans.
- Provide direct instruction in Habits of Mind and developing Adult Core Capabilities.
- Empower young humans by creating relevant systems where “earning and learning” are associated with Executive Function supports.
- High expectations are associated with reward, recognition, and relevance.
There are a number of research- or evidence-based variations...
Success with slower learners or students who have fallen behind -- Scientific finding

Cognitive Science identified two factors in helping slow or sporadic learners to catch up:
1. Make sure they believe that they can improve, and
2. Persuade them it will be worth it. (Willingham 2009:183)

This means students need reliable instruction including substantive feedback from teachers about academic and behavioral performance.
Ensure that adolescents have access to two clear systems with transparent and privilege-free procedures:

1. Reporting a concern
2. Asking for help
Once these components are in place, we can start to talk about the Academic Press.

- Trauma-informed strategies help us to challenge students without triggering survival behaviors
- Trauma informed strategies help us to emphasize the function of classrooms as learning places, not places of threat
- Use of data cycles and equity platforms help students understand they are being treated fairly
- Use of expected routines and proactive plans keep amygdalas off and working memory open to connecting information
Please find Handout #12, The Science of Adult Capabilities

Please take the time to read the two-page handout after considering these questions:

1. How do these adult capabilities connect to Executive Function?
2. How might serve-and return be developmentally adjusted for adolescents?
3. Why are responsive, trusted adults critical in providing opportunities?
4. What role might epigenetics play when helping adolescents develop adult capabilities?

Once you are done reading, discuss your answers with another human or two...
Let’s talk about your thoughts and responses.

Anyone wish to share?

1. How do these adult capabilities connect to Executive Function?
2. How might serve-and return be developmentally adjusted for adolescents?
3. Why are responsive, trusted adults critical in providing opportunities?
4. What role might epigenetics play when helping adolescents develop adult capabilities?
Trauma-informed Rule #2: Steer clear of power struggles

Use
- Use humor when possible; no sarcasm

Stay
- Stay calm and confident; de-escalate when possible; learn to let some things go

Be
- Be proactive instead of reactive; use written and visual supports when possible

Be
- Be aware of spatial sensitivities; ask permission to come into the space or to touch work or property

Make
- Make use of protocols that allow adult to defer a discussion till adolescent if de-escalated
Trauma-informed Rule #3: Responsive relationships can mitigate the effects of trauma.

Reliable routines and expected responses help establish responsive relationships.

Responsive relationships allow automaticity for parts of the critical Serve-and-Return exchanges.

Coordinated responses (from multiple humans to one human) to certain Serve-and-Return situations can help increase automaticity in one area and therefore, attention and learning in another.
How thinking works... (Willingham 2009)
Trauma-informed Rule #4: Help create coordinated responsive relationships when possible

https://www.childwelfare.gov/fei/ - The Family Engagement Inventory seeks to help providers from a variety of disciplines coordinate requirements and resources.

The best way to help change the thinking and behavior of a young human is to change the thinking and behavior of the older humans interacting with young humans. Coordinating the Serve and Return response builds capacity in young brains as well as in the family.
So---how can we create research-informed programs that move adolescents to adult success?
Extensive work on this subject has been done at Harvard...
Please find Handout #12 in your folder.

If you are here with a team, please feel free to group together for the next task.

This four-page handout from the Harvard Center for the Developing Child is a *Guide for Practitioners* for humans working to help adolescents and adults build core capabilities.

Knowing what you now know about cognitive science and neuroscience, please read the handout. While you read, make note of the cognitive science and/or neuroscience you recognize in the text.

Think about your personal or professional interactions with adolescents or adults who need to build core life skills. What might you be interested in trying? What might you be interested in adjusting?
Collective efficacy is the most powerful factor in student achievement.
Need common use of Mindset and Improvement Cycle
Mindset: Here’s how we give humans in difficult situations HOPE.

- Hard work matters
- Practice leads to improvement
- Improvement, not perfection
- Growth is the currency
- Intelligence is malleable and can be grown
- Mistakes are a part of learning
- Collaborative problem-solving works
- Having a plan increases the probability of the outcome
Data Feeds a Cycle of Continuous Improvement—
Humans need to know and understand this concept as it relates to learning. Small increments of improvement are most successful and sustainable.
Expected is better than Unexpected

- Reliable routines reduce disruptions and distractions
- Reliable routines and clear, common language reduce misunderstandings
- Communicate proactively to reduce the unexpected; use common language
- Teaching routines and reactions is critical
- Some students need more practice than others
Interventions: Multi-Tiered Systems of Support (Ci3T) - http://www.ci3t.org/

Comprehensive, Integrated, Three-Tiered Model of Prevention
(Lane, Kalberg, & Menzies, 2009)

- **Tier 1**
  - Primary Prevention (=80%)
  - Academic: Validated Curricula
  - Behavioral: PBIS Framework
  - Social: Validated Curricula

- **Tier 2**
  - Secondary Prevention (=15%)
  - Goal: Prevent Harm
  - School/classroom-wide systems for all students, staff, & settings

- **Tier 3**
  - Tertiary Prevention (=5%)
  - Goal: Reduce Harm
  - Specialized individual systems for students with high risk

- **Goal: Reverse Harm**
  - Specialized group systems for students at risk
Explain the “Why?” - Do not mistake probing questions for disrespect.

Here are some great responses when families or students ask “why” certain systems or procedures are in place.

- Research about applications of cognitive science (for classrooms and individuals)
- Research about the applications of Career, College, Civic Readiness strategies
- New federal regulations within Every Student Succeeds Act (ESSA)
- New OSPI guidance regarding district and school responsibilities under ESSA, as well as new discipline laws which come into effect this year and next
Questions before we review resources?
I have learned a lot from all of you.