

Buddha's Brain:

The Practical Neuroscience Of Happiness, Love, and Wisdom

Omega Institute

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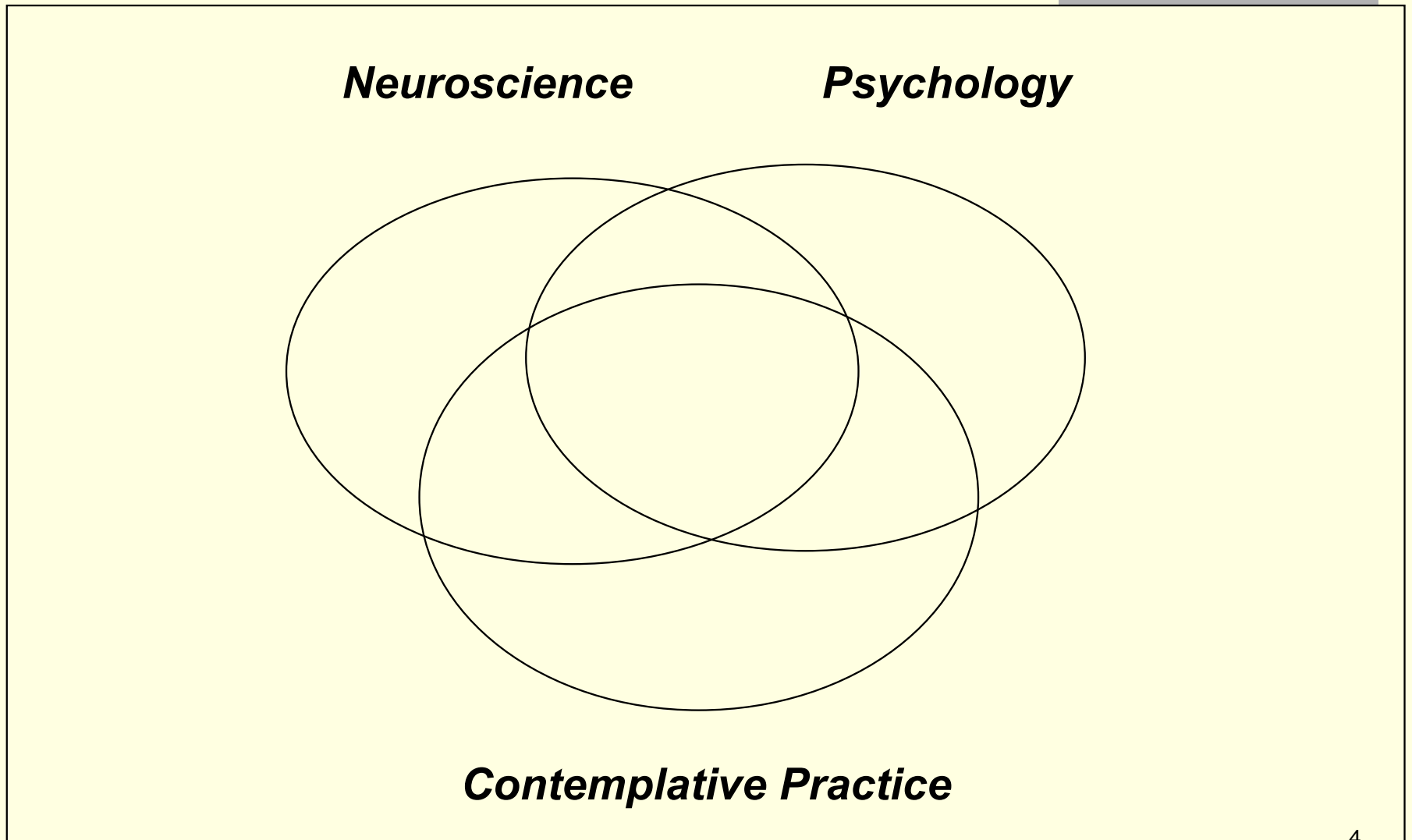
Topics

- **Perspectives**
- **Neural factors of mindfulness**
- **Using your mind to change your brain**
- **Being on your own side**
- **Inner resources**
- **Taking in the good**
- **Steadying the mind**
- **Being and doing**
- **The Responsive mode**
- **The Reactive mode**
- **Taking the fruit as the path**



Perspectives

Common - and Fertile - Ground



We ask, “What is a thought?”

*We don't know,
yet we are thinking continually.*

Venerable Tenzin Palmo




Neural Factors of Mindfulness

Basics of Meditation

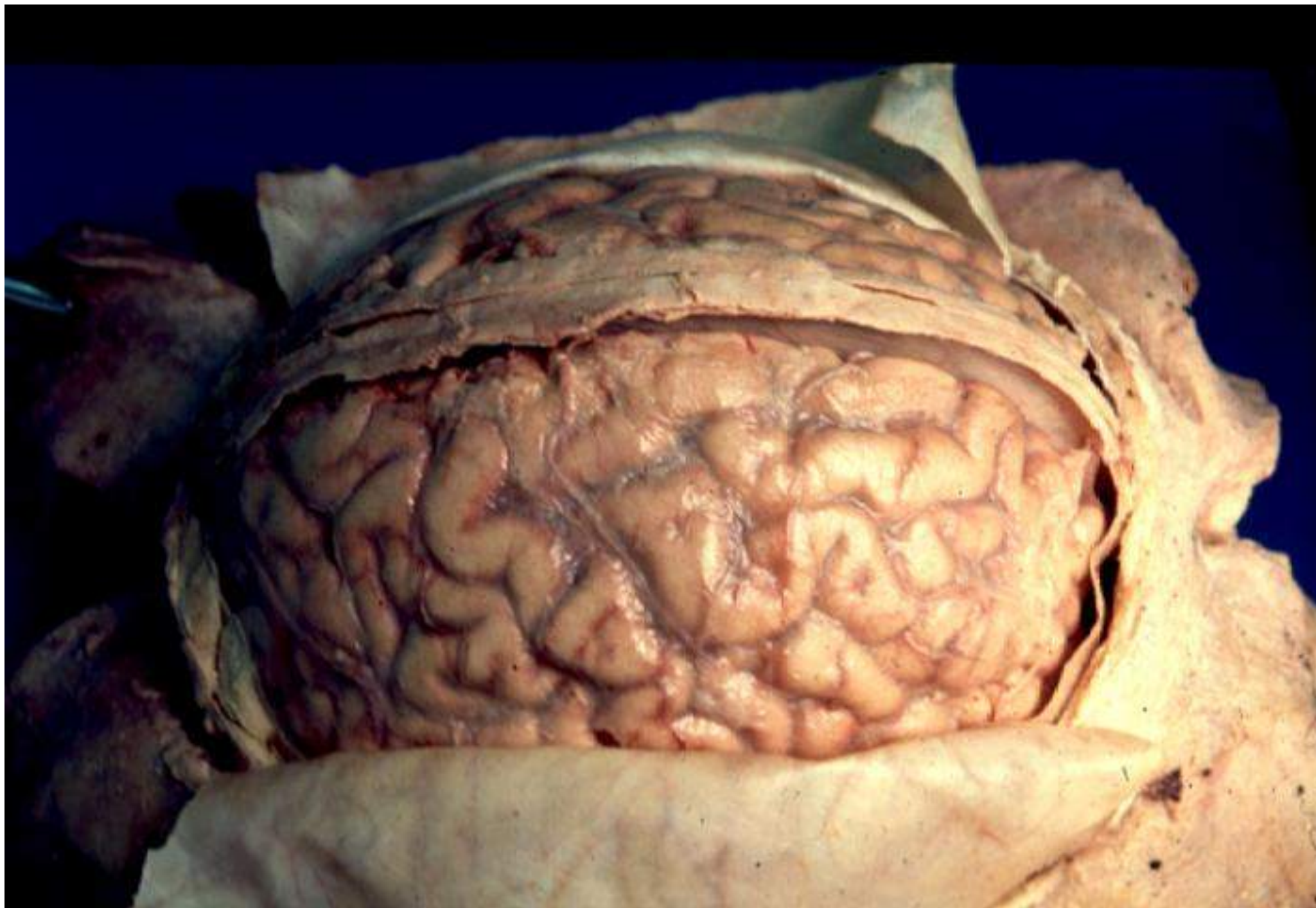
- Relax; posture that is comfortable and alert
- Simple good will toward yourself
- Awareness of your body
- Focus on something to steady your attention
- Accepting whatever passes through awareness
- Gently settling into peaceful well-being

7 Neural Factors of Mindfulness

- **Setting an intention** - “top-down” frontal, “bottom-up” limbic
- **Relaxing the body** - parasympathetic nervous system
- **Feeling cared about** - social engagement system
- **Feeling safer** - inhibits amygdala/ hippocampus alarms
- **Encouraging positive emotion** - dopamine, norepinephrine
- **Panoramic view** - lateral networks
- **Absorbing the benefits** - positive implicit memories



Using Your Mind to Change Your Brain



Mental States Become Neural Traits

- The nervous system represents, stores, operates upon, and communicates *information*. This is the “mind,” which is mainly outside awareness.
- How neural activity becomes conscious experience remains a mystery - but there is no doubt that mental and neural activity co-arise.
- As the mind changes, the brain changes - both temporarily and in lasting ways.

Fact #1

As your brain changes, your mind changes.



Ways That Brain Can Change Mind

■ For better:

- Caffeine: more alertness; ibuprofen: less pain
- SSRIs: more serotonin in synapses
- Thicker insula: more self-awareness, empathy
- More left prefrontal activation: more happiness

■ For worse:

- Injury; Phineas Gage
- Concussion, stroke, tumor, Alzheimer's
- Intoxication; imbalances in neurotransmitters
- Cortisol-based shrinkage of hippocampus: less capacity for contextual memory

Fact #2

As your mind changes, your brain changes.

Immaterial mental activity co-occurs with, correlates with material neural activity.

This produces temporary changes in your brain and lasting ones. *Temporary* changes include:

- Alterations in brainwaves (= changes in the firing patterns of synchronized neurons)
- Changing consumption of oxygen and glucose
- Ebbs and flows of neurochemicals

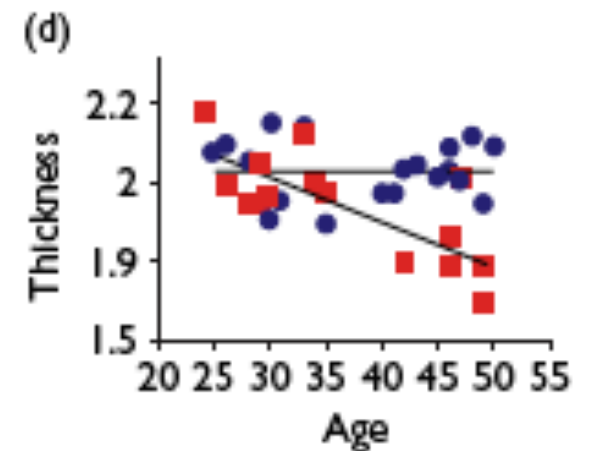
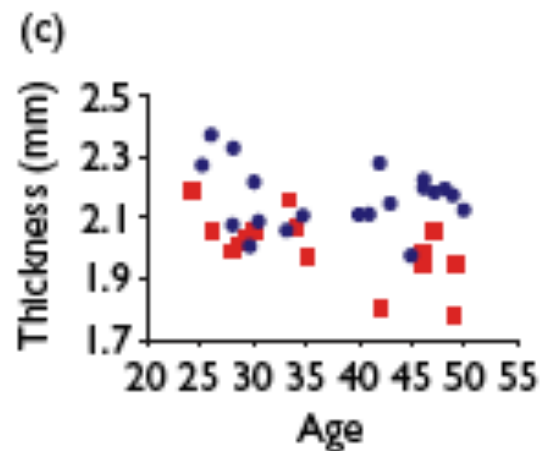
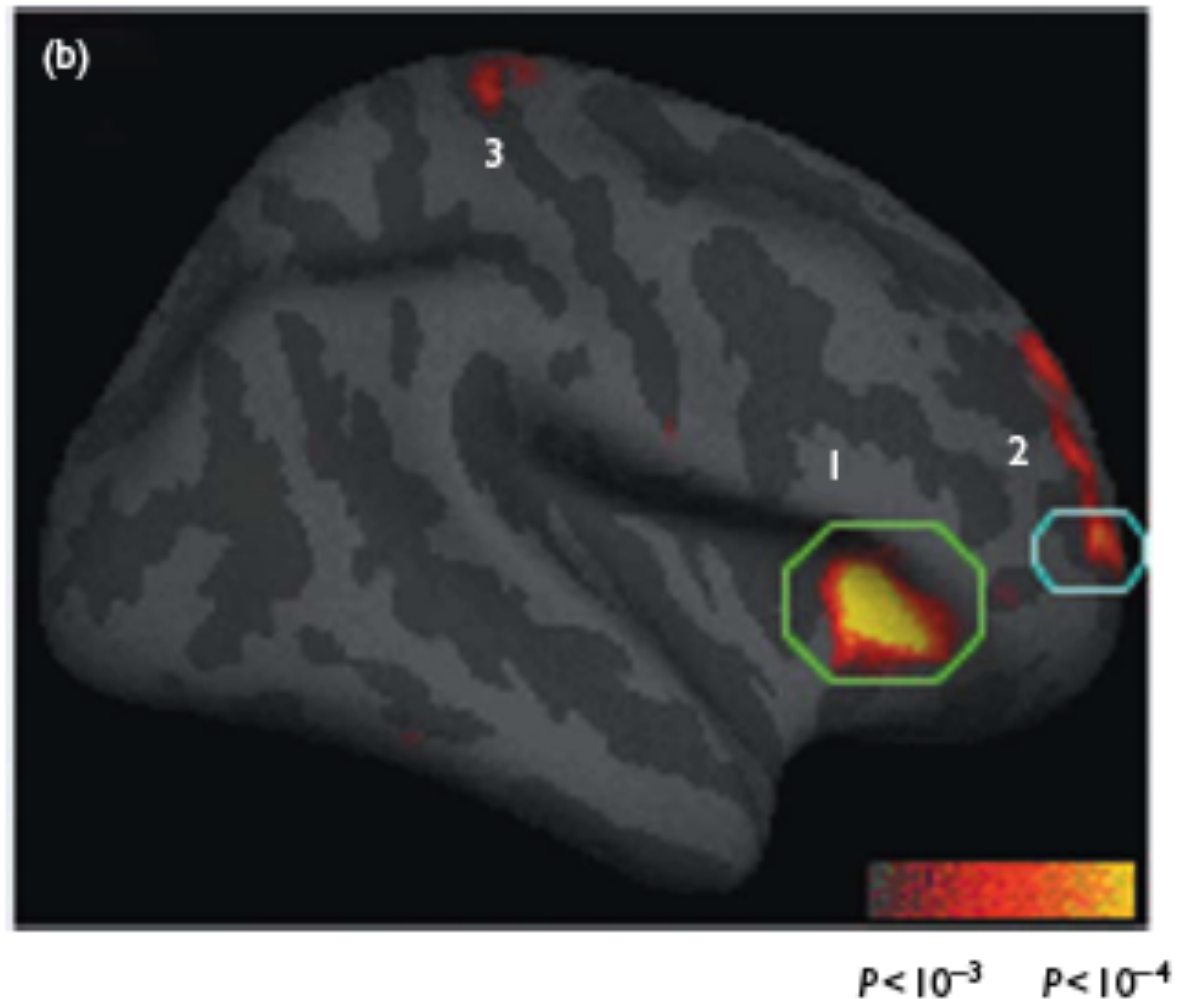
Tibetan Monk, Boundless Compassion



Mind Changes Brain in Lasting Ways

- What flows through the mind sculpts your brain.
Immaterial experience leaves material traces behind.
- Increased blood/nutrient flow to active regions
- Altered epigenetics (gene expression)
- “Neurons that fire together wire together.”
 - Increasing excitability of active neurons
 - Strengthening existing synapses
 - Building new synapses; thickening cortex
 - Neuronal “pruning” - “use it or lose it”

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



Meditation - Neural Benefits

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

Honoring Experience

Your experience *matters*.

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

Fact #3

You can use your mind
to change your brain
to change your mind for the better.

This is self-directed neuroplasticity.

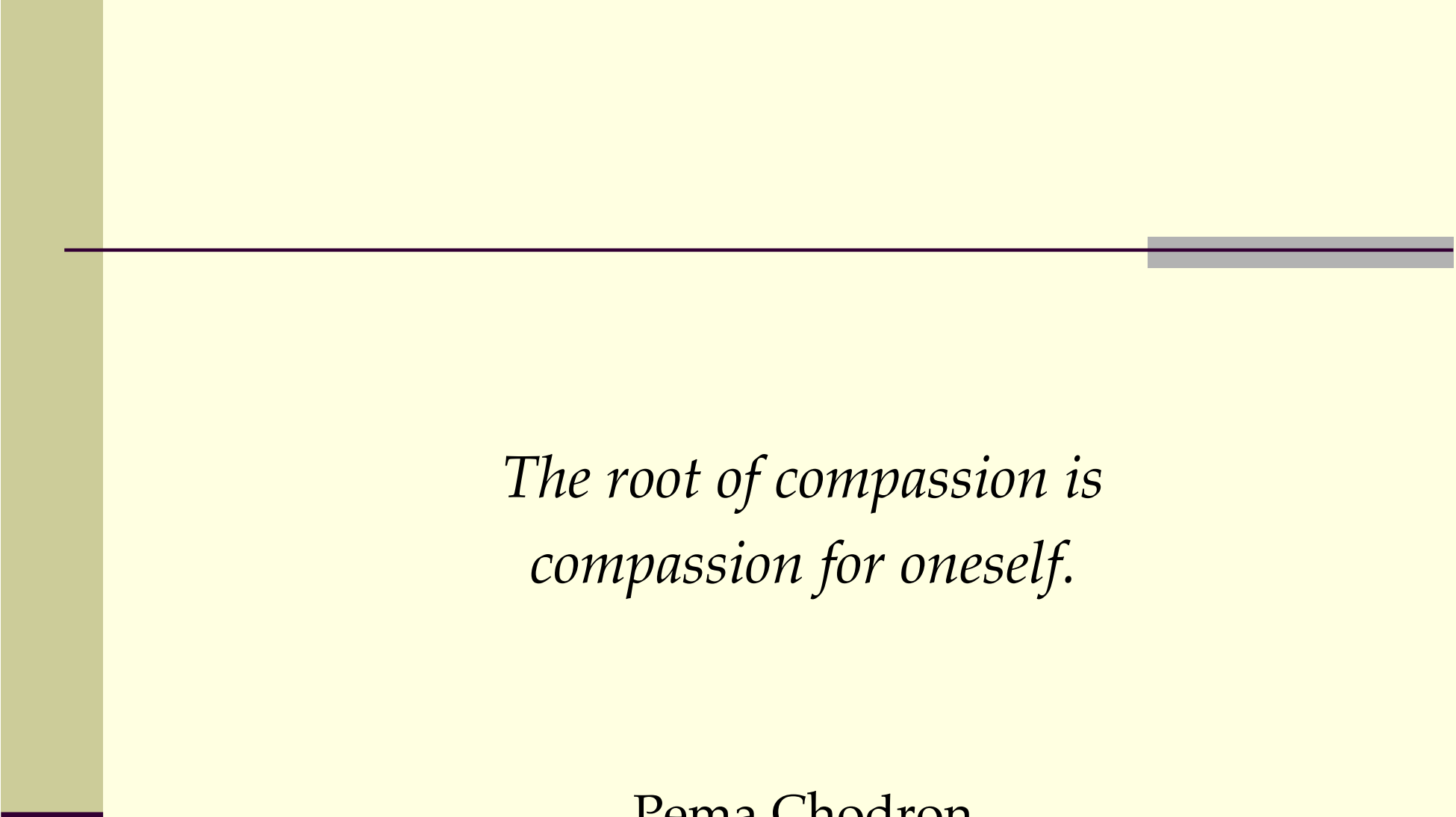
How to do this, in skillful ways?



Being on Your Own Side

*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



*The root of compassion is
compassion for oneself.*

Pema Chodron

Self-Compassion

- 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.”

“Anthem”

*Ring the bells that still can ring
Forget your perfect offering
There is a crack in everything
That's how the light gets in
That's how the light gets in*

Leonard Cohen



Inner Resources

Causes and Effects

Mental and physical phenomena arise, persist, and pass away due to causes.

The brain is shaped by the mental/neural states that are activated, installed, and reactivated within it.

Inner “poisons” (e.g., hatred, greed, heartache, delusion) cause suffering, harm, and negative cycles.

Inner resources (e.g., peace, happiness, love, wisdom) cause contentment, welfare, and positive cycles.

Inner Resources Include


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

Cultivating Inner Resources

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

Feeding the Hungry Heart

- Healthy development requires caregivers to give a child extensive mirroring, attunement, and prizing; healthy adult relationships require much the same.
- These are normal “narcissistic supplies.” Deficits lead to:
 - Feelings of inadequacy, worthlessness, and shame
 - Tendencies toward extremes of clinging or distance
- As an adult, you can take in narcissistic supplies, gradually weaving them into your brain and your being.
- This is not clinging to praise, etc. It is filling the hole in your heart so your happiness is increasingly unconditional - not dependent on external events.



Taking in the Good

How to Take in the Good (TG)

1. Have a good experience.
 - You are already having one.
 - You deliberately recognize a good fact and let it become a good experience.
2. Extend the good experience in:
 - Time - for 10-20-30+ seconds
 - Space - in your body and feelings
 - Intensity - help it become stronger
3. Absorb the good experience by intending and sensing that is becoming a part of you, woven into the fabric of your brain and being.

Components of a Good Experience

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

Types of Good Experiences

Avoiding Harms

- Feeling basically alright right now
- Feeling protected, strong, safe, at peace

Approaching Rewards

- Everyday sensual pleasures
- Satisfactions in accomplishing goals
- Feeling glad, grateful, contented, fulfilled
- Therapeutic, spiritual, or existential realizations

Attaching to Others

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

Obstructions to Taking in the Good

■ 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 a partner off the hook

Psychological Antidotes

Avoiding Harms

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

Approaching Rewards

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

Attaching to Others

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

Right Mindfulness and Right Effort

- The great bird of practice has two wings: *being with* and *working with* the mind.
 - *Working with* reduces negative and increases positive.
 - In sum: Let be, let go, let in.
- *Being with* is fundamental, but it's incomplete:
 - As a state, it is not peace, happiness, love, or wisdom.
 - As a factor, it needs virtue, wisdom, compassion, etc.
 - *Being with* and *working with* are synergistic; they can co-arise without interfering with each other.
- And often we need to *work with* the mind to build up inner resources for *being with* it - for mindfulness.

Cultivation Undoes Craving


- All life has goals. The brain continually seeks to avoid harms, approach rewards, and attach to others - even that of a Buddha.
- 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.



Steadying the Mind

The Power of Attention

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



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

William James

*Concentration is
the proximate cause of wisdom.*

*Without concentration, one cannot even secure
one's own welfare, much less the lofty goal of
providing for the welfare of others.*

Acariya Dhammapala

Penetrative insight

joined with calm abiding

utterly eradicates

afflicted states.

Shantideva

How the Brain Pays Attention

- Key functions:

- Holding onto information
- Updating awareness
- Seeking stimulation

- Key mechanisms:

- Dopamine and the gate to awareness
- The basal ganglia stimostat

Challenges to Mindfulness and Concentration

- We evolved continually scanning, shifting, wide focus attention in order to survive: “monkey mind.”
- This generic, hard-wired tendency varies in the normal range of temperament, extending from “turtles” to “jackrabbits.”
- Life experiences - in particular, painful or traumatic ones - can heighten scanning and distractibility.
- Modern culture - with its fire hose of information and routine multi-tasking - leads to stimulation-hunger and divided attention.

Individual Differences in Attention

	<u>Holding Information</u>	<u>Updating Awareness</u>	<u>Seeking Stimulation</u>
High	Obsession Over-focusing	Porous filters Distractible Overload	Hyperactive Thrill-seeking
Mod	Concentrates Divides attention	Flexible Assimilation Accommodation	Enthusiastic Adaptive
Low	Fatigues w/Conc. Small WM	Fixed views Oblivious Low learning	Stuck in a rut Apathetic Lethargic

Inner Resources for Mindfulness

- Mindfulness arises and persists due to factors *installed* in implicit memory. It is the result of deliberate efforts; these are not in principle at odds with it.
- This installation could be enhanced by taking in experiences of mindfulness factors such as:
 - Intention
 - Relaxation, reducing vigilance
 - Self-compassion; self-acceptance; distress tolerance
 - The sense of stable mindfulness itself
- TG receptively *absorbs* mental states, not changing them.
- TG of mindfulness factors and benefits (e.g., equanimity) could also occur outside of practices of open awareness.



Being and Doing

Dual Modes

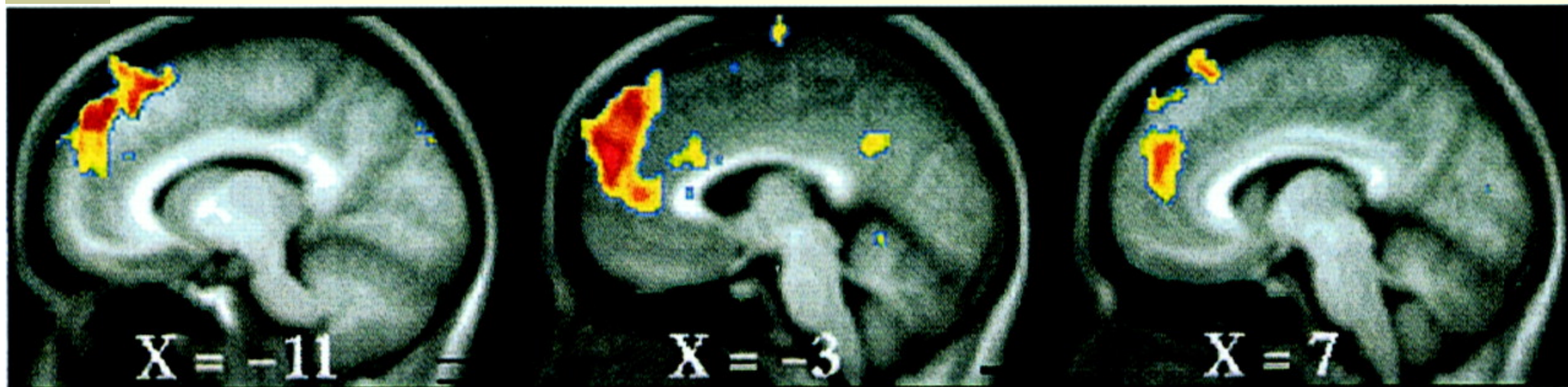
“Doing”

Mainly representational
Much verbal activity
Abstract
Future- or past-focused
Goal-directed
Sense of craving
Personal, self-oriented perspective
Focal view
Firm beliefs
Evaluative
Lost in thought, mind wandering
Reverberation and recursion
Tightly connected experiences
Prominent self-as-object
Prominent self-as-subject

“Being”

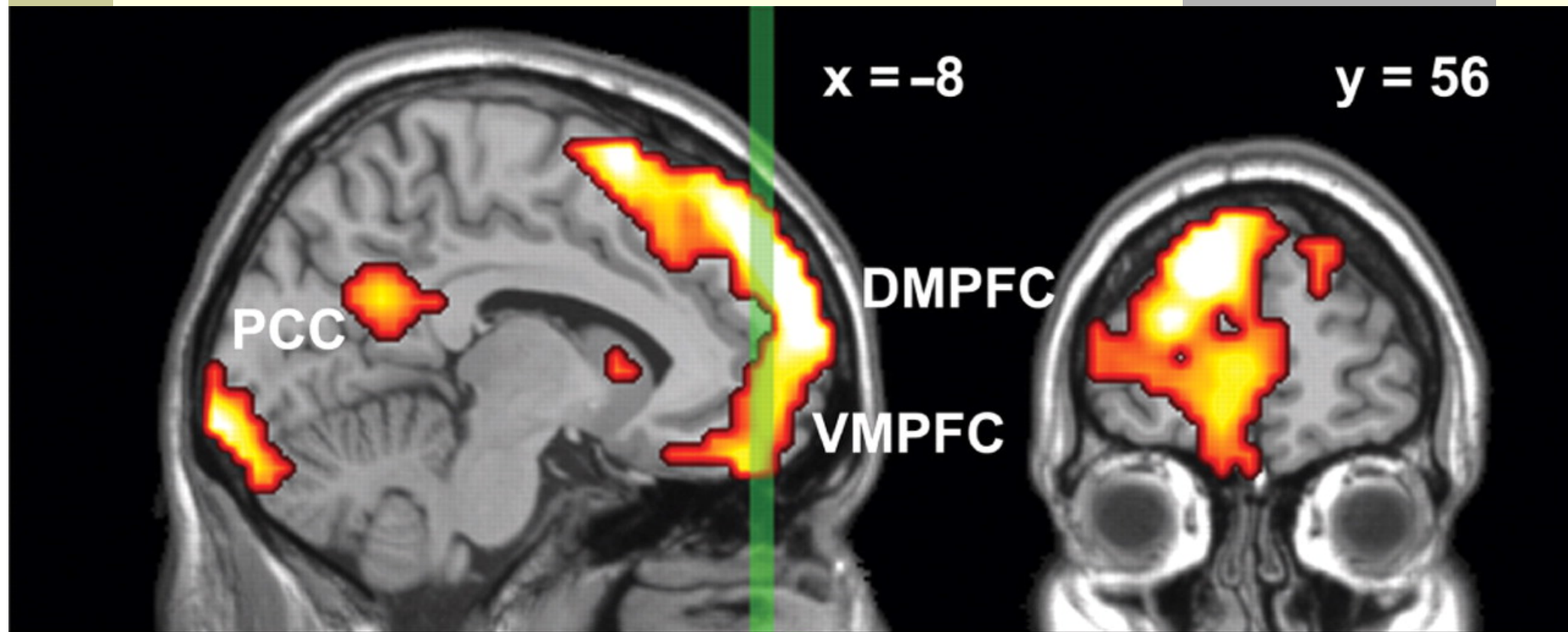
Mainly sensory
Little verbal activity
Concrete
Now-focused
Nothing to do, nowhere to go
Sense of peace
Impersonal, 3rd person perspective
Panoramic view
Uncertainty, not-knowing
Nonjudgmental
Mindful presence
Immediate and transient
Loosely connected experiences
Minimal or no self-as-object
Minimal or no self-as-subject

Increased Medial PFC Activation Related to Self-Referencing Thought



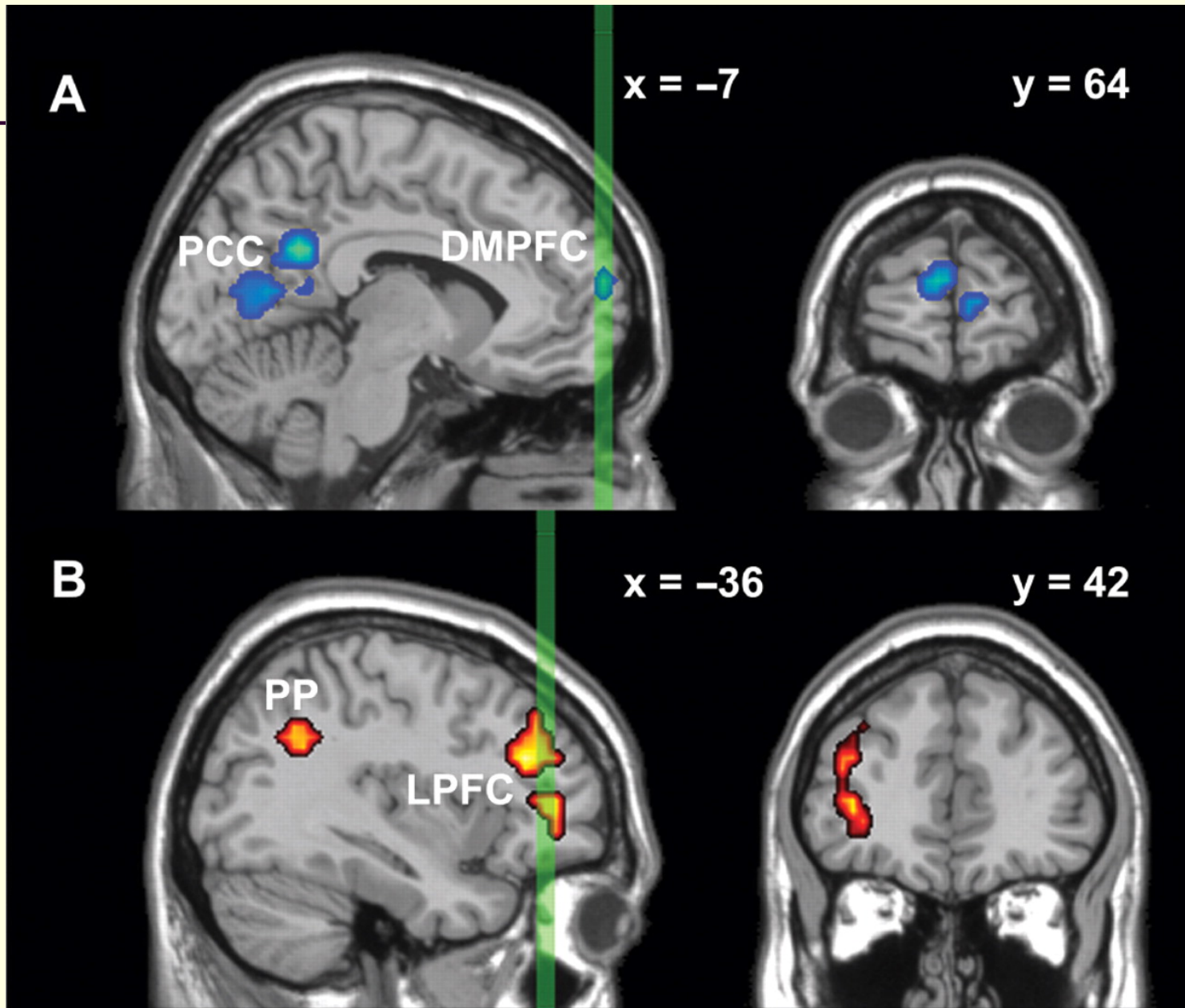
Gusnard D. A., et.al. 2001. *PNAS*, 98:4259-4264

Cortical Midline Areas for Self-Referencing Thought

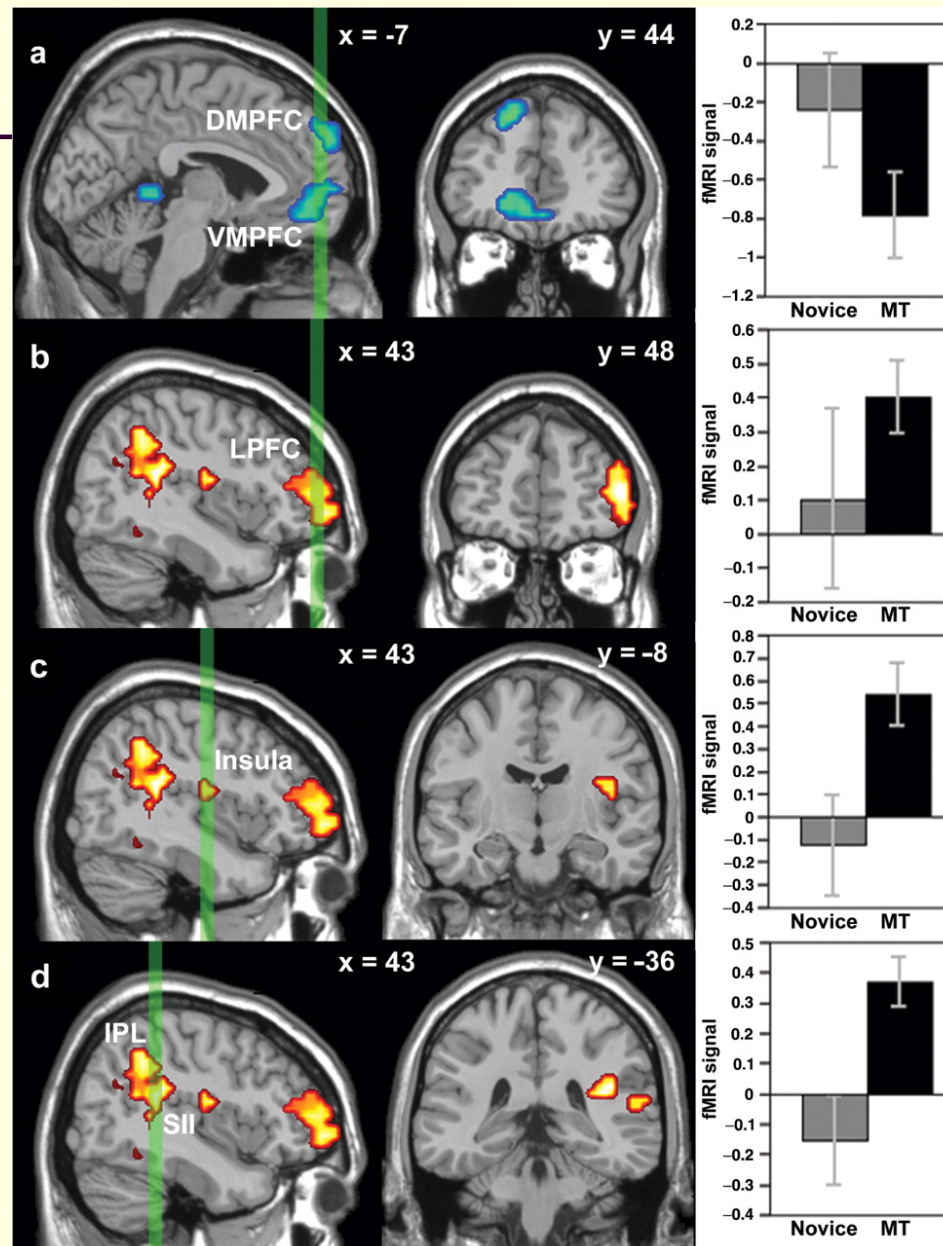


Farb, et al. 2007. *Social Cognitive Affective Neuroscience*, 2:313-322

Self-Focused (blue) and Open Awareness (red) Conditions (in the novice, pre MT group)



Self-Focused (blue) vs Open Awareness (red) Conditions (following 8 weeks of MT)



Dual Modes

“Doing”

Mainly representational
Much verbal activity
Abstract
Future- or past-focused
Goal-directed
Sense of craving
Personal, self-oriented perspective
Focal view
Firm beliefs
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Lost in thought, mind wandering
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Ways to Activate “Being” Mode

- Relax
- Focus on bare sensations and perceptions
- Sense the body as a whole
- Take a panoramic, “bird’s-eye” view
- Engage “don’t-know mind”; release judgments
- Don’t try to connect mental contents together
- Let experience flow, staying here now
- Relax the sense of “I, me, and mine”

How to Take in the Good (TG)

1. Have a good experience.
 - You are already having one.
 - You deliberately recognize a good fact and let it become a good experience.
2. Extend the good experience in:
 - Time - for 10-20-30+ seconds
 - Space - in your body and feelings
 - Intensity - help it become stronger
3. Absorb the good experience by intending and sensing that is becoming a part of you, woven into the fabric of your brain and being.

Whole Body Awareness

- Sense the breath in one area (e.g., chest, upper lip)
- Sense the breath as a whole: one gestalt, percept
- Sense the body as a whole, a whole body breathing
- Sense experience as a whole: sensations, sounds, thoughts . . . all arising together as one unified thing
- It's natural for this sense of the whole to be present for a second or two, then crumble; just open up to it again and again.

Panoramic Awareness

- Recall a bird's-eye view (e.g., mountain, airplane)
- Be aware of sounds coming and going in an open space of awareness, without any edges: boundless
- Open to other contents of mind, coming and going like clouds moving across the sky.
- Pleasant or unpleasant, no matter: just more clouds
- No cloud ever harms or taints the sky.

“Bahiya, you should train yourself thus.”

In reference to the seen, there will be only the seen. To the heard, only the heard. To the sensed, only the sensed. To the cognized, only the cognized.

When for you there will be only the seen in the seen, only the heard in the heard, only the sensed in the sensed, only the cognized in the cognized, then, Bahiya, there's no you in that.

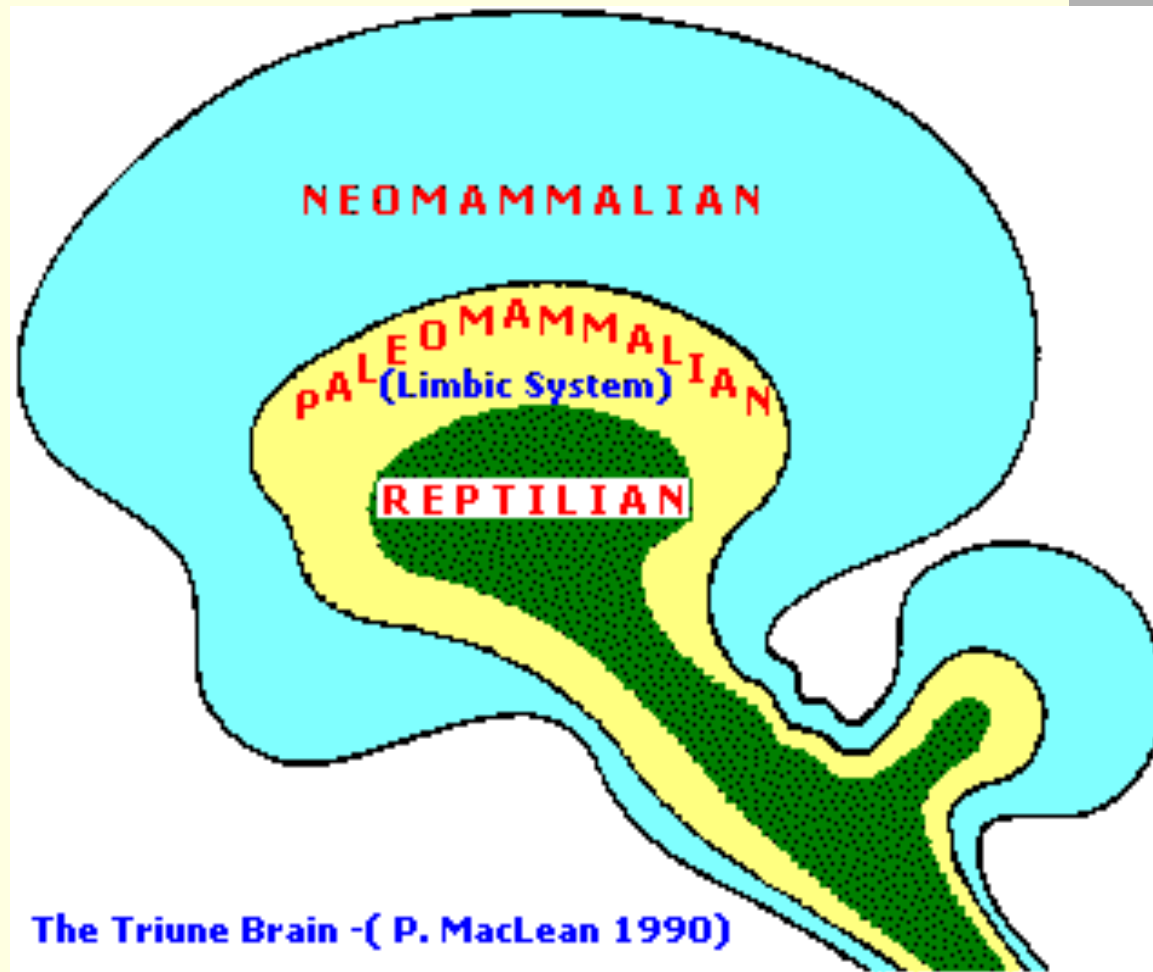
When there's no you in that, there's no you there. When there's no you there, you are neither here nor yonder nor between the two.

This, just this, is the end of all suffering.



The Responsive Mode

Evolutionary History



The Triune Brain

Three Motivational Systems

■ Avoid Harms:

- Primary need, tends to trump all others
- Functional in first animals

■ Approach Rewards:

- Functional in first animals
- Elaborated in mammals via sympathetic arousal, limbic/emotional valence, sustained pursuit, etc.

■ Attach to Others:

- Functional in mammals and birds
- Very elaborated in humans via pair bonding, language, empathy, cooperative planning, altruism, etc.

The Homeostatic Home Base

When not disturbed by threat, loss, or rejection:

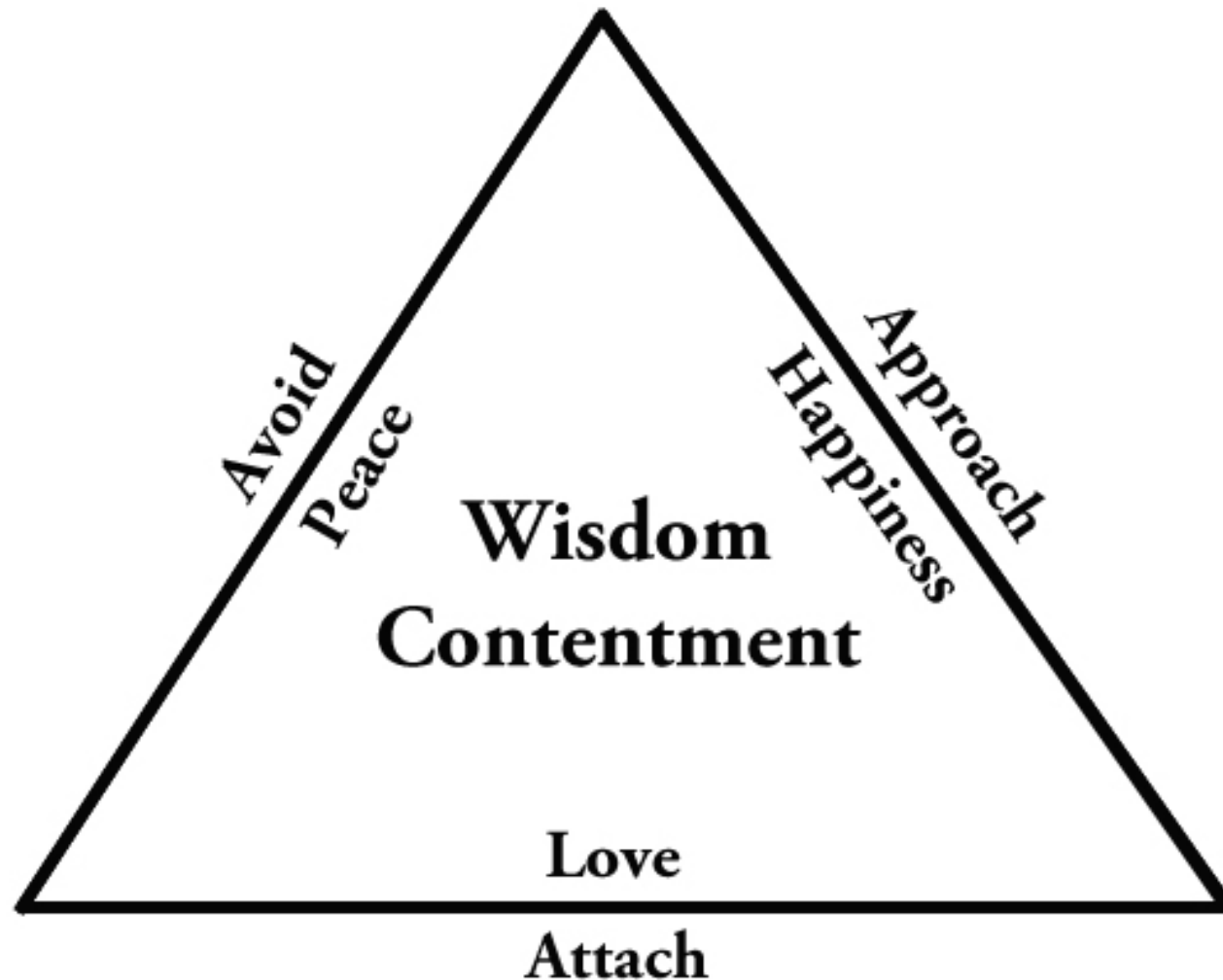
The body defaults to a sustainable equilibrium of refueling, repairing, and pleasant abiding.

The mind defaults to a sustainable equilibrium of:

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

This is the brain in its homeostatic ***Responsive*** mode.

The Responsive Mode



Behind the Obscurations

Sam sees *“peeping among the cloud-wrack . . . a white star
twinkle for a while.*

*The beauty of it smote his heart, as he looked up out of the
forsaken land, and hope returned to him.*

*For like a shaft, clear and cold, the thought pierced him that
in the end the Shadow was only a small and passing thing:
there was light and high beauty forever beyond its reach.”*

Tolkein, *The Lord of the Rings*



© Kalyan Varma

Key Benefits of Responsive Mode

- Fueling for Reactive mobilizations; recovery after
- Positive emotions, cognitions, and behaviors
- Positive cycles
- Promotes virtue and benevolence

*The good life, as I conceive it, is a happy life.
I do not mean that if you are good you will be happy;
I mean that if you are happy you will be good.*

Bertrand Russell



The Reactive Mode

Fired up for Survival

When disturbed by threat, loss, or rejection:

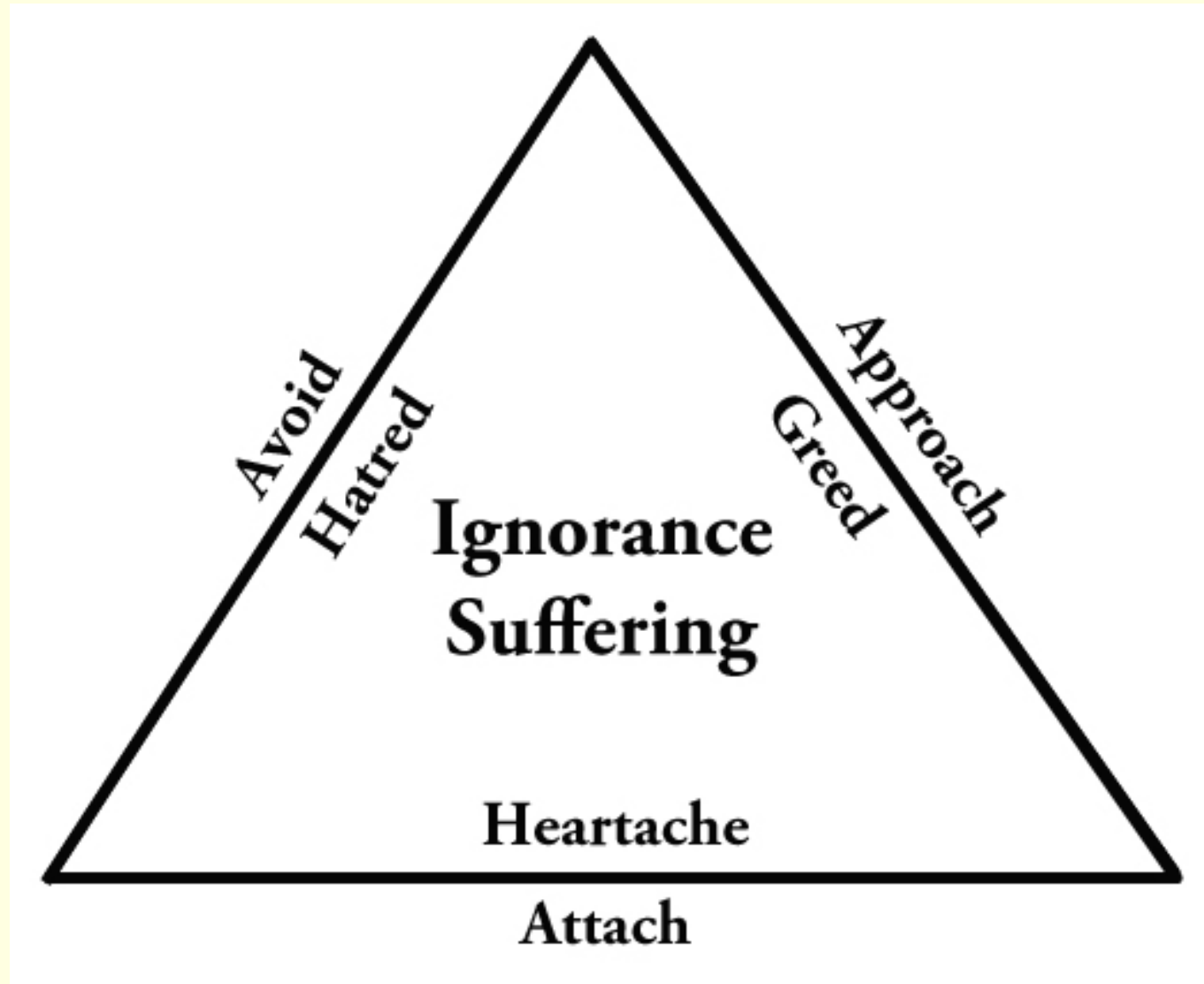
The body fires up into the stress response; resources are expended for immediate needs while long-term building is deferred; outputs exceed inputs; unsustainable.

The mind fires up into:

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

This is the brain in its allostatic ***Reactive*** mode.

The Reactive Mode



Evolution of the Negativity Bias

- **Harms** (“sticks”) - Predators, natural hazards, social aggression, pain (physical and psychological)
- **Rewards** (“carrots”) - Food, sex, shelter, social support, pleasure (physical and psychological)
- Avoiding “sticks” usually affects passing on genes more than approaching “carrots.”
 - Urgency - Usually, sticks must be avoided immediately while carrots allow a longer approach.
 - Impact - Often, the presence of a stick ends life while the absence of a carrot does not; if you fail to get a carrot today, you’ll likely have another chance tomorrow, but if you fail to avoid a stick today - whap! - no more carrots forever.

Negativity Bias: Some Consequences

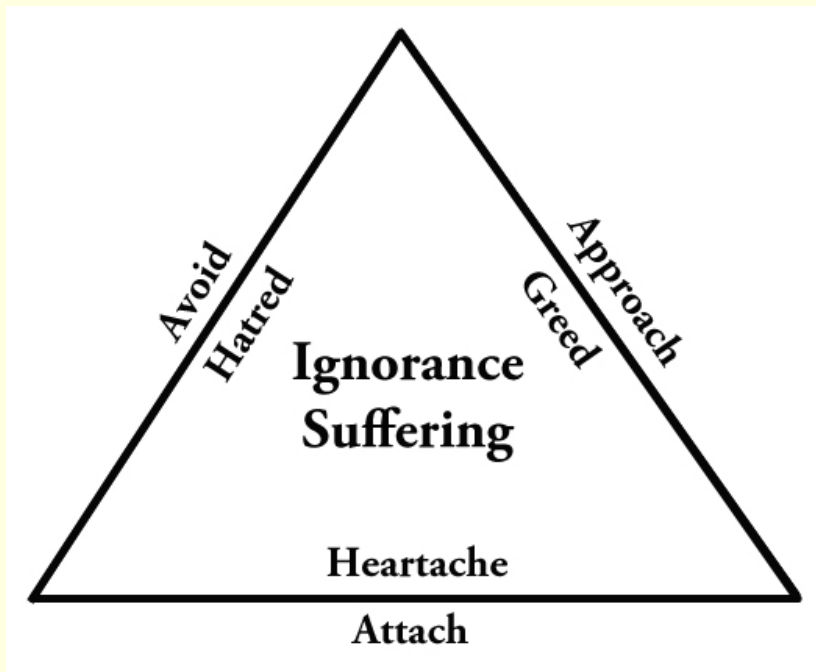
- Negative stimuli get more attention and processing.
- Easy to create learned helplessness, hard to undo
- Negative interactions: more powerful than positive
- Negative experiences are internalized more efficiently into implicit memory than positive ones.
 - Like Velcro for the negative but Teflon for the positive
 - In life, therapy, meditation, and trainings, activated positive mental states routinely wash through the brain like water through a sieve without getting installed.

A Major Result of the Negativity Bias: Threat Reactivity

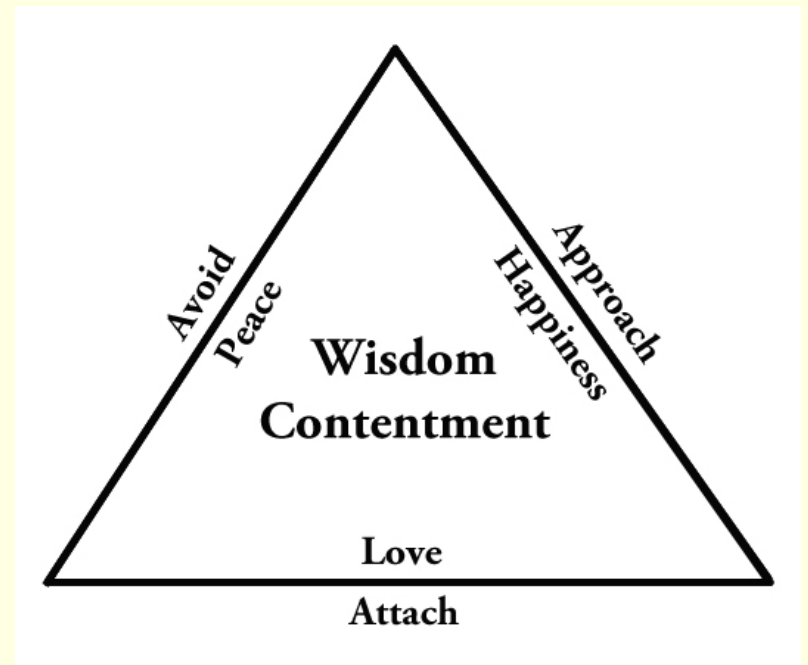
- Two mistakes:
 - Thinking there is a tiger in the bushes when there isn't one.
 - Thinking there is no tiger in the bushes when there is one.
- We evolved to make the first mistake a hundred times to avoid making the second mistake even once.
- This evolutionary tendency is intensified by temperament, personal history, culture, and politics.
- Threat reactivity affects individuals, couples, families, organizations, nations, and the world as a whole.

Choices . . .


Or?



Reactive Mode



Responsive Mode



*We can deliberately use the mind
to change the brain for the better.*



Taking the Fruit as the Path

Coming Home . . .

Peace

Happiness

Love



Know the mind.

Shape the mind.

Free the mind.

Great Books

See www.RickHanson.net for other great books.

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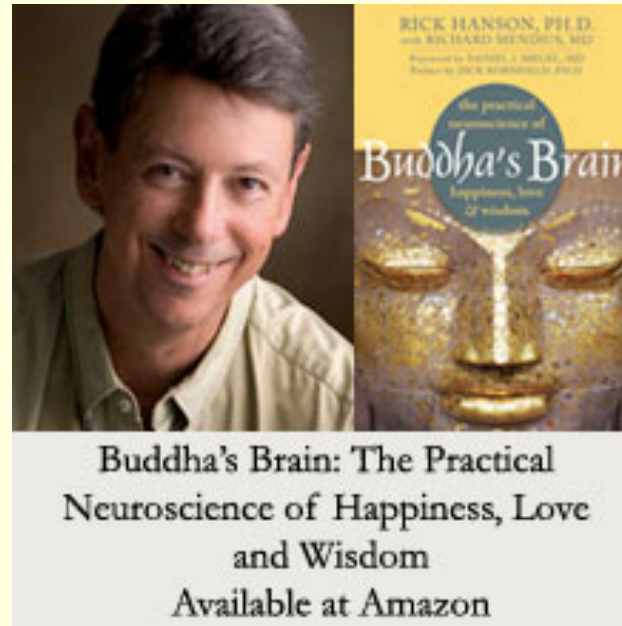
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