

A photograph of a pink lotus flower in full bloom, centered in the frame. The petals are a soft pink color with some darker pink edges. The background is dark and out of focus, showing the silhouettes of lily pads and water. The overall mood is serene and contemplative.

The science of mindfulness

Lori Schwanbeck

**What is the value
in knowing the
science?**



What is the value in knowing the science?

1. Credibility (?)

2. Motivates others to engage in practices

3. Identify specific physiological impact of various practices



Daniel Goleman



Richie Davidson



Altered Traits



Science Reveals How
Meditation Changes Your
Mind, Brain, and Body

NEW YORK TIMES BESTSELLING AUTHORS
Daniel Goleman & Richard J. Davidson

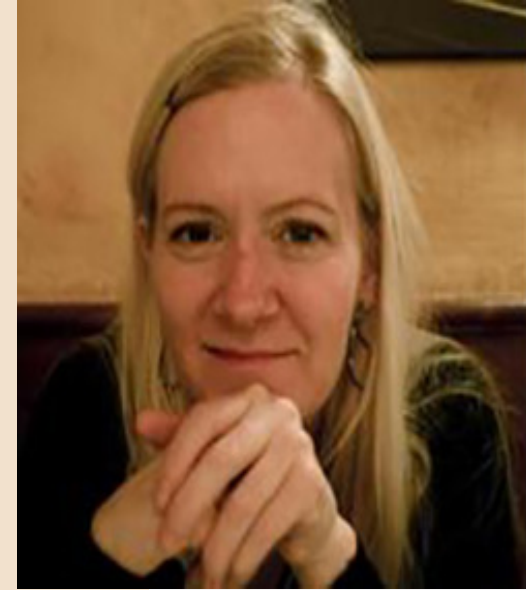
Amishi Jha



Helen Wang



**Willoughby
Britton**



"Deliberate breath
(regardless of the pattern)
makes the mind visible."

Andrew D. Huberman, Ph.D.

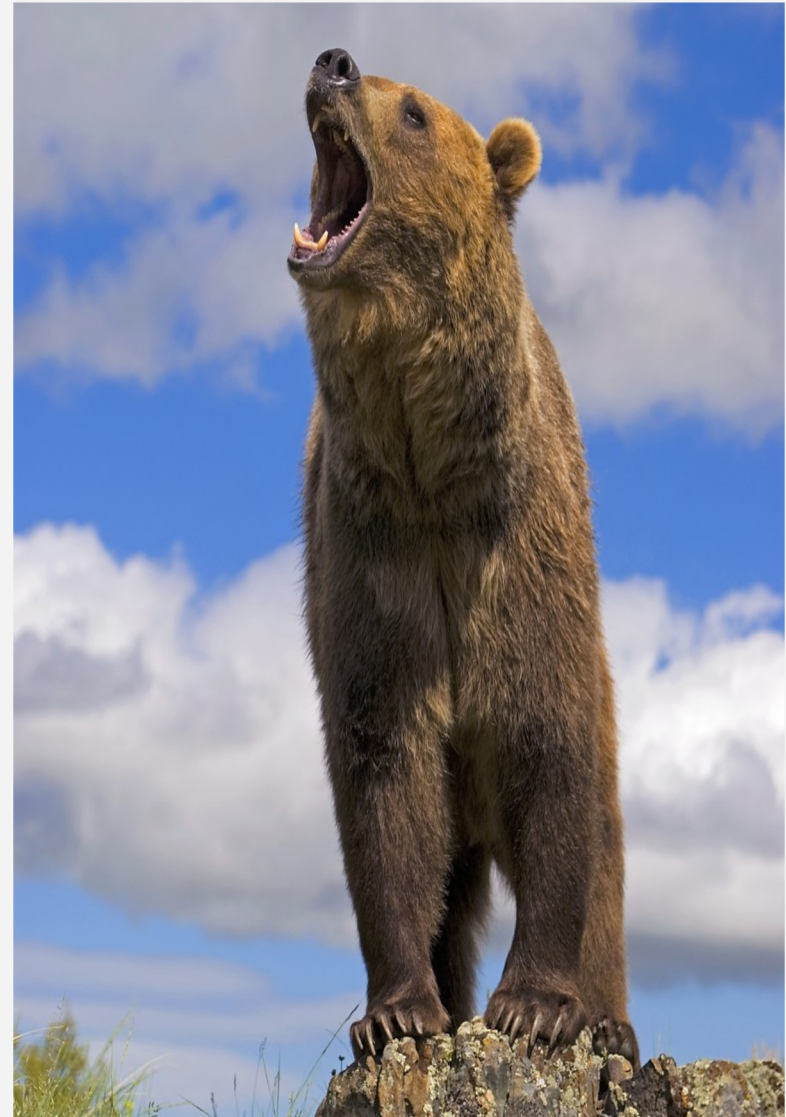


Evolutionary Biology

- Descendants of nervous ancestors
- Better safe than sorry
- Minimize threat, maximize reward
- Circuitry designed for survival

Survival supported by:

- Behavior: Flight / flight / freeze
- Thoughts: Negativity bias
- Emotions: Activated





**MODERN
PROBLEMS**



**PRIMITIVE
CIRCUITRY**



NEUROPLASTICITY

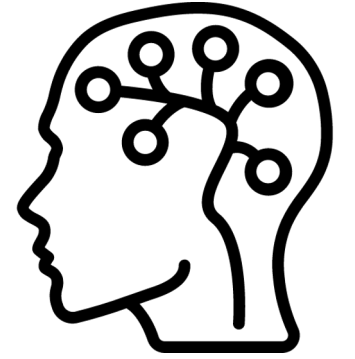
The ability of the brain
to change its structure
and its function
depending on how
you use it

Researched Benefits of Mindfulness

Influences *attention*, which in turn:

Affects emotion regulation	→	Equanimity
Affects cognition	→	Insight
Influences behavior	→	Wise Action, Compassion
Influences physiology	→	Reduction in suffering

Emotion Regulation



Equanimity



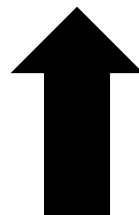
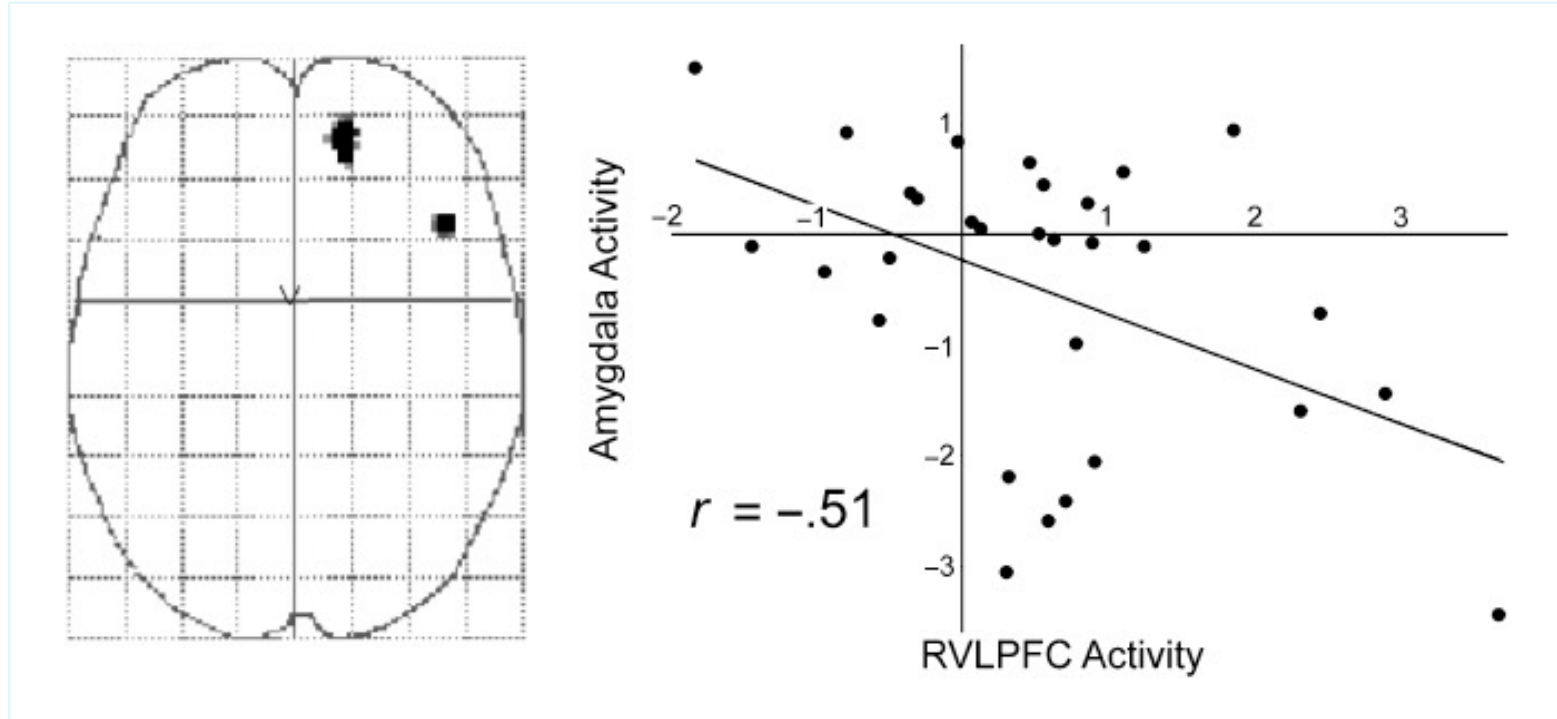
Emotional Granularity

" The greater your granularity,
the more precisely you can
experience your self and your
world. You are able to
regulate and act on emotions in
a much more targeted, and
effective way"

Dr. Lisa Feldman Barrett

"How Emotions are Made"
"7 1/2 Lessons about the Brain"

Pre-frontal cortex activation down-regulates amygdala through use of Labeling



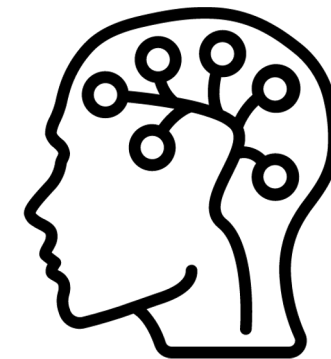
Emotion
Naming Area
(RVL PFC)



Emotional
Reactivity
(Amygdala)



Cognition



Insight

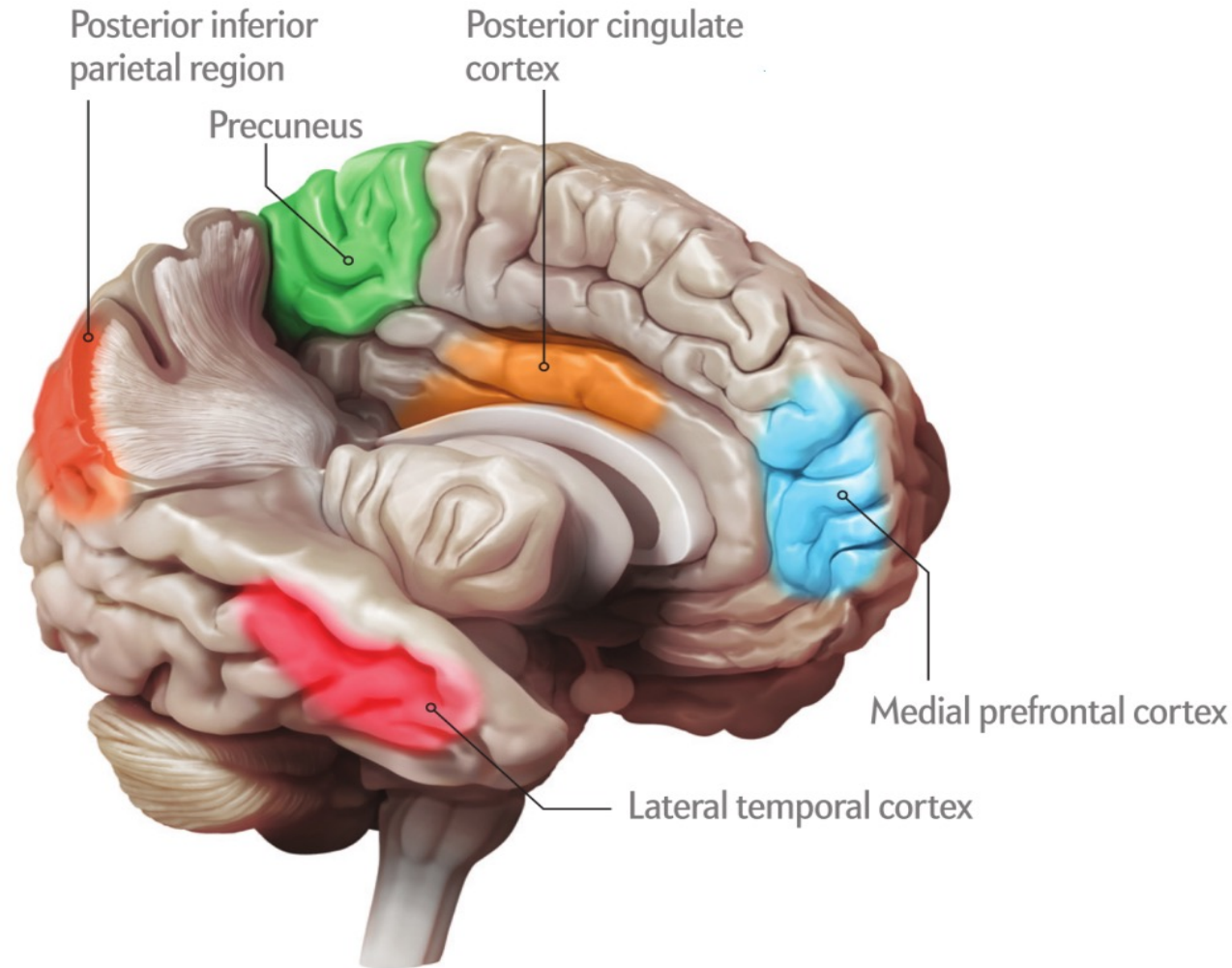




Changes in Attention and Mind-Wandering

Default Mode Network (DMN)

- Related to **mind-wandering** and self-referential thinking.
- **Less active** during meditation
- Meditation practice → **greater connectivity** with attention management regions, even when at rest.

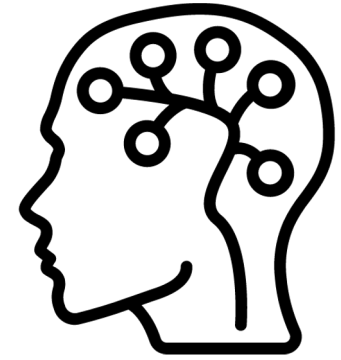


3 breath practice



- 1. Focus on breath**
- 2. Relax the body**
- 3. "What's most important right now?"**

Behavior



Wise Action





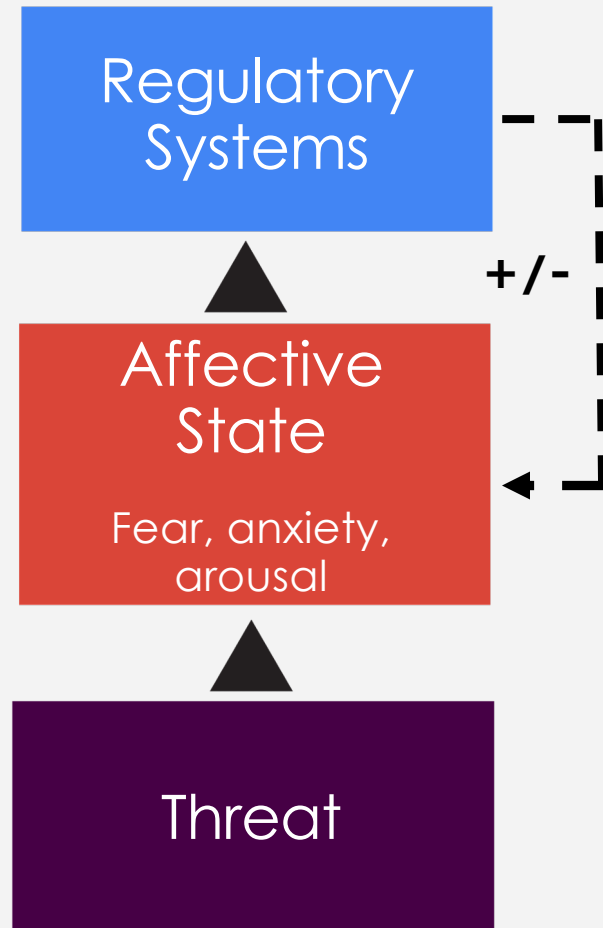
“OK, OK, you’ve made your point.
I’ll admit that sometimes when I feel
threatened, I snap.”

Wise action:

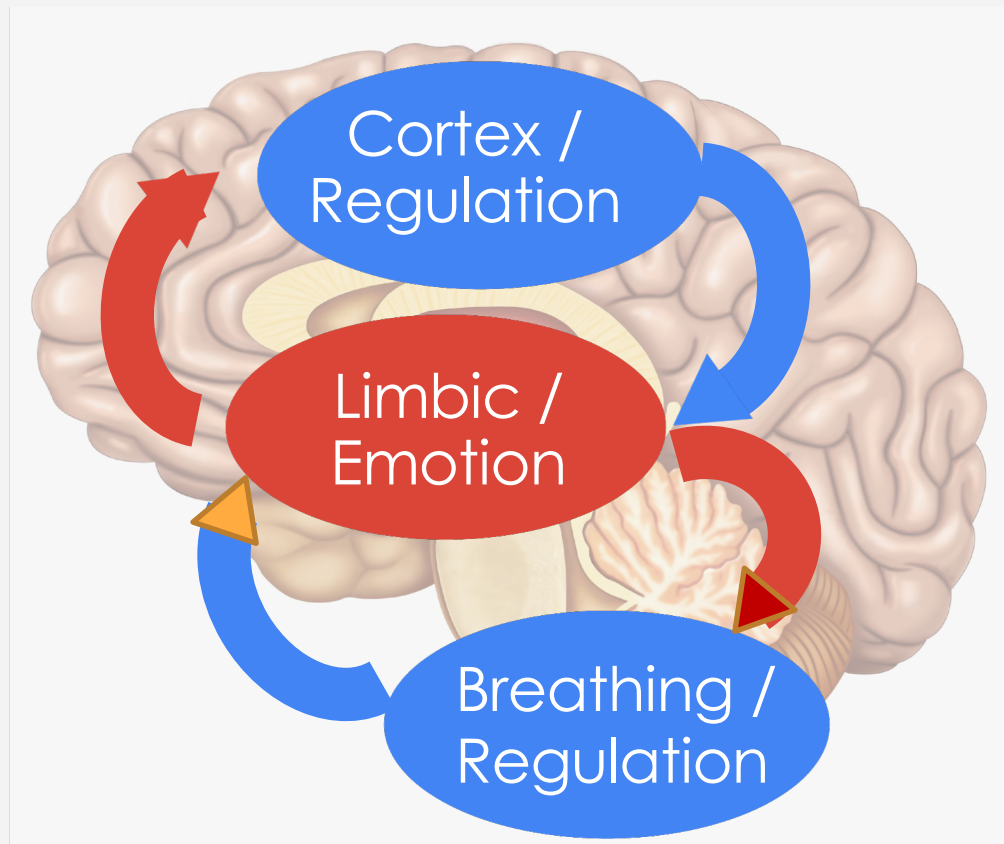
Response Flexibility

...is the ability to pause, step back, reflect, shift perspectives, create options and choose wisely.

- Linda Graham



Neural Model of Emotion Regulation



STOP Practice



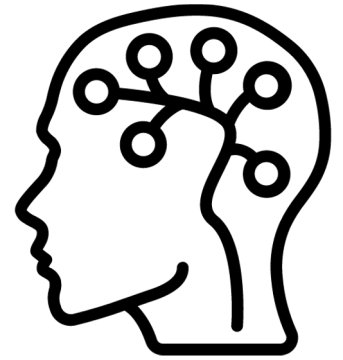
Stop

Take a Breath

Observe, Inquire

Proceed

Behavior



Empathy &
Compassion





Researched Benefits of Compassion

Compassion is an adaptive social emotion, which creates well-being and resilience especially in stressful situations."

~Tania Singer, Leipzig



Max Plank Institute for Human Cognitive and Brain Sciences

Breath based practice

calming

Monitoring thoughts

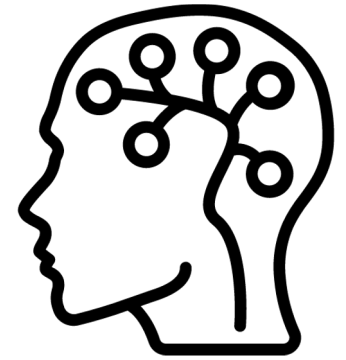
observing mind/decentering

Loving Kindness

positive mood &
prosocial behavior



Physiology

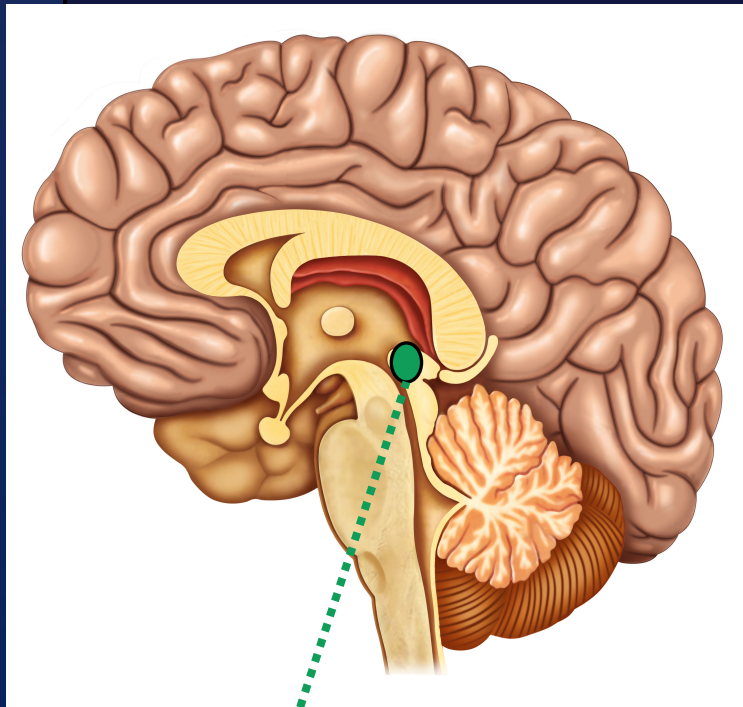


Reduction in suffering



Mindfulness Practice

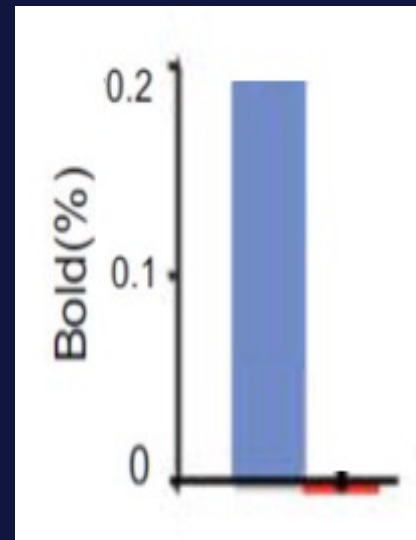
Less Anticipatory Stress, Faster Recovery



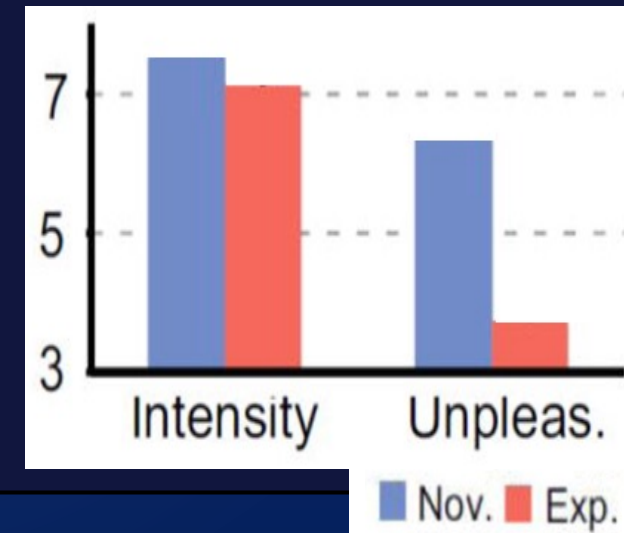
Amygdala

Novice vs Expert meditators responding to pain

Less anticipatory amygdala activation



Less self-reported unpleasantness afterwards





↓ **Inflammation**

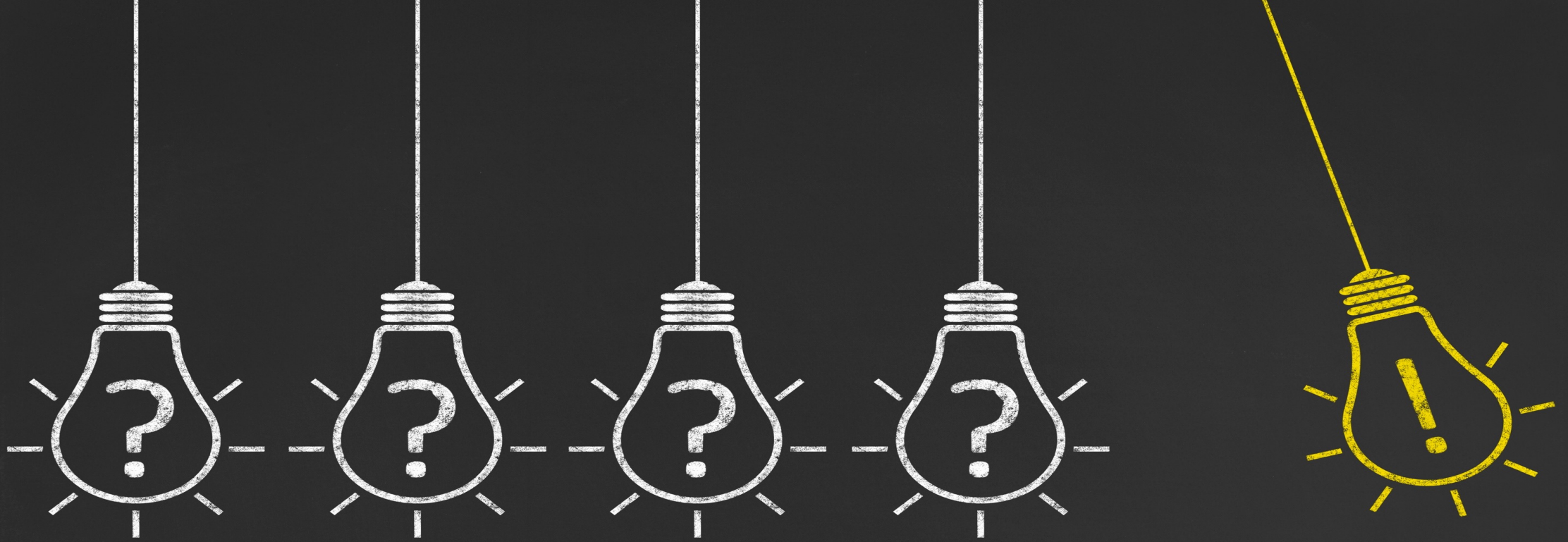
(Davidson et al., 2017)

↓ **Pain, anxiety, depression**

(Goyal et al., 2014)

↑ **Telomerase**

(Ornish et. al., 2013; Carlson et al., 2014)



QUESTIONS? INSIGHTS? PONDERINGS?

A close-up photograph of a pink lotus flower in full bloom. The petals are a soft pink color with some darker pink edges. The flower is centered in the frame, with its stem visible. The background is dark and out of focus, showing the silhouettes of lily pads and other aquatic plants. The overall mood is serene and elegant.

Thank you