

# ***Hardwiring Happiness***

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# Topics

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- **Self-directed neuroplasticity**
- **“Taking in the good” (TG)**
- **The evolving brain**
- **Healing old pain**




# Perspectives



*The history of science is rich in the example  
of the fruitfulness of bringing  
two sets of techniques, two sets of ideas,  
developed in separate contexts  
for the pursuit of new truth,  
into touch with one another.*

J. Robert Oppenheimer



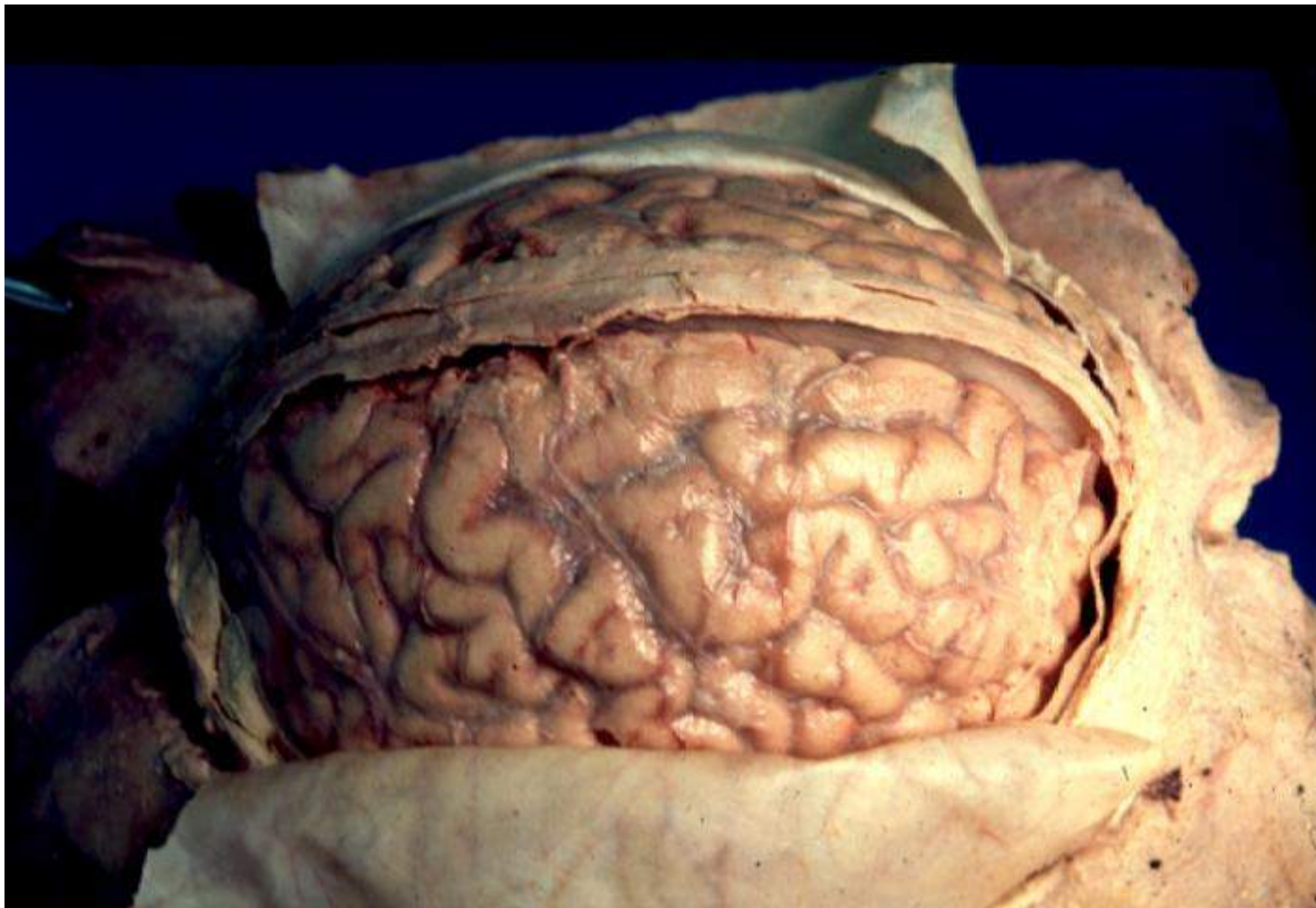
*When the facts change,  
I change my mind, sir.*

*What do you do?*

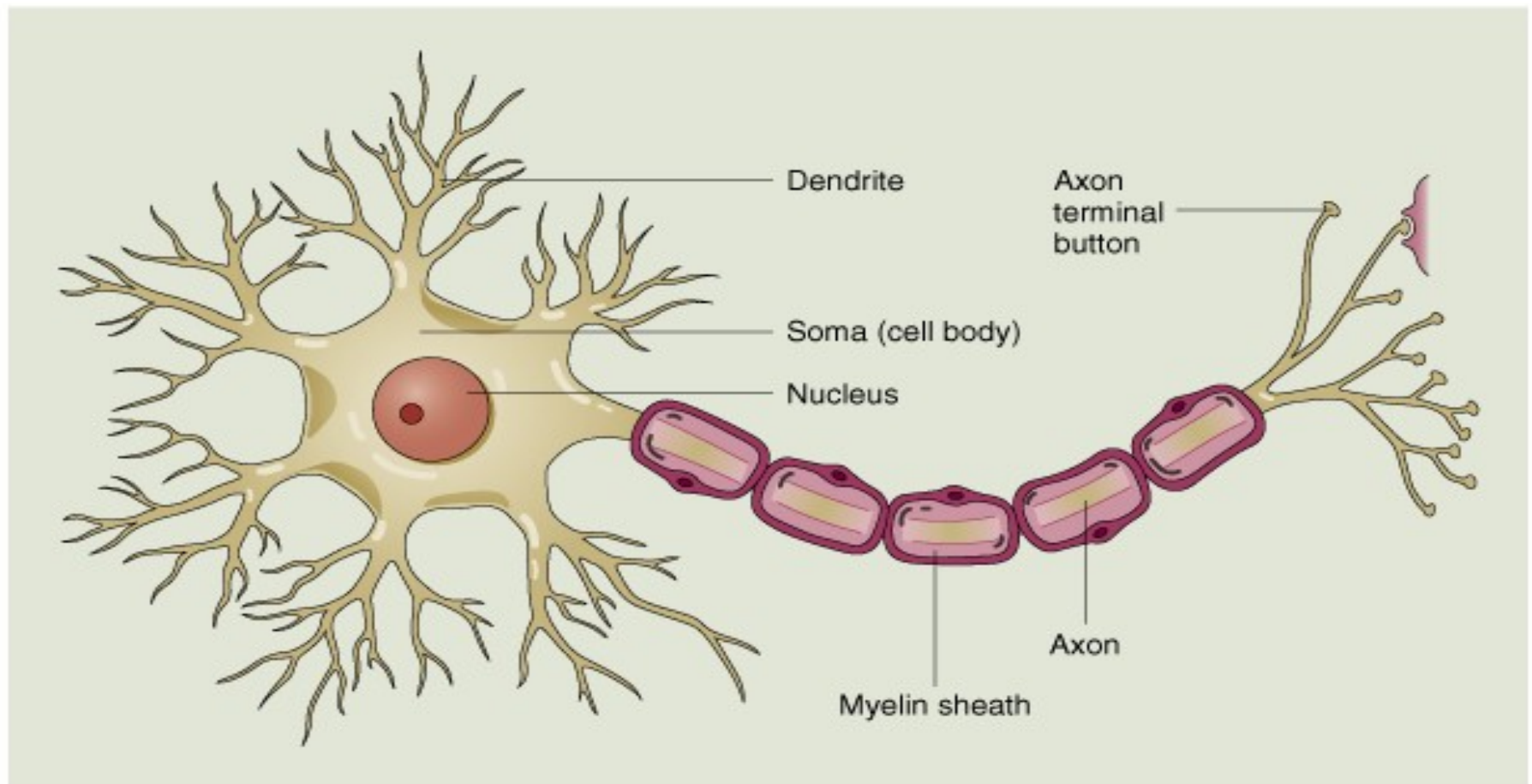
John Maynard Keynes



# **Self-Directed Neuroplasticity**



# A Neuron



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# Your Brain: The Technical Specs

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## ■ **Size:**

- 3 pounds of tofu-like tissue
- 1.1 trillion brain cells
- ~ 100 billion “gray matter” neurons

## ■ **Activity:**

- Always on 24/7/365 - Instant access to information on demand
- 20-25% of blood flow, oxygen, and glucose

## ■ **Speed:**

- Neurons firing around 5 to 50 times a second (or faster)
- Signals crossing your brain in a tenth of a second

## ■ **Connectivity:**

- Typical neuron makes ~ 5000 connections with other neurons:  
~ 500 trillion synapses

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*All cells have specialized functions. Brain cells have particular ways of processing information and communicating with each other. Nerve cells form complete circuits that carry and transform information.*

*Electrical signaling represents the language of mind, the means whereby nerve cells, the building blocks of the brain, communicate with one another over great distances. Nerve cells generate electricity as a means of producing messages.*

*All animals have some form of mental life that reflects the architecture of their nervous system.*

Eric R. Kandel







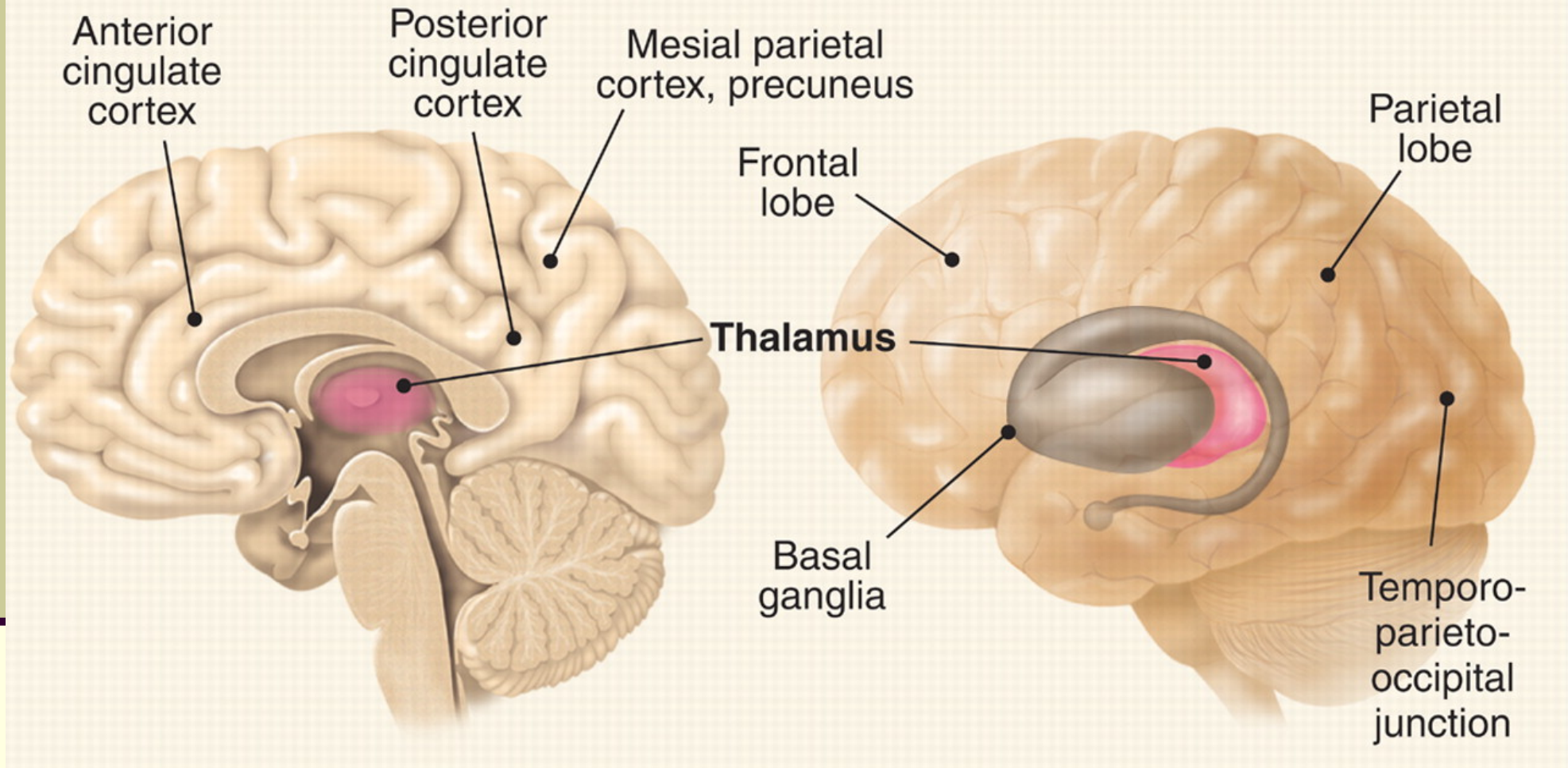
# The Mind/Brain System - A Working Model

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- Information in the nervous system:
  - Immaterial information is represented by a material substrate; the shapes of these words convey their meanings.
  - It includes signals, meanings, data, and instructions.
  
- “Mind” = the information in the nervous system (NS):
  - Mind is a natural phenomenon.
  - Most mind is unconscious.
  - Awareness, experience, and happiness are aspects of mind.
  - The NS constrains, conditions, and constructs mind.
  - Mind constrains, conditions, and constructs the NS.
  
- NS and mind co-arise interdependently, two distinct aspects of one integrated system: “dual-aspect monism”



# Key Brain Areas for Consciousness

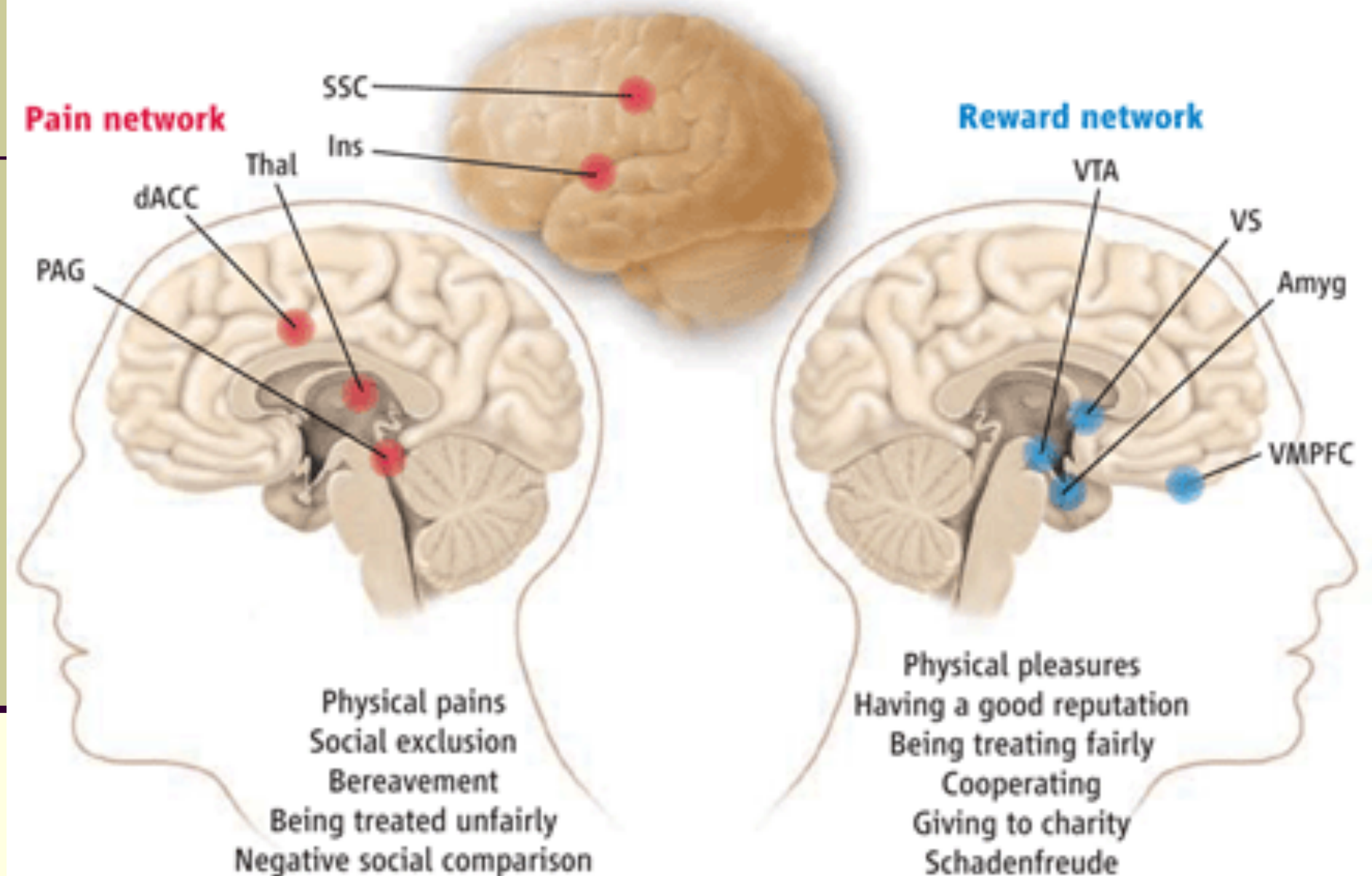


(adapted from) M. T. Alkire et al., *Science* 322, 876-880 (2008)

# Three Facts about Brain and Mind


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- As the brain changes, the mind changes.
  - Mental activity depends upon neural activity.
- As the mind changes, the brain changes.
  - Transient: brainwaves, local activation
  - Lasting: epigenetics, neural pruning, “neurons that fire together, wire together”
  - Experience-dependent neuroplasticity
- You can use the mind to change the brain to change the mind for the better: self-directed neuroplasticity.



Pain network: Dorsal anterior cingulate cortex (dACC), insula (Ins), somatosensory cortex (SSC), thalamus (Thal), and periaqueductal gray (PAG). Reward network: Ventral tegmental area (VTA), ventral striatum (VS), ventromedial prefrontal cortex (VMPFC), and amygdala (Amyg). K. Sutliff, in Lieberman & Eisenberger, 2009, *Science*, 323:890-891 16

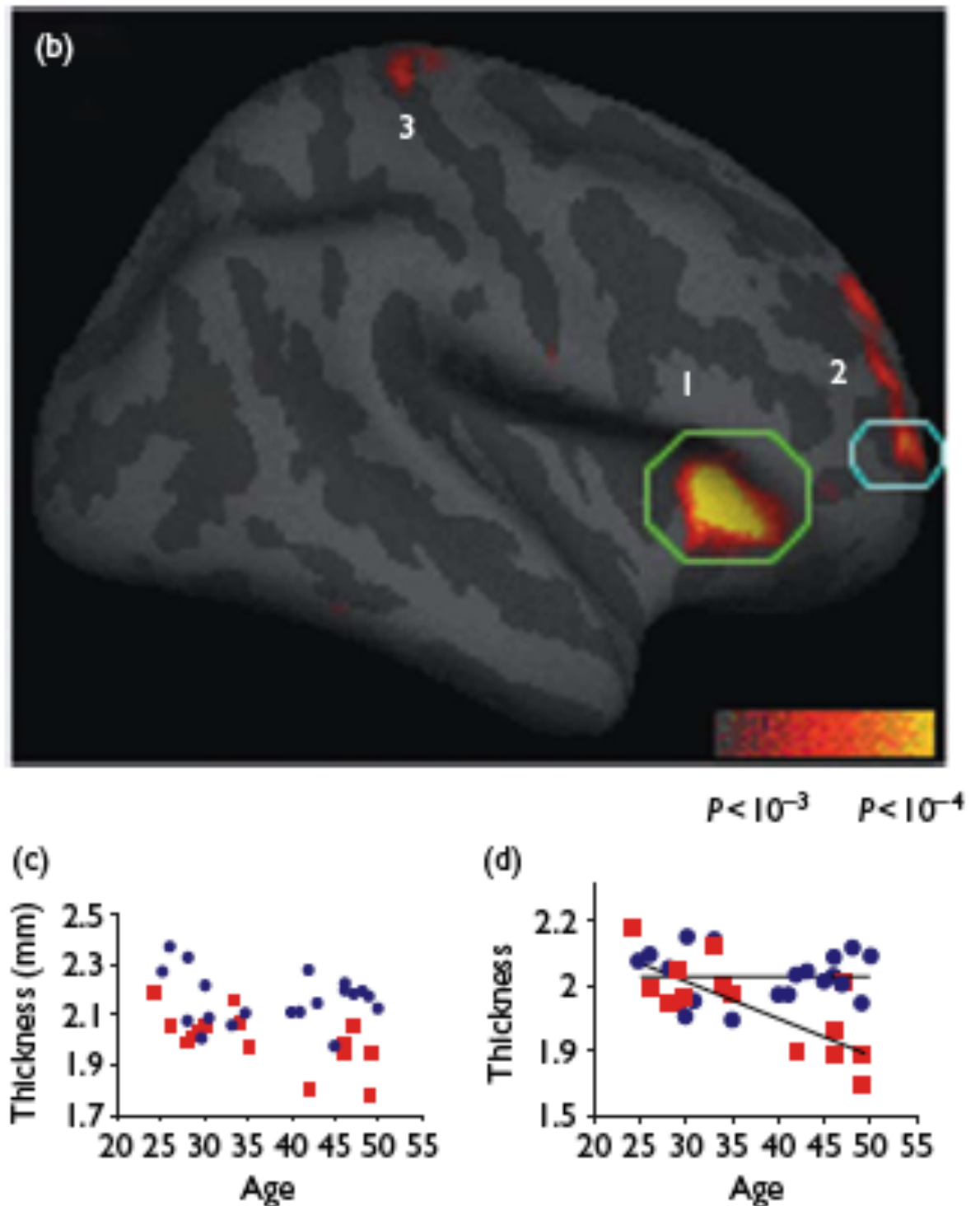




*[People] ought to know that  
from nothing else but the brain  
come joys, delights, laughter and sports,  
and sorrows, griefs, despondency, and lamentations.*

Hippocrates

Lazar, et al. 2005.  
Meditation  
experience is  
associated  
with increased  
cortical thickness.  
*Neuroreport*, 16,  
1893-1897.



# Effects of Meditation on Brain - 1

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Increased gray matter in the:

- Insula - interoception; self-awareness; empathy for emotions
- Hippocampus - visual-spatial memory; establishing context; inhibiting amygdala and cortisol
- Prefrontal cortex (PFC) - executive functions; attention control

Reduced cortical thinning with aging in insula and PFC

# Effects of Meditation on Brain - 2

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- Increased activation of left frontal regions, which lifts mood
- Increased power and reach of gamma-range brainwaves - may be associated with integration, “coming to singleness,” “unitary awareness”
- Preserved telomere length

# Honoring Experience

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**One's experience *matters*.**

**Both for how it feels in the moment  
and for the lasting residues it leaves behind,  
woven into the fabric of a person's brain and being.**

# The Power of Mindfulness

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- Attention is like a spotlight, illuminating what it rests upon.
- Because neuroplasticity is heightened for what's in the field of focused awareness, attention is also like a vacuum cleaner, sucking its contents into the brain.
- Directing attention skillfully is therefore a fundamental way to shape the brain - and one's life over time.

*The education of attention  
would be an education par excellence.*

William James

## The Joy of Tech™

by Nitrozac & Snaggy



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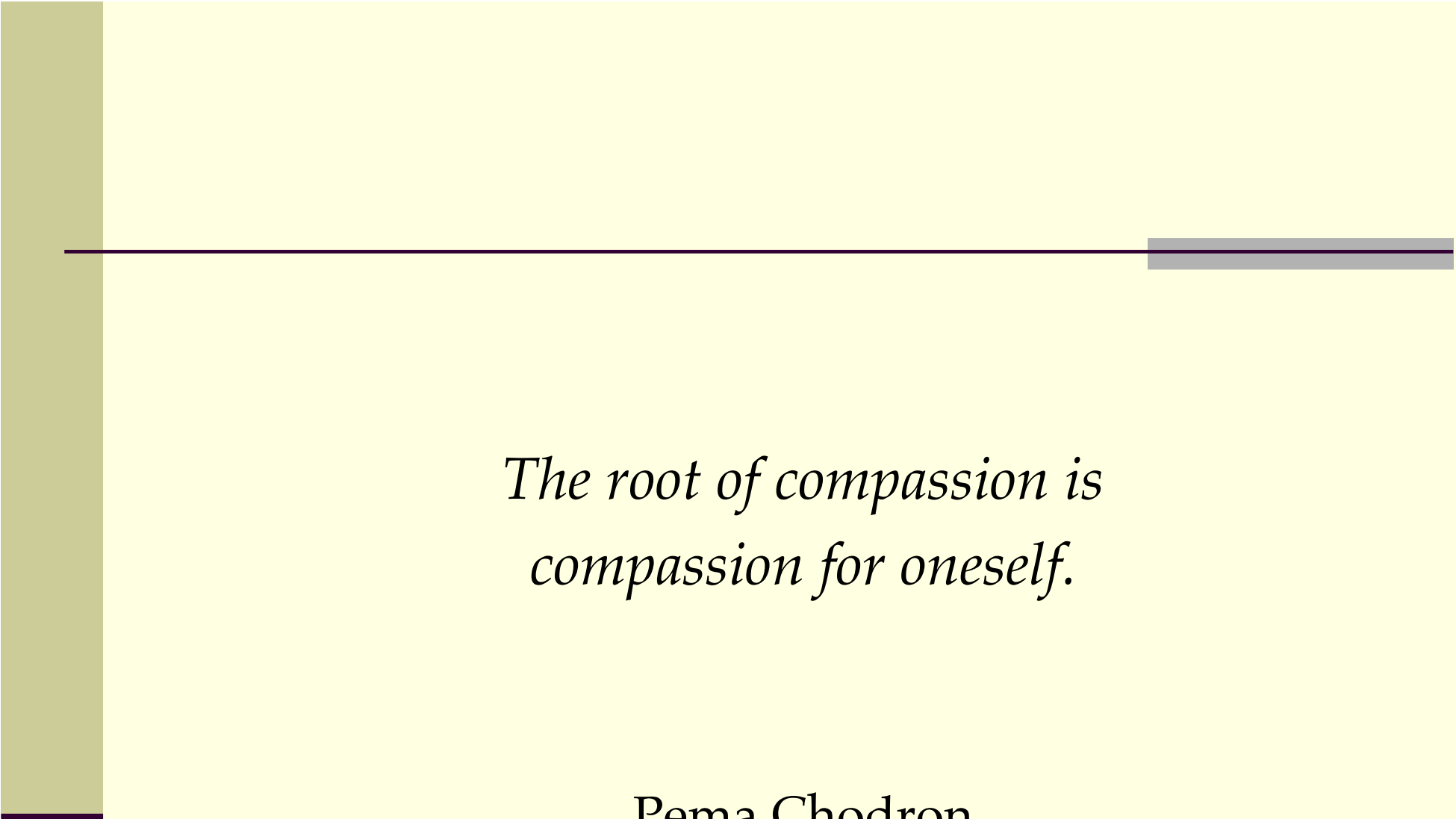
joyoftech.com

# Self-Compassion

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- Compassion is the wish that a being not suffer, combined with sympathetic concern. Self-compassion simply applies that to oneself. It is not self-pity, complaining, or wallowing in pain.
- Studies show that self-compassion buffers stress and increases resilience and self-worth.
- But self-compassion is hard for many people, due to feelings of unworthiness, self-criticism, or “internalized oppression.” To encourage the neural substrates of self-compassion:
  - Get the sense of being cared about by someone else.
  - Bring to mind someone you naturally feel compassion for
  - Sink into the experience of compassion in your body
  - Then shift the compassion to yourself, perhaps with phrases like: “May I not suffer. May the pain of this moment pass.”





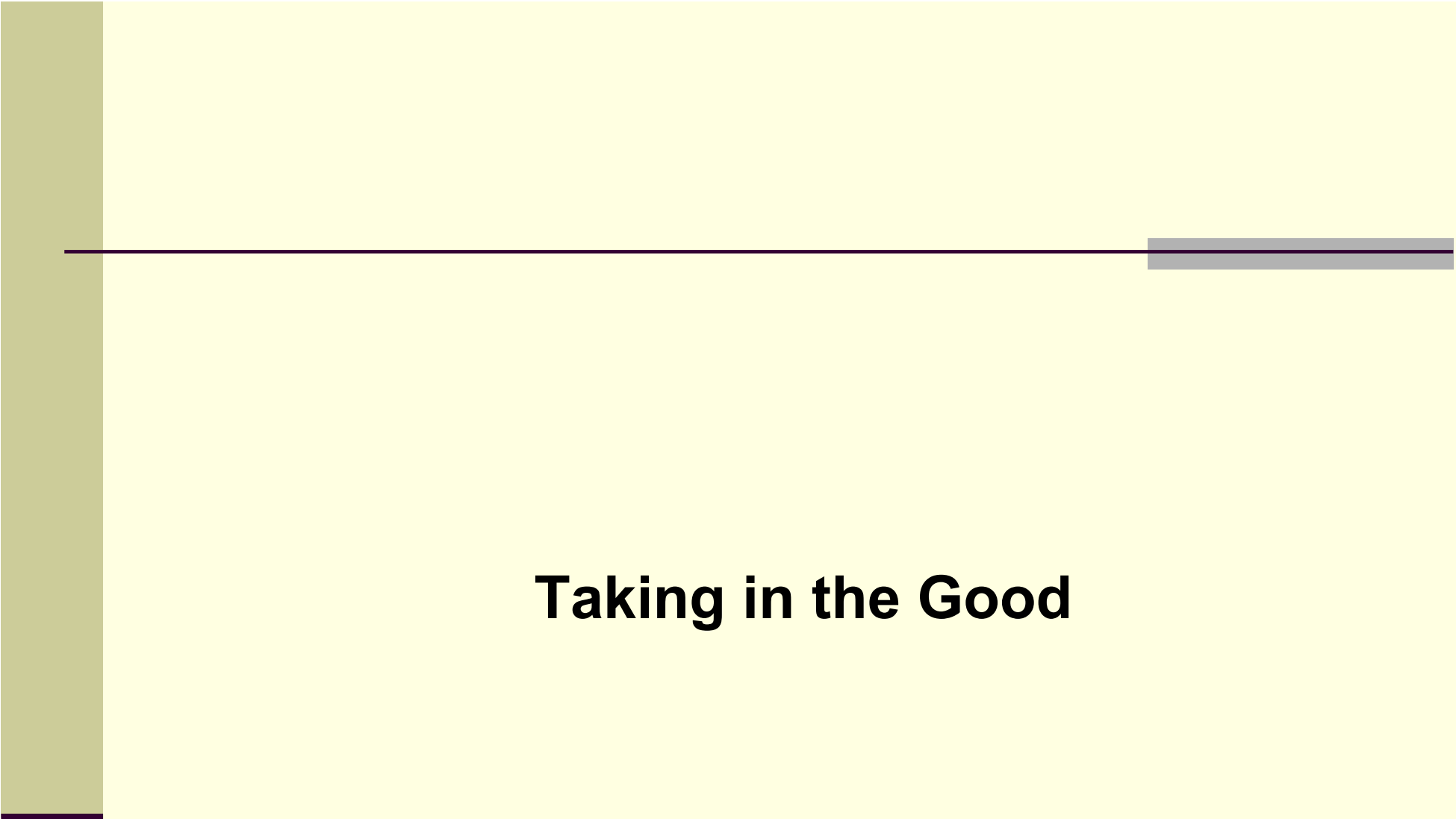
*The root of compassion is  
compassion for oneself.*

Pema Chodron



*If one going down into a river,  
swollen and swiftly flowing,  
is carried away by the current --  
how can one help others across?*

The Buddha



# **Taking in the Good**



**Just having positive experiences is not enough.**

**They pass through the brain like water through a sieve, while negative experiences are caught.**

**We need to engage positive experiences actively to weave them into the brain.**

# Inner Strengths Include

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- **Virtues** (e.g., patience, energy, generosity, restraint)
- **Executive functions** (e.g., meta-cognition)
- **Attitudes** (e.g., optimism, openness, confidence)
- **Capabilities** (e.g., mindfulness, emotional intelligence, resilience)
- **Positive emotions** (e.g., gratitude, self-compassion)
- **Approach orientation** (e.g., curiosity, exploration)

# Cultivating Inner Strengths

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- Inner strengths develop via pleasant and painful experiences, modeling, conceptualization, and practice.
- **Pleasant experiences** are a particularly powerful factor, e.g.:
  - Nurture child development
  - Encourage exploration and skill development
  - Help us endure the unpleasant and convert it to resources
  - Motivate us to continue learning
  - Initiate and sustain the Responsive mode
  - One can value pleasant experiences without craving them.
- The final common pathway of all these processes is the *installation* of the resource in neural structure. This is cultivation: how to do it well?

# Cultivation in Context

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- Three ways to engage the mind:
  - Be with it. Decrease negative. Increase positive.
  - The garden: Observe. Pull weeds. Plant flowers.
  - Let be. Let go. Let in.
  - Mindfulness present in all three ways to engage mind
- While “being with” is primary, it’s often isolated in Buddhist, nondual, and mindfulness-based practice.
- Skillful means for decreasing the negative and increasing the positive have developed over 2500 years. Why not use them?

# HEAL by Taking in the Good

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1. Have a positive experience. Notice or create it.
2. Enrich the experience through duration, intensity, multimodality, novelty, personal relevance
3. Absorb the experience by intending and sensing that it is sinking into you as you sink into it.
4. Link positive and negative material.

Benefits: Specific contents internalized. Implicit value of being active and treating yourself like you matter. Gradual sensitization of the brain to the positive.



# It's Good to Take in the Good (TG)

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- Grows specific inner strengths, such as resilience, positive mood, and feeling cared about. Some target our needs for safety, satisfaction, and connection; can heal old wounds.
- Implicitly, TG:
  - Shows that there is still good in the world
  - Is active rather than passive
  - Treats oneself kindly, like one matters
  - Rights an unfair imbalance, given the negativity bias
- Can sensitize the brain to the positive

# Targets of TG

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- Bodily states - healthy arousal; PNS; vitality
- Emotions - both feelings and mood
- Views - expectations; object relations; perspectives on self, world, past and future
- Desires - values, aspirations, passions, wants
- Behaviors - repertoire; inclinations

# Instances of Taking in the Good

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- You find yourself already having a good experience.
- You self-activate a good experience by:
  - Looking for a good fact
  - Recalling a good fact
  - Creating a good fact
  - Imagining a good fact that has never been
- Situations:
  - On the fly
  - At specific times (e.g., meals, before bed)
  - When prompted (e.g., by a therapist)

# Types of Good Facts

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- Events (e.g., finished a load of laundry, someone was friendly to you, this cookie tastes good)
- Conditions (e.g., food, shelter, fresh air, have friends, dog loves you, flowers blooming, ain't dead yet)
- Qualities within oneself (e.g., fairness, decency, determination, good at baking, loving toward kids)

# Some Types of Resource Experiences

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## **Avoiding Harms**

- Feeling basically alright right now
- Feeling protected, strong, safe, at peace
- The sense that awareness itself is untroubled

## **Approaching Rewards**

- Feeling basically full, the enoughness in this moment as it is
- Feeling pleased, glad, grateful, satisfied
- Therapeutic, spiritual, or existential realizations

## **Attaching to Others**

- Feeling basically connected
- Feeling included, seen, liked, appreciated, loved
- Feeling compassionate, kind, generous, loving

# Resources for Taking in the Good

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- Intention; willing to feel good
- Identified target experience
- Openness to the experience; embodiment
- Mindfulness of the steps of TG to sustain them
- Working through obstructions

# Implicit TG in Therapy

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- Drawing attention to good facts
- Encouraging a positive response to a good fact
- Drawing attention to key aspects of an experience
- Slowing the client down; not moving on
- Linking rewards to desired thoughts and actions
- Doing TG oneself

# Explicit TG in Therapy

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- Teaching the method
  - Background helps about brain, negativity bias
  - Emphasizing facts and mild experiences
  - Surfacing obstructions
- Doing TG with client(s) during a session
  - To reinforce a key resource state
  - To link rewards to desired thoughts or actions
- Encouraging TG between sessions
  - Naming occasions
  - Identifying key positive facts and experiences



# Doing TG with a Couple

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- Basic steps (often informal):
  - Attention to a good fact
  - Evoking and sustaining a good experience
  - Managing obstructions
  - Awareness of the impact on one's partner
  - Debriefing, often from both partners
  
- Pitfalls to avoid:
  - Seeming to side with one person
  - Unwittingly helping a person overlook real issues
  - Letting the other partner pile on

# Obstructions to Taking in the Good

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## ■ General

- Distractibility
- Blocks to self-awareness in general

## ■ Specific

- Fears of losing one's edge or lowering one's guard
- Sense of disloyalty to others (e.g., survivor guilt)
- Culture (e.g., selfish, vain, sinful)
- Gender style
- Associations to painful states
- Secondary gains in feeling bad
- Not wanting to let someone off the hook
- Thoughts that TG is craving that leads to suffering

# Promoting Client Motivation

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- During therapy, but mainly between sessions, notice:
  - When learning from therapy works well
  - New insights
  - When things happen consistent with therapist's realistic view of you, the world, the future
  - Good qualities in yourself emphasized by therapist
- Then practice three, sometimes four, steps of TG.
- Can be formalized in daily reflections, journaling
- In general: take appropriate risks of “dreaded experiences,” notice the (usually) good results, and then take those in.

# TG and Children

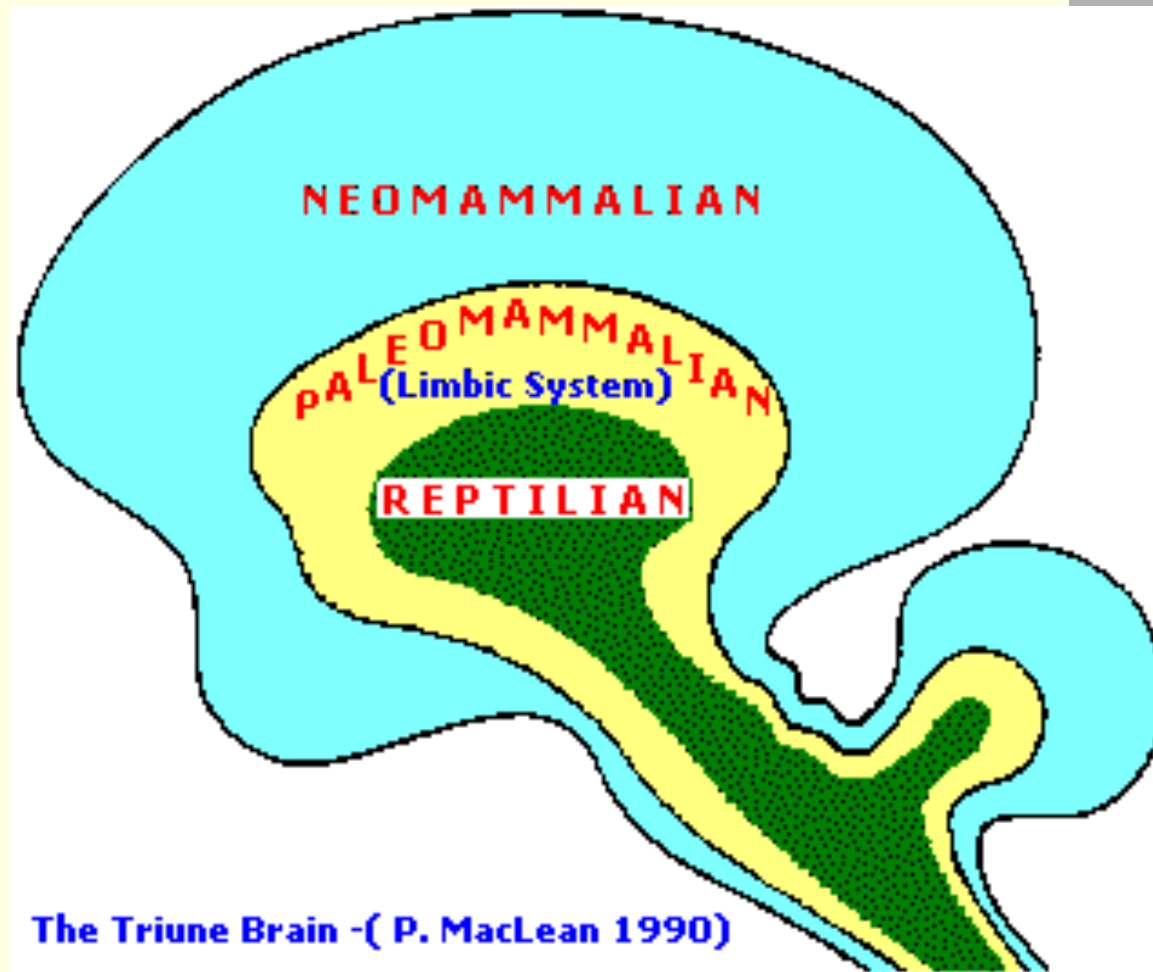
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- All kids benefit from TG.
- Particular benefits for mistreated, anxious, spirited/ADHD, or LD children.
- Adaptations:
  - Brief
  - Concrete
  - Natural occasions (e.g., bedtimes)



# **The Evolving Brain**

# Evolutionary History



## The Triune Brain

# Three Fundamental Motivational and Self-Regulatory Systems

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- **Avoid Harms:**

- Primary need, tends to trump all others

- **Approach Rewards:**

- Elaborated via sub-cortex in mammals for emotional valence, sustained pursuit

- **Attach to Others:**

- Very elaborated via cortex in humans for pair bonding, language, empathy, cooperative planning, compassion, altruism, etc.

# The Homeostatic Home Base

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*When not disturbed by threat, loss, or rejection [no deficit of safety, satisfaction, and connection]*

The body defaults to a sustainable equilibrium of refueling, repairing, and pleasant abiding.

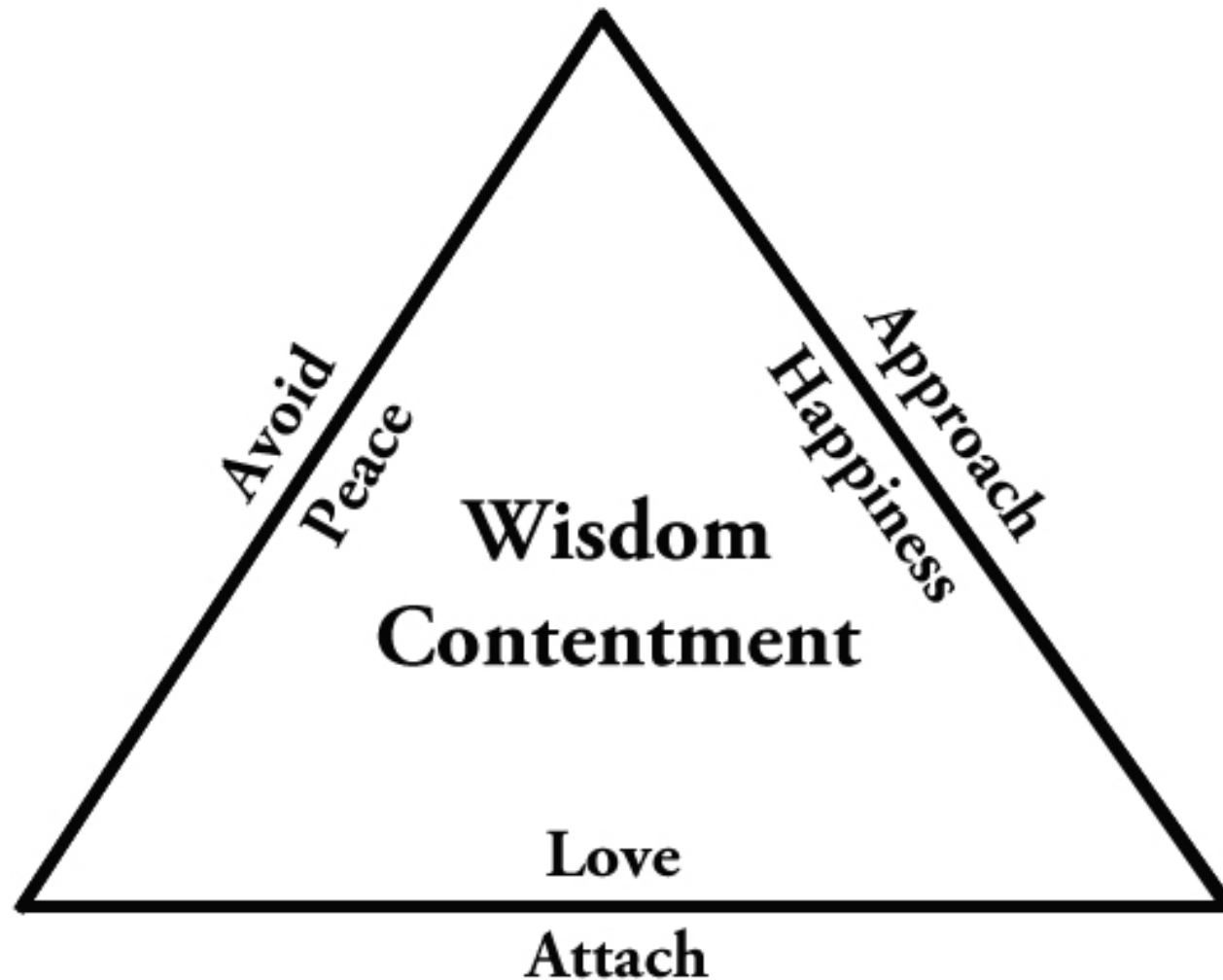
The mind defaults to a sustainable equilibrium of:

- **Peace** (the Avoiding system)
- **Contentment** (the Approaching system)
- **Love** (the Attaching system)

This is the brain in its homeostatic ***Responsive,***  
*minimal craving* mode.



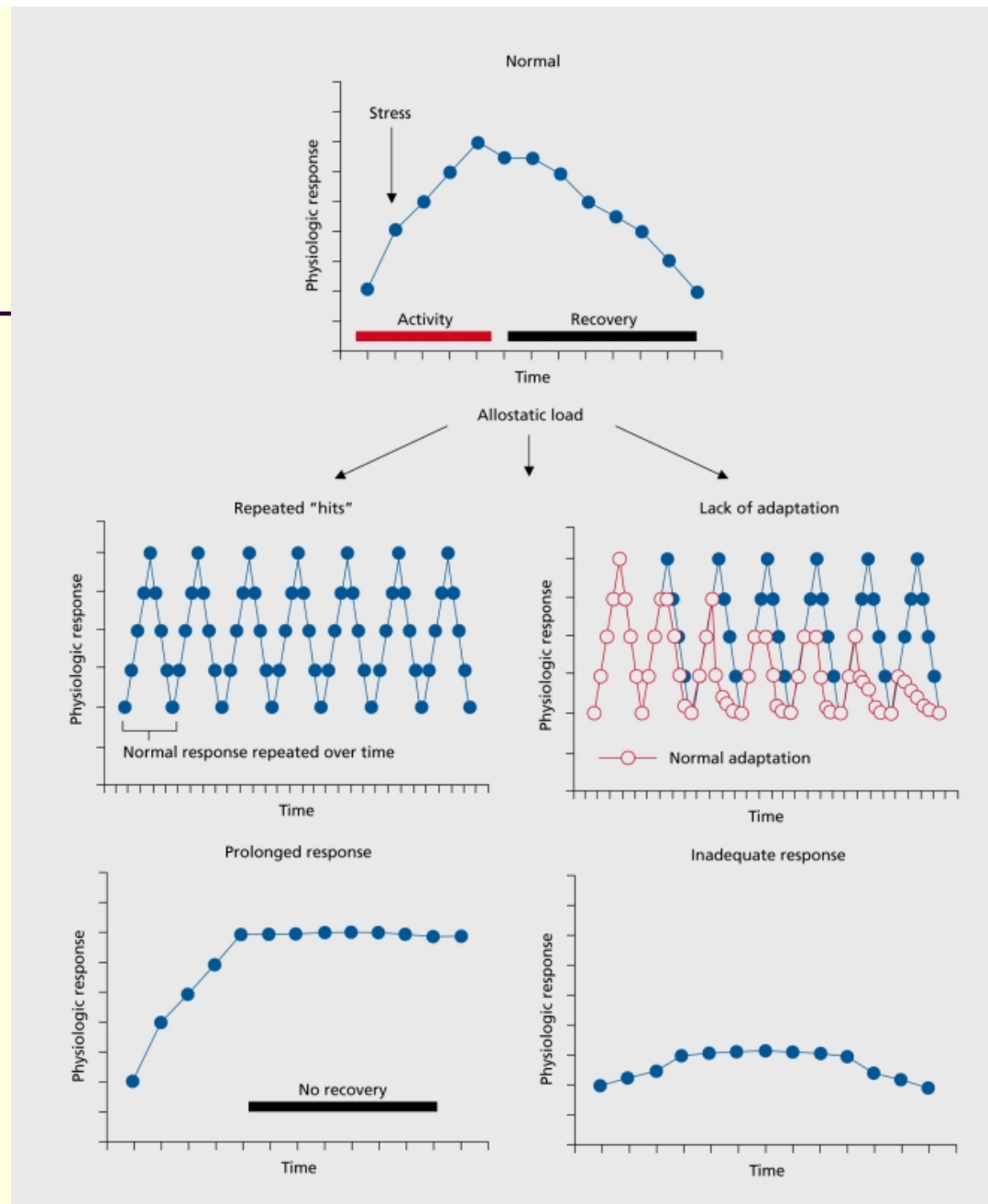
# The Responsive Mode



# Some Benefits of Responsive Mode

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- Recovery from “mobilizations” for survival:
  - Refueling after depleting outpourings
  - Restoring equilibrium to perturbed systems
  - Reinterpreting negative events in a positive frame
  - Reconciling after separations and conflicts
  
- Promotes prosocial behaviors:
  - Experiencing safety decreases aggression.
  - Experiencing sufficiency decreases envy.
  - Experiencing connection decreases jealousy.
  - We’re more generous when our own cup runneth over.



### Adaptive and maladaptive responses to challenges

Top panel: adaptive stress response. Lower panels: Top left - repeated stressors, no time for recovery. Top right - adaptation wears out. Bottom left - stuck in stress activation. Bottom right - inadequate stress response. <sup>51</sup> McEwen, 1998. New England Journal of Medicine, 338:171-179.

# But to Cope with Urgent Needs, We Leave Home . . .

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*When disturbed by threat, loss, or rejection [deficit of safety, satisfaction, or connection]:*

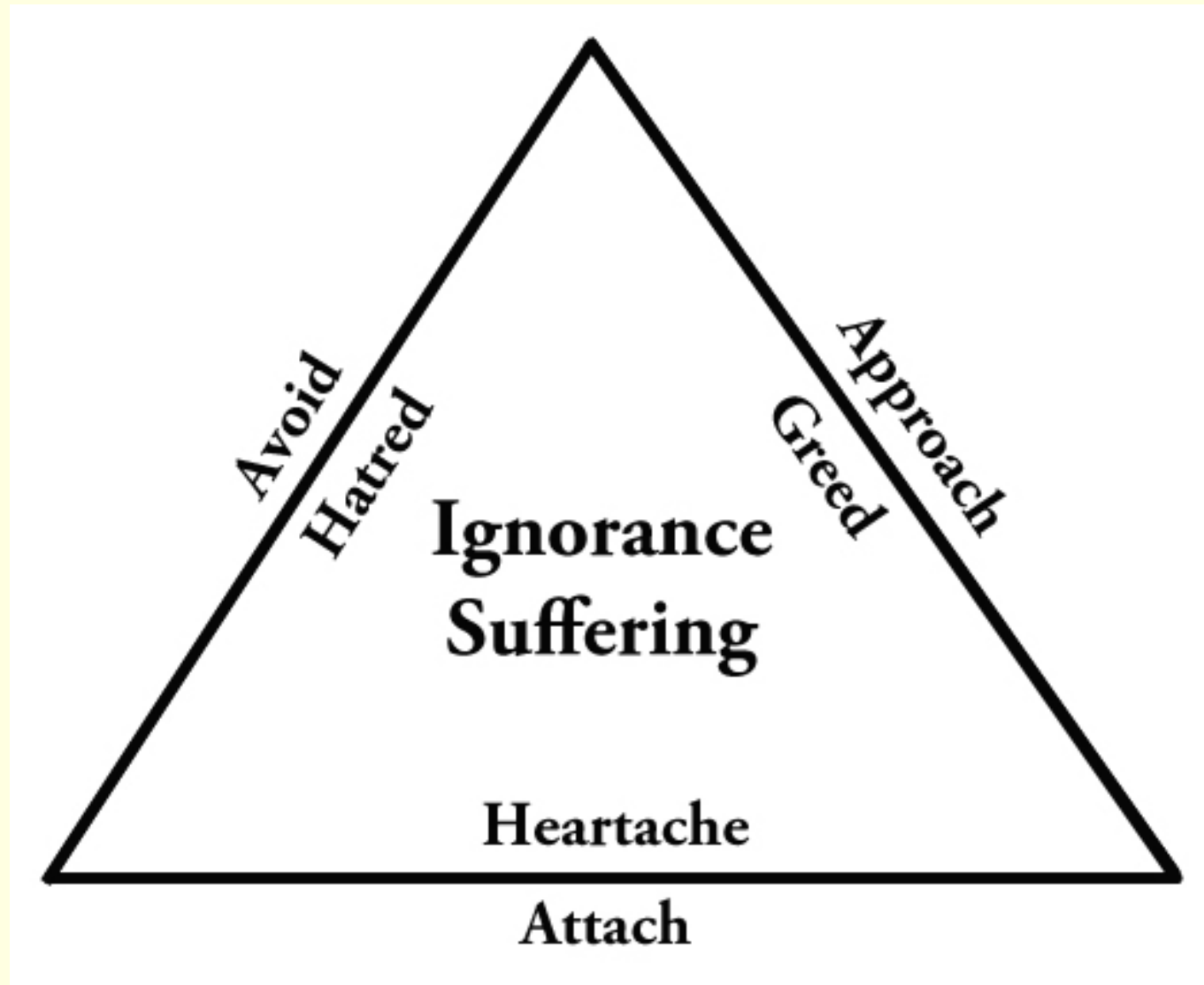
The body fires up into the stress response; outputs exceed inputs; long-term building is deferred.

The mind fires up into:

- **Hatred** (the Avoiding system)
- **Greed** (the Approaching system)
- **Heartache** (the Attaching system)

This is the brain in allostatic, **Reactive**, *craving* mode.<sup>52</sup>

# The Reactive Mode

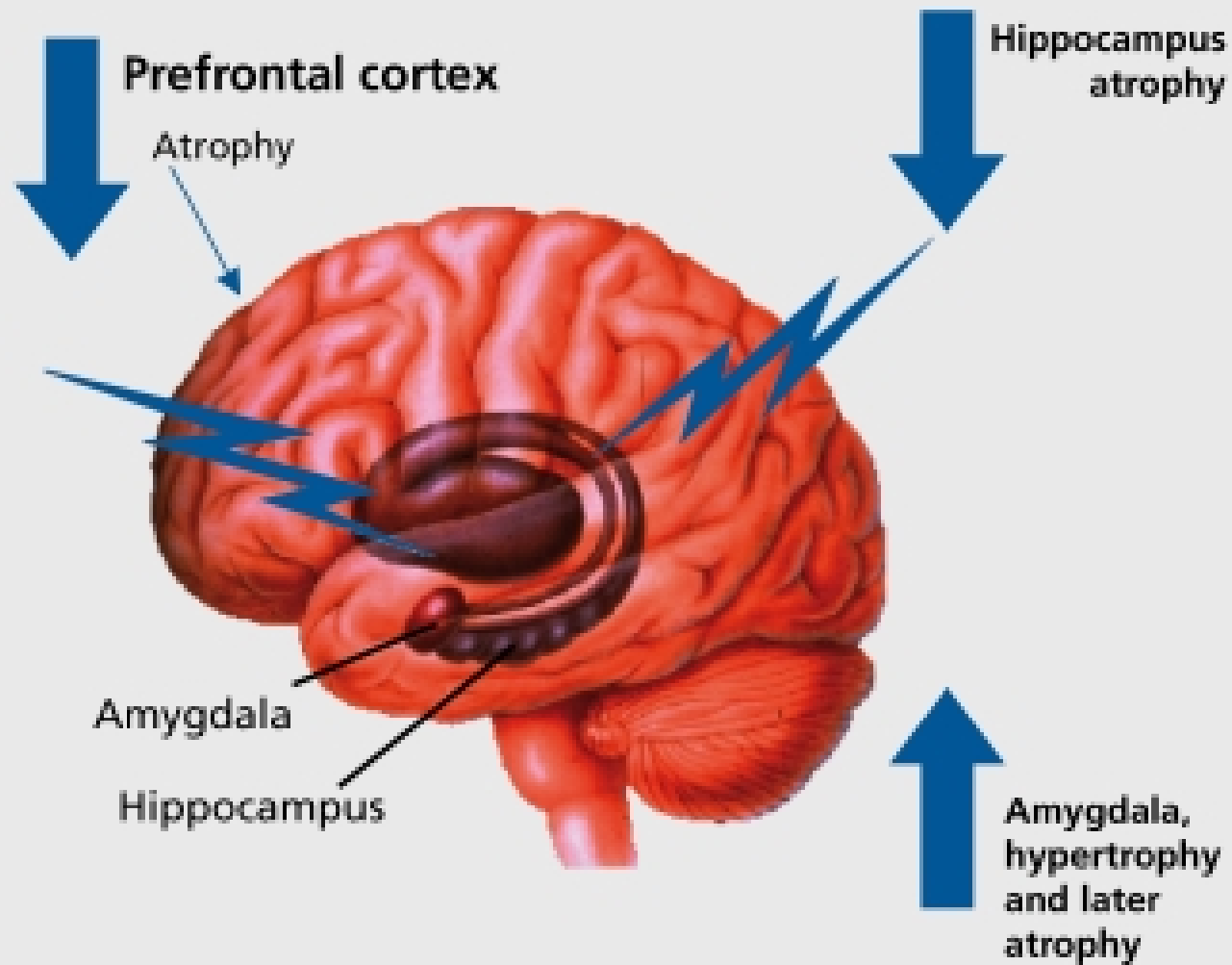


# Negativity Bias

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- As our ancestors evolved, not getting hit by “sticks” was more important for survival than getting “carrots.”
- Negative stimuli get more attention and processing. Loss aversion.
- Preferential encoding in implicit memory:
  - Easy to create learned helplessness, hard to undo
  - Negative interactions: more powerful than positive
  - Good at learning from bad, bad at learning from good
  - Most good experiences are wasted on the brain:  
lowers both the results of practice and motivation

## The brain under stress: structural remodeling



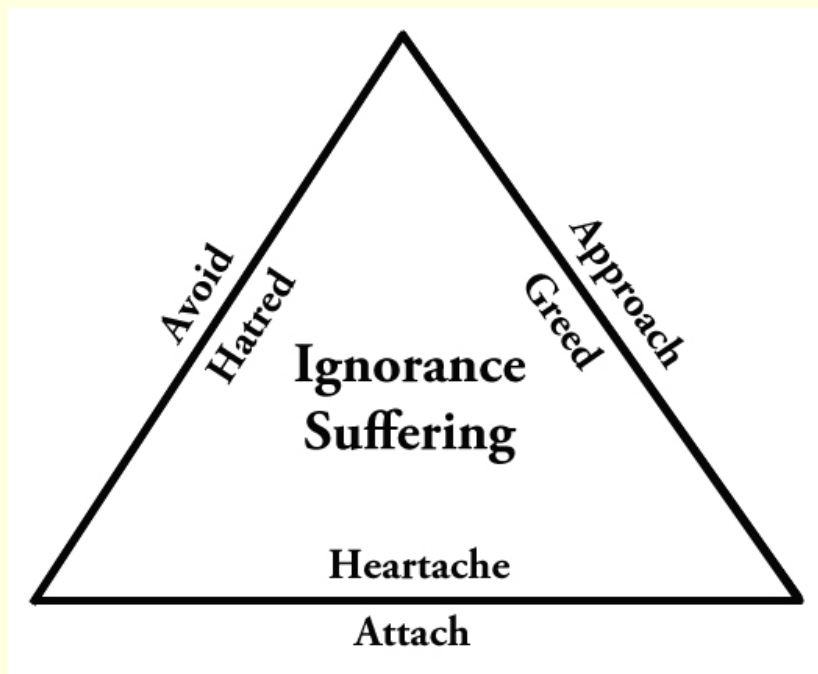
# Reactive Dysfunctions in Each System

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- **Avoiding** - Anxiety disorders; PTSD; panic, terror; rage; violence
- **Approaching** - Addiction; over-drinking, -eating, -gambling; compulsion; hoarding; driving for goals at great cost
- **Attaching** - Borderline, narcissistic, antisocial PD; symbiosis; “looking for love in all the wrong places”

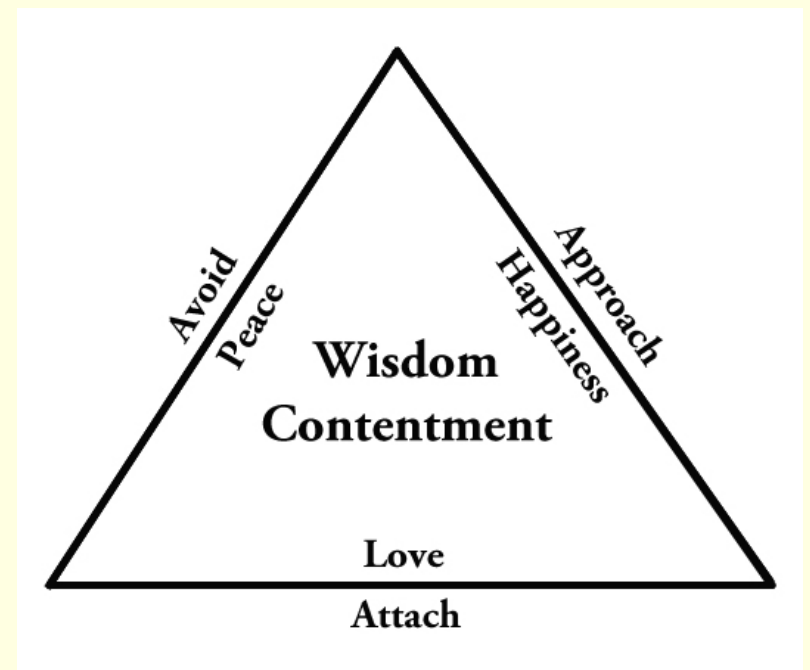


# Choices . . .

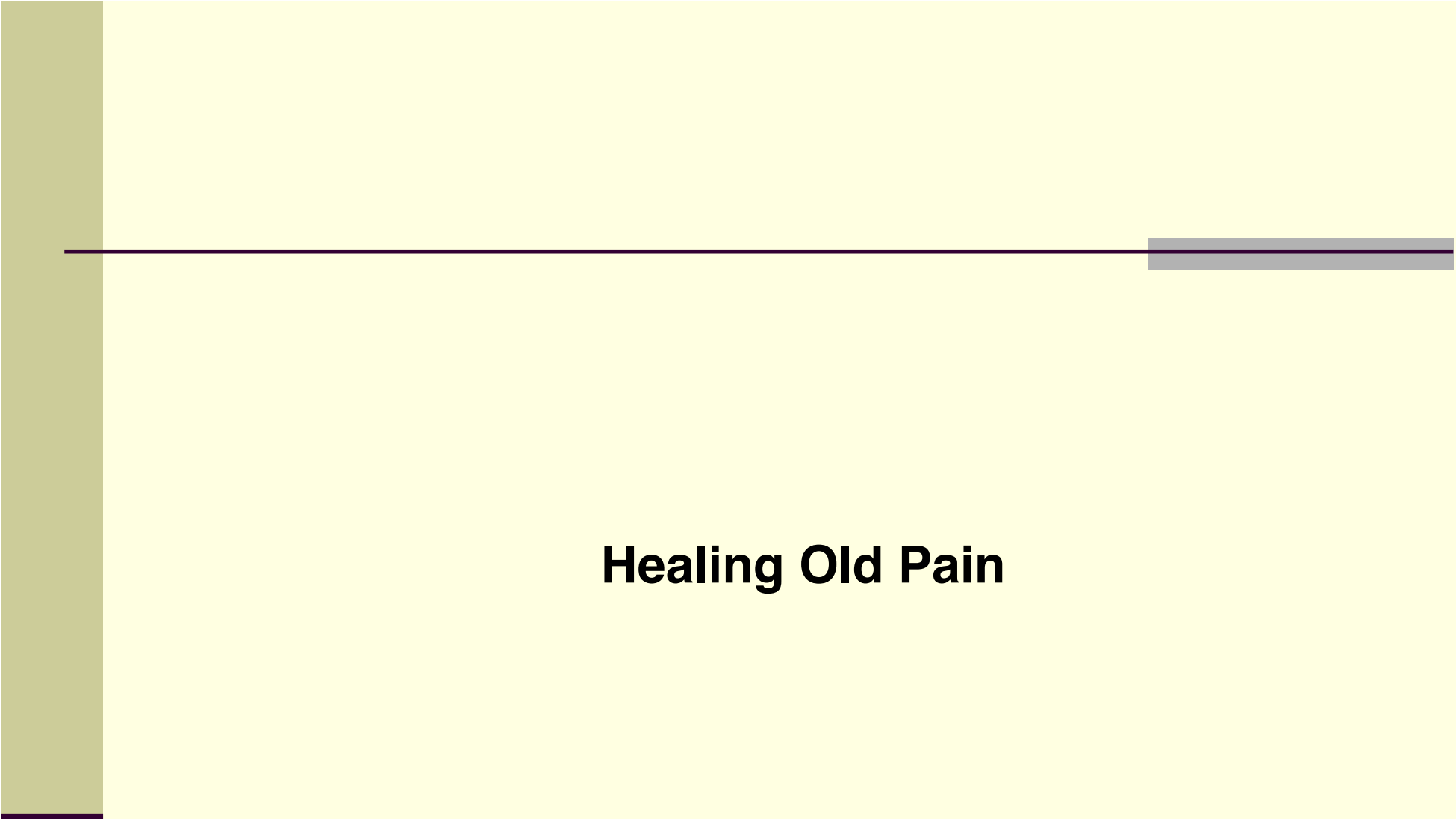


**Reactive Mode**

Or?



**Responsive Mode**



# Healing Old Pain

# Using Memory Mechanisms to Help Heal Painful Experiences

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- The machinery of memory:
  - When explicit or implicit memory is re-activated, it is re-built from schematic elements, not retrieved *in toto*.
  - When attention moves on, elements of the memory get re-consolidated.
- The open processes of memory activation and consolidation create a window of opportunity for shaping your internal world.
- Activated memory tends to associate with other things in awareness (e.g., thoughts, sensations), esp. if they are prominent and lasting.
- When memory goes back into storage, it takes associations with it.
- You can imbue implicit and explicit memory with positive associations.

# The Fourth Step of TG

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- When you are having a positive experience:
  - Sense the current positive experience sinking down into old pain, and soothing and replacing it.
- When you are having a negative experience:
  - Bring to mind a positive experience that is its antidote.
- In both cases, have the positive experience be big and strong, in the forefront of awareness, while the negative experience is small and in the background.
- You are not resisting negative experiences or getting attached to positive ones. You are being kind to yourself and cultivating positive resources in your mind.

# Psychological Antidotes

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## Approaching Opportunities

- Satisfaction, fulfillment --> Frustration, disappointment
- Gladness, gratitude --> Sadness, discontentment, “blues”

## Affiliating with “Us”

- Attunement, inclusion --> Not seen, rejected, left out
- Recognition, acknowledgement --> Inadequacy, shame
- Friendship, love --> Abandonment, feeling unloved or unlovable

## Avoiding Threats

- Strength, efficacy --> Weakness, helplessness, pessimism
- Safety, security --> Alarm, anxiety
- Compassion for oneself and others --> Resentment, anger

# The Tip of the Root

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- For the fourth step of TIG, try to get at the youngest, most vulnerable layer of painful material.
- The “tip of the root” is commonly in childhood. In general, the brain is most responsive to negative experiences in early childhood.
- Prerequisites
  - Understanding the need to get at younger layers
  - Compassion and support for the inner child
  - Capacity to “presence” young material without flooding

# TIG and Trauma

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- General considerations:
  - People vary in their resources and their traumas.
  - Often the major action is with “failed protectors.”
  - Cautions for awareness of internal states, including positive
  - Respect “yellow lights” and the client’s pace.
- The first three steps of TIG are generally safe. Use them to build resources for tackling the trauma directly.
- As indicated, use the fourth step of TIG to address the peripheral features and themes of the trauma.
- Then, with care, use the fourth step to get at the heart of the trauma.

*First of all, do no harm.*

# The Fruit as the Path

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**Peace**

**Contentment**

**Love**



# Cultivation Undoes Craving

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- All life has goals. The brain continually seeks to avoid harms, approach rewards, and attach to others - even that of a sage.
- It is wholesome to wish for the happiness, welfare, and awakening of all beings - including the one with your nametag.
- We rest the mind upon positive states so that the brain may gradually take their shape. This disentangles us from craving as we increasingly rest in a peace, happiness, and love that is independent of external conditions.
- With time, even the practice of cultivation falls away - like a raft that is no longer needed once we reach the farther shore.

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*Think not lightly of good, saying,  
"It will not come to me."*

*Drop by drop is the water pot filled.*

*Likewise, the wise one,  
gathering it little by little,  
fills oneself with good.*

# Great Books

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See [www.RickHanson.net](http://www.RickHanson.net) for other great books.

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See [www.RickHanson.net](http://www.RickHanson.net) for other scientific papers.

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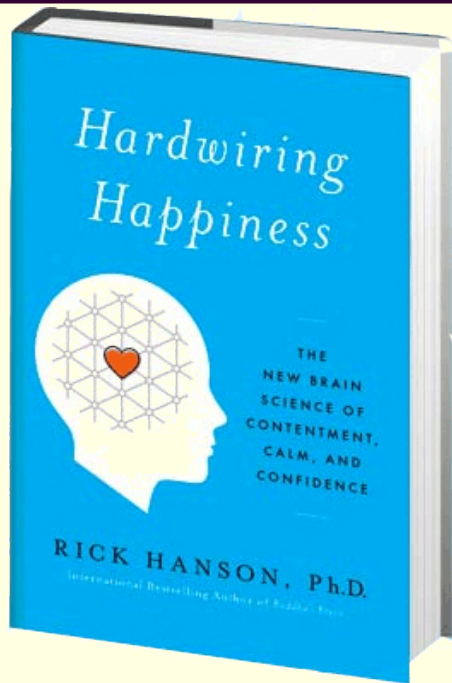
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