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Use Your Head

Understanding the Brain to Improve Emotional Wellness and Activate Your Life

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Introduction

- Session Objective
  - Describe how evidence-based interventions support achieving goal-directed behaviors
- Learning Objectives
  - Explain the role brain structures have in emotional expression, attention allocation, and mood regulation
  - Discuss benefits of meditation, visualization, and positive affirmations
  - Apply these interventions to improve mood, emotions, memory, and achieve goal-directed behaviors

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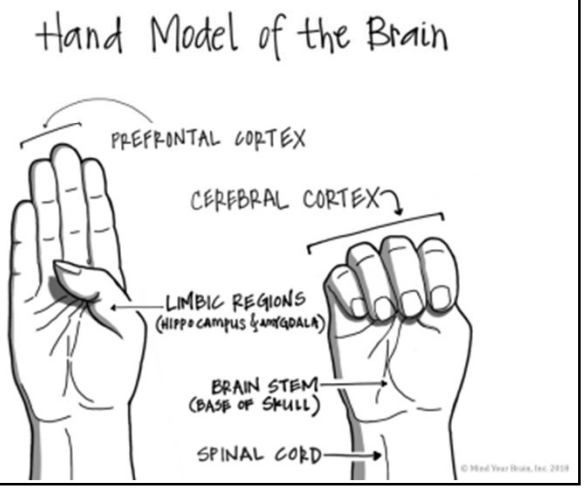
Understanding Brain Structures

- When we can see what is happening in brain, we can change what the brain does
  - Palm – basic body functions
  - Thumb – behavioral and emotional responses
  - Other fingers – higher thinking brain



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Understanding Brain Structures

- 3 pieces of foil (millions of years of evolution)
- 2 jelly beans (amygdalae – reptilian brain)
  - Emotions, memory, survival instincts
- 1 peanut (anterior cingulate – higher-level functions)
  - Motivation, decision making, learning, impulse control

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Understanding Brain Structures

- 2 jellybeans in palms of hand and close the hand
  - Amygdalae - old, first to be created, reptilian brain
- Two pieces of foil around the hand
  - Millions of years of development, millions of neuropathways
- Peanut
  - Anterior cingulate cortex – emotional heart of the brain
- Last layer of foil
  - A few million years and frontal lobes

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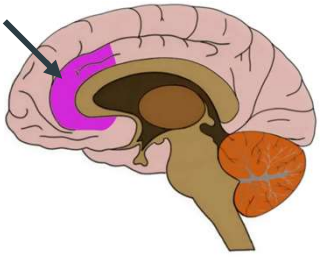
Anterior Cingulate Cortex - “the peanut”

- Emotional awareness and expression, decision making, pain management, attention allocation
  - Dorsal
    - Cognitive control
    - Connects to prefrontal cortex, parietal cortex, motor areas, and eye fields responsible for interpreting stimuli
  - Ventral
    - Emotional response and reactivity, connected to limbic system and brain’s reward system
    - Connects to anterior insula, amygdala, hippocampus, and hypothalamus



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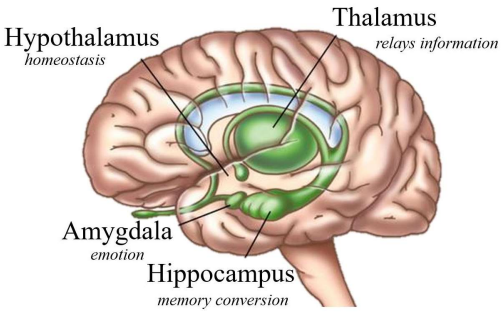
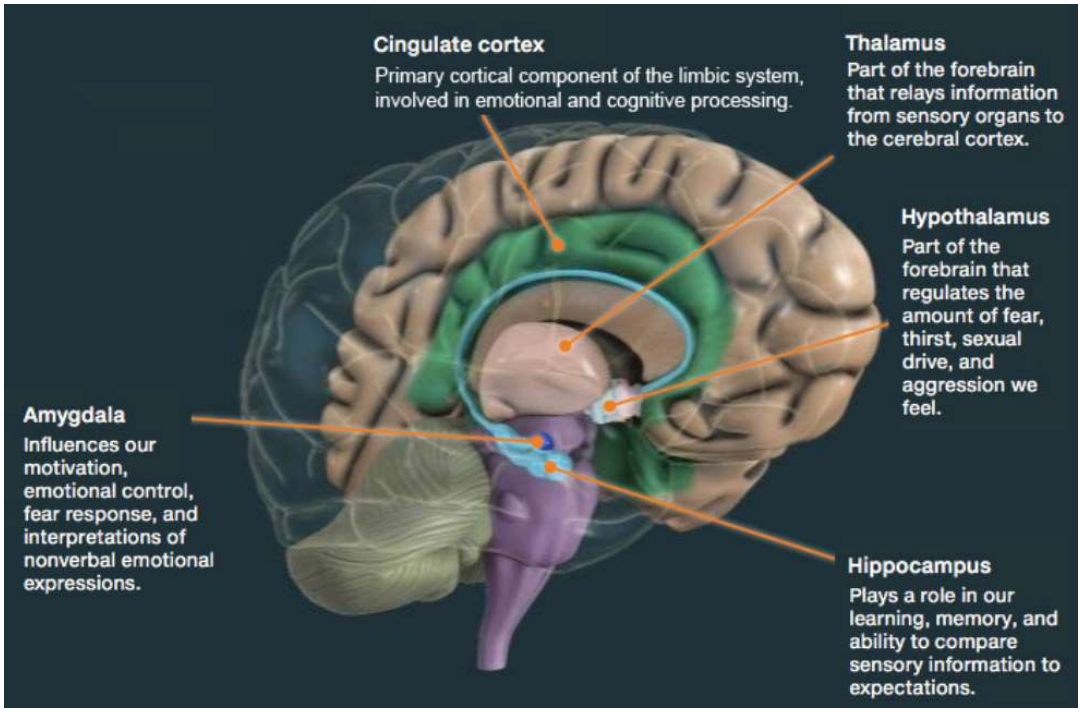
Limbic System – "the peanut and the hand"

- Four main parts that connects areas of the brain that deal with high and low functions
  - Links the conscious, intellectual functions of the cerebral cortex with the unconscious, autonomic functions of the brain stem
  - Facilitates memory storage and retrieval, establish emotional states





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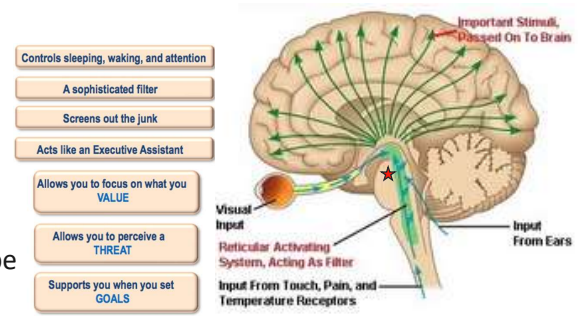
Reticular Activating System – "base of wrist/palm"

- Bundle of nerves in the brainstem projects anteriorly to hypothalamus and posteriorly to thalamus
- Primitive part of the brain
  - Controls wakefulness, our ability to focus, fight-flight response, and how we perceive the world
  - Controls what incoming information (stimulus) you are aware of, so that you'll be motivated to behave in a certain way



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Kinder Surprise and Kinder Joy

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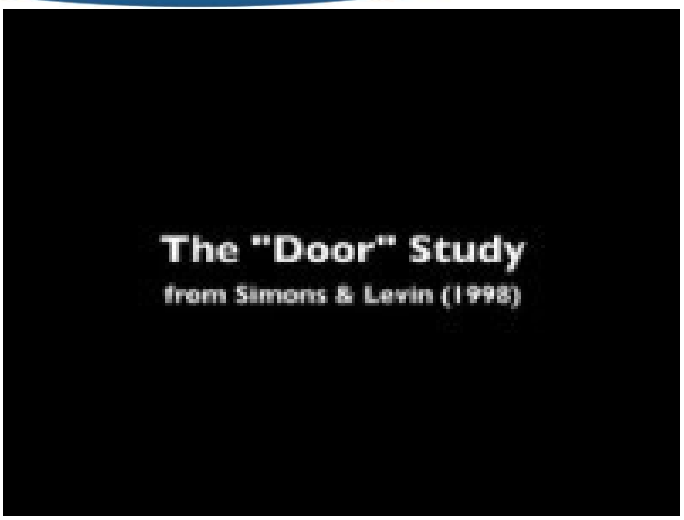
1998
The Door Study



https://www.youtube.com/watch?v=FWSxSQsspiQ

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Meditation and Mindfulness

- Family of mental training practices regulating cognition, emotion, and the self, in which mental and related somatic events are influenced by a specific directing of attention and awareness
- Benefits to:
  - Prefrontal cortex, anterior cingulate cortex, amygdala

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Meditation

- Two main styles:
  - Focused attention
    - Focus on a specific object e.g., breath, symbol, counting, etc.
  - Open monitoring
    - Non-judgmental detached awareness to experience
    - Allowing thoughts to come and go through the mind, simply noticing and letting them go
- Many meditations include a combination of these styles

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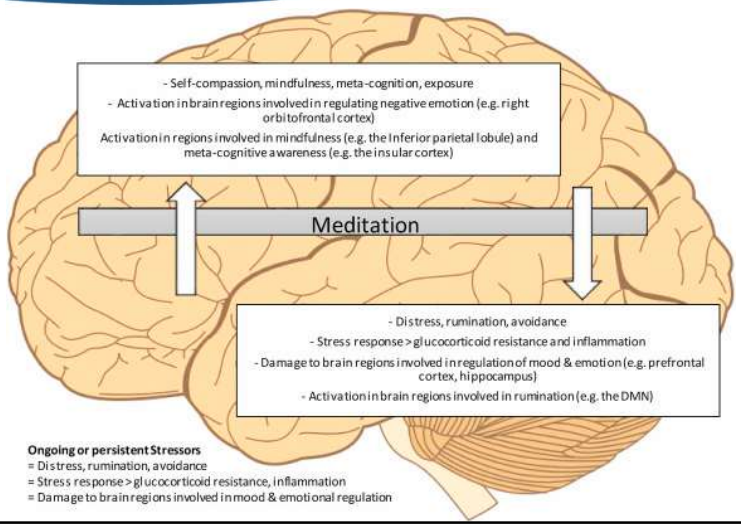
Meditation Research

Review Study:

Impacts of meditation on stress related psychological, physiological and neurobiological outcomes

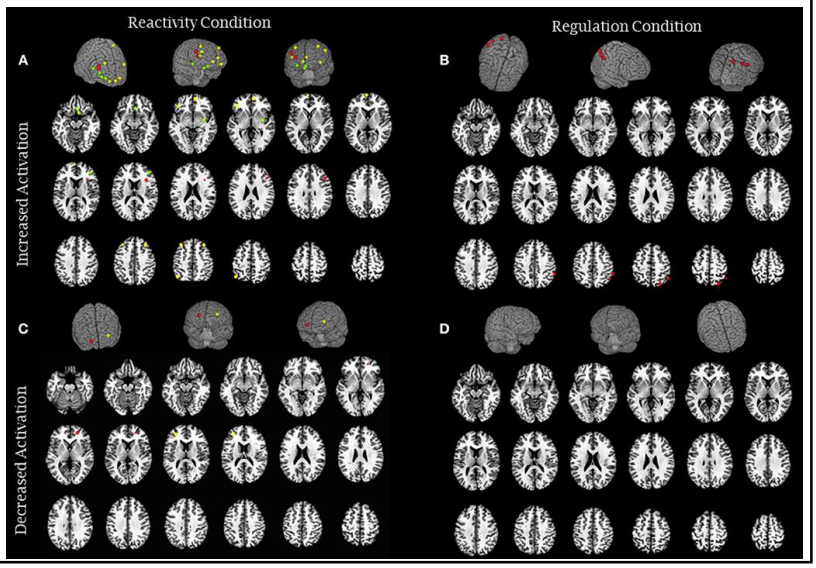


(Pascoe et al., 2021)

Meditation Research

Emotional Reactivity
Passive viewing of emotional stimuli without instruction to change/modulate experience

Emotional Regulation
Use strategy to attempt to modulate the impact of emotional stimuli



Review Study:

Does meditation alter brain responses to negative stimuli?

Used MRI to analyze neural response

(Magalhaes et al., 2018)

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Research on Meditation Frequency/Duration

- 10 minutes (Norris et al., 2018)
- 20 mins/day for 4 days (Zeidan et al., 2010)
- 11 hours of training, split up into 30-minute sessions conducted over a one-month period (Tang et al., 2010)
- 13 mins/day for 8 weeks (Basso et al., 2019)
  - "even relatively short daily meditation practice can have similar behavioral effects as longer duration and higher-intensity mediation practices"

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Visualization

- Form a picture or video in your mind that represents a situation or goal
- Intentionally changing how you think, feel, and approach situations in your life
  - Changes how brain networks are organized, creating more connections among different regions
  - Programming your brain to recognize the resources you need and the order you need them in to achieve your goals
  - Building motivation you need to follow through with resources you have
- Benefits to:
  - RAS, motor cortex, occipital lobe, and neuroplasticity

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Visualization

- Visualization is more active than regular meditation
- Imagining allows us to remember and mentally rehearse our intended movement
  - Perspective is important – first person vs third person
  - Visualization is more important as we get older

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Visualization and the RAS

- RAS protects us from overload and focuses our attention
  - Focus on what you want/enjoy, you are more likely to encounter it
  - Visualization primes the brain to focus on certain stimuli and identify it when it comes across your perceptive field

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Visualization and the Thalamus

- If you give an experience a 'label' and meaning, it will be perceived as something that actually exists in the world and increase activity in the thalamus
- Whatever neural pathways are formed as a part of imagining something, can be *strengthened* by doing that same thing later and it will feel familiar

*The thalamus [the part of the reality-making process of the brain] makes no distinction between inner and outer realities, and thus, **any idea, if contemplated long enough, will take on a semblance of reality** … The concept begins to feel more attainable and real, and this is the first step in motivating other parts of the brain to take deliberate action in the world.*

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Visualization

- Techniques:
  - Be the participant not the observer
  - Visualize the outcome and process
  - Use all of your sense
  - Be non-judgmental
  - The **strength** of the brain connections is directly proportional to the **intensity** of your imagination

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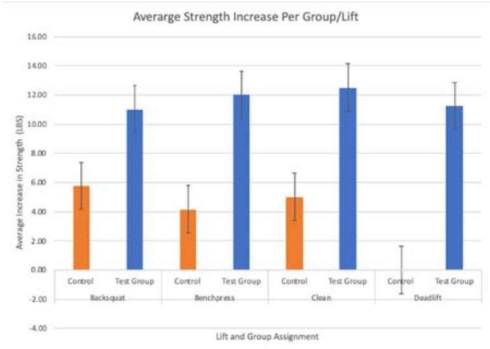
Visualization Research

- Test group visualized themselves performing a lift for at least 5 mins; frequency of choice. Both groups continued regular training
- Results
  - Participants who positively visualized had a significant increase in weight moved during a lift (10-15 lbs vs ~5 lbs)
  - Visualizing between 5-15 mins will produce similar results, 15+ mins produces greater increase in strength



(Hynes & Turner 2020)

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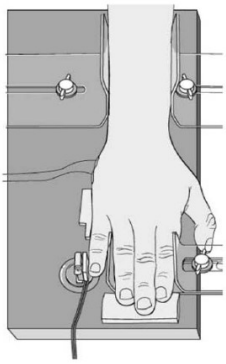
Visualization Research

- Groups:
  - Finger abduction strength
  - Physical exercises, visualization, control
- Results:
  - Physical: 53% increase
  - Visualization: initial 35% increase, 40% increase 4 weeks after training
  - Control: no significant increase



(Ranganathan et al., 2004)

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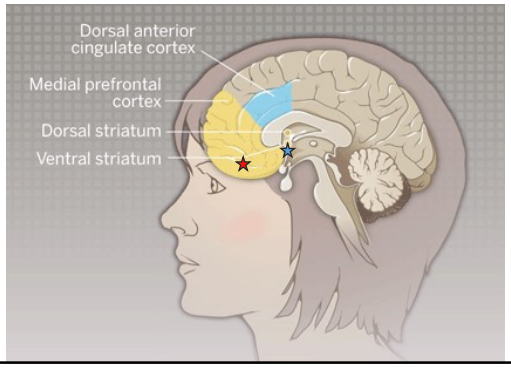
Positive Affirmations

- Positive statements that you say to yourself
  - "I am…" , "I have…"
- Benefits to:
  - Reward center (ventral striatum and ventromedial prefrontal cortex), RAS, and limbic system



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Positive Affirmation Research

- Self-affirmation has been shown to increase activity in reward-related neural regions, including the ventral striatum and ventromedial prefrontal cortex
- Neural pathways specifically the ventromedial prefrontal cortex—involved in positive valuation and self-related information processing—becomes more active when we consider our personal values
- When practicing positive affirmations, we are better able to view "otherwise-threatening information as more self-relevant and valuable" and have greater behavior change

(Dutcher et al., 2020; Cascio et al., 2016; Falk et al., 2015)

Resilience Training that Can Change the Brain

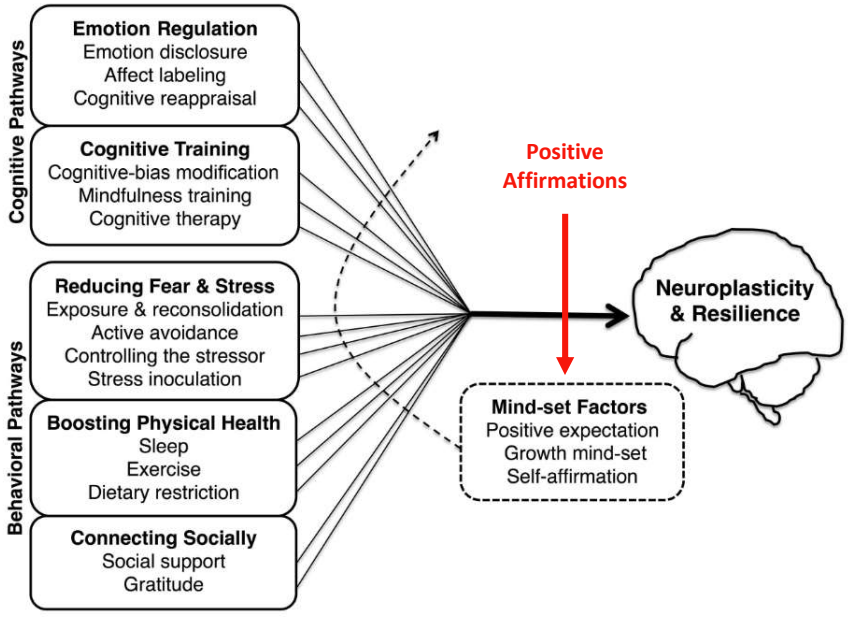

Figure 1. Schematic of the 15 strategies (solid boxes) that can boost resilience and lead to long-term change in the nervous system. Also shown are the three mind-set factors (dashed box) that can improve learning and implementation of these resilience-boosting strategies. Thin lines from the strategies converge onto a thick arrow to depict their additive effect on the nervous system and resilience.

(Tabibnia et al., 2018)

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Experiential Learning

- Meditation
  - The 3-minute breathing space
- Visualization
  - The candle exercise
- Group positive affirmations
  - "I am …"
- Personal positive affirmations

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Group Discussion

- What did you experience during each of the practices?
- Do you feel different now compared to before each of the practices? If so, how?
- What difficulties were experienced?

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Overcoming Difficulties

- Common mistakes
  - Poor posture, environment, giving up too quickly, jumping ahead, daydreaming
- Obstacles and solutions

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Summary and Additional Resources

- Meditation, visualization, and affirmations are simple evidence-based techniques that support achieving goal-directed behaviors
  - These techniques improve mood, emotions, memory
- These techniques can be self-directed or guided and require very little time

https://drive.google.com/drive/folders/16CifkibXU4NfQcwHxuKbNjMiizn7LvOc?usp=sharing

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Thank you!

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