



How to Use GoToWebinar:

- Move any electronic handheld devices away from your computer and speakers
- We recommend that you close all file sharing applications and streaming music or video
- Check your settings in the audio panel if you are experiencing audio problems
- During the presentation, you can send questions to the webinar organizer, but these will be held until the end
- Audience members will be muted during the call

**A recording of this webinar and a PDF of the presentation
will be available online at
www.pathwaysrtc.pdx.edu**



Questions

- Please feel free to send any questions as we proceed through the webinar.
- We will answer the questions in the order received at the end of the webinar.
- Any questions that cannot be answered during the webinar will be followed up in writing.



Presenters



Julie Rosenzweig, Professor of Social Work at Portland State University



Jennifer Gerlach, college student at Southern Illinois University Edwardsville, and founder of Active Minds at SIUE.



Unfinished Business: Brain Development & Traumatic Stress in Transition-age Youth

Julie Rosenzweig
Jennifer Gerlach

November 13 2012

TODAY'S WEBINAR

- Brain development and functioning during emerging adulthood
- Neurobiology of traumatic stress
- Trauma-informed care

SCIENCE & VOICE

INSERT YOUR
LIFE STORY
HERE

TRANSITION-AGE TASKS

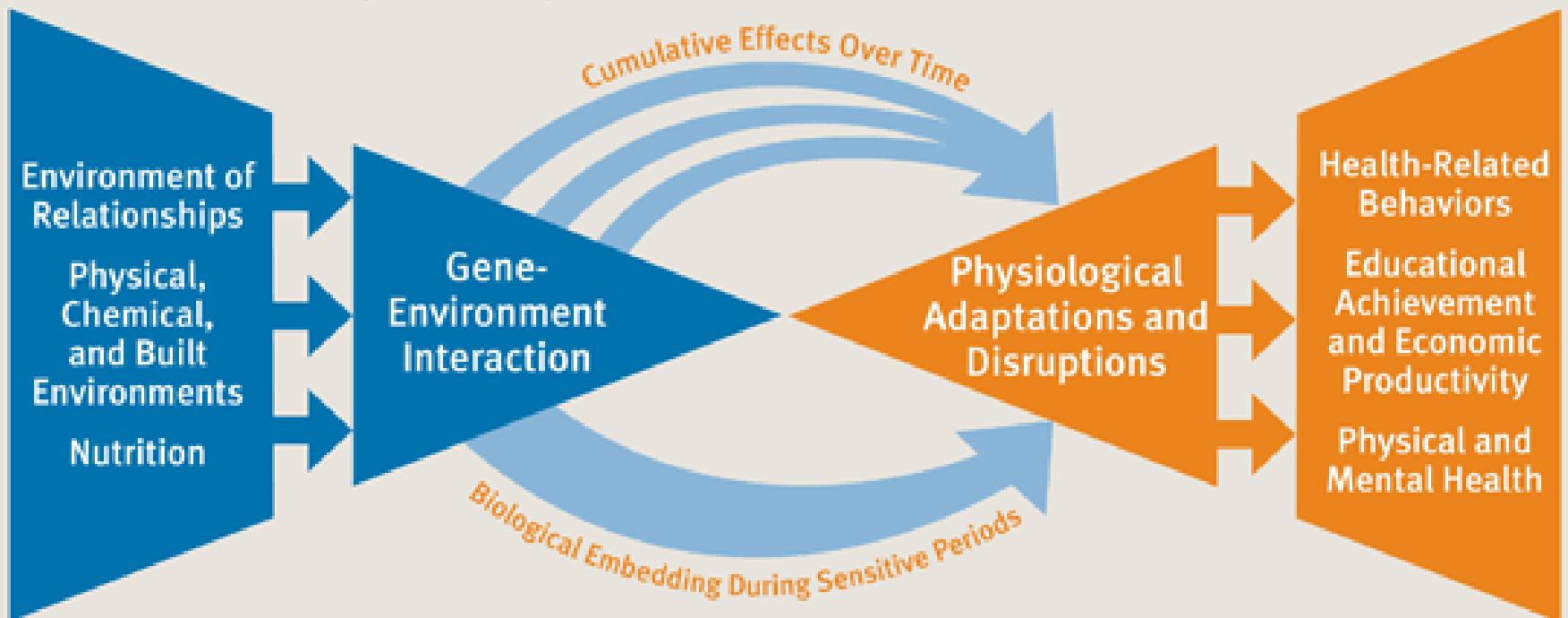
INTEGRATION & MEANING-MAKING

- Opportunity for *integration*
- Reconciling narratives of the *past* with the *present* & toward an *anticipated future*.
- Creating coherence across storylines:
 - Self-in-relationships (connection).
 - Self-in-environments (family, community, culture).
 - Achievements in independence, education, work, & intimacy.

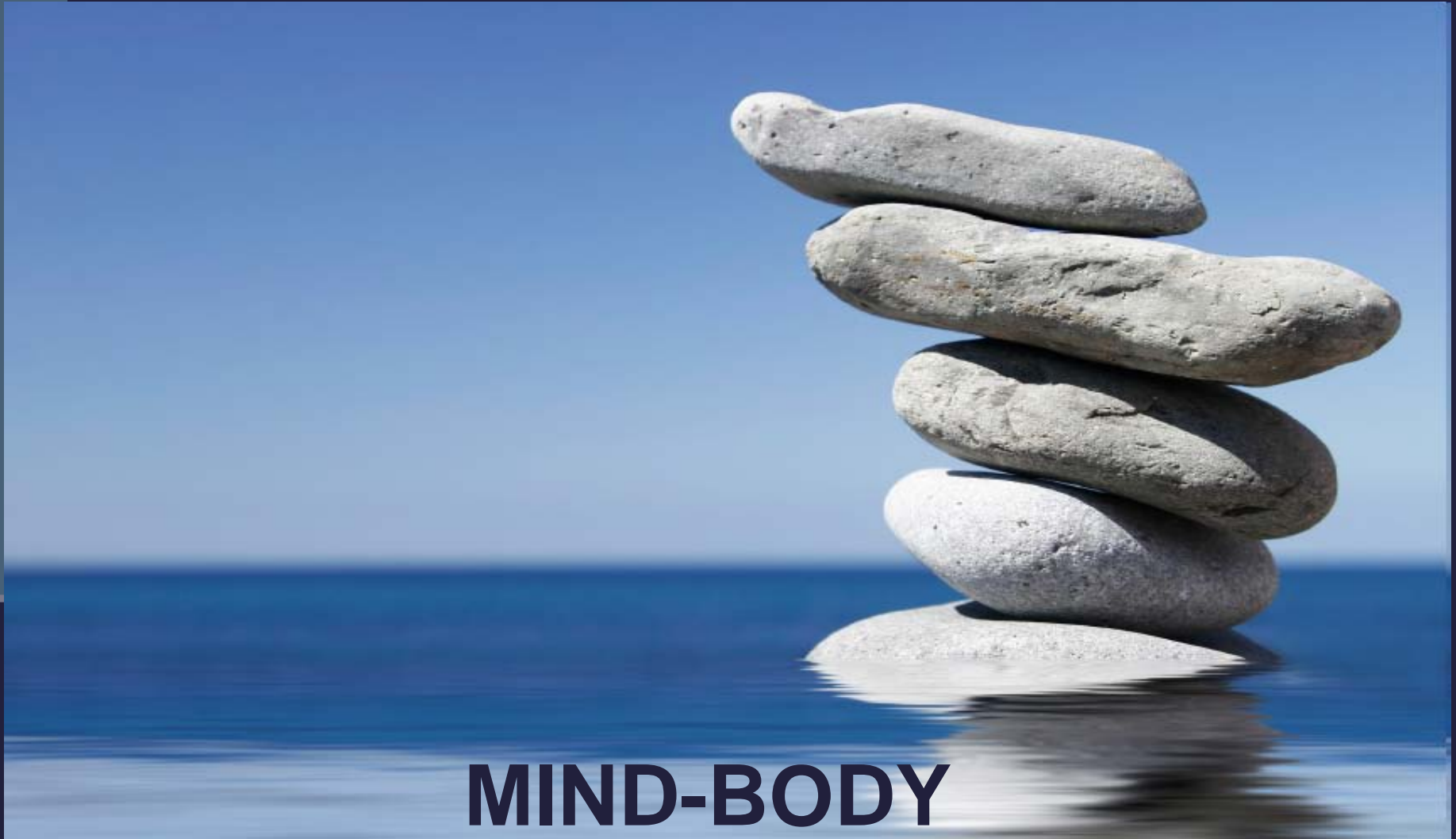
BIO-DEVELOPMENTAL FRAMEWORK

Foundations of Healthy Development
and Sources of Early Adversity

Lifelong Outcomes



THE EMBODIED BRAIN



MIND-BODY



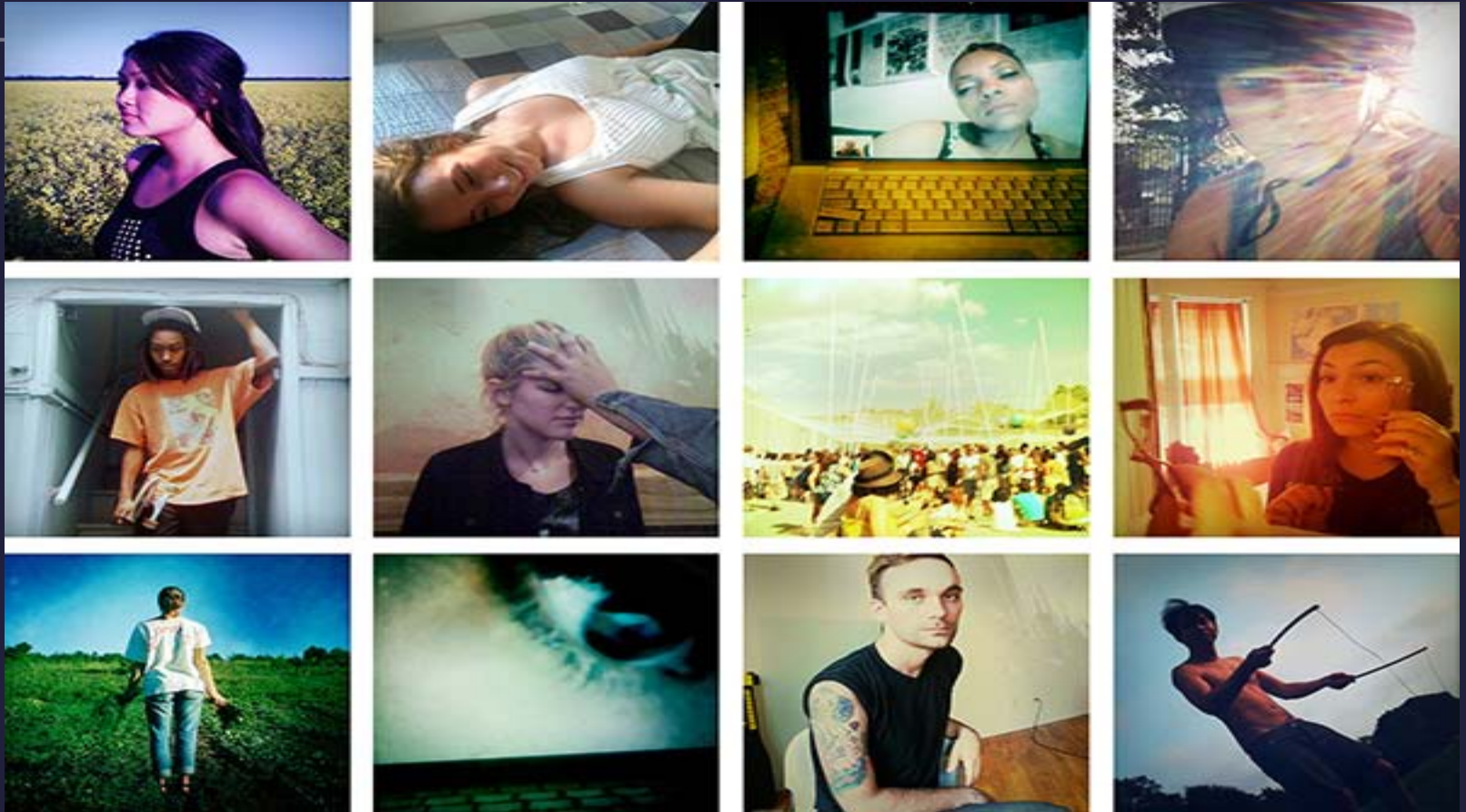
Plasticity

Proliferation
& Pruning

Myelination

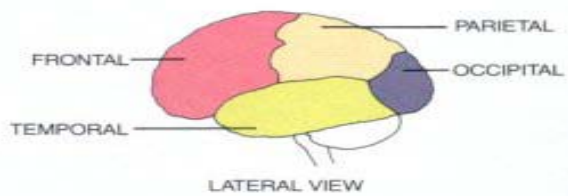
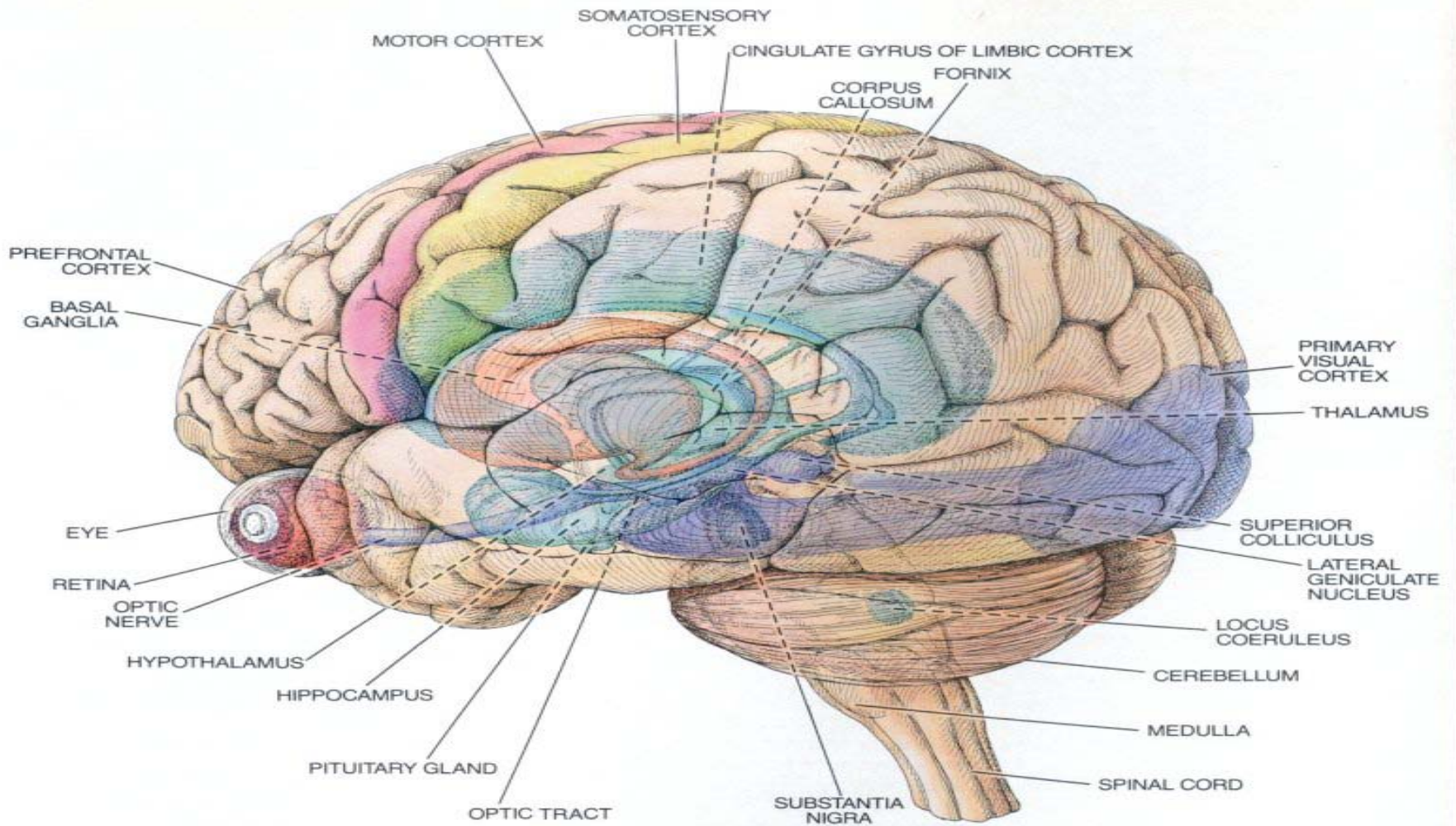
Adaptation

EXPERIENCE WIRES THE BRAIN



Picture from *What is it about 20-Somethings?*
By Robin Marantz Henig, New York Times
August 18, 2010

REWRITING EPIGENETICS



RIGHT & LEFT DIFFERENT & CONNECTED



TWO HALVES OF THE WHOLE

Right-hemisphere

- on-line at birth, dominant
- attachment processes
- affect regulation, empathy
- social
- non-linear
- body sense
- images, themes, patterns

Left-hemisphere:

- myelination 18 months
- logical
- cause/effect reasoning
- verbal processing (language)
- sequential
- plans and structures
- “the interpreter”

CORPUS CALLOSUM

Connective body between hemispheres, 200 million nerve fibers
Transfers information between left and right
(inter-hemispheric communication)

THE POWER PLAYERS

CROSS SECTION

Corpus callosum

A large band of nerve fibers through which information flows back and forth between the left and the right hemispheres of the brain

Thalamus

The relay station for most information going into the brain

Hypothalamus

Regulates sex hormones, blood pressure and body temperature

Pituitary gland

The master gland of the body produces its own hormones and also influences the hormonal production of the other glands in the body

Amygdala

Regulates the heartbeat and other visceral functions and processes the emotion fear

Hippocampus

Helps establish long-term memory in regions of the cerebral cortex

Basal ganglia

A control system for movement and cognitive functions

Cerebellum

Essential for coordination of movement

Pons

Medulla oblongata

Control of breathing, circulation, heartbeat and digestion

Spinal cord



TIME Graphics by Steve Hahn, Photos: Marked Edge/Photo Bank

AMYGDALA

“almond”



- Temporal lobes
- Major affective activities
- Survival, fear: freeze, flight, fight
- Receives information first, tells you how you feel
- Autism: social behavior interpretation
- Depression
- PTSD
- Aggression

HIPPOCAMPUS

“seahorse”

- Temporal lobes
- Learning and memory
- Converts short term to permanent memory
- Affected by estrogen
- Key structure in Alzheimer's dementia
- Significantly affected by alcohol use during adolescence
- Severe stress or persistent mood symptoms reduces volume



MEMORY SYSTEMS

IMPLICIT

Amygdala, right brain primary

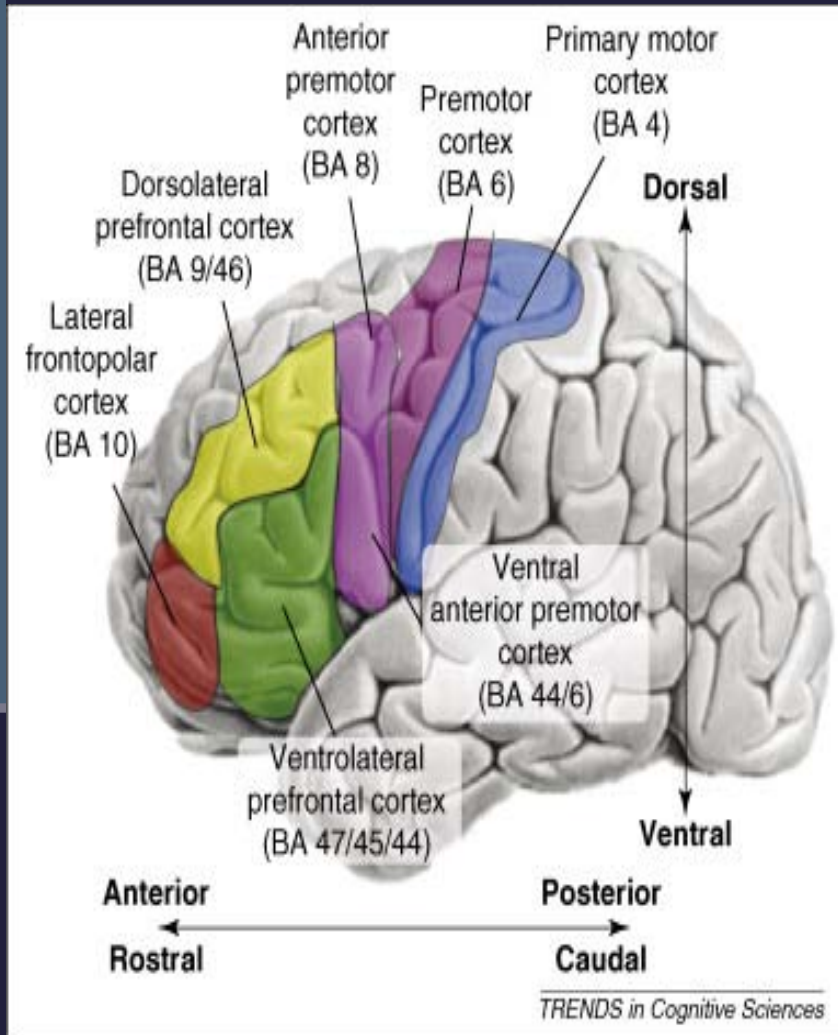
- Present at birth
- Pre-verbal
- Mental models
- Encodes emotions, behavioral patterns, learned habits, perceptions
- Encoded w/o conscious attention
- Recall void of conscious remembering
- Activates strong feelings/body sensations

EXPLICIT

Hippocampus, left brain primary

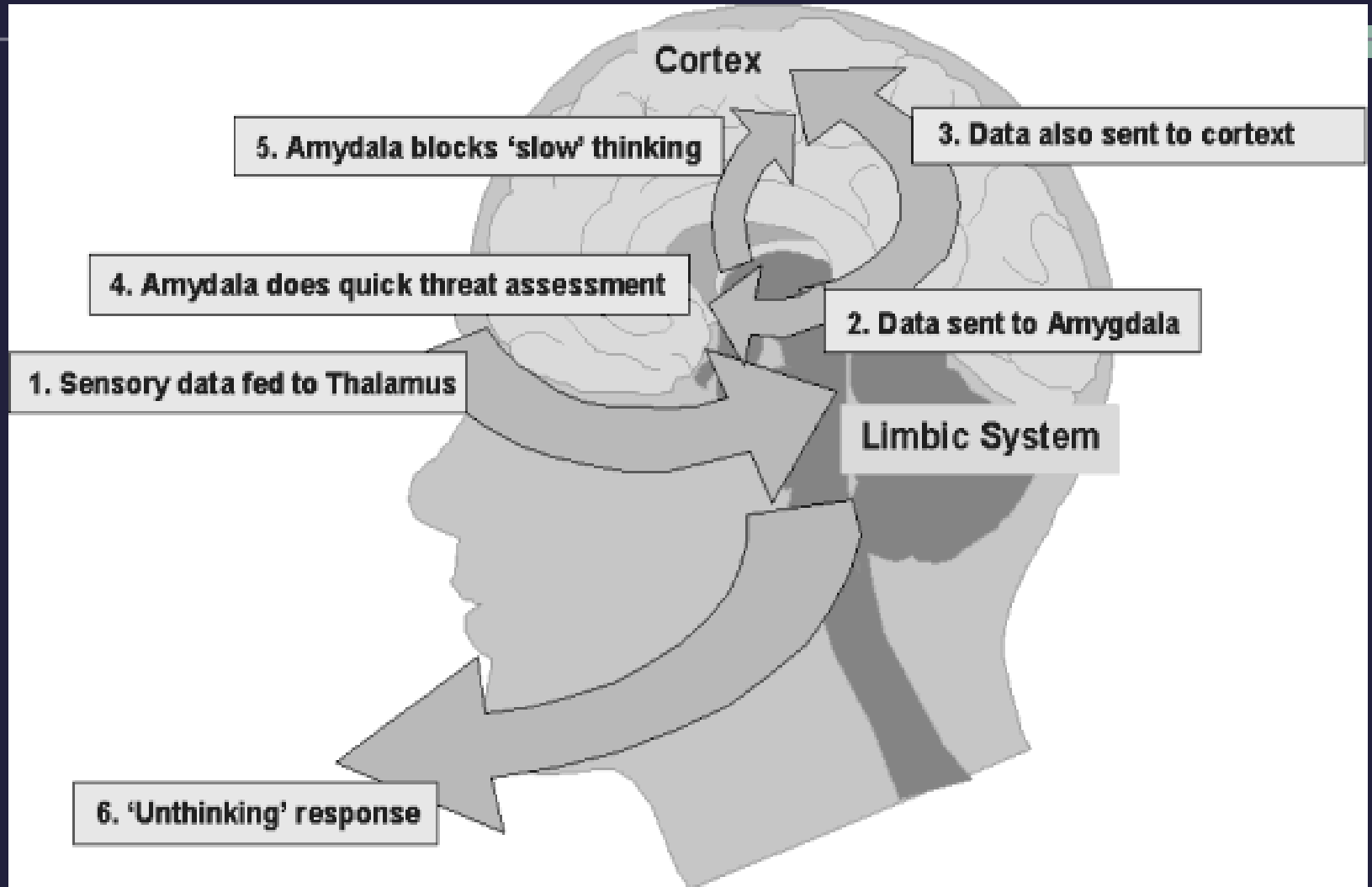
- Middle of second year
- Factual
- Autobiographical: sense of self & time
- Encoding requires conscious attention
- Awareness of remembering
- Sense of self in the past
- Creates narratives

PREFRONTAL CORTEX (PFC)



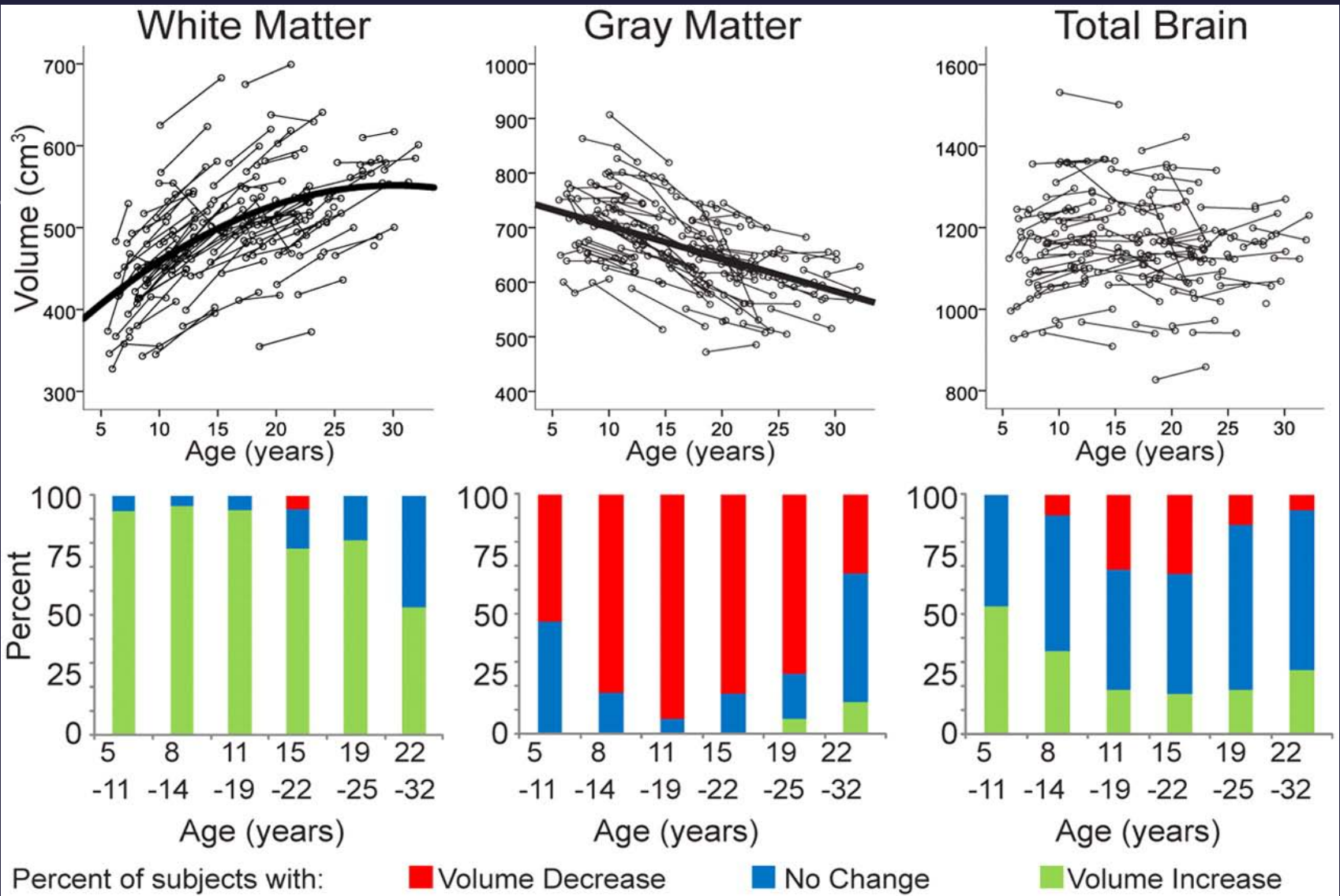
- Last area of myelination
- Highly interconnected with limbic structures
- Rule-based, goal directed (attention)
- Executive functions: planning, reasoning, problem solving
- Delays/inhibits immediate reaction to stimuli & forecast consequences
- Affect regulation, response flexibility
- Working memory

PROCESSING



DEVELOPMENTAL ARCHITECTURAL CHANGES

- Proliferation (exuberance) of synapses/dendrites primarily in the prefrontal cortex, just before puberty.
- Significant pruning between ages 12 to 20.
- Most pronounced age 16+, on average @ 7-10% total loss.
- Activity directs architecture. Circuits used the most get hardwired. Hebb's law: fire together-wire together.
- Myelination increases efficiency, regulatory capacity, response flexibility.



Lebel C , Beaulieu C J. Neurosci. 2011;31:10937-10947

DEVELOPMENTALLY ADAPTATIVE BEHAVIORS

- Sensation & novelty seeking heightened
- Brain develops an over-sensitivity to reward, under-sensitivity to risk.

For example:

- Less sensitive to the sedative and motor coordination impairment effects of alcohol.
 - More sensitive to social dis-inhibiting effects of alcohol.
- Romantic attachments (brains in love)

STRESS

Positive

Tolerable

Toxic

Acute...Chronic

Buffers & Mediators



JENNIFER'S STORY

Levels of stressful experiences:

Their causes, consequences and why we experience them!

Positive Stress

- A personal challenge that has a satisfying outcome
 - Result: Sense of mastery and control
 - HEALTHY BRAIN ARCHITECTURE
 - good self esteem, judgment and impulse control

Tolerable Stress

- Adverse life events buffered by supportive relationships
 - Result: Coping and recovery
 - HEALTHY BRAIN ARCHITECTURE
 - good self esteem, judgment and impulse control

Toxic Stress

- Unbuffered adverse events of greater duration and magnitude
 - Result: Poor coping and compromised recovery
- Result: Increased life-long risk for physical and mental disorders
 - COMPROMISED BRAIN ARCHITECTURE
 - Dysregulated physiological systems

ADAPTION TO THREAT

real or perceived



Photo: Sandilya Theuerkauf

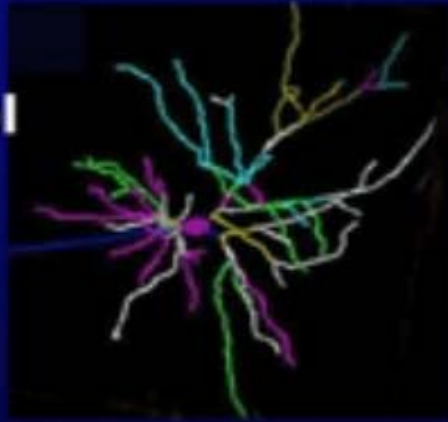
BRAIN RESPONSE TO TRAUMA

- Sustained state of activation
- Over-develops limbic structures
- Under-develops frontal lobe
- Brain resources for cognitive and social skills less activated
- Reduced connections in corpus callosum
- Decreased volume of the hippocampus
- Alters memory functions

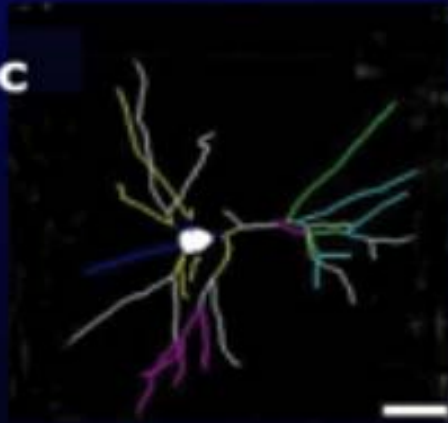
Stress causes neurons to shrink or grow

....but not necessarily to die

Control



Chronic stress

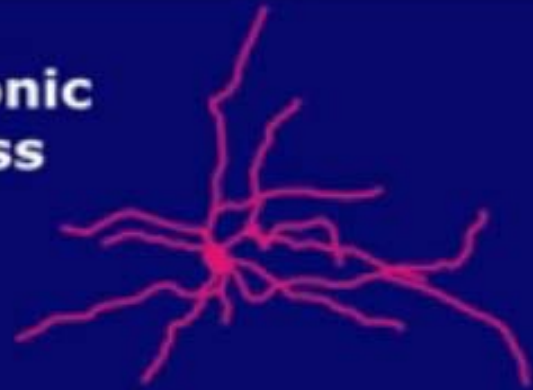


**Prefrontal Cortex
And Hippocampus**

Control

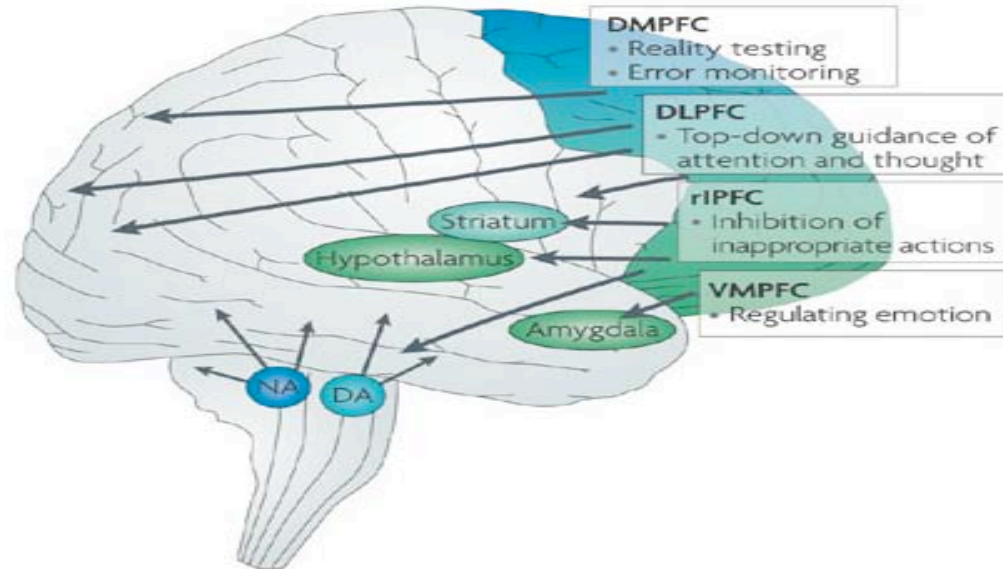


Chronic stress

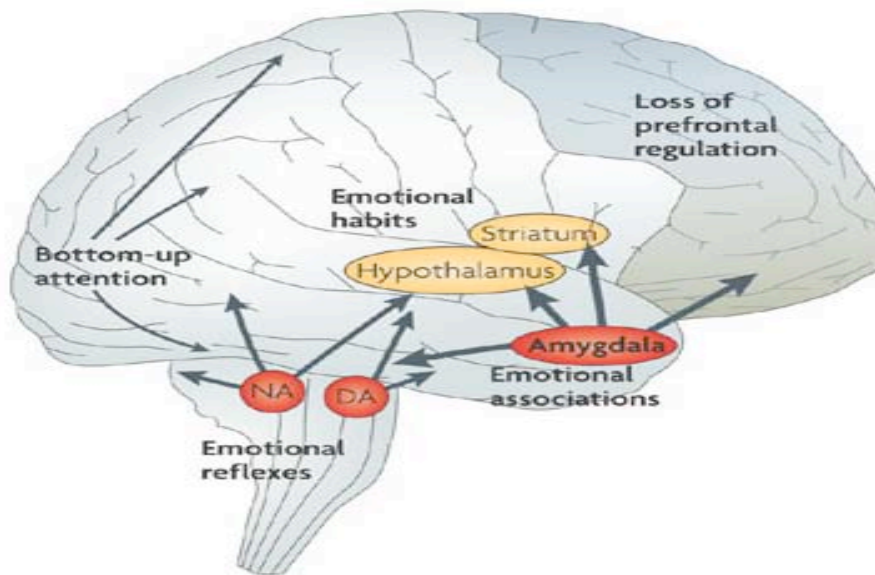


**Amygdala
OFC**

a Prefrontal regulation during alert, non-stress conditions



b Amygdala control during stress conditions



TRAUMATIC STRESS IN THE DEVELOPING BRAINS OF YOUTH

- Hyper-vigilance & activation may lead to aggression, violence
- Traumatic stress may be mistaken for attentional deficits
- May be the tipping-point for mental health disorders
- “Reactivation avoidance” may result in self-medication, truancy, underperformance in school, increase risk-taking, eating disorders, etc
- Victim identity may become central to emerging consolidated identity
- Inability to see self in future
- May present with chronic physical complaints
- Impaired attachment skills

BUFFERS: PERSONAL & CONTEXTUAL

- Resilient capacity
- Quality of attachments
- Personal meaning
- Cultural-specific context & meaning
- Social meanings
- Level of safety/threat in environment, immediate ecology

THE TRAUMA-INFORMED CARE PERSPECTIVE

- Paradigm shift: **What happened to you?** no longer What's wrong with you?
- Practice of ***universal precaution***
- “Trauma-informed organizations, programs, and services are based on an understanding of the vulnerabilities or triggers of trauma survivors that traditional service delivery approaches may exacerbate, so that these services and programs can be more supportive and **avoid re-traumatization**” (SAMSHA).

TRAUMA-INFORMED SYSTEMS OF CARE

Process of organizational cultural change

Principles through a relational lens:

- Safety
- Trustworthiness
- Choice
- Collaboration
- Empowerment

(Harris and Fallot ,2001)



QUESTIONS & ANSWERS



REFERENCES

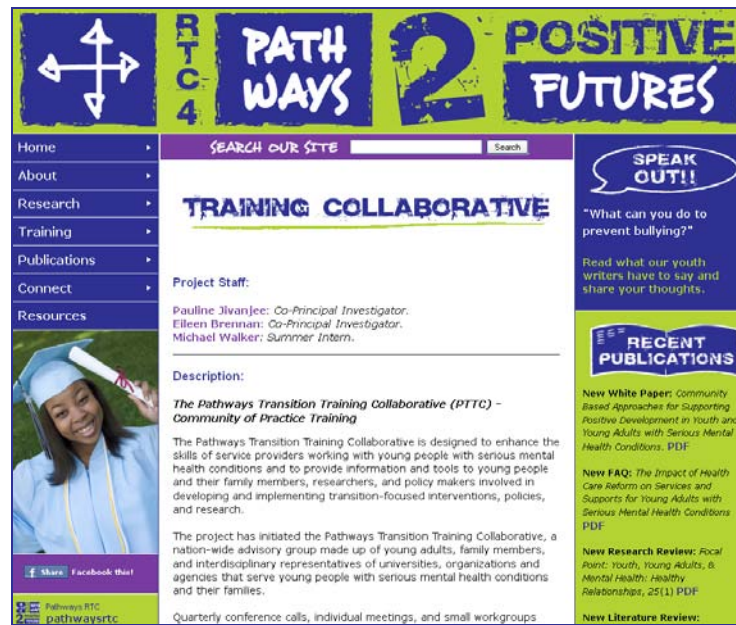
- Arnsten, A. (2009). Stress signalling pathways that impair prefrontal cortex structure and function. *Nature Reviews Neuroscience*, 10(6), 410-422.
- Bennett, C. M. & Baird, A. A. (2006). Anatomical changes in the emerging adult brain: A voxel-based morphometry study. *Human Brain Mapping*, 27(9), 766-777.
- Davidson, R. & McEwen, B. (2012). Social influences on neuroplasticity: Stress and interventions to promote well-being. *Nature Neuroscience*, 15(5), 689-695.
- Goldstein, A., Wekerle, C., Tonomyr, L., Thornton, T., Wacchter, R., Pereira, J.,...MAP Research Team (2011). *International Journal of Mental Health and Addiction*, 9(4), 335-342
- Harris, M. & Fallot, D. (Eds) (2001). *Using trauma theory to design service systems*. San Francisco, CA: Jossey-Bass.

- Obradovic, J., Burt, K. B., & Masten, A. S. (2006). Pathways of adaptation from adolescence to young adulthood: Antecedents and correlates. *Annals of the New York Academy of Sciences*, 1094, 340-344.
- Roisman, G., Masten, A., Coatsworth, & Tellegen, A. (2004). Salient and emerging developmental tasks in the transition to adulthood. *Child Development*, 75(1), 123-133.
- Romer, D. & Walker, E. (Eds). (2007). *Adolescent psychopathology and the developing brain*. New York, NY: Oxford University Press.
- Schilling, E., Aseltine, R., Gore, S. (2007). Adverse childhood experiences and mental health in young adults: A longitudinal study. *BMC Public Health*, 7(30), 1-10. doi: 10.1186/1471-2458-7-30.
- Schulenberg, J. E., Sameroff, A., & Cicchetti, D. (2004). The transition to adulthood as a critical juncture in the course of psychopathology and mental health. *Development and Psychopathology*, 16(4), 799-806.
- Spear, L. (2010). *The behavioral neuroscience of adolescence*. New York, NY: W.W. Norton.



Slides and References

Today's slides and references are available at:



[www.pathwaysrtc.pdx.edu/
proj-trainingcollaborative.shtml](http://www.pathwaysrtc.pdx.edu/proj-trainingcollaborative.shtml)



Additional Questions

**If you have additional questions
or feedback, please contact us**

Eileen Brennan, Co-Principal Investigator:

brennane@pdx.edu

Pauline Jivanjee, Co-Principal Investigator:

jivanjeep@pdx.edu

Claudia Sellmaier, Graduate Research Assistant:

csellmaier@pdx.edu

Julie Rosenzweig, Consultant:

rosenzweigj@pdx.edu

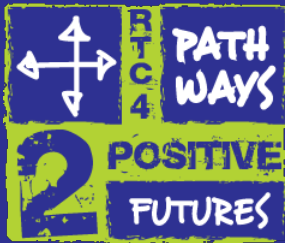
Our project website

www.pathwaysrtc.pdx.edu/proj-trainingcollaborative.shtml



For More Training Opportunities

- Please sign up for ***RTC Updates***, a monthly email announcement of the latest news and opportunities at <http://www.pathwaysrtc.pdx.edu/joinourlists.php>
- Watch ***RTC Updates*** for announcements about **Promoting Positive Pathways to Adulthood**—a series of eight one-hour interactive online training modules that you will be able to access on your own schedule, coming in 2013.



Acknowledgments/Funders



The development of the contents of this presentation were supported by funding from the National Institute of Disability and Rehabilitation Research, United States Department of Education, and the Center for Mental Health Services Substance Abuse and Mental Health Services Administration, United States Department of Health and Human Services (NIDRR grant H133B090019). The content does not represent the views or policies of the funding agencies. In addition, you should not assume endorsement by the Federal Government.

