

# The science of mindfulness

Lori Schwanbeck

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



# What is the value in knowing the science?

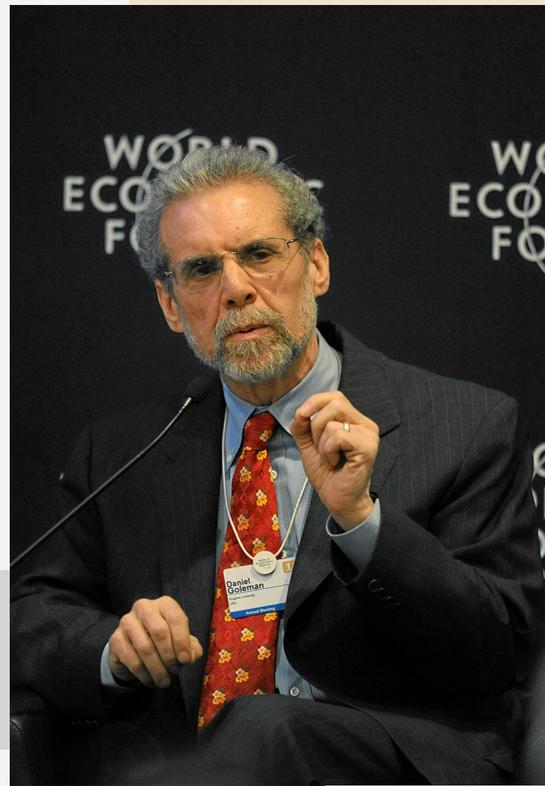
**1. Credibility (?)**

**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.

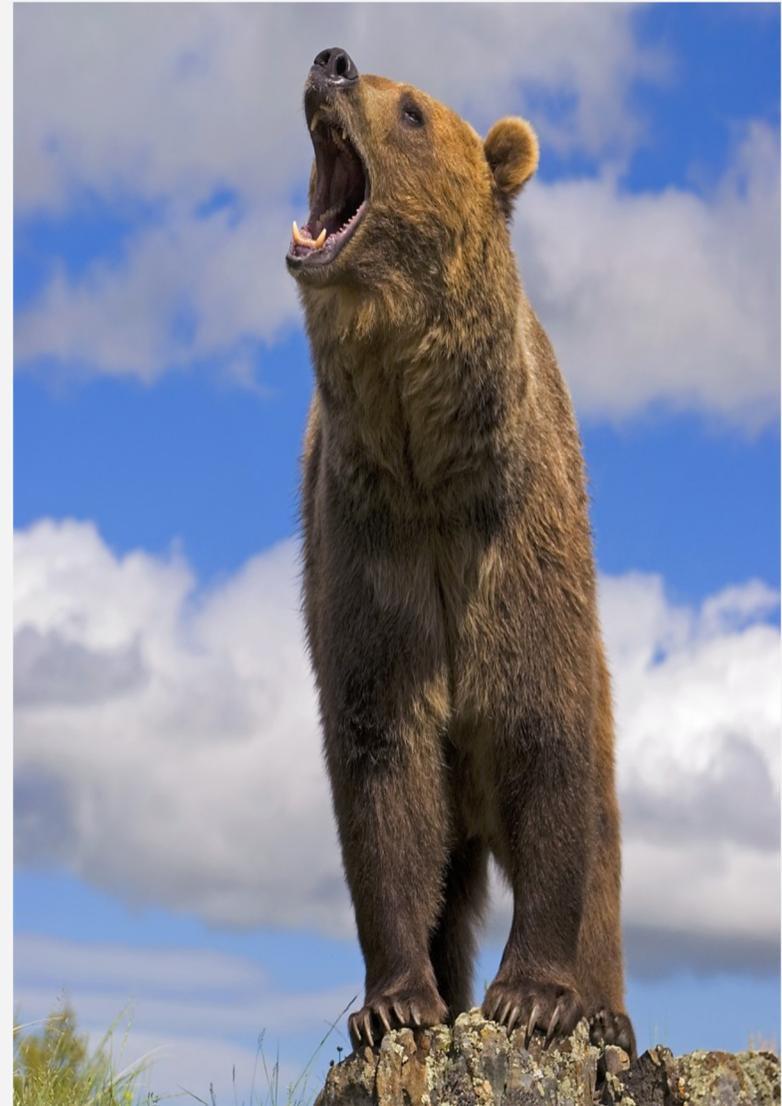


# Evolutionary Biology

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

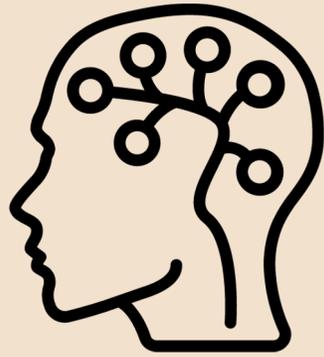
Survival supported by:

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





**MODERN  
PROBLEMS**



**PRIMITIVE  
CIRCUITRY**



# NEUROPLASTICITY

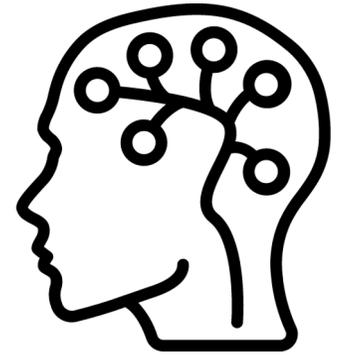
The ability of the brain  
to change its structure  
and its function  
depending on how  
you use it

# 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



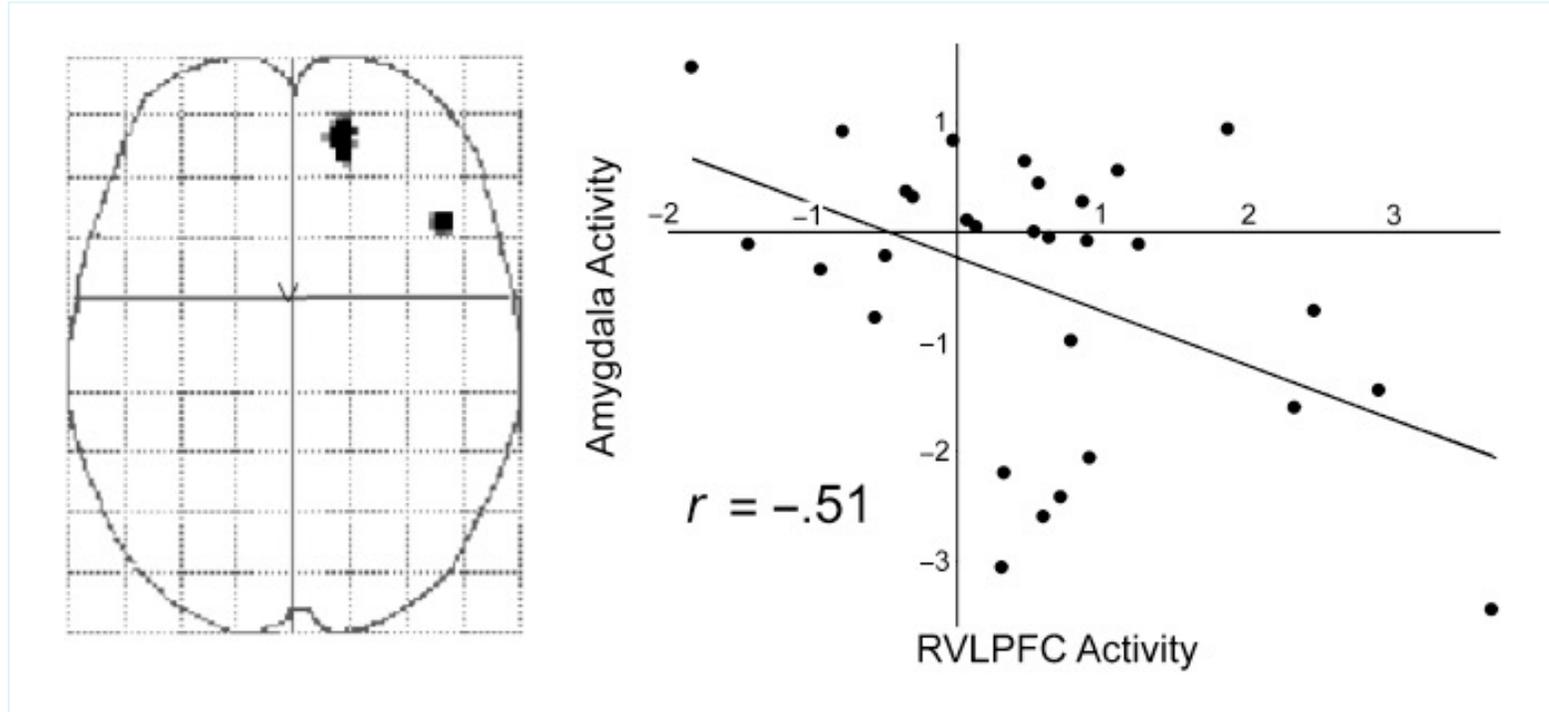
# Emotional Granularity

" 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 Barret

"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

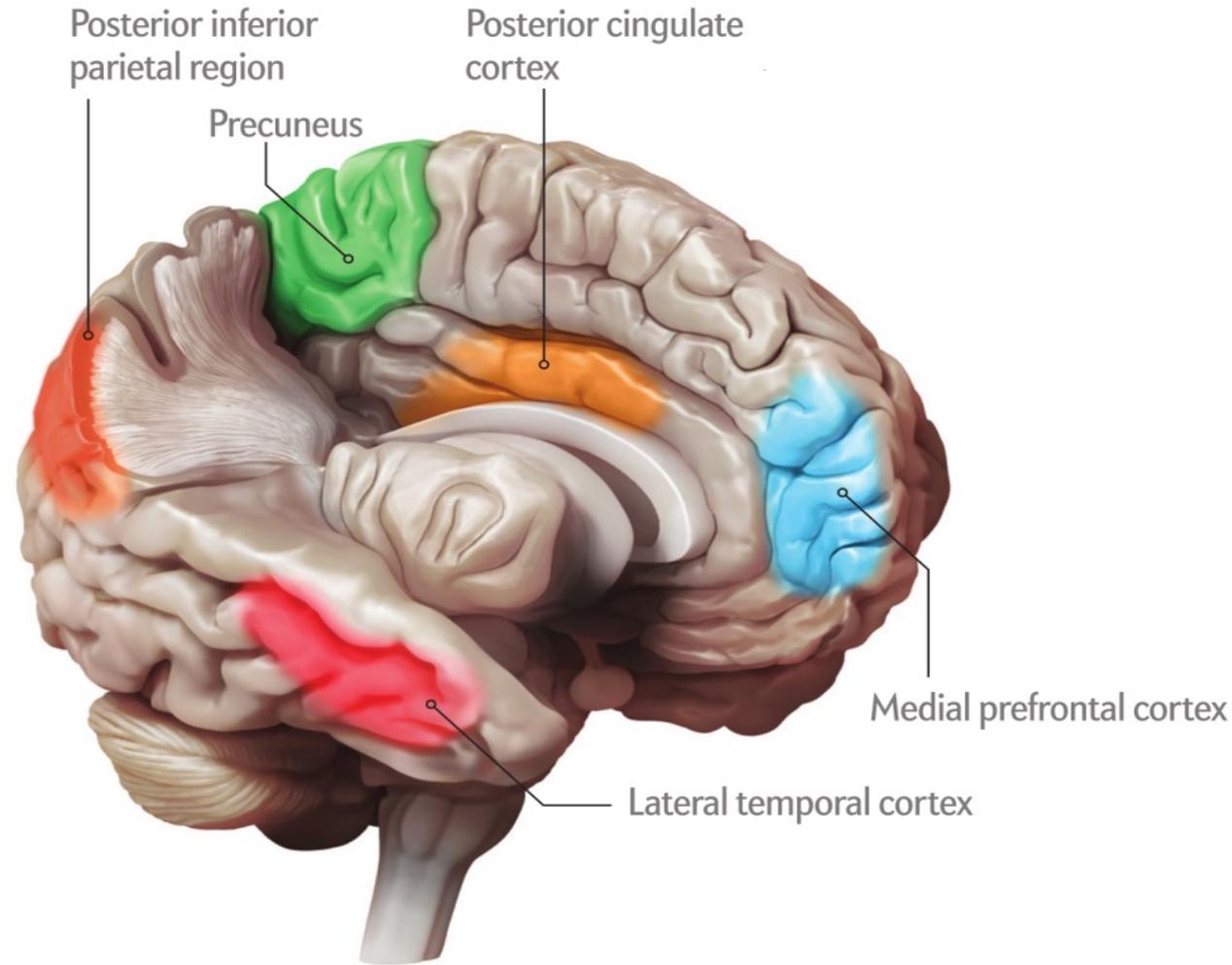




# Changes in Attention and Mind-Wandering

## 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.

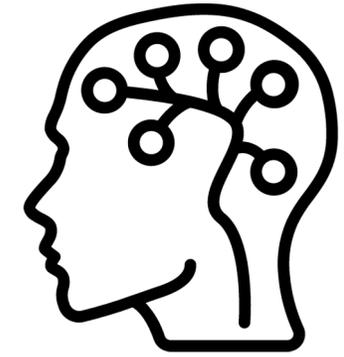


# **3 breath practice**



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

Behavior



Wise Action



Baldwin



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

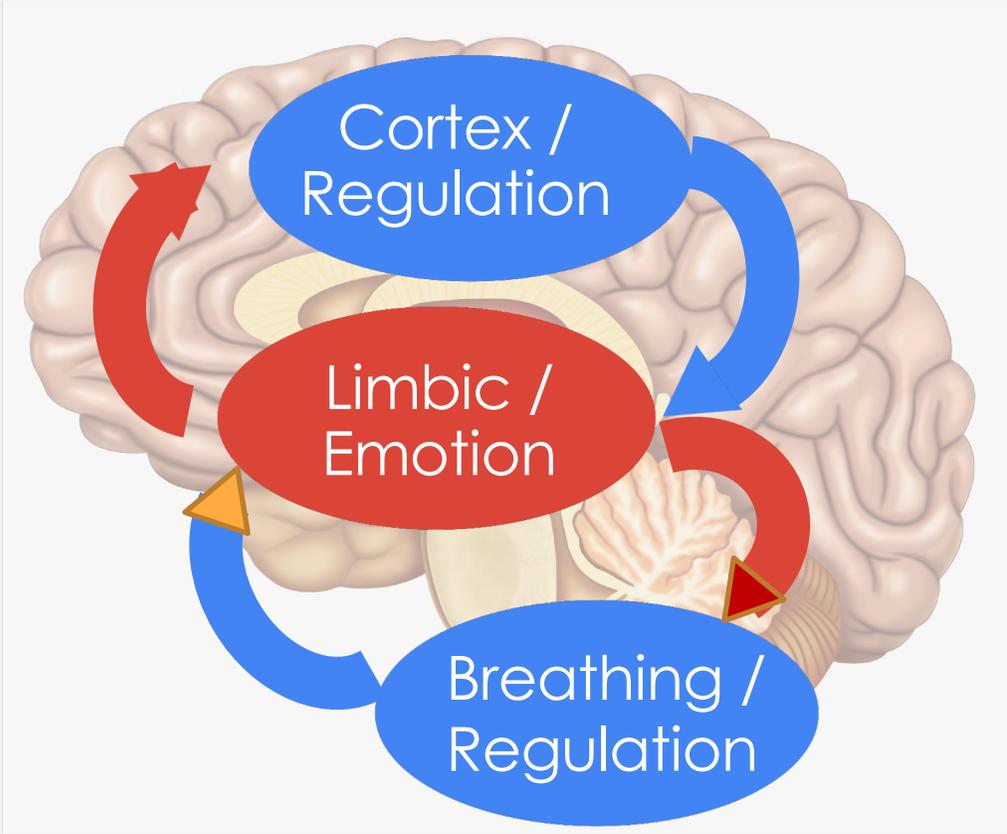
# Wise action:

## 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



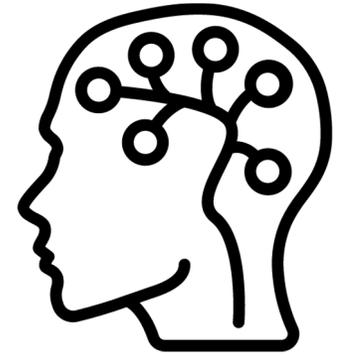
Stop

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

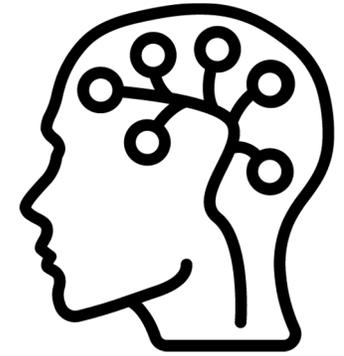
observing mind/decentering

Loving Kindness

positive mood &  
prosocial behavior



Physiology

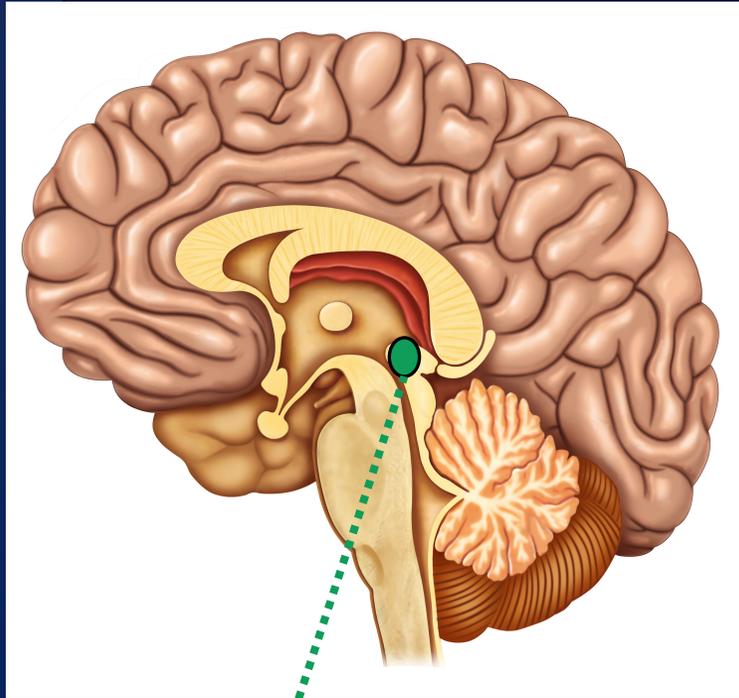


Reduction in suffering



# Mindfulness Practice

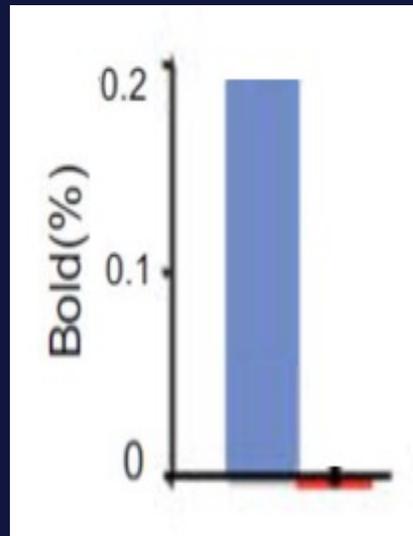
## Less Anticipatory Stress, Faster Recovery



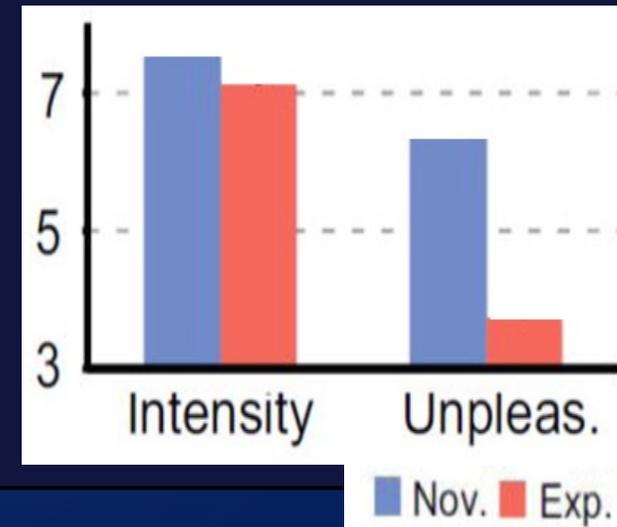
Amygdala

### Novice vs Expert meditators responding to pain

Less anticipatory amygdala activation



Less self-reported unpleasantness afterwards





↓ **Inflammation**

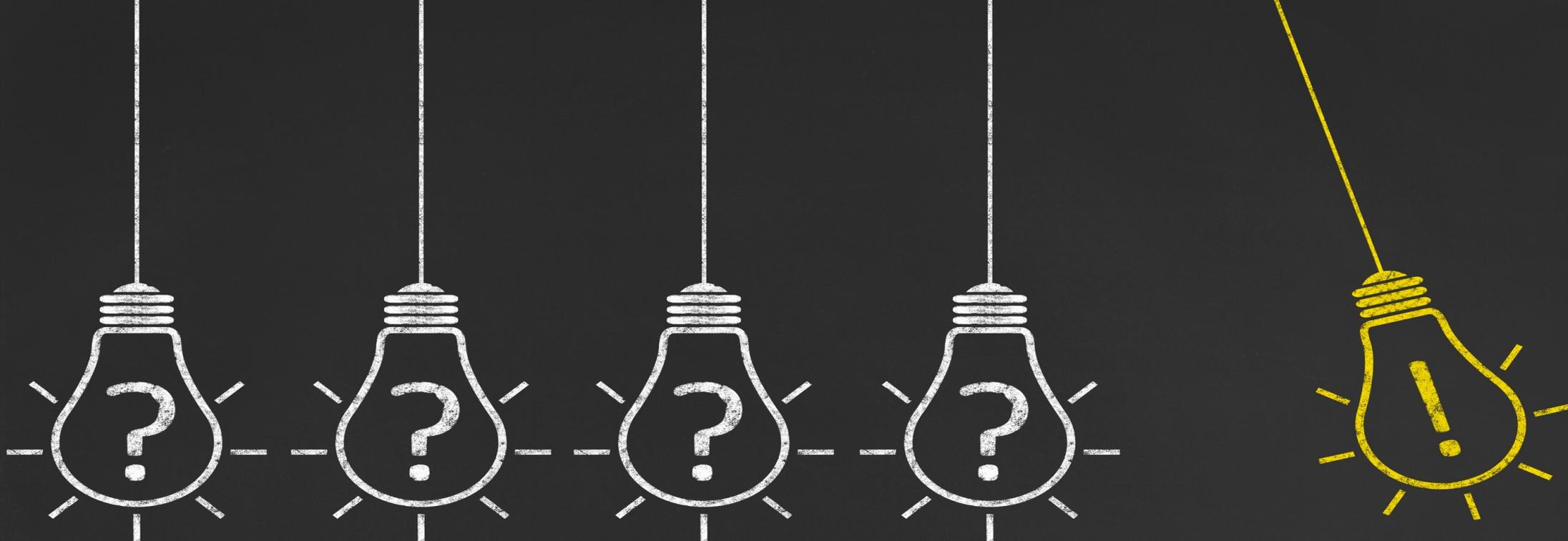
*(Davidson et al., 2017)*

↓ **Pain, anxiety, depression**

*(Goyal et al., 2014)*

↑ **Telomerase**

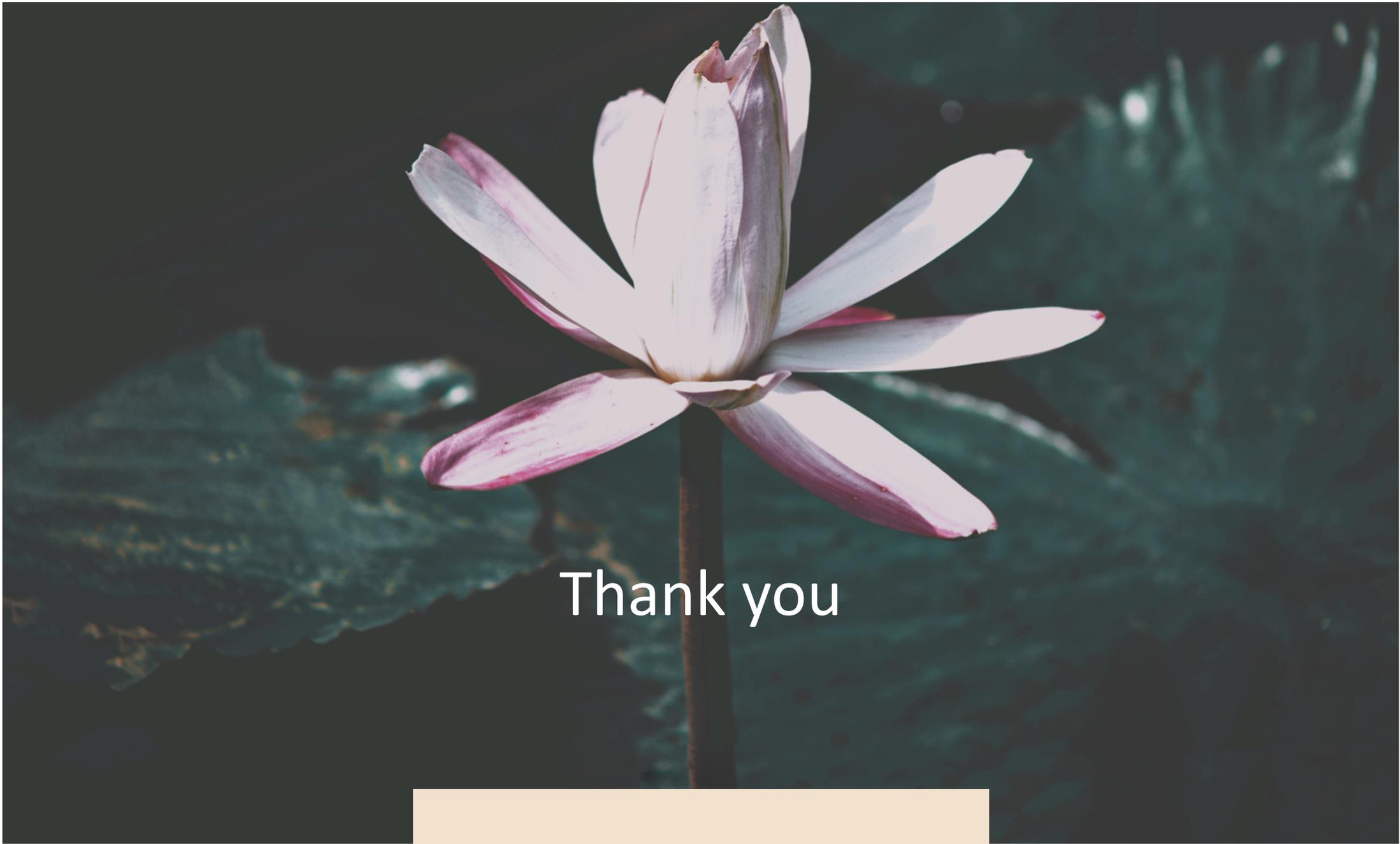
*(Ornish et al., 2013; Carlson et al., 2014)*



**QUESTIONS?**

**INSIGHTS?**

**PONDERINGS?**



Thank you

