The Adolescent Brain and How to Improve Learning

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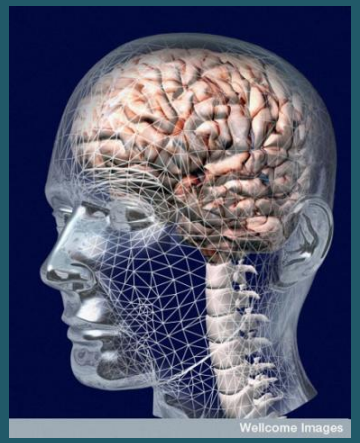
Adolescent Brain Development

- The frontal lobe (the “executive” area of the brain that controls planning, reasoning, and impulse control) continues developing during adolescence.
- With time, neural networks that help brain cells communicate become larger and work faster in the brains of teenagers.
- The brain’s white matter is not fully formed until age 20 – The frontal lobe is the last area of the brain to be myelinated.

The Frontal Lobe

- During adolescence, the brain undergoes an increased production of gray matter (which is responsible for the generation of nerve impulses to process the brain's information).
- A process called "pruning" follows, where the connections among unused neurons are eliminated.
- "Pruning" makes the brain more efficient, strengthening the useful connections and getting rid of "clutter".



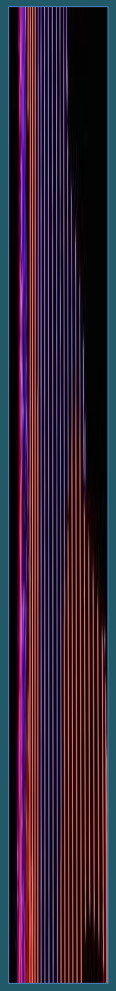
Adolescent Behavior

- *Why do teens tend to lack impulse control and decision making skills, demonstrate irrational behaviors, recklessness, and have emotional outbursts?*

- Teens tend to see their lives as full of ‘drama’ as they process information much differently than adults:
  - Adults usually rely on the frontal lobes, (center of reasoning and language), to respond to situations
  - Adolescents rely more on the amygdala (which controls a wide range of emotions) as they react quickly without considering the consequences of their actions.
  - Teens are more likely to misinterpret and respond emotionally to situations.
  - They may not be able to find the words to express their feelings - They may have difficulty identifying their emotions or the emotions of others.

Adolescent Brain Development

- Teens begin to develop some advanced reasoning abilities during teenage years and can develop stronger synapses with repeated practice and learning.
- When teens “exercise” their brains by learning to control impulses, order their thoughts, and understand abstract concepts, it lays good neural foundations for adulthood.
- During teenage years, it is important to “use it or lose it” (because of the “pruning” that occurs), and to form healthy pathways rather than unhealthy ones.



Teens Seek Stimulation

- The capacity for learning of an adolescent brain is amazing, but they often need guidance with prioritizing and organizing.
- The “cellular excitement” in their brain helps teenagers learn languages and musical instruments much easier than adults.
- Neurochemical changes, puberty, and changes in the way the brain processes rewards and pleasure often lead to risky, thrill-seeking behaviors like experimenting with drinking and drugs.
- Environmental factors or experiencing trauma can and also contribute to high-risk behavior.

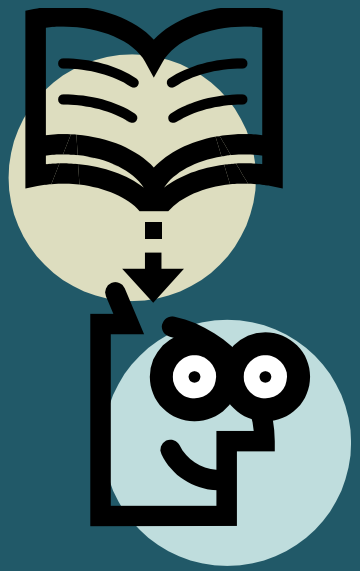
Implications of Drugs or Alcohol

- While the brain is still developing, it is more sensitive to drugs
- Brain changes from using drugs are more likely to become “hardwired” in the brain, leading to addictions in adulthood.
- Adolescents are also more vulnerable to the affects of alcohol on memory and learning abilities.
- Growing up in fear and chaos increases their risk of depression, substance abuse, and other harmful behaviors

Helping Teens Learn

- The teenage brain filters out a lot of incoming stimuli, making teaching them more challenging
- Their brain pays more attention **if the information has meaning**, and **if it causes an emotional response**.
- **Practice and rehearsal** are critical for long term learning.
- Think of the human brain as social - It **requires interaction** to develop properly.
- Provide more **visual information and active learning**.
- Encourage teens to get plenty of sleep.
- Give simple instructions, both verbally and in writing.

- Abstract thought processes aren't developed until age 18-20
- The most effective teaching style for adolescents is to create concrete experiences, involving hearing, seeing, smelling and/or touching.
- Symbolic experiences like reading books and abstract thinking (trying to make generalizations about things) can build from their experiences.
- An adolescent's brain can hold seven, (plus or minus two), items of information in their working memory.



Effective Learning Strategies

- **Storytelling** – Either real or fictional
- **Reciprocal teaching -** (Think, Pair, Share) or small group discussion
- **Metaphor, Analogy or Simile -** to connect the information to something they are familiar with
- **Visuals/Graphics -** (A picture is worth a thousand words)
- **Hands-on/Simulation** activities
- **Wait Time** – Give them time to process your question before asking for a response
- (See handout for reference – The Adolescent Brain – Learning Strategies and Teaching Tips)

Conclusion

- Teens have brain development that affects their thinking, behavior, mood, and ability to learn.
- Effective learning is very possible if teaching is done in an engaging way that connects with their concrete experiences.
- They have an opportunity to develop a faster, sharper and more focused brain as their gray matter and neural connections can be changed.
- With our help, teens can lay foundations for healthier thinking and stronger neural pathways that will be with them throughout their lifetime.

References

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- With contributions by LeeAnn Knutson, a psychology student