Building Resilient Learning Environments

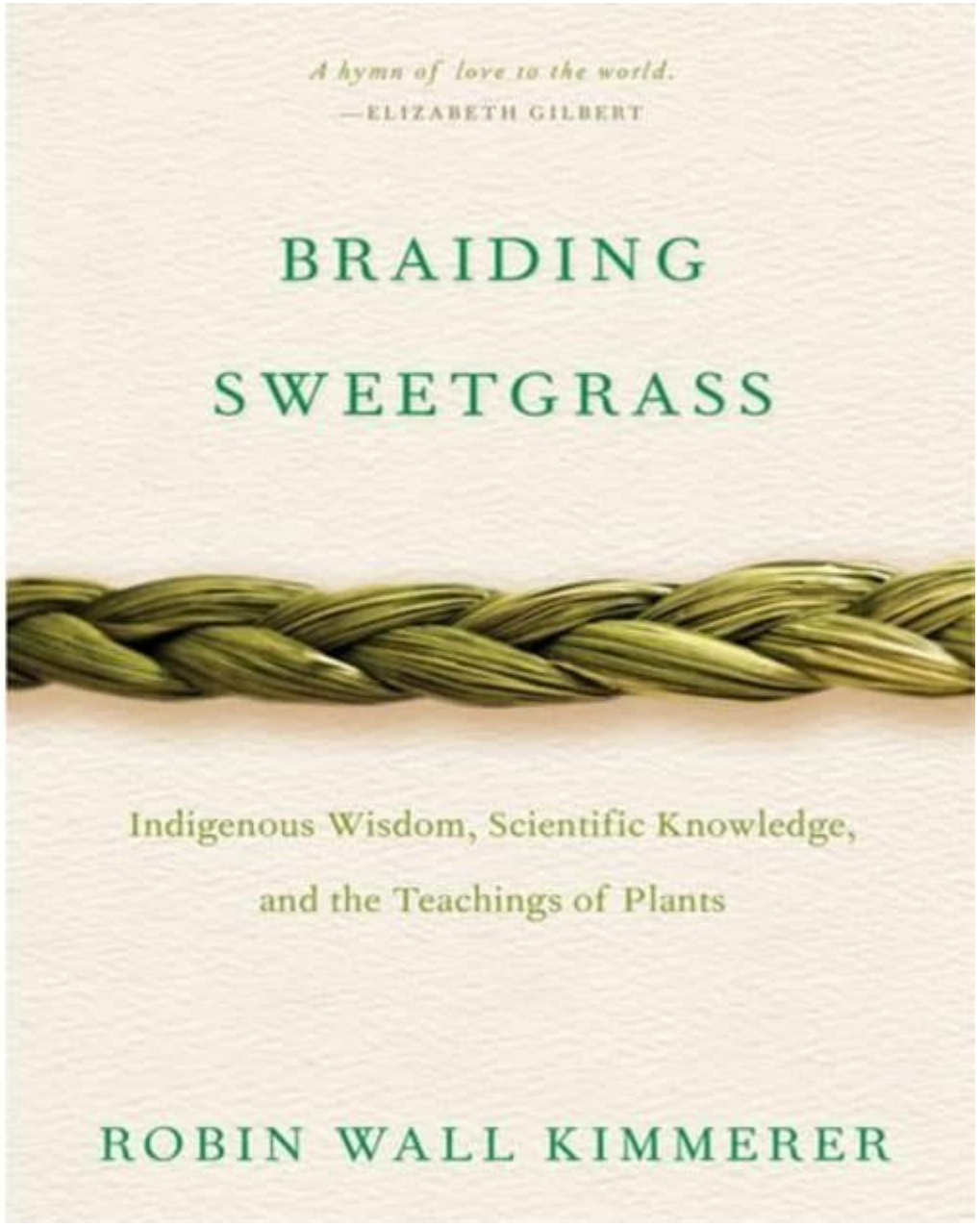
Mays Imad, PhD :: mimad@conncoll.edu :: @lrningsanctuary

With your colleagues, please discuss:

1. Reflect (after you introduce yourselves) on what brings you here today?
2. What are your hopes for this term and the coming year?

Today, we will:

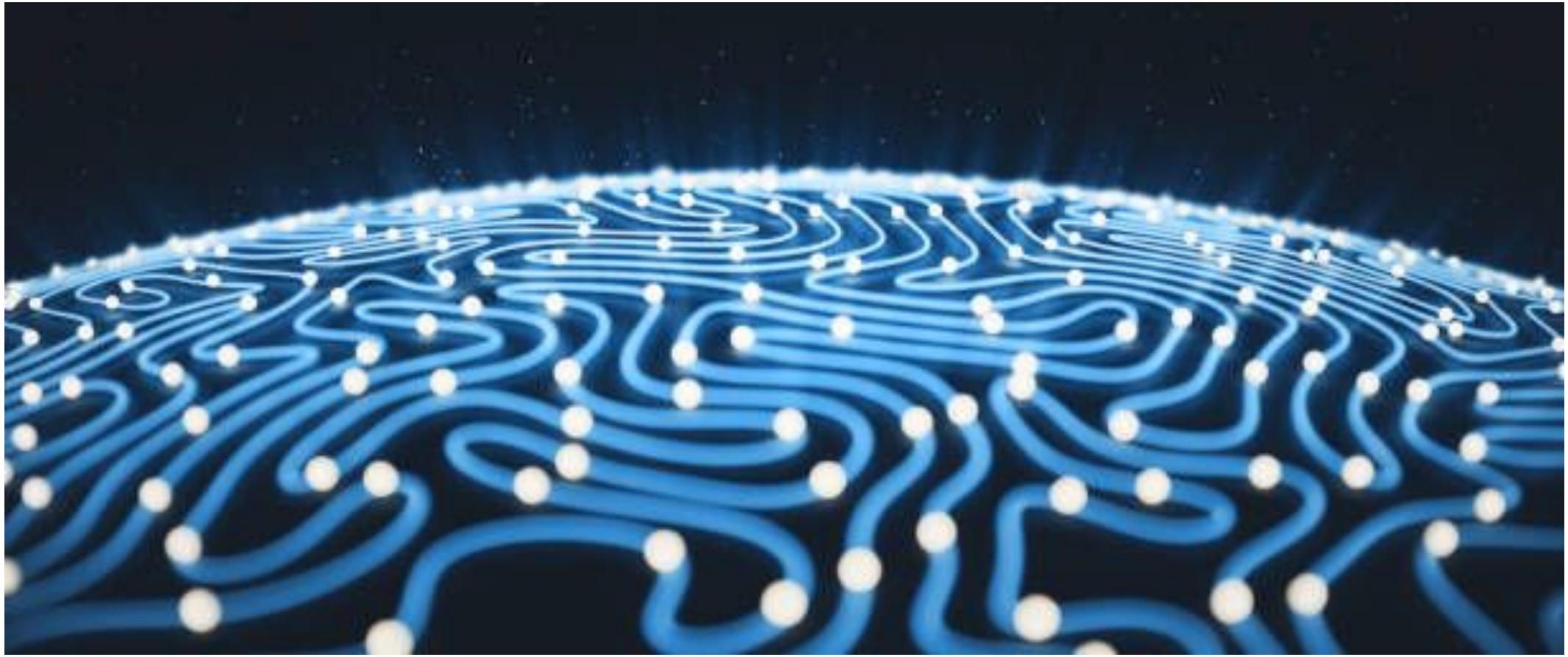
1. Discuss why the science (of learning, of trauma, of resilience) matters.
2. Examine some of scientific basis of emotional regulation and resilience.
3. Consider examples of polyvagal-informed teaching and learning practices.


A hymn of love to the world.
—ELIZABETH GILBERT
BRAIDING
SWEETGRASS
Indigenous Wisdom, Scientific Knowledge,
and the Teachings of Plants
ROBIN WALL KIMMERER

“The grasses feed the ants with seeds and the ants feed the grasses with soil. They hand off life to one another. They understand their interconnections; they understand that the life of one is dependent on the life of all. Leaf by leaf, root by root, the trees, the berries, the grasses are joining forces, and so there are birds and deer and bugs that have come to join them. And so the world is made.”

We are Relational

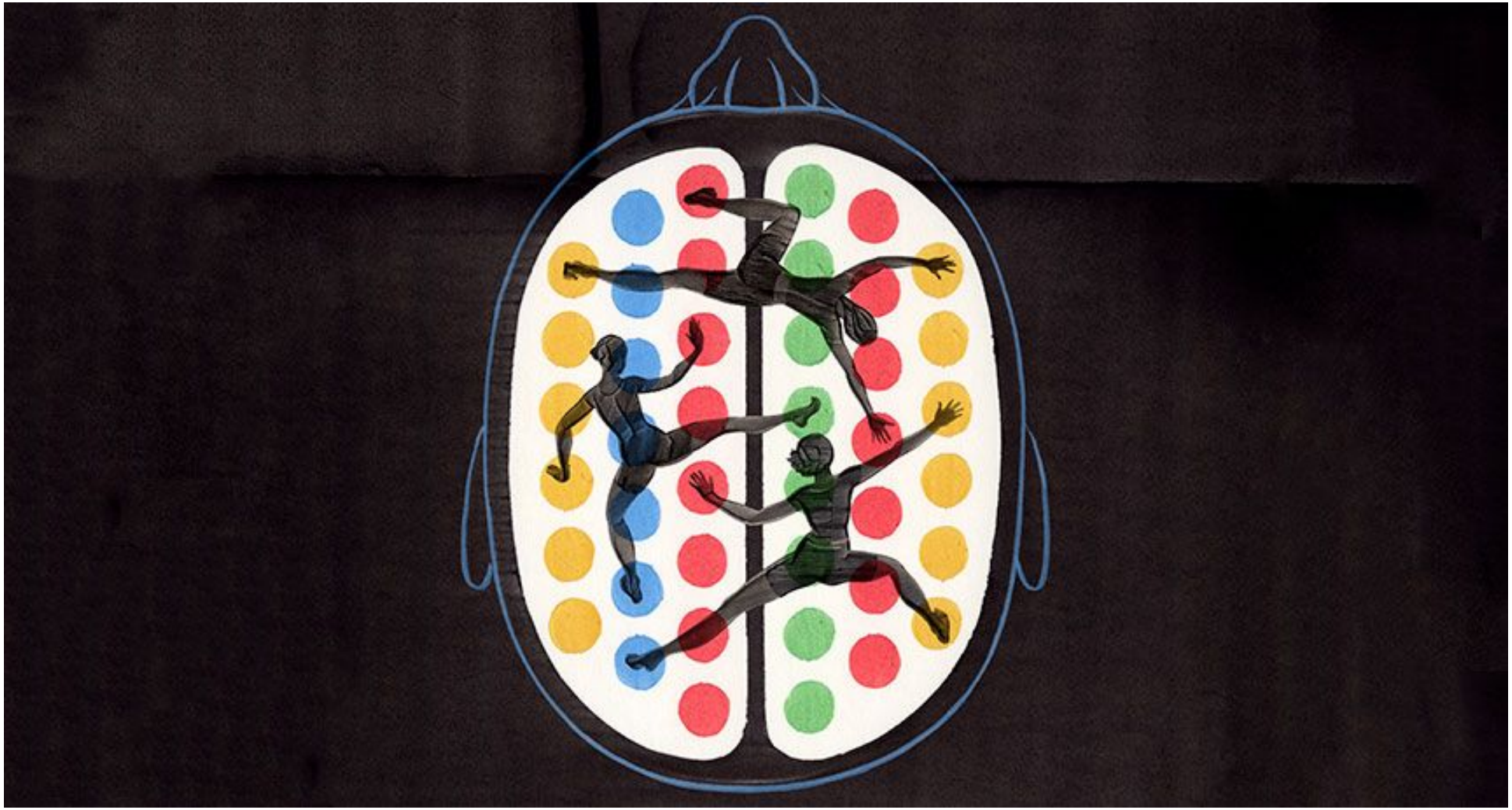
We are Wired for Learning



https://www.istockphoto.com/photos/neuroscience-learning

Learning Takes Brain Acrobatics

https://www.sciencenews.org/article/brain-flexibility-learning



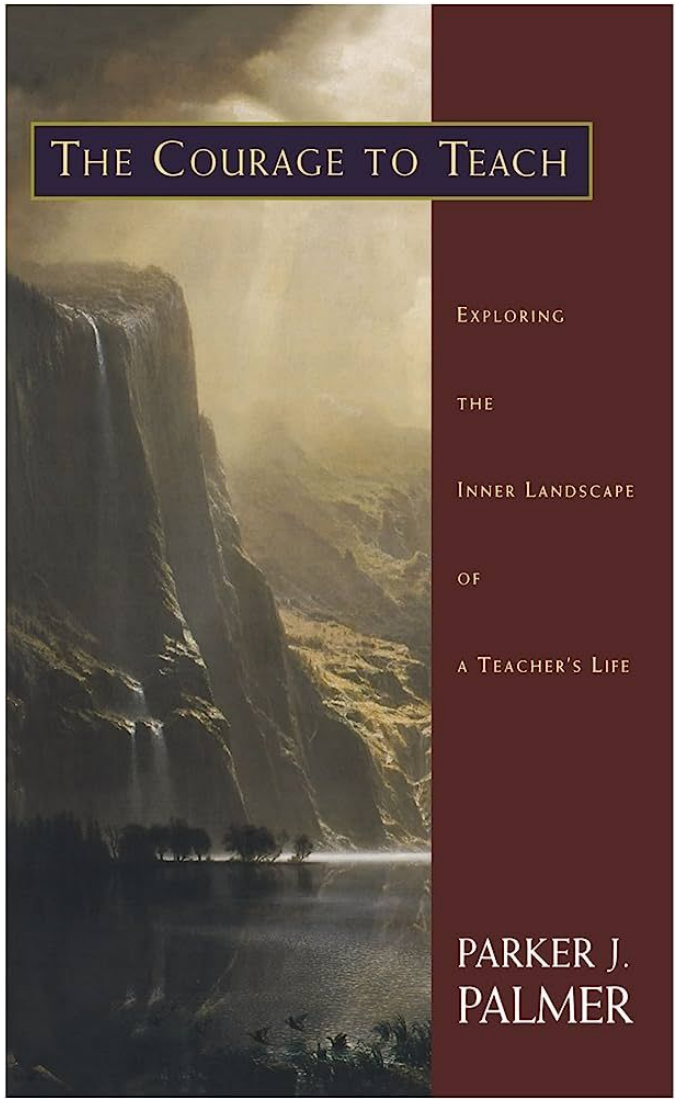
Learning is Relational

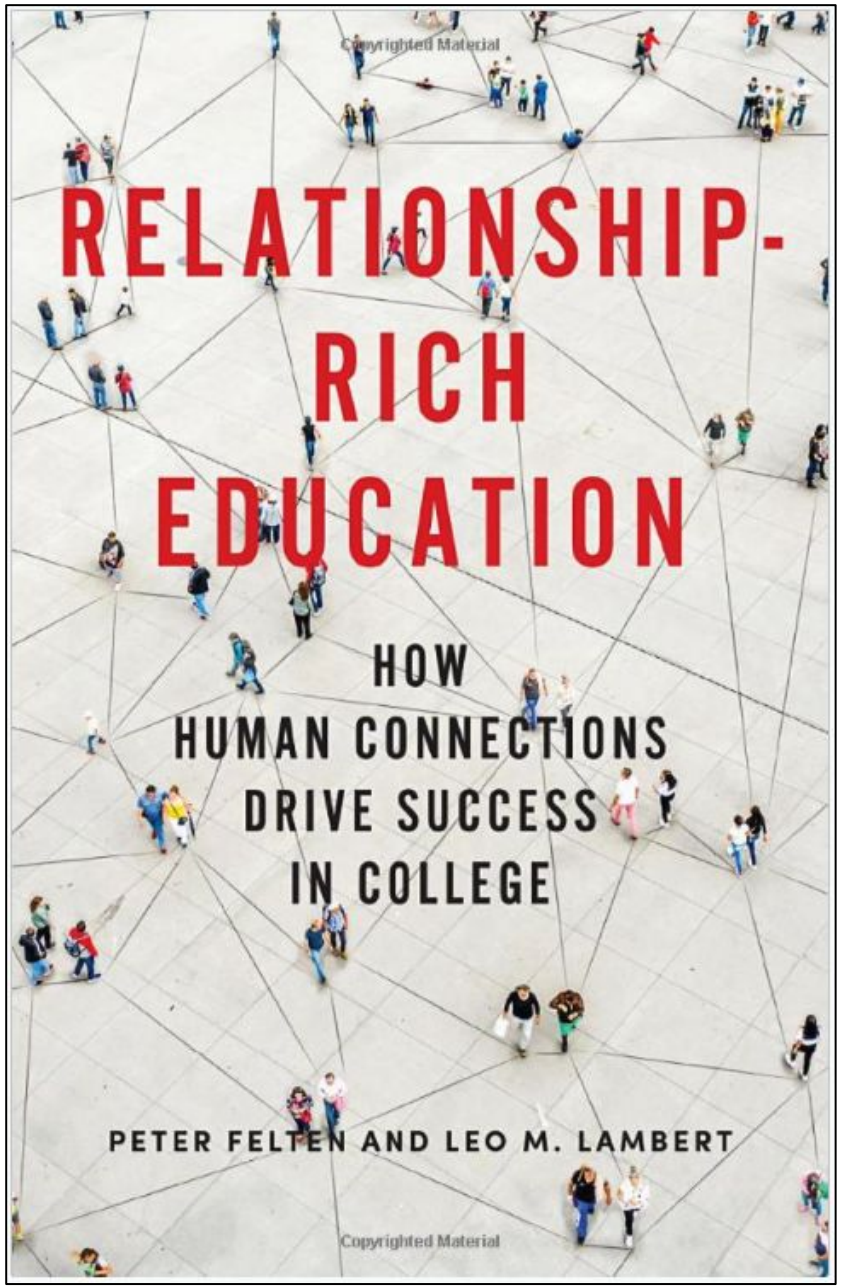
Learning is Relational

We connect new information to what we know, to who we are, to what we value, and to the larger community and the world.

Teaching is Relational

“Good teachers possess a capacity for connectedness. They are able to weave a complex web of connections among themselves, their subjects, and their students so that students can learn to weave a world for themselves.”

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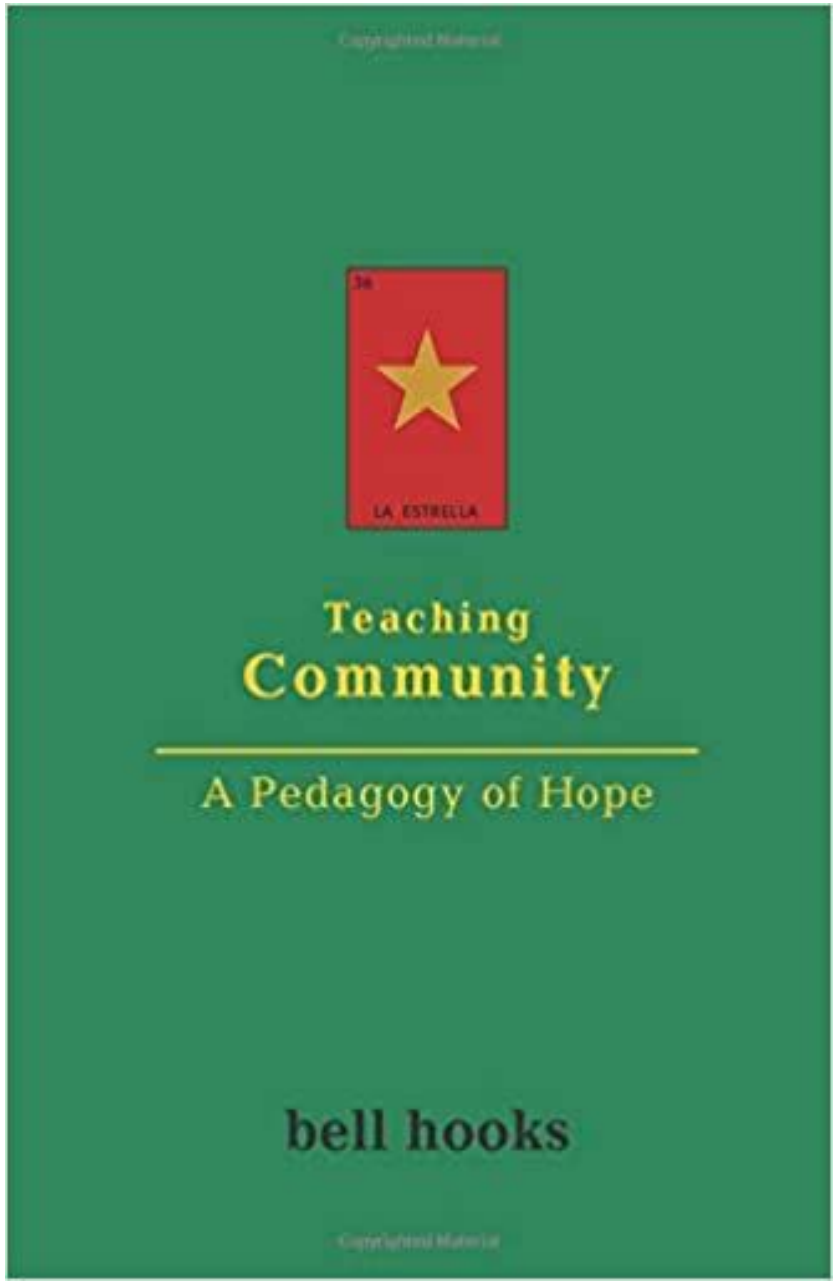

LA ESTRELLA
Teaching Community
A Pedagogy of Hope
bell hooks

Teaching and Learning as Biological Phenomena

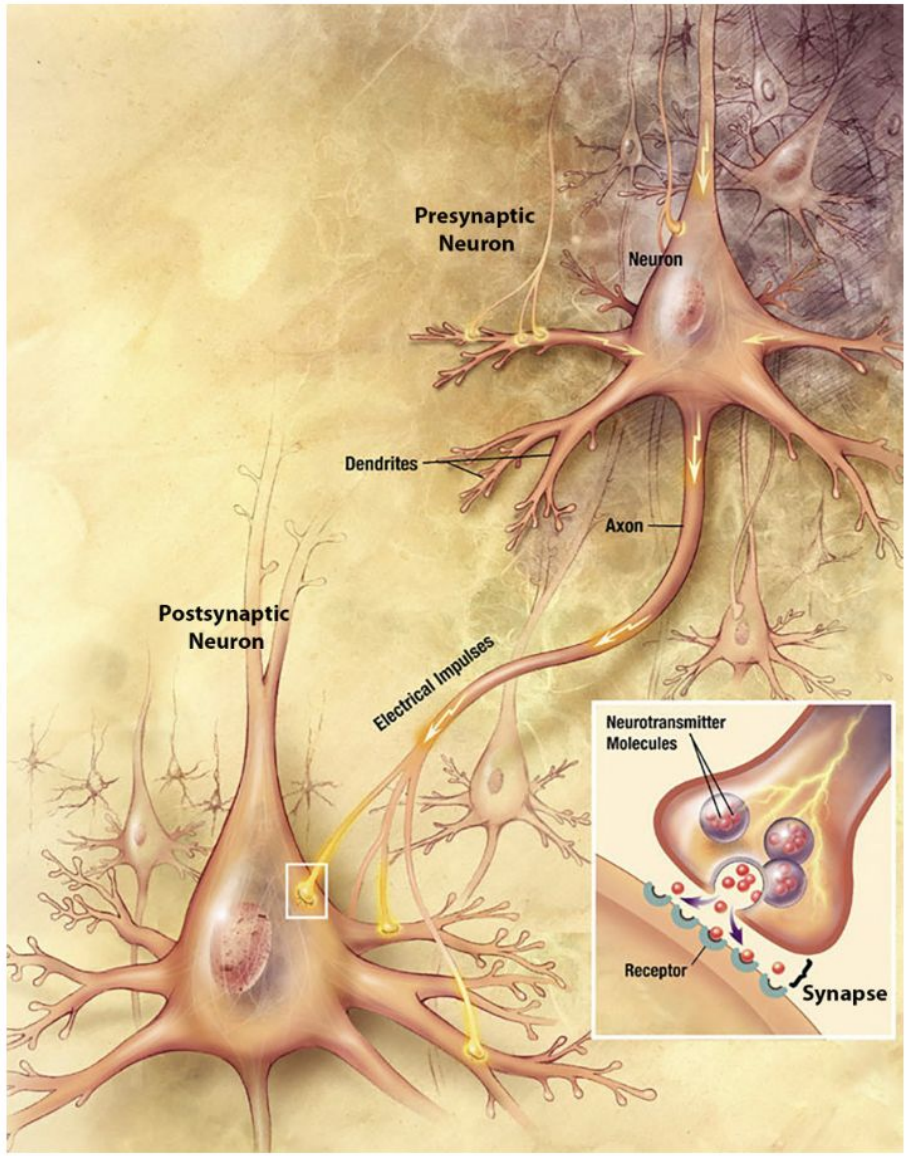
Teaching as Brain Changing: Exploring Connections between Neuroscience and Innovative Teaching

Melinda T. Owens and Kimberly D. Tanner*
Science Education Partnership and Assessment Laboratory, San Francisco State University, San Francisco, CA 94132

How do you conceptualize learning? Do you think of learning as a contractual agreement: the instructor performs certain actions to facilitate learning, and the student, in turn, explicitly or implicitly promises to behave in ways to receive that learning? Or do you think of learning in sociological terms: the learner, through what he or she learns, transforms his or her beliefs and becomes a more emancipated citizen of the world? Or perhaps you think of learning in psychological terms: learners are motivated, store facts in their minds, and create mental knowledge structures. All of these ways of conceptualizing learning can be beneficial in understanding how students learn and what makes teaching effective.

However, at their most fundamental and mechanistic level, teaching and learning are neurological phenomena arising from physical changes in brain cells. The notion that learning and memory are neurobiological processes is relatively young, dating back only to the 18th century (Hartley, 1749). Even today, only about half of teachers and the general public, depending on the country, agree that "learning occurs through the modification of the brain's nervous connections" (Herculano-Houzel, 2002, p. 102; Howard-Jones *et al.*, 2009; Deligiannidi and Howard-Jones, 2015; Hermida *et al.*, 2016). Nevertheless, recent advances in brain science have given us an in-depth picture of the molecular and cellular changes that occur during learning, and the consensus of neurobiologists is that these alterations are both necessary and sufficient for the formation of memories (Takeuchi *et al.*, 2014).

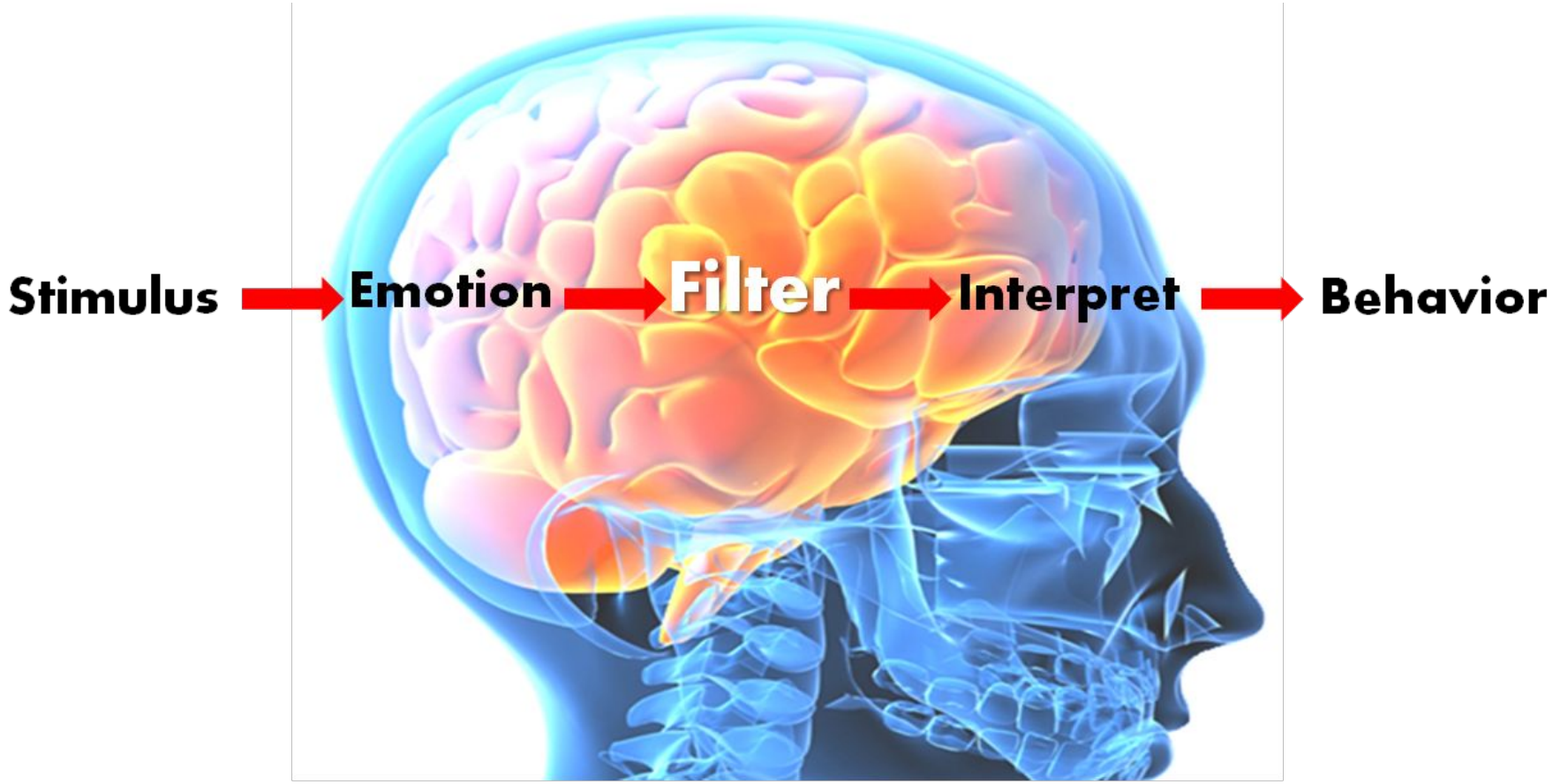
If anyone should appreciate that teaching and learning are biological phenomena, one would predict it would be biologists, and scientists more generally. However, few of us were likely taught about the neurobiology of learning in our pedagogical training. In this paper, we will first explore how one might conceptualize learning as a biological process in the context of a common teaching technique called the *think–pair–share*. Then, we will give an overview of what is known from biological research about the neurobiological basis of learning and explore how various teaching techniques might harness known neurological mechanisms to promote the creation and retrieval of long-term memories. This *Feature* does not aspire to give instructions for how one should teach. Certainly, there have been many attempts to use the findings of neuroscience to create guidelines for instruction, particularly in K–12 education, and



CBE Life Sci Educ June 1, 2017 16:fe2
DOI:10.1187/cbe.17-01-0005
*Address correspondence to: Kimberly D. Tanner (kdtanner@sfsu.edu).

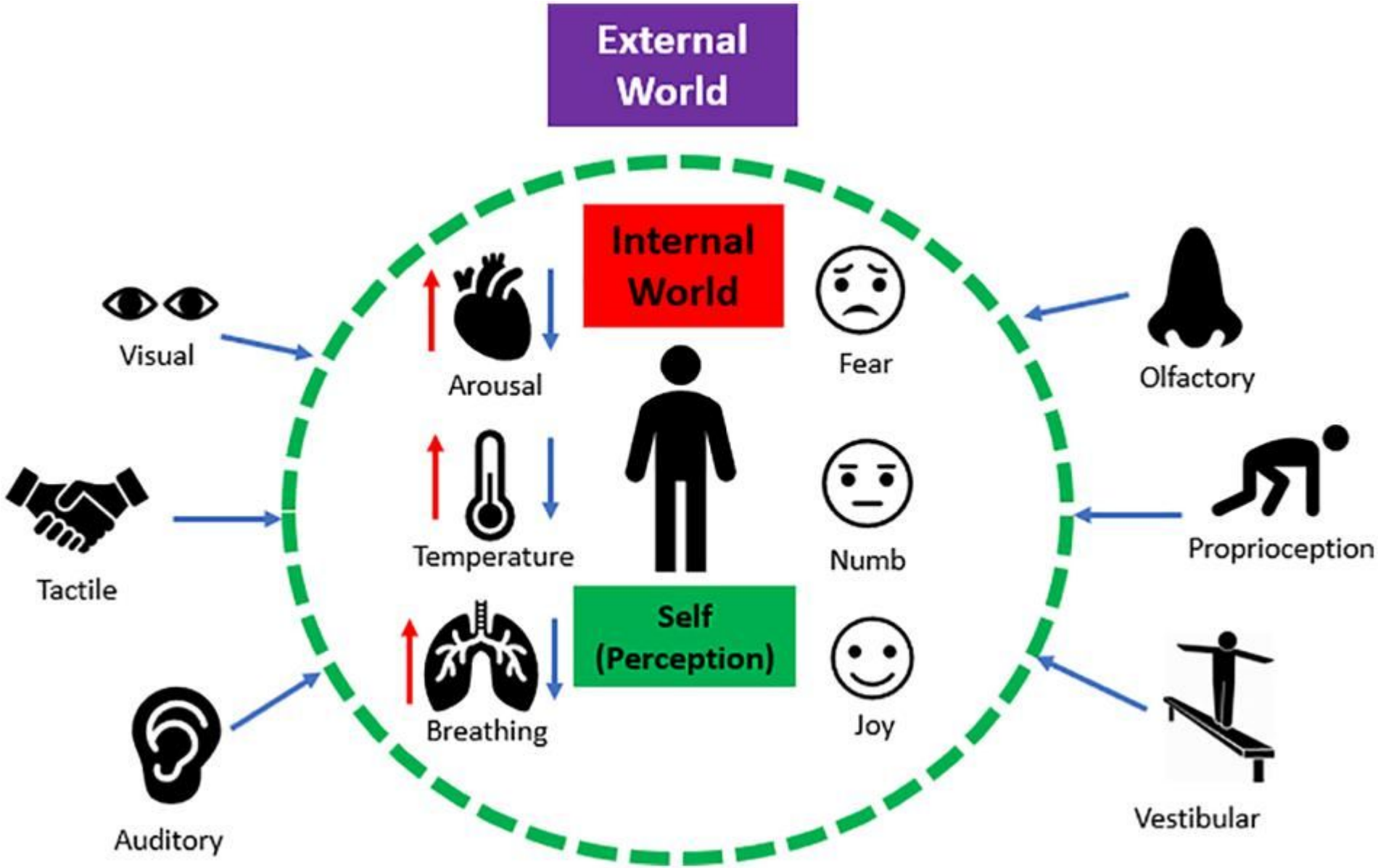
How Do We Process Sensory Information (and the world around us)?

We Feel, Then We Assign Meaning, Then We Act



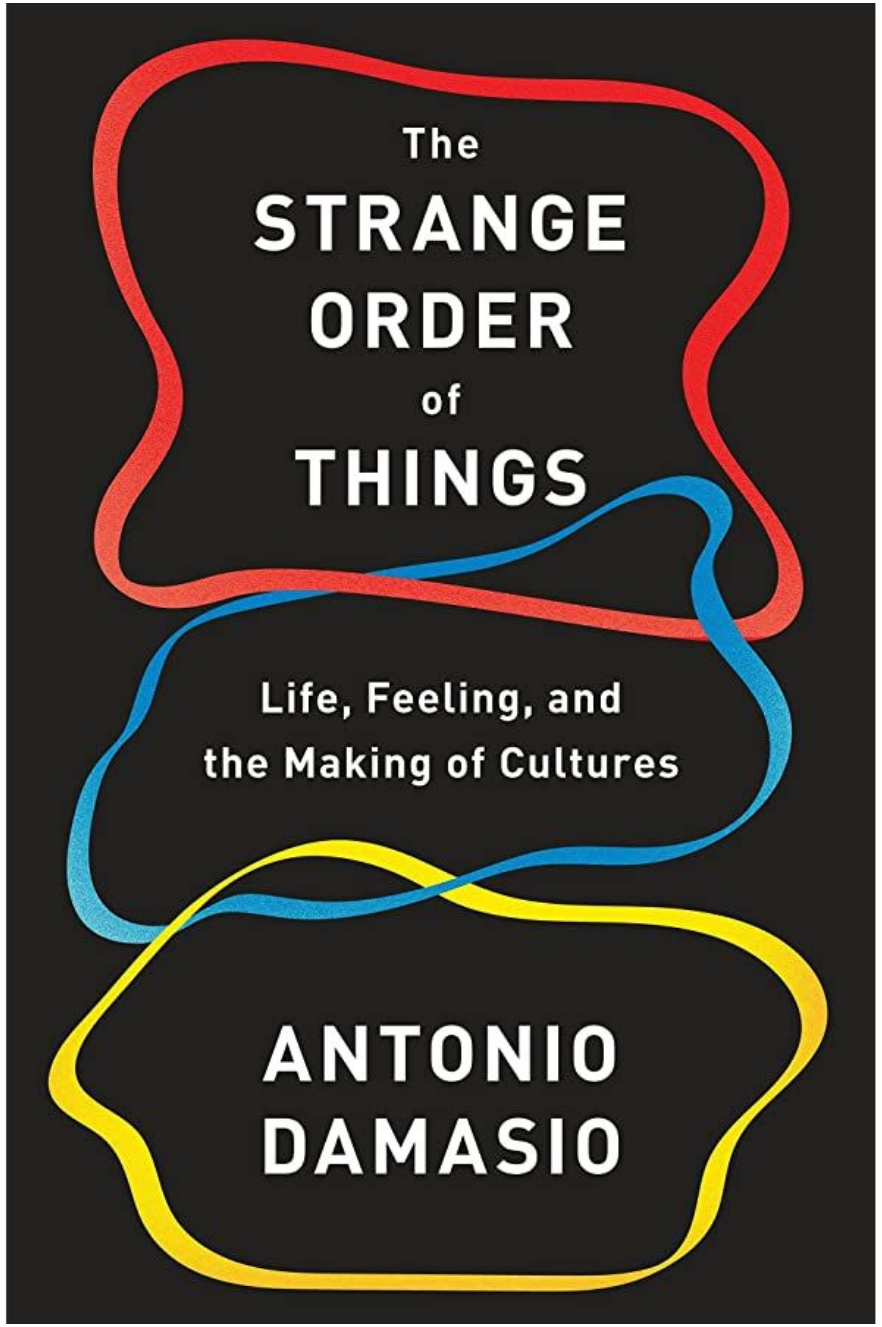
https://www.thetraderisk.com/how-to-optimize-your-emotional-capital/

The processing of sensory information begins at the subconscious level before it is passed on to the conscious level of the brain.



https://www.frontiersin.org/files/Articles/625490/fnins-15-625490-HTML/image_m/fnins-15-625490-g001.jpg

“Together, integrating inner affective sensations and external sensory information plays a pivotal role in shaping the perception of a sensory experience.”

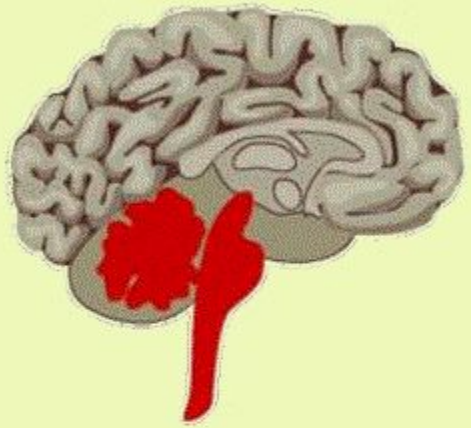


"Feelings, as deputies of homeostasis, are the catalysts for the responses that began human cultures."

Trauma is Relational

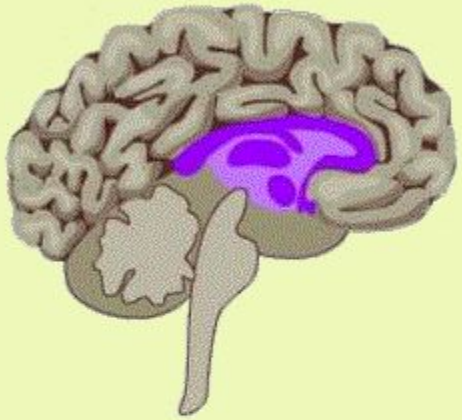
Trauma impacts our ability to engage, learn, connect, & remember

The Three-Parted Brain



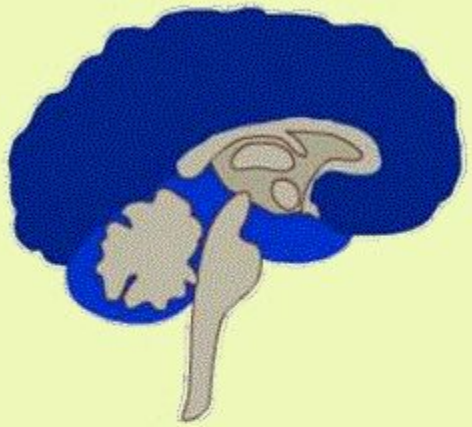
Lizard Brain
(Brain stem and cerebellum)

Autopilot
Fight & Flight



Mammal Brain
(Limbic System)

Emotions
Memories
Habits
Attachments



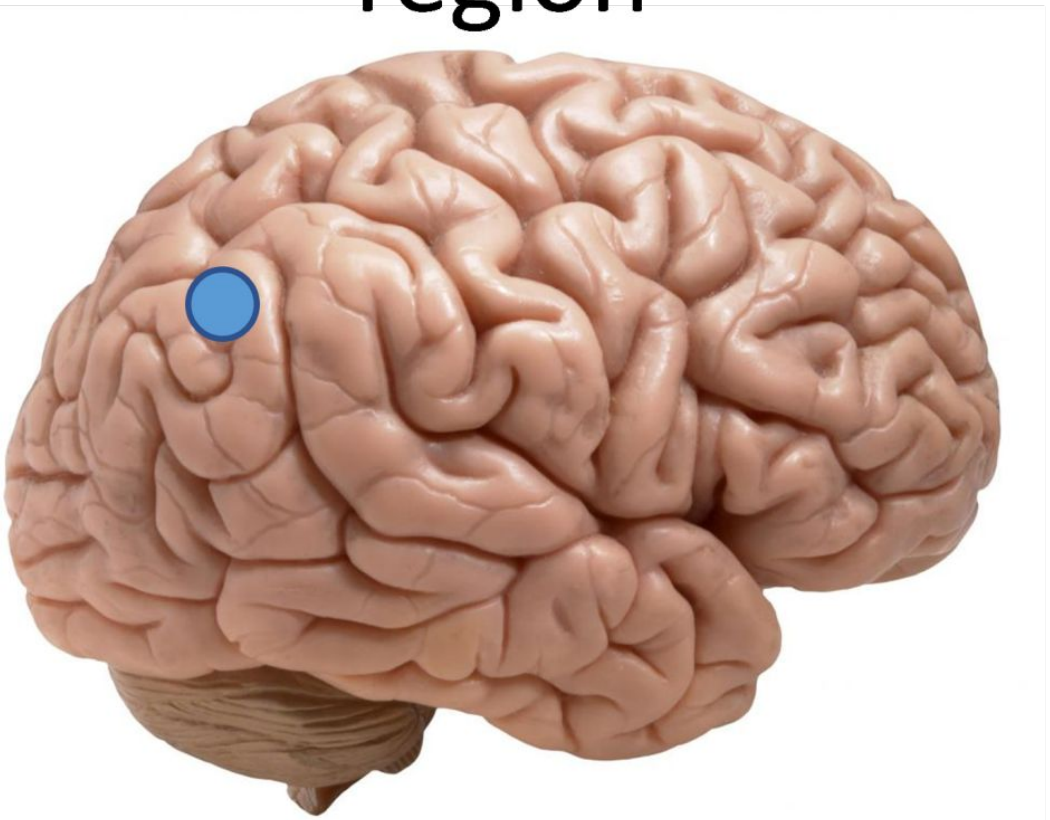
Human Brain
(Neo-Cortex)

Language, abstract thought, imagination, consciousness, reasoning, rationalising

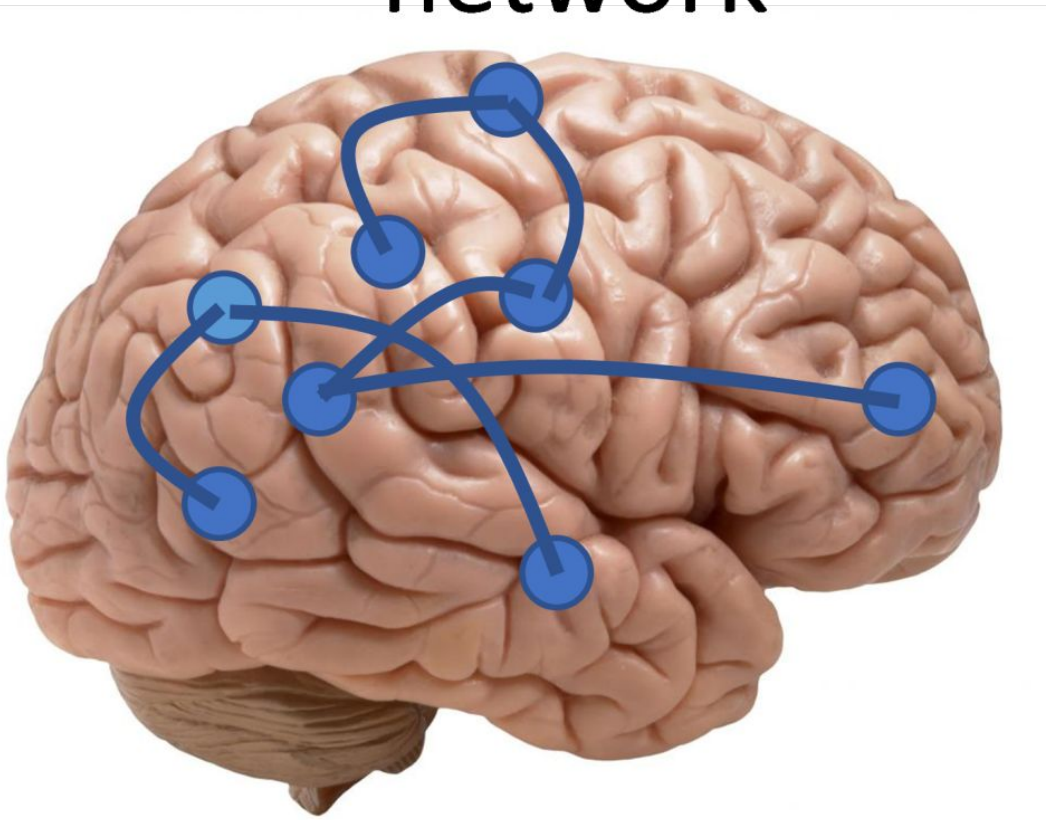
(From Paul D. MacLean's model of the "Triune Brain")

https://en.wikipedia.org/wiki/Triune_brain

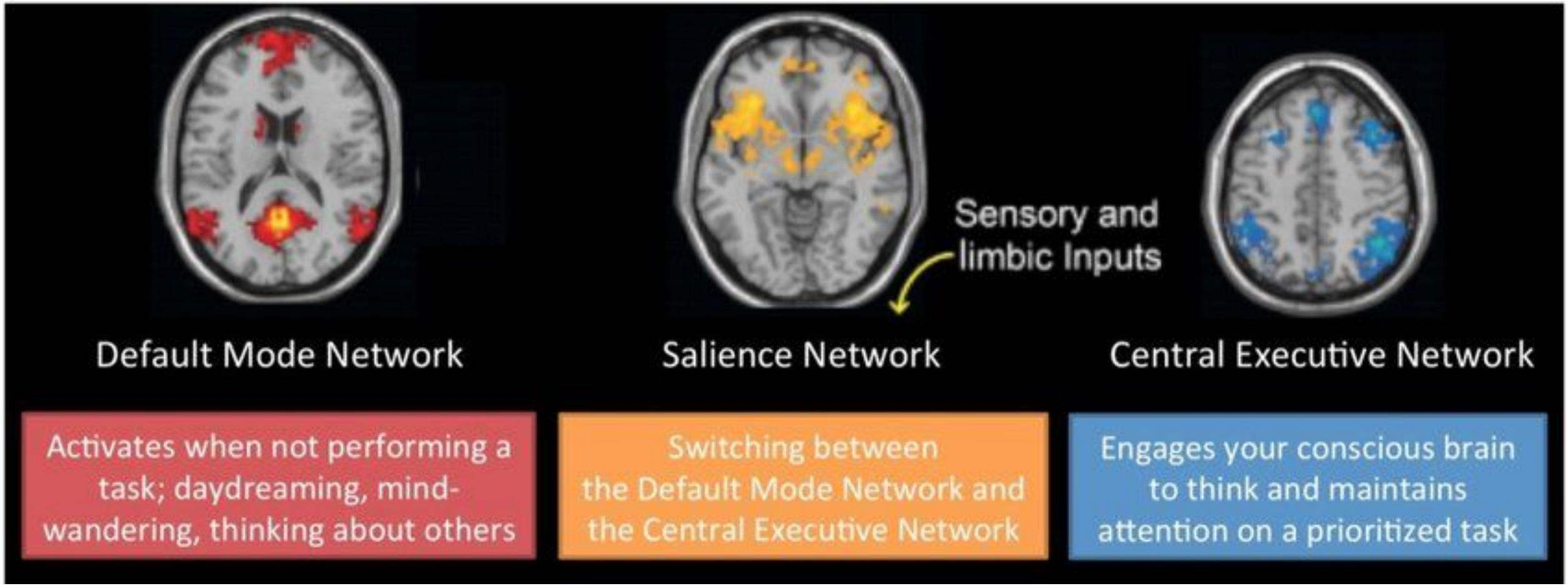
region



network

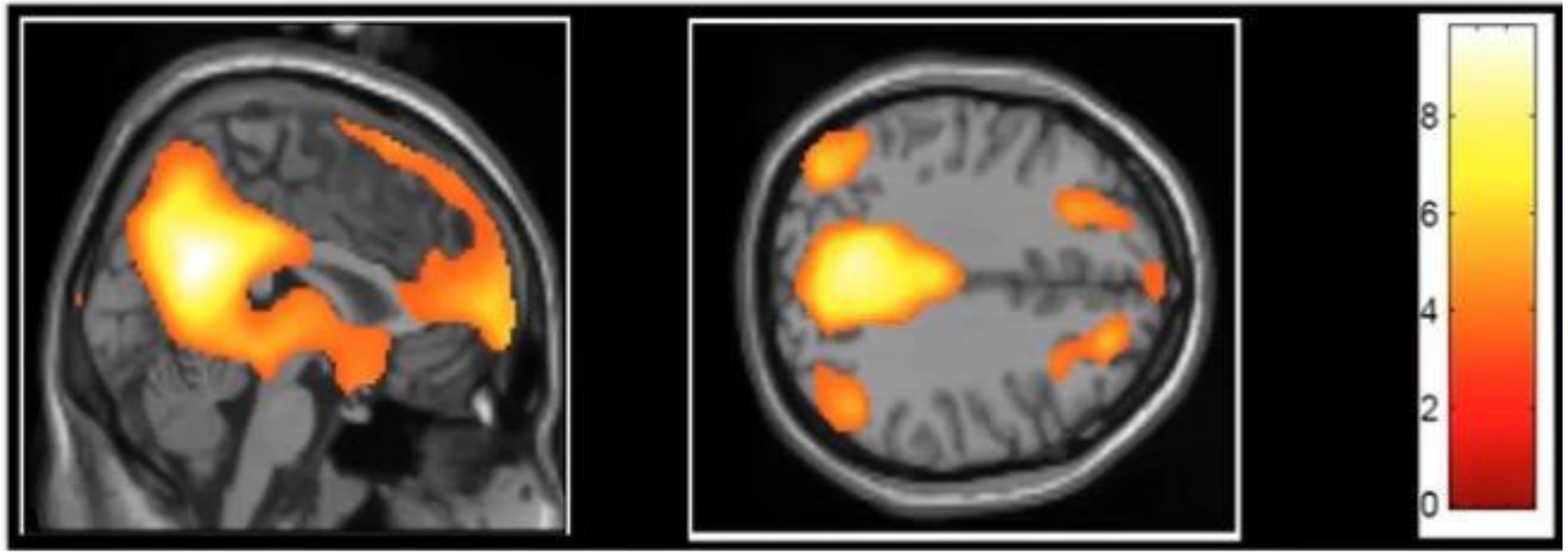


https://cognitionemotion.wordpress.com/2021/01/02/what-kind-of-brain-network-overlapping-and-dynamic/



https://www.researchgate.net/profile/Abdelhak-Hammoudi/publication/352492508/figure/fig2/AS:1035831246602240@1623972822577/Central-Executive-Network-the-Default-Mode-Network-and-the-Salience-Network_W640.jpg

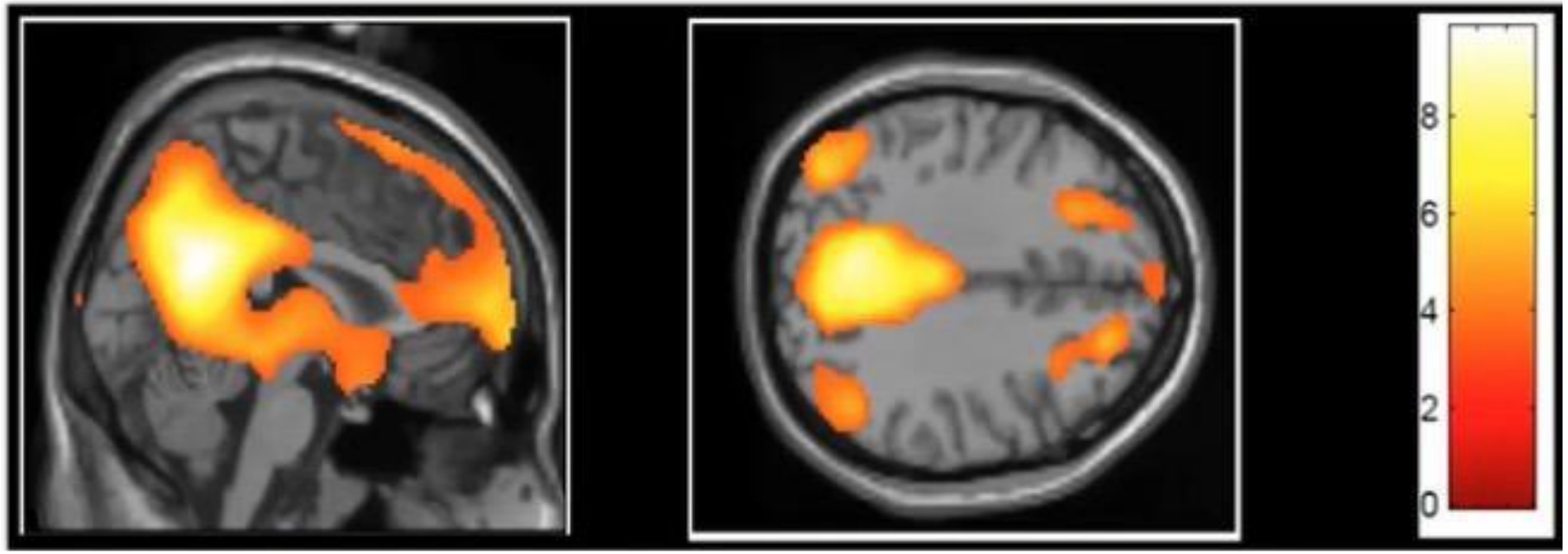
Default Mode Network

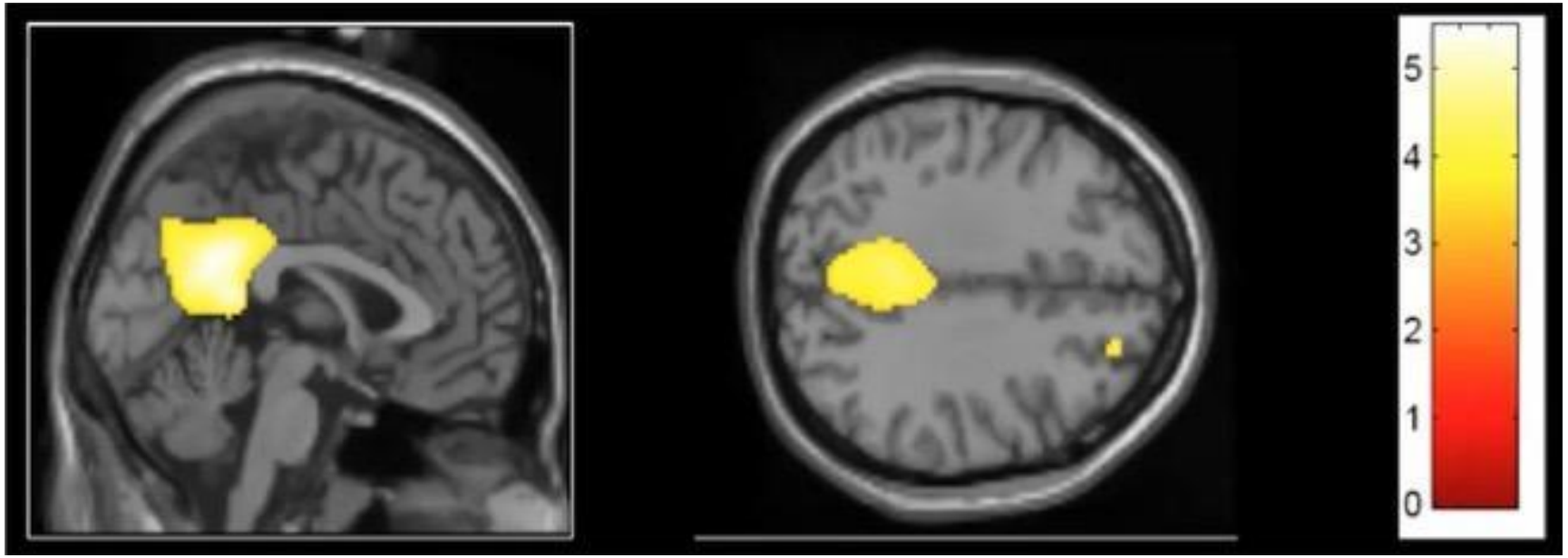


At rest, various parts of the brain are talking with each other and integrating information.

Bluhm…Lanius J of Psychiatry & Neuroscience, 2009

Default Mode Network





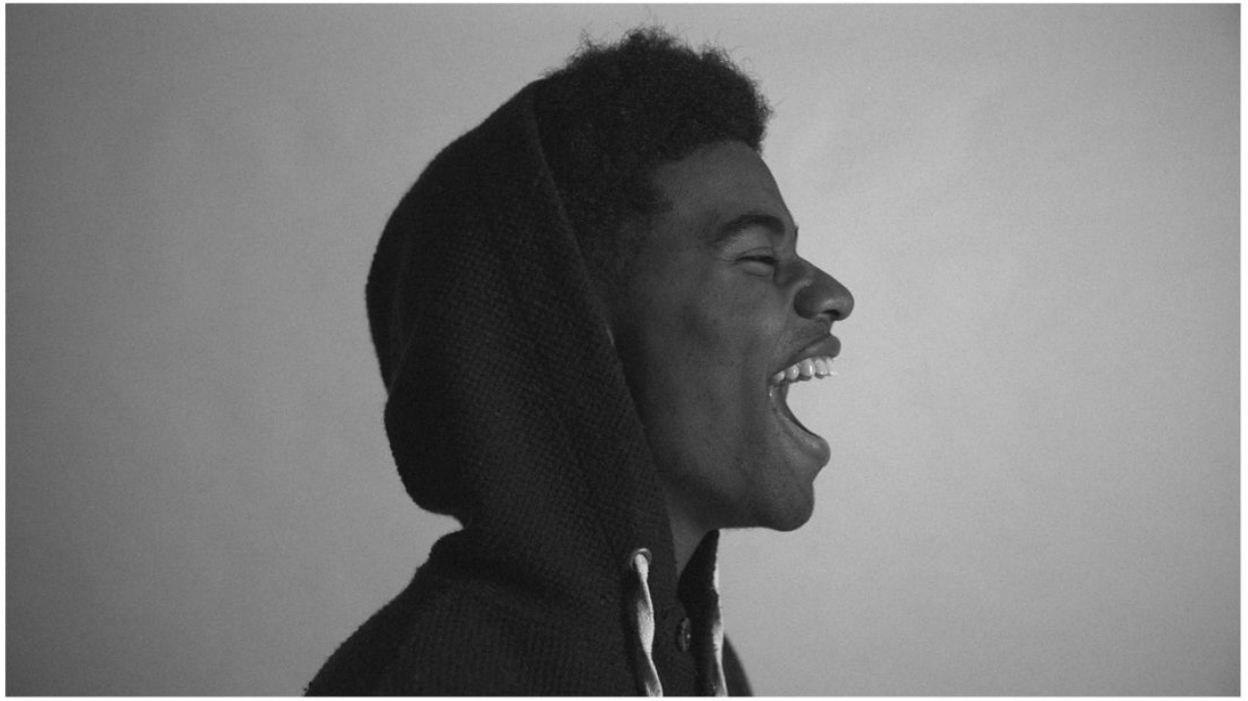
At rest, various parts of the brain are talking with each other and integrating information.

Bluhm…Lanius J of Psychiatry & Neuroscience, 2009

In trauma patients, there is no integration and the person is **“stuck” in the past.**

Trauma shatters our assumptions about relationships, about the benevolence of the world, the meaningfulness of the world, and our sense of self.

What do you notice among your students, faculty (*and yourself*) that wasn't there before the pandemic?:



The Future of Healing: Shifting From Trauma Informed Care to Healing Centered Engagement

Shawn Ginwright · Follow

14 min read · May 31, 2018

Healing is Relational

Autonomic Nervous System = Foundation of Our Lived Experiences

Available online at www.sciencedirect.com
ScienceDirect
Biological Psychology 74 (2007) 116–143
BIOLOGICAL PSYCHOLOGY
www.elsevier.com/locate/biopsycho

The polyvagal perspective☆

Stephen W. Porges

University of Illinois at Chicago, Brain-Body Center, Department of Psychiatry (mc 912), Chicago, IL 60612, United States

Accepted 26 June 2006
Available online 16 October 2006

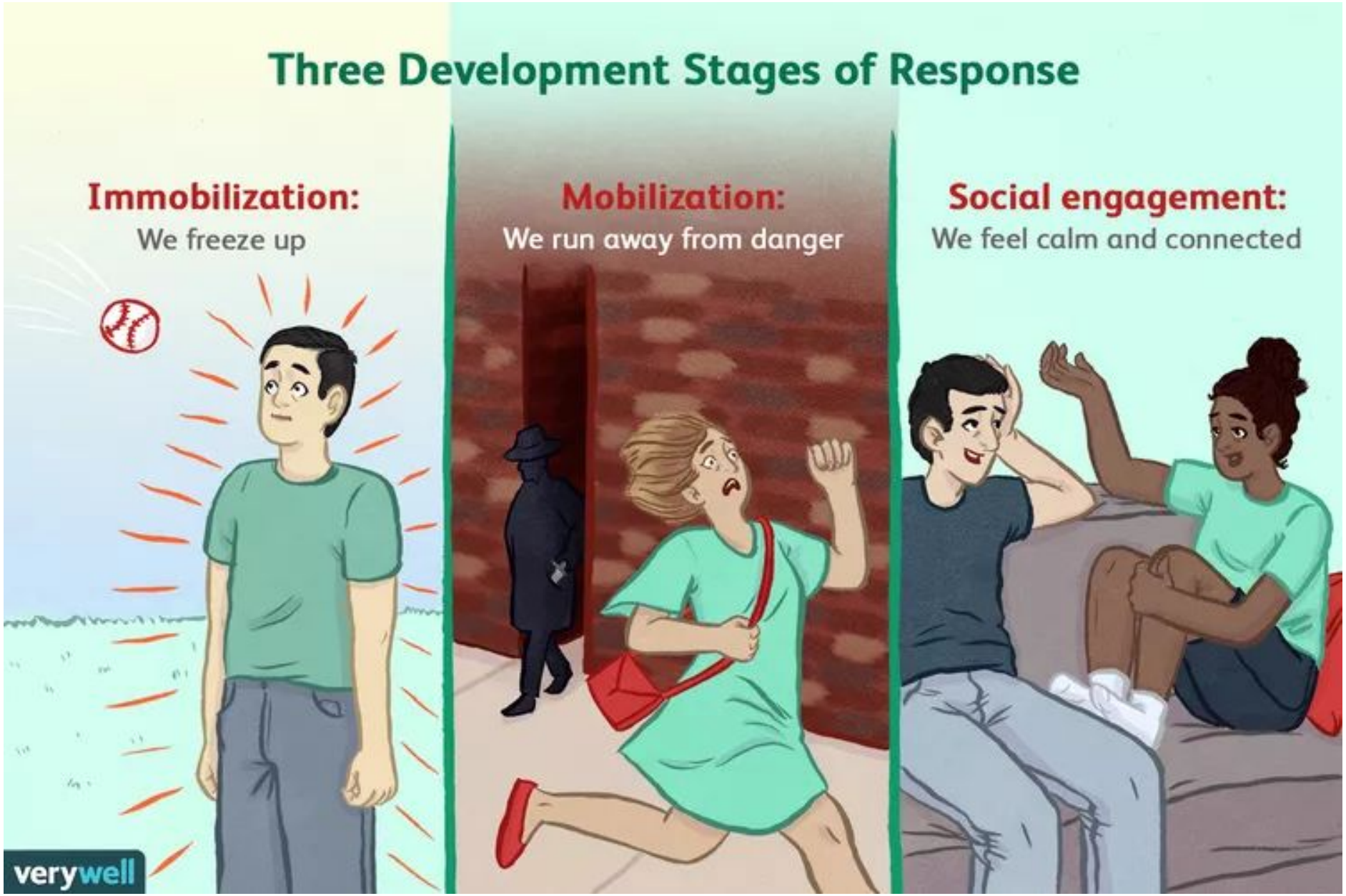
Abstract

The polyvagal theory introduced a new perspective relating autonomic function to behavior, that included an appreciation of the autonomic nervous system as a "system," the identification of neural circuits involved in the regulation of autonomic state, and an interpretation of autonomic reactivity as adaptive within the context of the phylogeny of the vertebrate autonomic nervous system. The paper has two objectives: first, to provide an explicit statement of the theory; and second, to introduce the features of a polyvagal perspective. The polyvagal perspective emphasizes how an understanding of neurophysiological mechanisms and phylogenetic shifts in neural regulation leads to different questions, paradigms, explanations, and conclusions regarding autonomic function in biobehavioral processes than peripheral models. Foremost, the polyvagal perspective emphasizes the importance of phylogenetic changes in the neural structures regulating the autonomic nervous system and how these phylogenetic shifts provide insights into the adaptive function and the neural regulation of the two vagal systems.

Neuroception

describes the neurobiological mechanisms involved in perceptions of safety, danger or life threat from

https://sanasumainsrilanka.wordpress.com/2021/04/25/neuroception-polyvagal-theory-2-kundalini-yoga-2021/



https://www.verywellmind.com/polyvagal-theory-4588049

Healing is Relational

Psychology and Psychotherapy: Theory, Research and Practice (2019), 92, 224–237

The British Psychological Society

www.wileyonlinelibrary.com

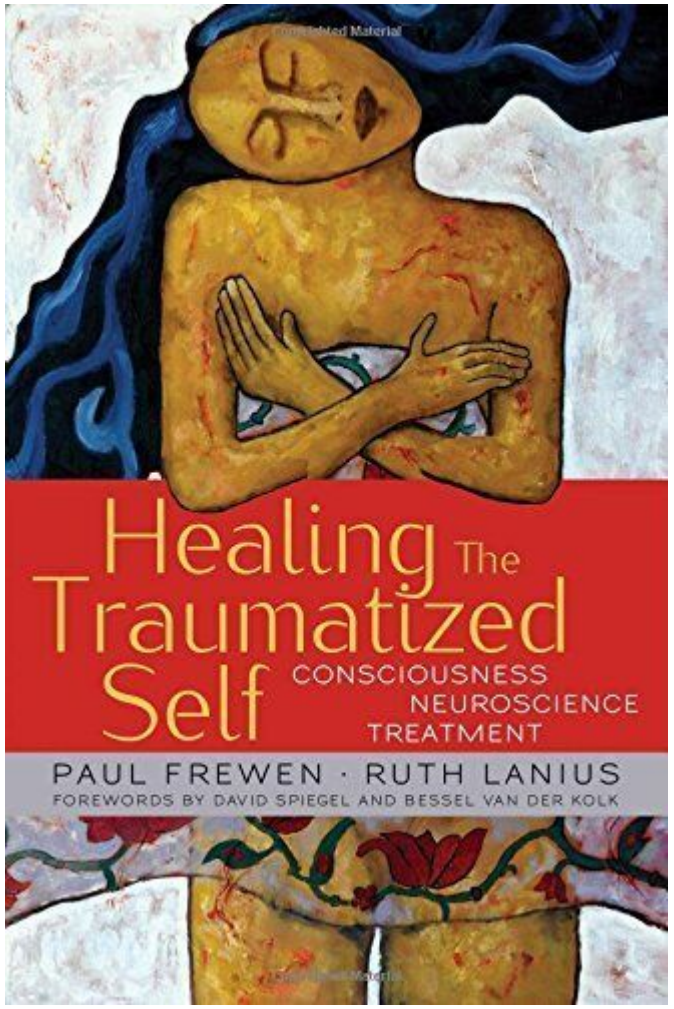
Special issue paper

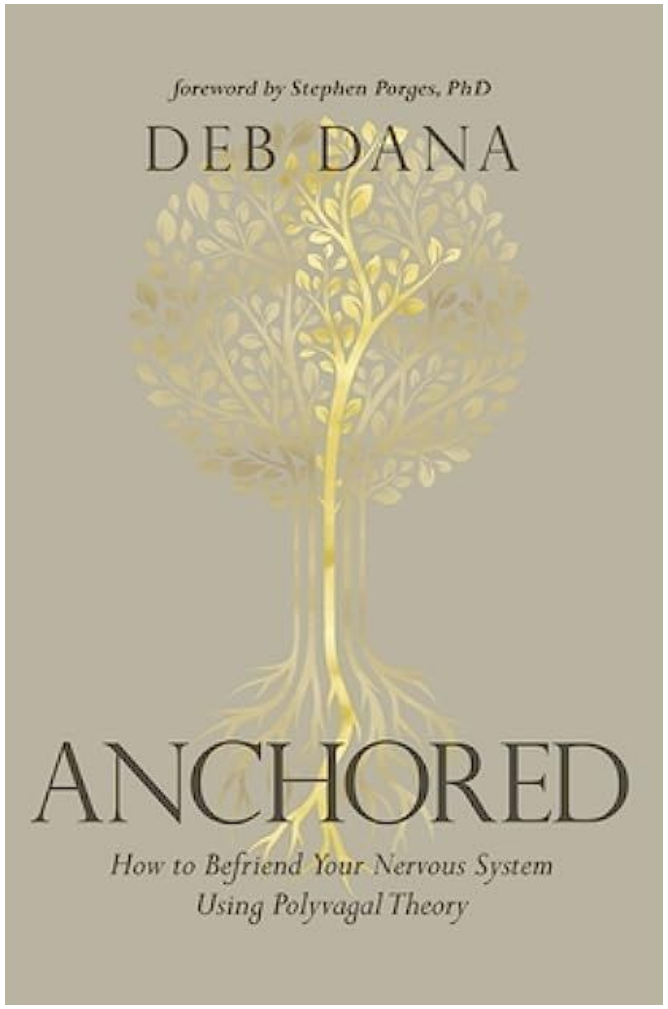
The mind in psychotherapy: An interpersonal neurobiology framework for understanding and cultivating mental health

Daniel J. Siegel*

Mindsight Institute, Santa Monica, California, USA

In this brief overview, I offer a conceptual approach to the mind that can support whatever clinical, research, public policy, or other approach you may be involved with. It seeks to


Healing The Traumatized Self
CONSCIOUSNESS
NEUROSCIENCE
TREATMENT
PAUL FREWEN · RUTH LANIUS
FOREWORDS BY DAVID SPIEGEL AND BESSEL VAN DER KOLK


foreword by Stephen Porges, PhD
DEB DANA
ANCHORED
How to Befriend Your Nervous System
Using Polyvagal Theory

December 14, 2021

How to Help Students Develop ‘Mental Immunity’

Colleges should educate students about toxic stress, the lasting effects of the pandemic and how to ameliorate the impact of those experiences on their learning, Mays Imad and her students write.

By Mays Imad and How to Help Students Develop ‘Mental Immunity’

“Prior to the pandemic, I was a good student in the sense that I got all my work done on time and was super passionate about learning. Then I went home [when the pandemic hit] and tried to continue my work. It was horrible … like all the missing assignments and lack of motivation and staring blankly at my work. I was trying to figure out what’s wrong with me. Did I lose my cognitive function? So I was like, maybe this is the real me, maybe I’m actually really unmotivated and lazy and maybe I was never a good student. I felt lonely and embarrassed and scared.”

The Journal of Undergraduate Neuroscience Education (JUNE), Winter 2022, 20(2):A253-A261

ARTICLE
Teaching to Empower: Leveraging the Neuroscience of Now to Help Students Become Self-Regulated Learners

Mays Imad
Biology Department, Connecticut College. New London, CT 06320; Department of Life and Physical Science, Pima Community College. Tucson, AZ 85716.

In his book Descartes' Error, neurologist Antonio Damasio argues that humans do not make decisions by relying exclusively on the rational or reason-oriented parts of their brain (2008). Evidence from patients with brain damage reveal that our abilities to reason and make decisions are greatly influenced by our emotions (Damasio et al., 1990; Saver and Damasio, 1991). In fact, our emotions and how we feel act as a gateway to our thinking and learning by providing "the bridge between rational [prefrontal cortex] and nonrational processes" [brainstem and limbic structures]." (Damasio, 2008). Understanding the ways in which our brain processes sensory inputs and integrates those inputs into our ongoing emotional state is critical for helping students become self-regulated, sophisticated learners.

In the following article, I will begin by briefly summarizing the role of emotions in learning and the impact of toxic stress on our students' ability to engage, learn, and thrive. I will then define and present a trauma-informed teaching and learning paradigm with practical strategies that empower students to continue to learn and succeed. I will address a few misconceptions about trauma-informed education. I will conclude by making a plea to you, members of the undergraduate neuroscience community, by presenting a case for the utility and moral imperative of educating our students about the basic functioning of their brains, especially as it relates to emotional regulation and learning.

Key words: toxic stress; emotional valance; trauma; trauma-informed education; amygdala hijack; limbic brake.

What Is Your Why? A First-Day In-Class Activity

Mays Imad ▪ August 14, 2023

Like many people, I have days when the simple act of getting out of bed feels daunting, let alone going to campus, lecturing, meeting with students, attending faculty meetings, grading papers, and so on. These challenging days are often amplified by an internal dialogue questioning why I feel this way, despite recognizing the sacrifices my parents made to get me here, understanding that I should be grateful for my job, and acknowledging that others may be facing more arduous circumstances. While all

From Deficit to Empowerment: A Neuroscience Approach to Unveiling the Learning Brain

Mays Imad • September 11, 2023

As a student, I would often find myself buried in textbooks, meticulously reviewing notes, highlighting ...

"Essential . . . Rest is a necessary step in reclaiming our power to resist systemic oppression."
–IBRAM X. KENDI, author of *How to Be an Antiracist* and *Stamped from the Beginning*

REST IS RESISTANCE

A MANIFESTO

TRICIA HERSEY

FOUNDER OF

THE NAP MINISTRY

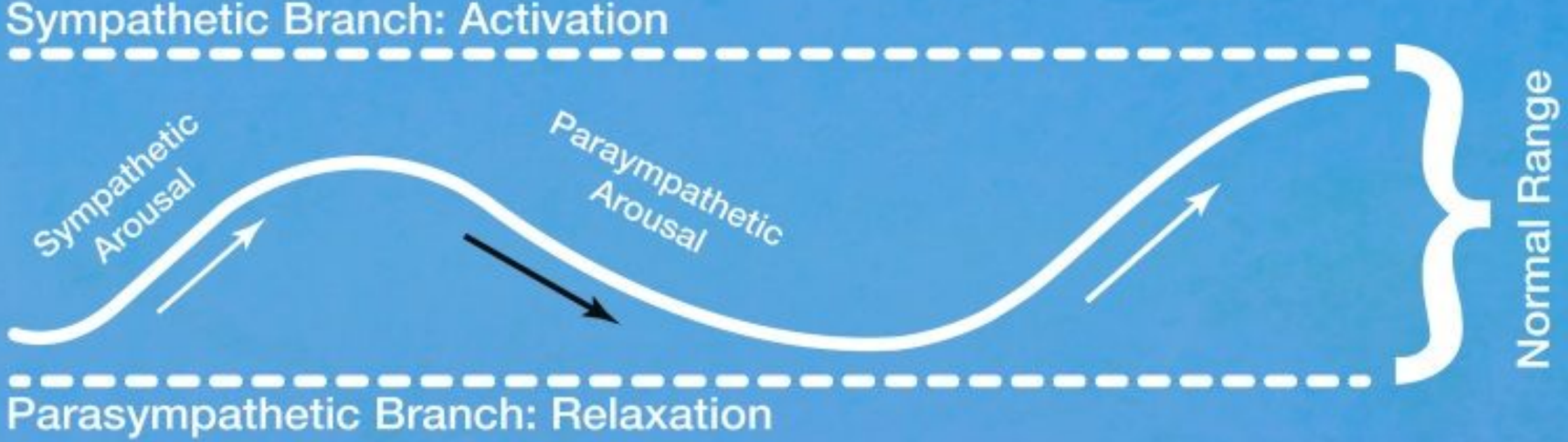
https://www.istockphoto.com/vector/resilience-coping-with-stress-and-crisis-emotional-and-psychological-ability-gm1295677676-389333014

The ability of an individual to bounce back from stress, adversity, failure, challenges, or even trauma.

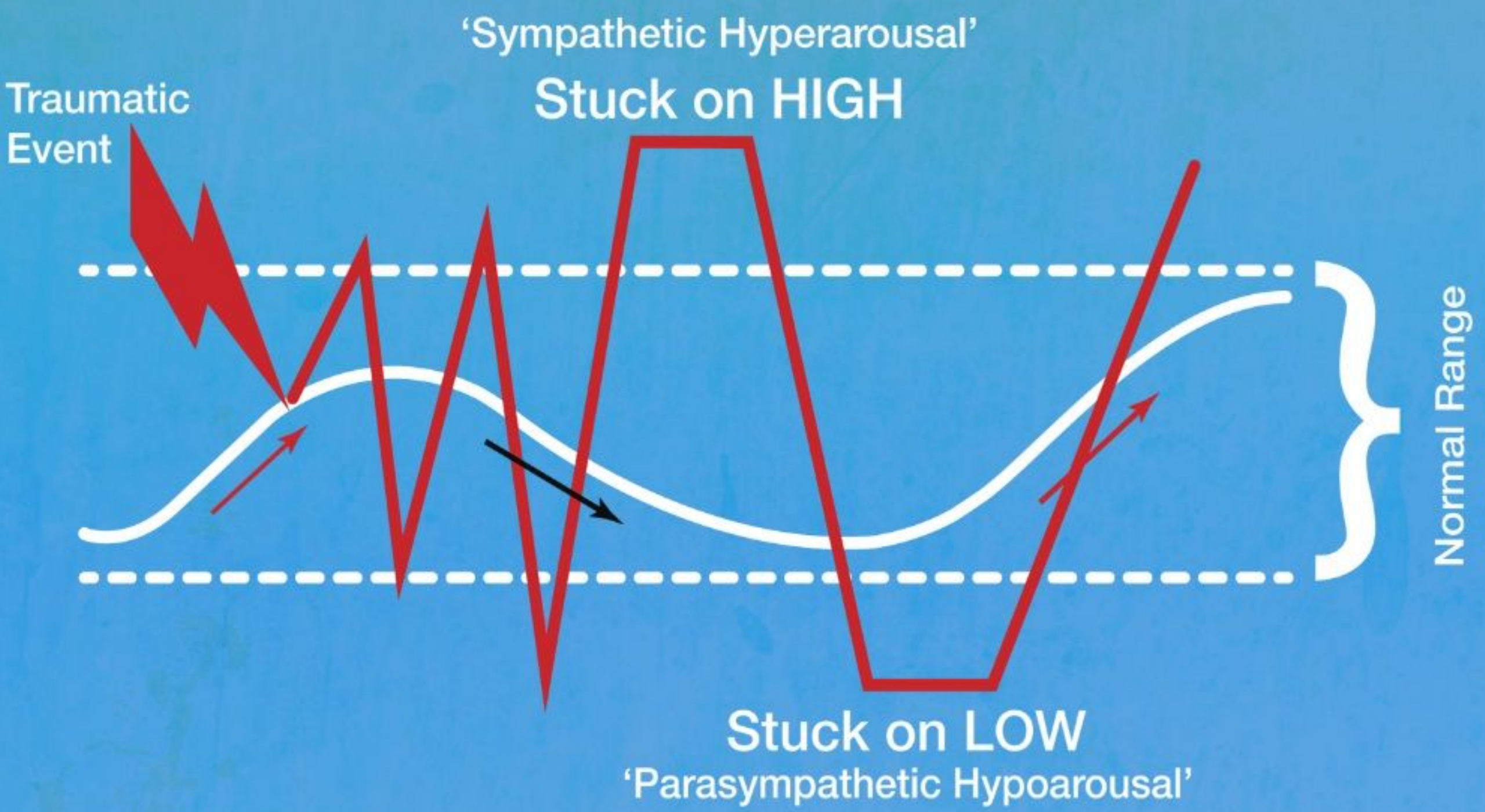
When storm rages, a tree bends and sways, moving with the wind rather than against it. This flexibility is resilience.

https://www.flickr.com/photos/fede_gen88/359789020

A Healthy Nervous System



http://hopemead.com/somatic-experiencing-trauma-resolution-somatic-therapy-peter-levine-flower-mound-tx



http://hopemead.com/somatic-experiencing-trauma-resolution-somatic-therapy-peter-levine-flower-mound-tx

frontiers in Human Neuroscience

REVIEW
published: 21 August 2018
doi: 10.3389/fnhum.2018.00326

Check for updates

Biological and Psychological Perspectives of Resilience: Is It Possible to Improve Stress Resistance?

Haoran Liu[1], *Chenfeng Zhang*[1], *Yannan Ji*[2] *and Li Yang*[1,3]*

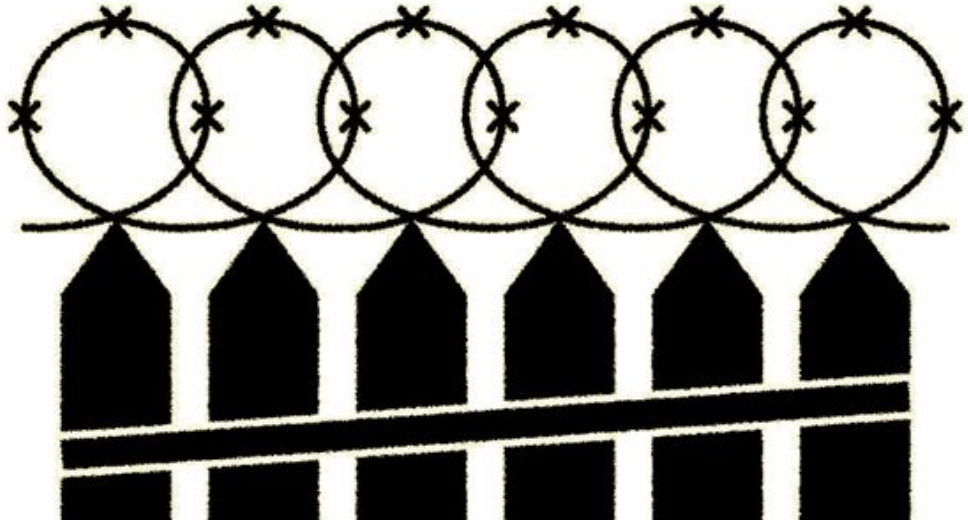
[1]School of Psychology, Center for Studies of Psychological Application, South China Normal University, Guangzhou, China, [2]School of Life Sciences, South China Normal University, Guangzhou, China, [3]Institute for Brain Research and Rehabilitation, South China Normal University, Guangzhou, China

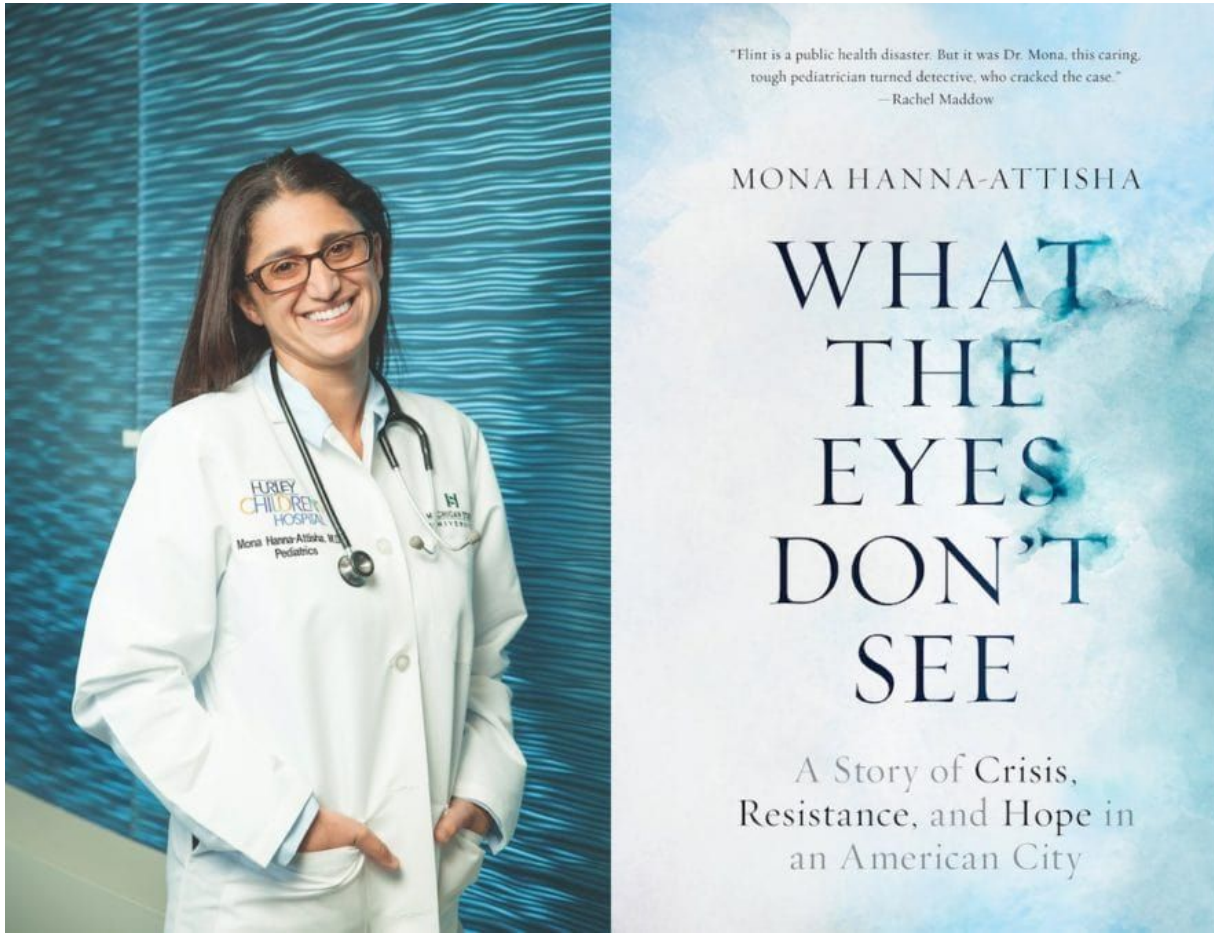
The term "resilience" refers to the ability to adapt successfully to stress, trauma and adversity, enabling individuals to avoid stress-induced mental disorders such as depression, posttraumatic stress disorder (PTSD) and anxiety. Here, we review

I'm Sick of Asking Children to Be Resilient

It's time for reparations and resources and to not expect kids to "rise above."

May 12, 2020

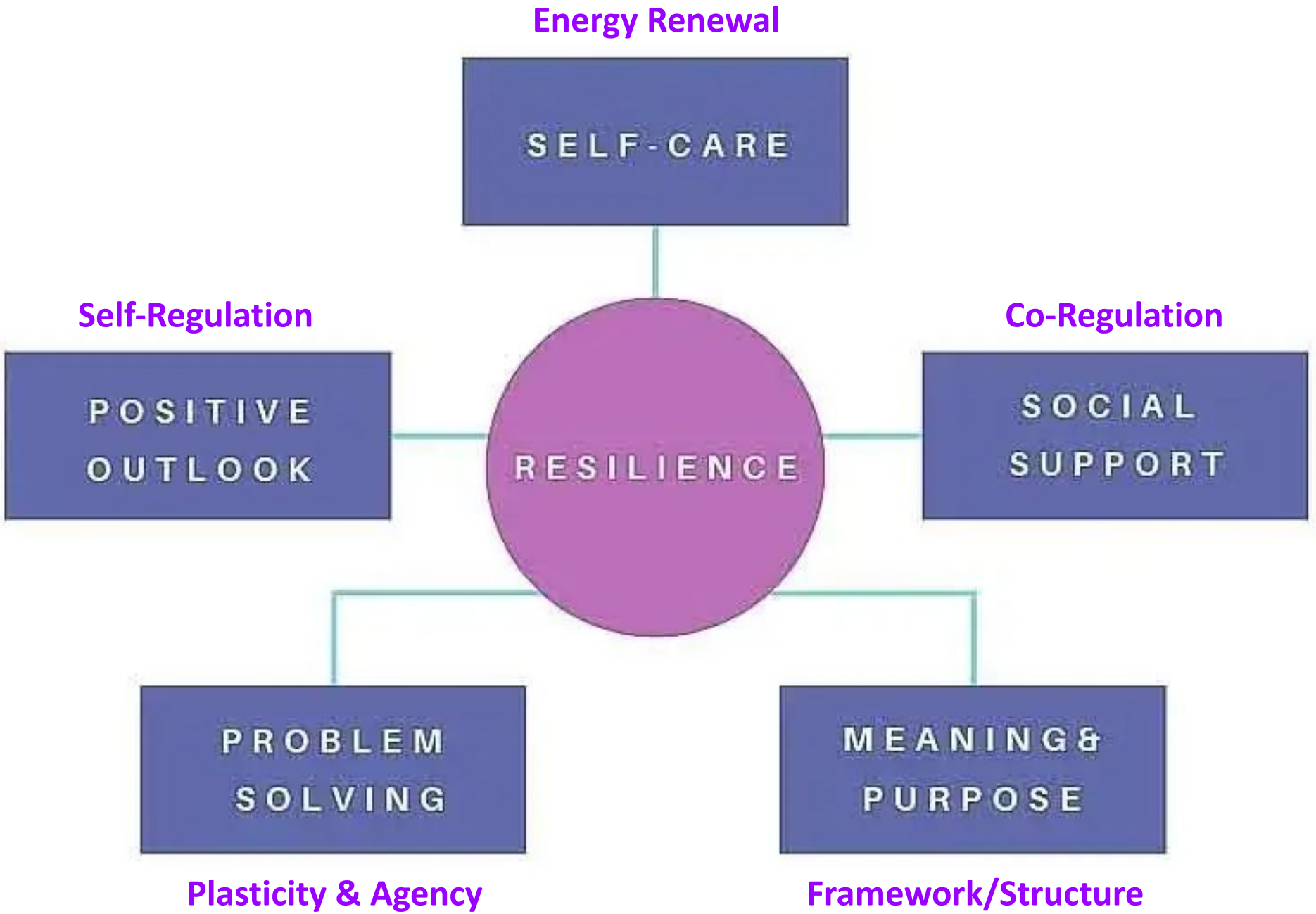




“Rather than hoping a child is tough enough to endure the insurmountable, we must build resilient places where all children can thrive.”

How might we within higher education foster an environment–that **“resilient space”**–in which our colleagues and students will be equipped with the necessary skills, resources, and support to not only navigate the various challenges they encounter but also to grow and learn from these experiences?

Resilience is Relational



https://medium.com/@payneresilience/the-five-factors-of-individual-resilience-62c9da745ae7

Ungar, M. 2018. Systemic resilience: principles and processes for a science of change in contexts of adversity. *Ecology and Society* 23 (4):34. https://doi.org/10.5751/ES-10385-230434

Synthesis

Systemic resilience: principles and processes for a science of change in contexts of adversity

Michael Ungar [1]

ABSTRACT. Despite the increasing popularity of discussions of resilience in disciplines as diverse as ecology, psychology, economics, architecture, and genetics (among many others), researchers still lack a conceptual model to explain how the resilience of one system relates to the resilience of other cooccurring systems. Models that explain resilience within a single system are more robust and better studied. Although some researchers argue that both ontological and epistemological weaknesses prevent such an integrated model from being developed (the incommensurability hypothesis), others have carried out metasyntheses using techniques like network citation analysis to identify common principles and processes that are associated with resilience across disciplines. Although useful, metasyntheses have yet to identify sufficient commonalities across bodies of research to account for a single model of resilience. This paper adapts methods used for the thematic synthesis of qualitative data to critically analyze metasyntheses of resilience and identify principles that explain patterns of resilience of different systems (biological, psychological, social, cultural, economic, legal, communication, and ecological systems are all considered). Sixteen purposefully selected published syntheses were reviewed, along with dozens of other supporting peer-reviewed articles and book chapters, supplemented by consultations with knowledge experts. Seven common principles across systems were identified. These include: (1) resilience occurs in contexts of adversity; (2) resilience is a process; (3) there are trade-offs between systems when a system experiences resilience; (4) a resilient system is open, dynamic, and complex; (5) a resilient system promotes connectivity; (6) a resilient system demonstrates experimentation and learning; and (7) a resilient system includes diversity, redundancy, and participation. Where evidence refutes a principle, discordant findings are highlighted. Together, these principles account for resilience as a sequence of systemic interdependent interactions through which actors (whether persons, organisms, or ecosystems) secure the resources required for sustainability in stressed environments.

Key Words: *common principles; disaster management; ecology; psychology; resilience; social-ecological systems; systemic*

Common Principles

1) resilience occurs in contexts of adversity;

2) resilience is a process;

3) there are trade-offs between systems when a system experiences resilience;

4) a resilient system is open, dynamic, & complex;

5) a resilient system promotes connectivity;

6) a resilient system demonstrates experimentation & learning;

7) a resilient system includes diversity, redundancy, & participation.

Desmond Tutu

"We have hardships without becoming hard. We have heartbreak without being broken."

– *The Book of Joy*