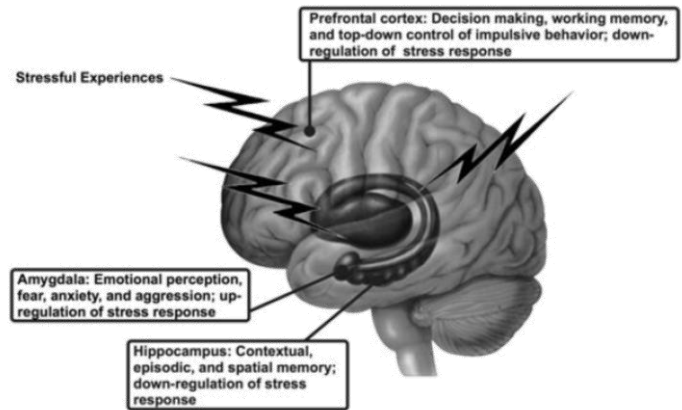


TRAINING BRAINS TO REGULATE STRESS

An Integrated Two-Generation Approach

Eric Pakulak: Brain Development Lab, University of Oregon

Prefrontal cortex, hippocampus, amygdala: sensitive to **chemical effects of stress**.



Prefrontal Cortex

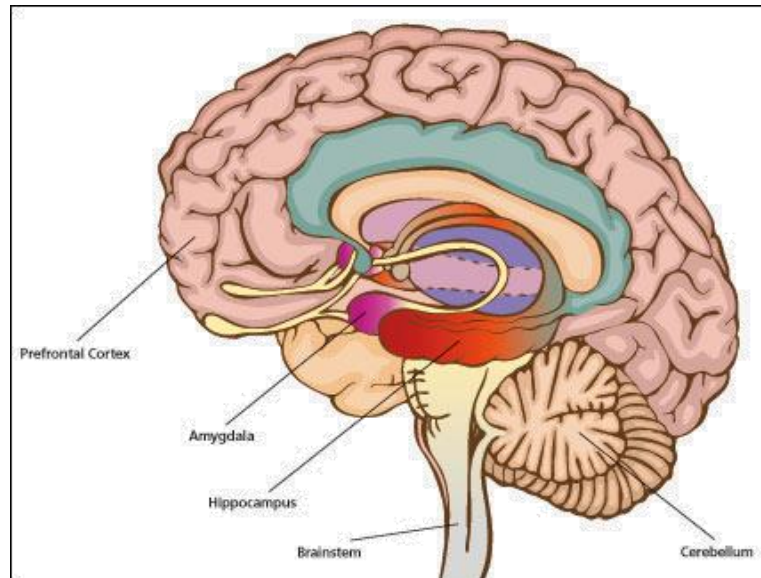
- **Self-regulation** (attention, executive function):
 - Judgment and decision making
 - Impulse control
 - Working memory
- **Foundational skills** important for school readiness
 - More predictive than IQ
- **Down-regulation** of stress response

Hippocampus

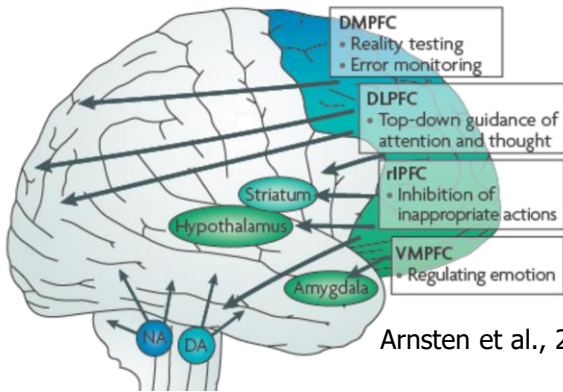
- Memory
 - Formation/consolidation of new memories
 - Memory retrieval
- **Down-regulation** of stress response

Amygdala

- Emotional processing
 - Emotional regulation and learning
 - **Perception** of potential threat
 - Fear, anxiety, aggression
- **Up-regulation** of stress response



Prefrontal Regulation



Arnsten et al., 2009

Alert, non-stress “default” condition:

- Prefrontal regulation of attention, thought, emotion
- Inhibition of inappropriate actions

Moderate Stress & Self-regulation

Positive

Brief increases in heart rate, mild elevations in stress hormone levels.

Tolerable

Serious, temporary stress responses, buffered by supportive relationships.

Toxic

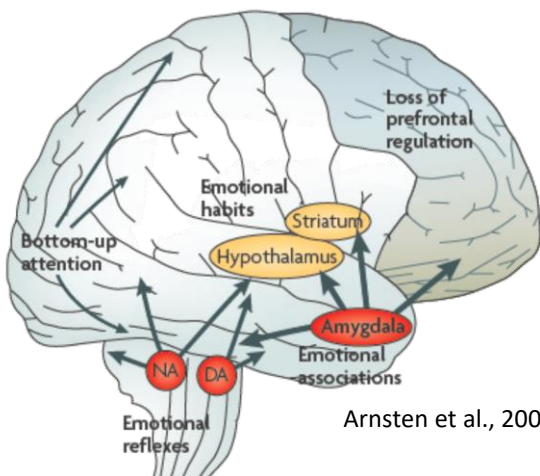
Prolonged activation of stress response systems in the absence of protective relationships.

Blair & Raver, 2015

Moderate increases in stress: attention/self-regulation **maximized**

- Rise above moderate levels: shift to more **reactive** response to experience

Stress



Arnsten et al., 2009

Amygdala activates stress pathways

- PFC regulation **impaired**
- Amygdala function **strengthened**
 - Regulation switches from **reflective** (“top down”) to **reactive** (“bottom up”)