Learning Systems – How to improve, build, and develop compensatory strategies

Sarah Levin Allen, Ph.D., CBIS
Pediatric Neuropsychologist
Executive Director, Brain Behavior Bridge
Director, Neurobehavioral Track, Biomedical Sciences Master's Program, Philadelphia College of Osteopathic Medicine
Assistant Professor, Psychology, Philadelphia College of Osteopathic Medicine
drallen@brainbehaviorbridge.com
www.brainbehaviorbridge.com
856-210-2201

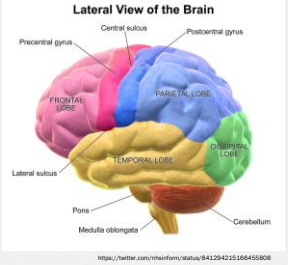
Outline

Learning in a classroom involves many things in addition to academic content!

- How does the brain learn?
- What are the essential systems for learning?
  - Cognitive
  - Executive
  - Emotional
  - Behavioral
- What are some recommendations to improve children's functioning?
  - Building Skills
  - Developing Strategies to promote learning

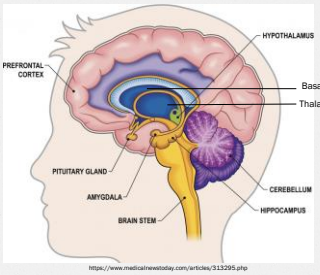
Brain Orientation

It only works in one way!

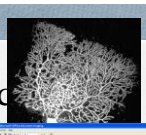


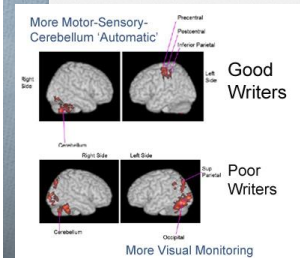
https://twitter.com/nihsinform/status/841294215166455808

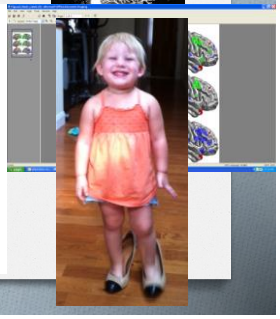
Brain & Learning Systems



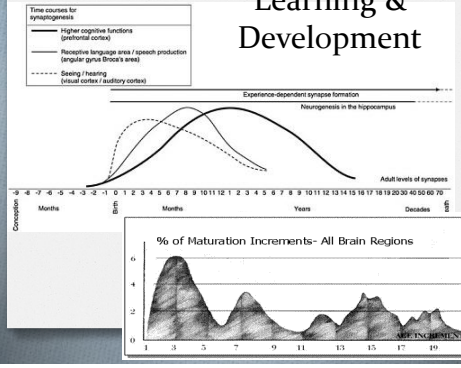
Learning Effic





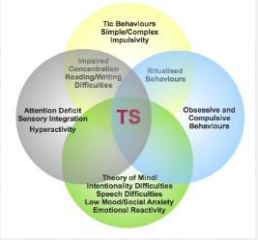


Learning & Development



Tourette and Disinhibition Syndromes

- Cognitive System
- Executive System
- Emotional System
- Behavioral System

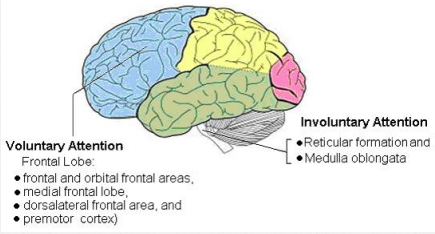


https://www.dealwithautism.com/tourette-syndrome-symptoms-treatment-for-tourettes/

Cognitive System

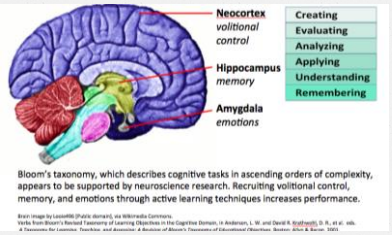
- Capacity for learning
  - Attention: Get it in
  - Learning: Keep it in
  - Connection: Get it out
- Sustained by all other systems
  - Executive
  - Emotional
  - Behavioral

Attention: Getting it in!



http://www.brainbehavioroptimization.com/simple.php?f=_spec_Attention.php&t=Attention

Learning: Keeping it in!

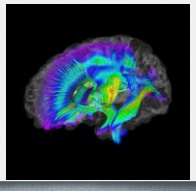


Bloom's taxonomy, which describes cognitive tasks in ascending orders of complexity, appears to be supported by neuroscience research. Recruiting volitional control, memory, and emotions through active learning techniques increases performance.

Brain Image by Looie496 (Public domain), via Wikimedia Commons.
Verbs from Bloom's Revised Taxonomy of Learning Objectives in the Cognitive Domain, in Anderson, L. W. and David R. Krathwohl, D. R., et al. eds. *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. Boston: Allyn & Bacon. 2001.

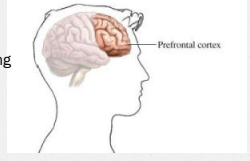
Connection: Getting it out!

- Communication pathways for connecting information
- Heavy Executive Load
  - Find the right information, organize, produce response



Executive System

- Control and organization for learning
- Skills Include
  - Organization/Planning
  - Flexibility
  - Initiation/ Problem Solving
  - Working Memory
  - Metacognition
  - Emotional Control
  - Behavioral Control
  - Inhibition/Regulation



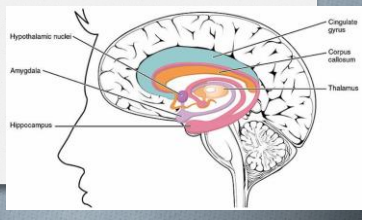
https://nervoustalk.wordpress.com/2014/07/10/cancer-that-causes-pedophilia/

Emotional System

- Heavily tied to learning
- Controlled by the frontal lobe
- Stability creates and openness for learning

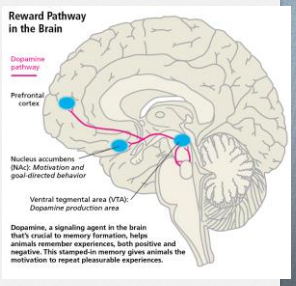
Emotion

- Basic Emotional State - Stability
- Depressive Symptoms
- Anxious Symptoms



Behavioral System

- Reward = start or continue
- Punishment = stop
- Basic Learning
- Rewards can increase learning and stimulate frontal lobe of the brain leading to more brain power!

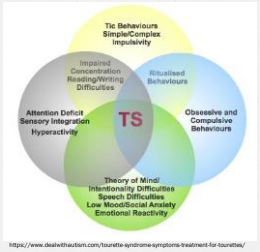


http://discovermagazine.com/2015/may/17-resetting-the-addictive-brain

Learning

- Connections between cognitive system, executive system, emotional system, and behavioral system
- All systems must be stable for learning
- Frontal Lobe **controls** all systems and only has so much power
- Emotional system contributes to learning and can reduce learning by taking away the frontal lobe power
- Behavioral system contributes to learning and can be used to enhance learning

Tourette and Disinhibition Syndromes



https://www.dealwithautism.com/tourette-syndrome-symptoms-treatment-for-tourettes/

Improving Children's Functioning

- Brain Tricks: Cognitive
  - Teach routines and provide consistent cuing to bring things out of the frontal lobe
    - Enhances the cognitive system
- Brain Tricks: Executive
  - Teach executive skills for improved access to learning
- Brain Tricks: Emotional
  - Balance emotion for heightened learning

Improving Children's Functioning

- Brain Tricks: Behavioral
  - Use positive behavioral reinforcement strategies to jump start learning
  - Teach skills before reinforcing them

Building Skills

- Determine the area of skill deficit keeping in mind the systems: cognitive, executive, behavioral, emotional
- Target skill deficit
- Consider remediation vs. compensation strategies

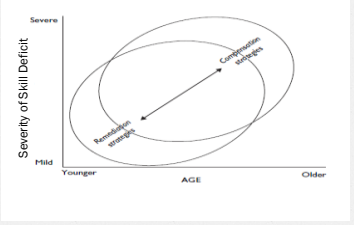
Compensation vs. Remediation

- Compensation – accommodating or "going around" the problem

vs.

- Remediation – teaching a skill or "making it better"

Compensation vs. Remediation



Designing Academic Intervention Programing

- 1. What systems are impacted and are they all stable?
- 2. What is the target pre-requisite skills needed for completing the behavior/task?
- 3. Where is the right balance of compensation vs. remediation?
- 4. How can we support these skills across systems to help students access learning?
- 5. How can we identify goals?
- 6. How do we teach skills then track & monitor progress?

Strategies to Promote Learning

- Teach Independence
  - Start with high levels of cuing and reduce over time (Track cues for marker of independence)
- Use reflective questioning to enhance communication between systems
- Balance systems to create openness for learning
- Practice Healthy Brain Habits
  - Exercise, Brain Foods, Problem Solving Practice

Summary

- The brain only works in one way!
  - Location & Connection Rules
- Look at all brain systems in kids especially those with disinhibiting disorders: cognitive, executive, emotional, behavioral
- All systems can support or hinder learning
- When designing interventions, think about compensation and remediation
- Always work to build independence and strengthen the systems and their connections

Resources

- Your Brain – Crash Course Youtube Channel https://www.youtube.com/watch?v=vHrmiy4W9C0
- Intervention Central _ Behavioral Interventions
  - http://www.interventioncentral.org/behavioral-intervention-modification
- Coping Cat & Phil Kendall – Emotional
  - http://www.copingcatparents.com/
- Executive Skills in the Classroom : http://www.efintheclassroom.net/
- MindUP Curriculum: https://mindup.org/
- Peg Dawson & Dick Guare – Executive Functioning
  - https://www.amazon.com/Executive-Skills-Children-Adolescents-Second/dp/1606235710
  - https://www.amazon.com/Smart-but-Scattered-Revolutionary-Executive/dp/1593854455
- George McCloskey – Executive Functioning
  - http://www.georgemccloskeyphd.com/books/
  - https://www.hcpss.org/f/schools/psychology/executive-functions-overview.pdf
  - https://www.region10.org/r10website/assets/File/WA%20and%20WD%20-%20Improving%20Executive%20Functions%20-%20McCloskey.pdf
- Tourette Syndrome - https://njcts.org/category/webinars/
- Healthy Brain Foods/Habits:
  - http://www.philly.com/philly/blogs/healthy_kids/Foods-that-will-boost-balance-and-bust-your-brain.html
  - http://www.philly.com/philly/blogs/healthy_kids/Healthy-meals-that-boost-brain-health.html
  - http://www.philly.com/philly/blogs/healthy_kids/Get-your-childs-brain-ready-for-school.html

Questions