

# ***Paper Tiger Paranoia***

Spirit Rock  
July 17, 2011

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The Wellspring Institute for Neuroscience and Contemplative Wisdom

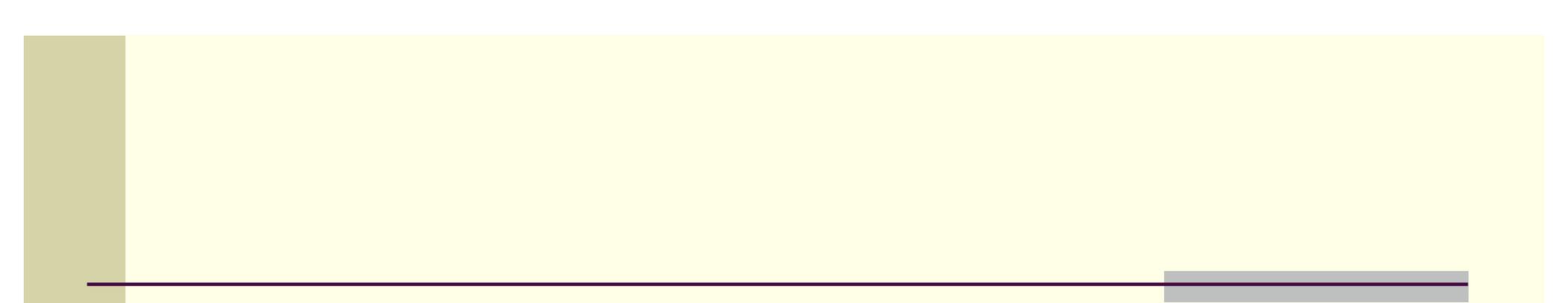
[www.WiseBrain.org](http://www.WiseBrain.org)      [www.RickHanson.net](http://www.RickHanson.net)

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# Topics

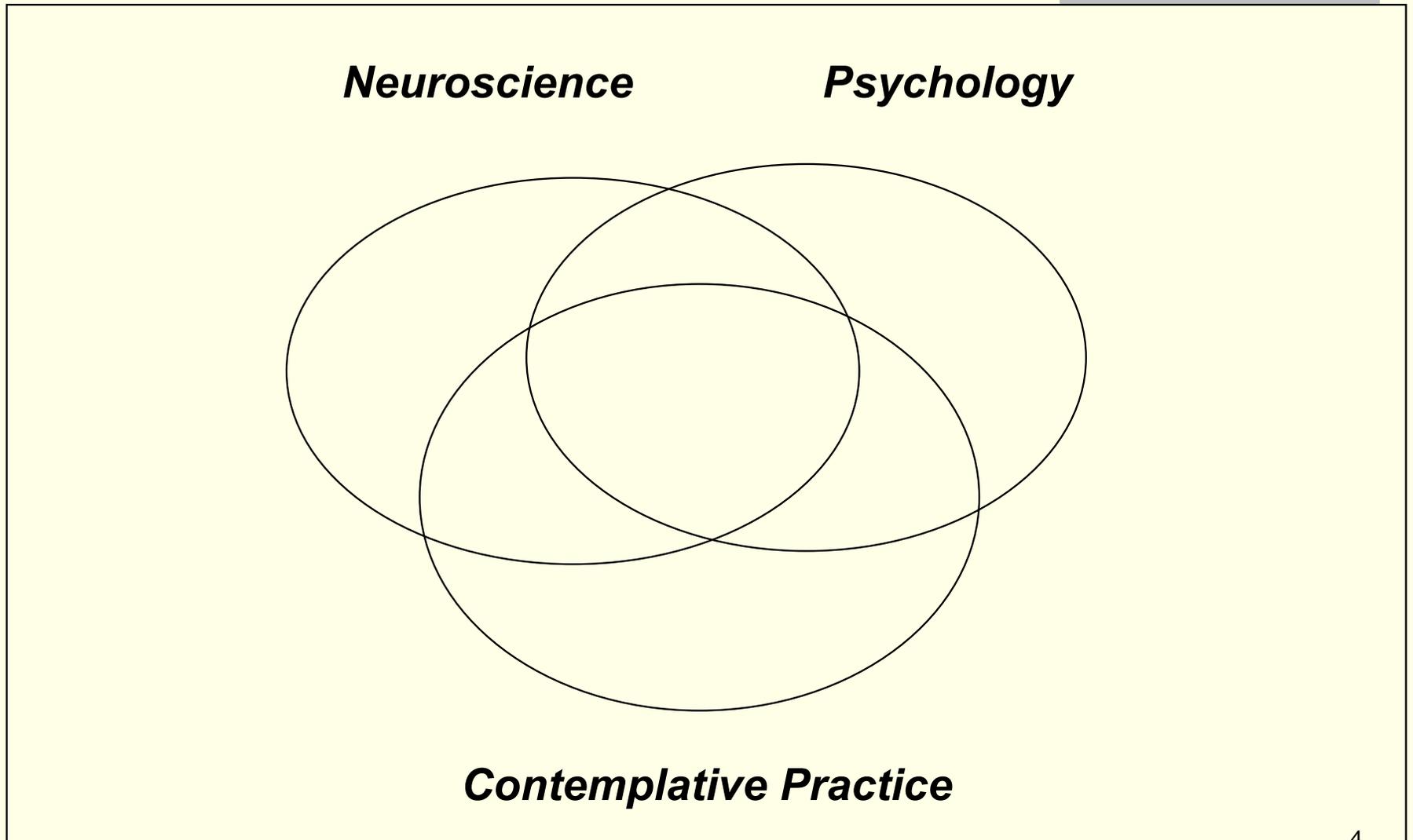
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- **Perspectives**
- **Self-directed neuroplasticity**
- **The evolution of fear**
- **Threat reactivity**
- **Taking in the good**
- **Internalizing safety**
- **Neural networks of inner peace**



# Perspectives

# Common - and Fertile - Ground



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*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

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

*What do you do?*

John Maynard Keynes

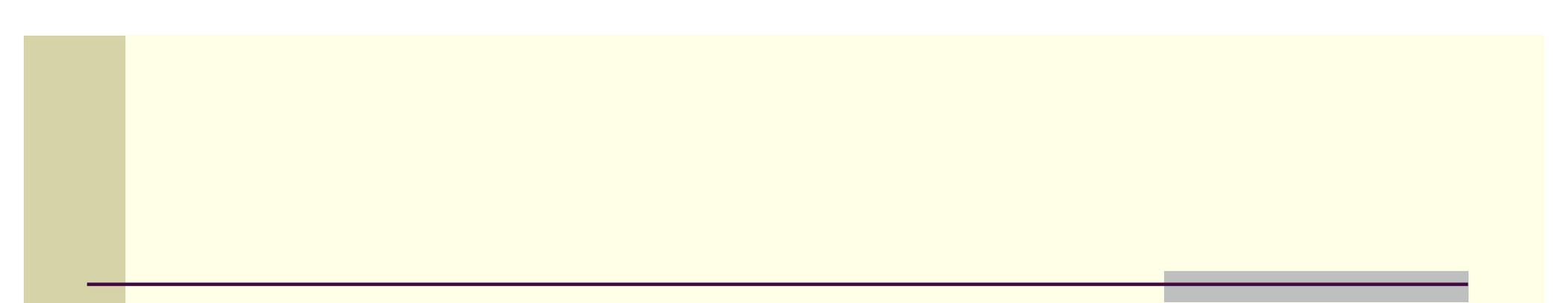
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*We ask, "What is a thought?"*

*We don't know,*

*yet we are thinking continually.*

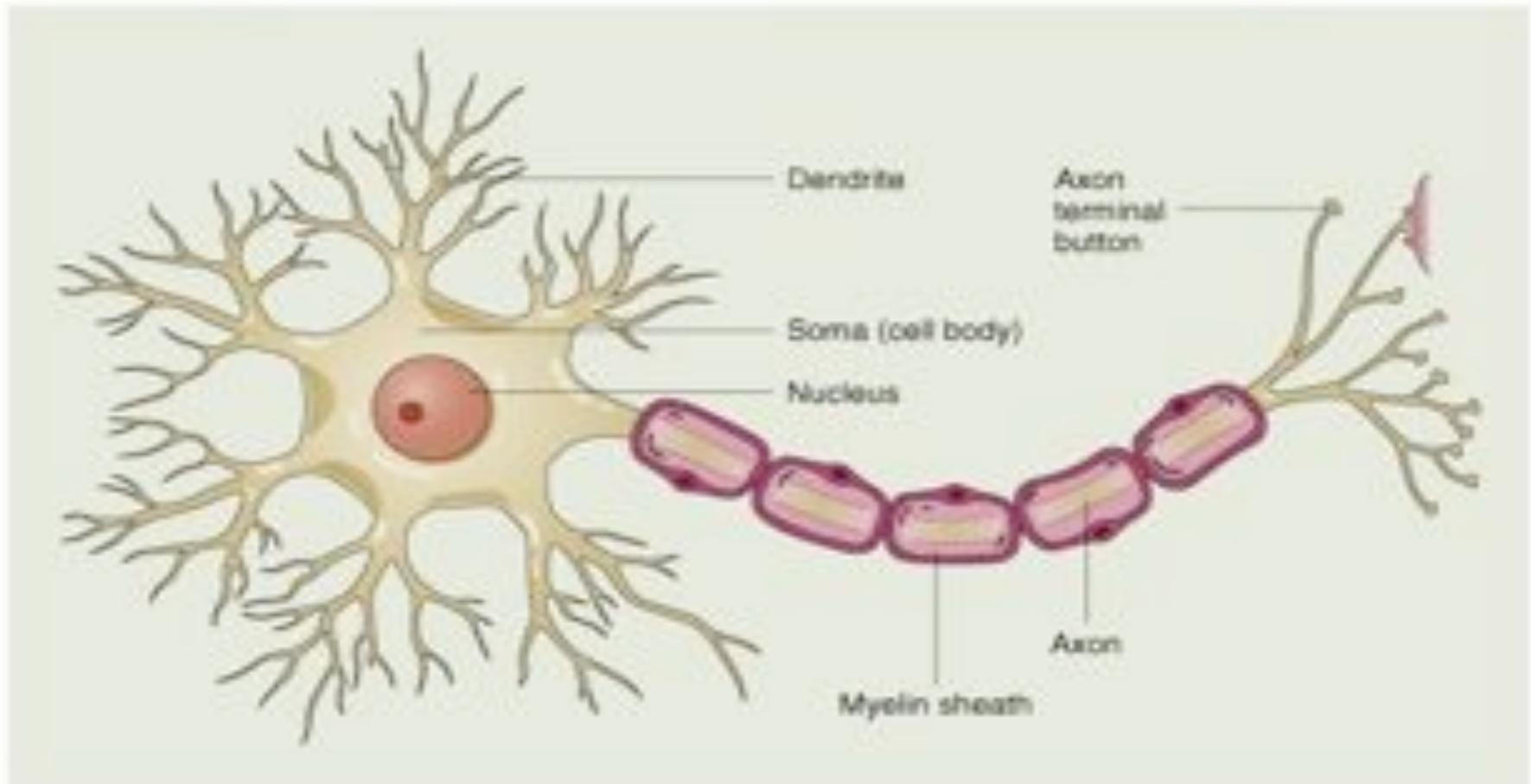
Venerable Tenzin Palmo



# **Self-Directed Neuroplasticity**



# A Neuron



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# The Mind/Brain System

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- “Mind” = flow of information within the nervous system:
  - Information is represented by the nervous system.
  - Most mind is unconscious; awareness is an aspect of mind.
  - The headquarters of the nervous system is the brain.
- In essence then, apart from hypothetical transcendental factors, the mind *is* what the brain *does*.
- Brain = necessary, *proximally* sufficient condition for mind:
  - The brain depends on the nervous system, other bodily systems, nature, and culture.
  - As we’ll see, the brain also depends on the mind.
- Therefore, the brain and mind are two aspects of one system, interdependently arising.

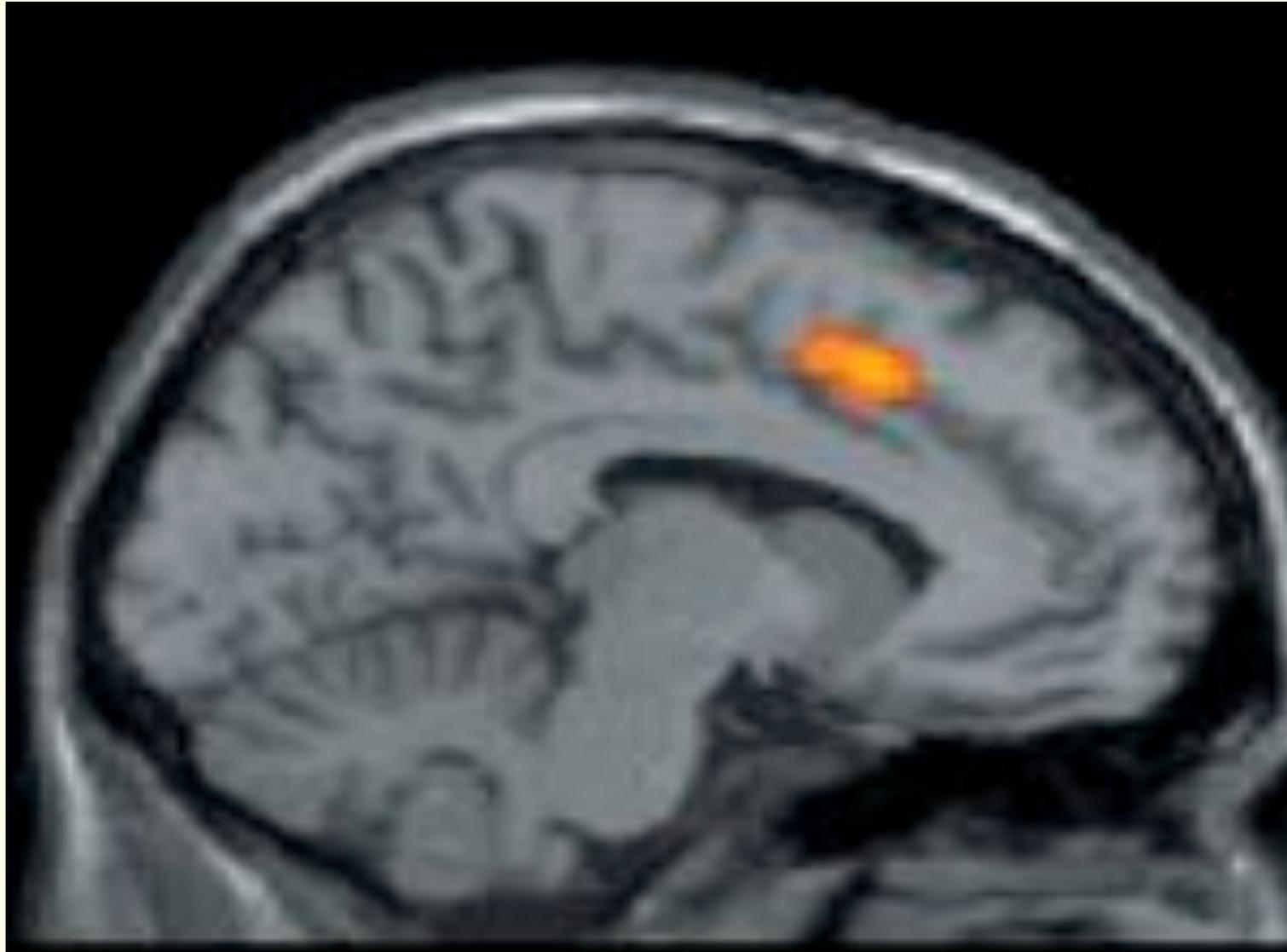
# Three Facts about Brain and Mind

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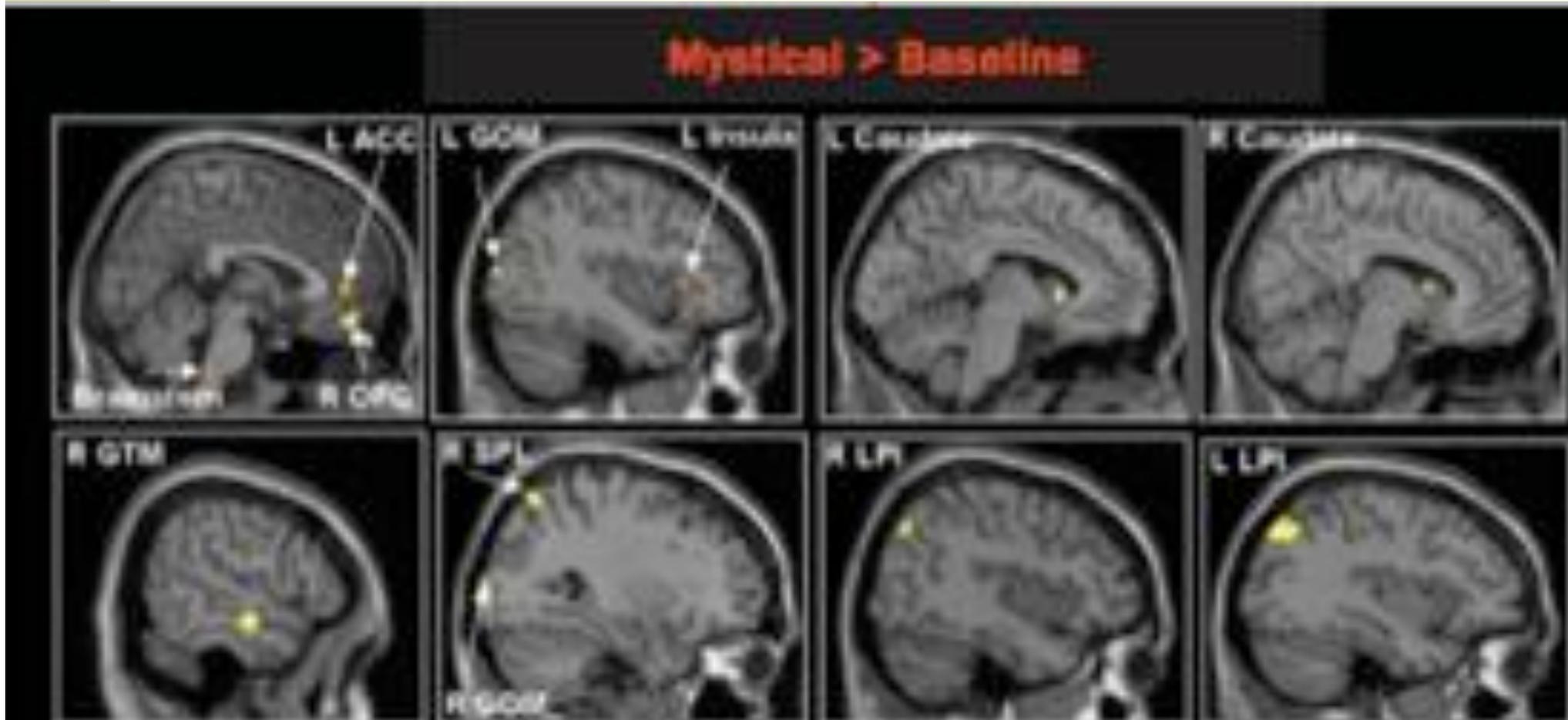
- As the brain changes, the mind changes.
- As the mind changes, the brain changes.
  - Transient: brainwaves, local activation
  - Lasting: epigenetics, neural pruning, “neurons that fire together, wire together”
- One can use the mind to change the brain to change the mind for the better: self-directed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

# Tibetan Monk, Boundless Compassion

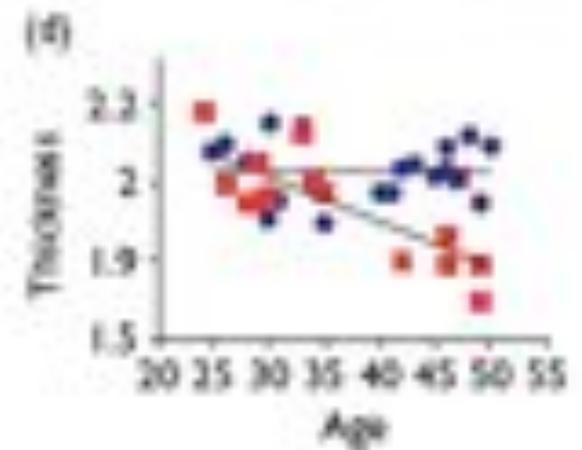
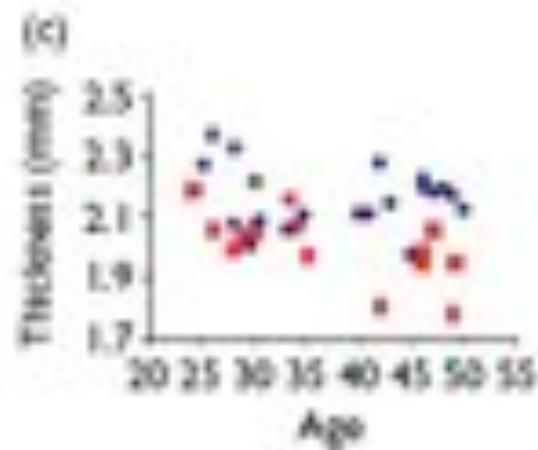
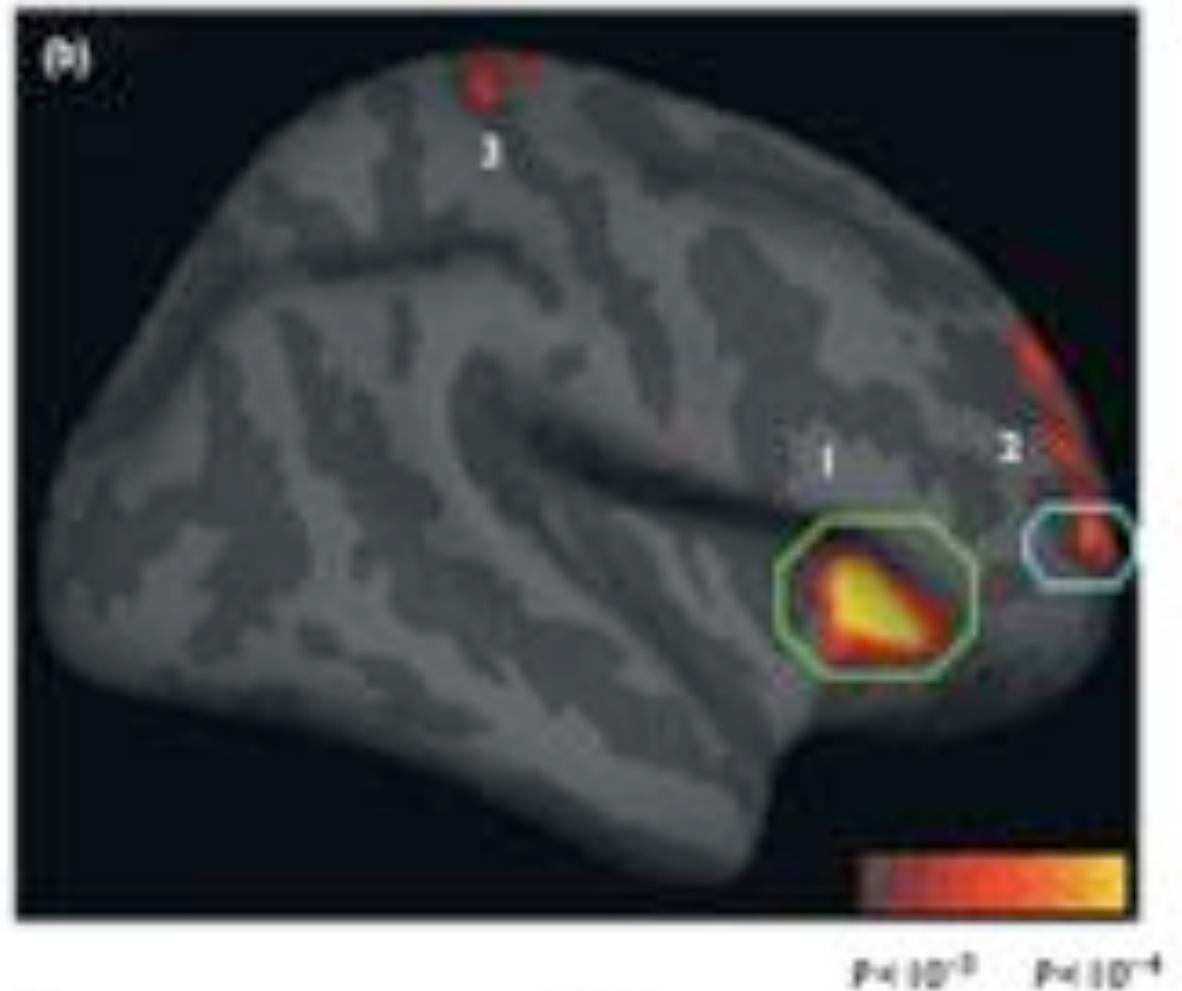
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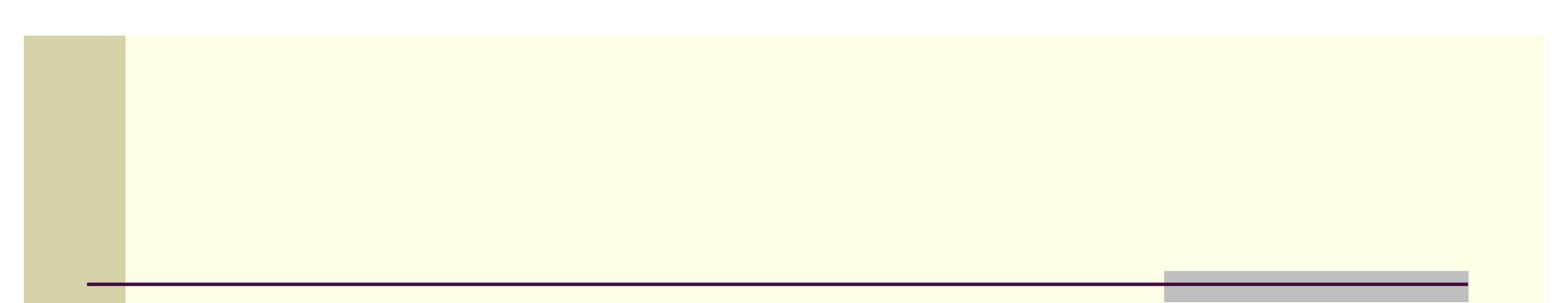


# Christian Nuns, Recalling a Profound Spiritual Experience



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





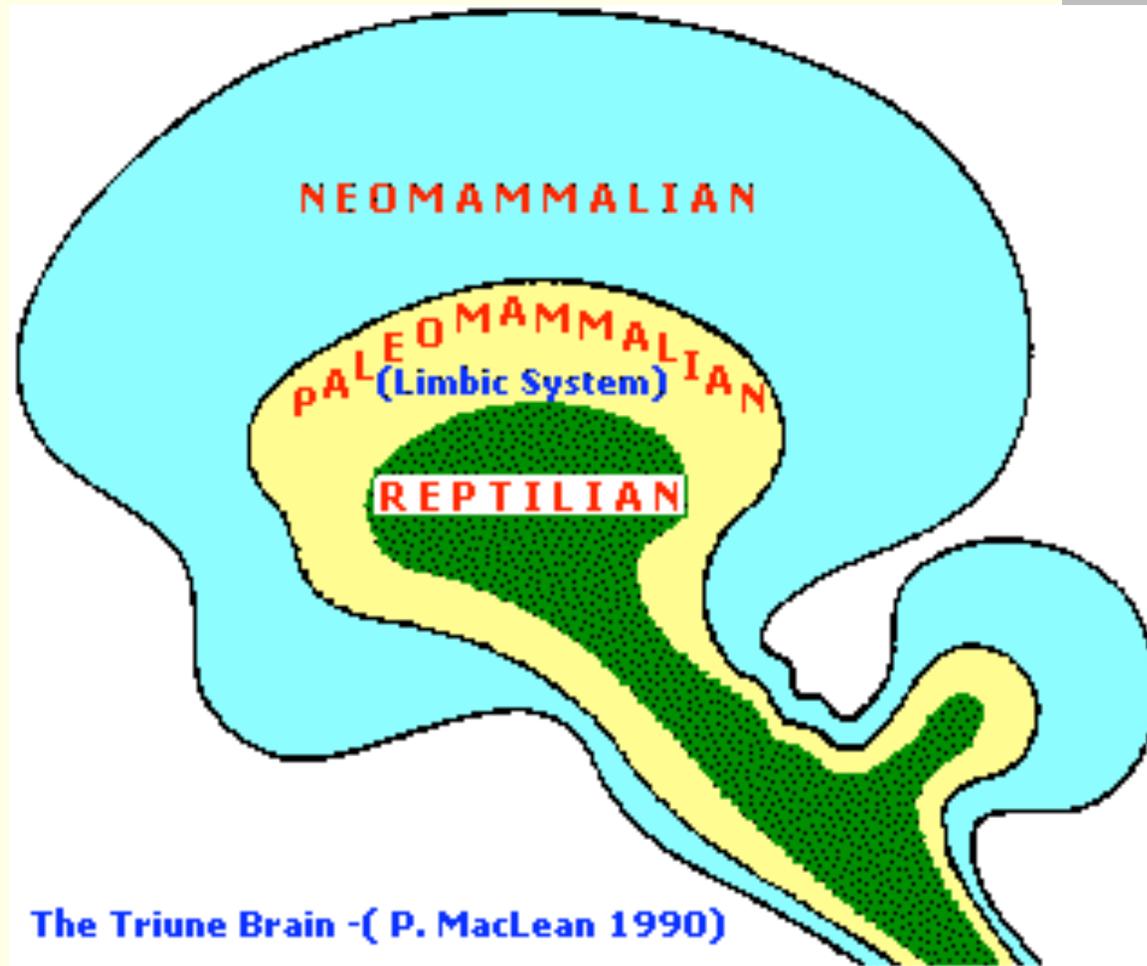
# **The Evolution of Fear**

# Evolution

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- ~ 4+ billion years of earth
- 3.5 billion years of life
- 650 million years of multi-celled organisms
- 600 million years of nervous system
- ~ 200 million years of mammals
- ~ 60 million years of primates
- ~ 6 million years ago: last common ancestor with chimpanzees, our closest relative among the “great apes” (gorillas, orangutans, chimpanzees, bonobos, humans)
- 2.5 million years of tool-making (starting with brains 1/3 our size)
- ~ 150,000 years of *homo sapiens*
- ~ 50,000 years of modern humans
- ~ 5000 years of blue, green, hazel eyes

# Evolutionary History



## The Triune Brain

# Three Stages of Brain Evolution

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## ■ Reptilian:

- Brainstem, cerebellum, hypothalamus
- Reactive and reflexive
- **Avoid** hazards

## ■ Mammalian:

- Limbic system, cingulate, early cortex
- Memory, emotion, social behavior
- **Approach** rewards

## ■ Human:

- Massive cerebral cortex
- Abstract thought, language, cooperative planning, empathy
- **Attach** to “us”

# Negativity Bias: Causes in Evolution

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- “Sticks” - Predators, natural hazards, social aggression, pain (physical and psychological)
- “Carrots” - Food, sex, shelter, social support, pleasure (physical and psychological)
- During evolution, avoiding “sticks” usually had more influence over survival than approaching “carrots.”
  - Urgency - Usually, sticks must be dealt with immediately, while carrots allow a longer approach.
  - Impact - Sticks usually determine mortality, carrots not; if you fail to get a carrot today, you’ll likely have a chance at a carrot tomorrow; but if you fail to avoid a stick today - whap!<sup>20</sup>  
- no more carrots forever.



**With the negativity bias, the Avoid system hijacks the Approach and Attach systems, inhibiting them or using them for its ends.**

# Negativity Bias: Physiology and Neuropsychology

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- Physiology:
  - Greater bodily arousal to negative stimuli
  - Pain is produced anywhere; pleasure is circumscribed.
- Neuropsychology:
  - Separate, low-level systems for negative and positive stimuli
  - Right hemisphere specialized for negative stimuli
  - Greater brainwave responses to negative stimuli
  - ~ 65% of amygdala sifts for negative stimuli
  - The amygdala-hippocampus system flags negative experiences prominently in memory: *like Velcro for negative experiences but Teflon for positive ones.*
  - More negative “basic” emotions than positive ones

# Negativity Bias: Some Consequences

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- Negative stimuli get more attention and processing.
- We generally learn faster from pain than pleasure.
- People work harder to avoid a loss than attain an equal gain (“endowment effect”)
- Easy to create learned helplessness, hard to undo
- Negative interactions: more powerful than positive
- Negative experiences sift into implicit memory.

# Negative Experiences Are Stressful

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- Sympathetic nervous system (SNS) and hypothalamic-pituitary-adrenal axis (HPAA)
- Surges of cortisol, norepinephrine, other hormones
- Fight, flight, or freezing behaviors
- Abandoning long-term needs for a short-term crisis

# Health Consequences of Chronic Stress

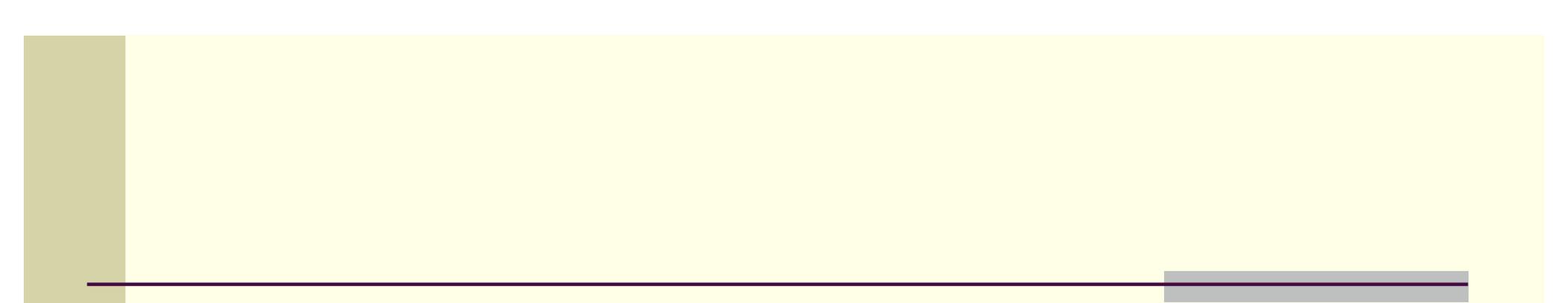
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## ■ Physical:

- Weakened immune system
- Inhibits GI system; reduced nutrient absorption
- Reduced, dysregulated reproductive hormones
- Increased vulnerabilities in cardiovascular system
- Disturbed nervous system

## ■ Mental:

- Lowers mood; increases pessimism
- Increases anxiety and irritability
- Increases learned helplessness (especially if no escape)
- Often reduces approach behaviors (less for women)
- Primes aversion (SNS-HPAA negativity bias)



# Threat Reactivity

# A Major Result of the Negativity Bias: Threat Reactivity

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- 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.

# Results of Threat Reactivity (Personal, Organizational, National)

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- Our initial appraisals are mistaken:
  - Overestimating threats
  - Underestimating opportunities
  - Underestimating inner and outer resources
- We update these appraisals with information that confirms them; we ignore, devalue, or alter information that doesn't.
- Thus we end up with views of ourselves, others, and the world that are ignorant, selective, and distorted. 28

# Costs of Threat Reactivity

## (Personal, Organizational, National)

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- Feeling threatened feels bad, and triggers stress consequences.
- We over-invest in threat protection.
- The boy who cried tiger: flooding with paper tigers makes it harder to see the real ones.
- Acting while feeling threatened leads to over-reactions, makes others feel threatened, and creates vicious cycles.
- The Approach system is inhibited, so we don't pursue opportunities, play small, or give up too soon.
- In the Attach system, we bond tighter to "us," with more fear and anger toward "them."

# A Poignant Truth

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Mother Nature is tilted toward producing gene copies.

But tilted against personal quality of life.

And at the societal level, we have caveman/cavewoman brains armed with nuclear weapons.

*What shall we do?*

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



# **Taking in the Good**

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**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.**

# How to Take in the Good

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1. Look for positive **facts**, and let them become positive experiences.
2. Savor the positive experience:
  - Sustain it for 10-20-30 seconds.
  - Feel it in your body and emotions.
  - Intensify it.
3. Sense and intend that the positive experience is soaking into your brain and body - registering deeply in emotional memory.

# Kinds of “Good” to Take in

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- The small pleasures of ordinary life
- The satisfaction of attaining goals or recognizing accomplishments - especially small, everyday ones
- Feeling grateful, contented, and fulfilled
  
- Things are alright; nothing is wrong; there is no threat
- Feeling safe and strong
- The peace and relief of forgiveness
  
- Being included, valued, liked, respected, loved by others
- The good feelings that come from being kind, fair, generous
- Feeling loving
  
- Recognizing your positive character traits
- Spiritual or existential realizations

# Benefits of Positive Emotions

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- The benefits of positive emotions are a proxy for many of the benefits of TIG.
- Emotions organize the brain as a whole, so positive ones have far-reaching benefits, including:
  - Promote exploratory, “approach” behaviors
  - Lift mood; increase optimism, resilience
  - Counteract trauma
  - Strengthen immune and protect cardiovascular systems
  - Overall: “broaden and build”
  - Create positive cycles

# The Fourth Step of TIG

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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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## Avoiding Harms

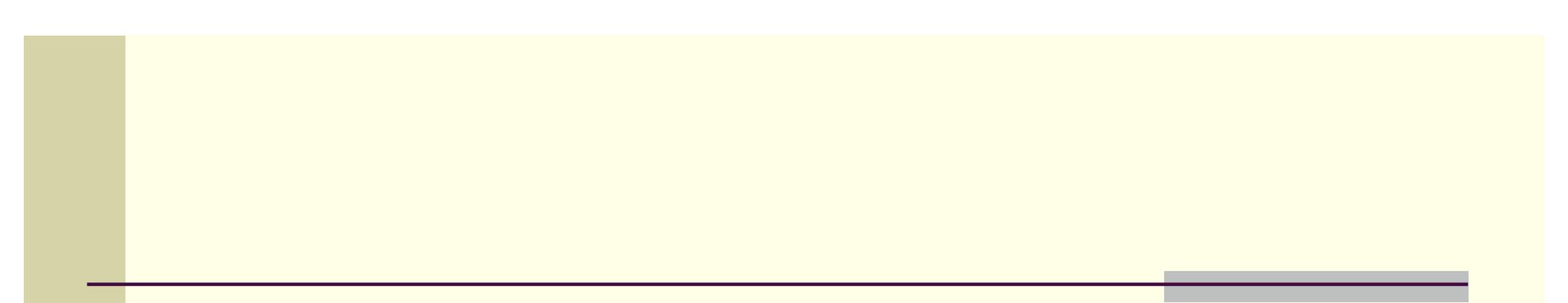
- Strength, efficacy --> Weakness, helplessness, pessimism
- Safety, security --> Alarm, anxiety
- Compassion for oneself and others --> Resentment, anger

## Approaching Rewards

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

## Attaching to “Us”

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



# Internalizing Safety

# Parasympathetic Nervous System

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- The “rest-and-digest” parasympathetic nervous system (PNS) balances and dials down the “fight-or-flight” sympathetic nervous system
- It soothes, resets, renews the body-mind. Though the SNS gets more press, the PNS is more primary.

# Cooling the Fires

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- Regard stressful activation as an affliction.
- Get in the habit of rapidly activating a PNS, “cooling” cascade when the body activates:
  - Inhale super-fully; hold it; l-o-n-g exhalation; repeat
  - Relax the tongue
  - Touch the lips
  - Relax the body
- Regard bodily activation as just another compounded, “meaningless,” and impermanent phenomenon; don’t react to it.

# Feeling Stronger and Safer

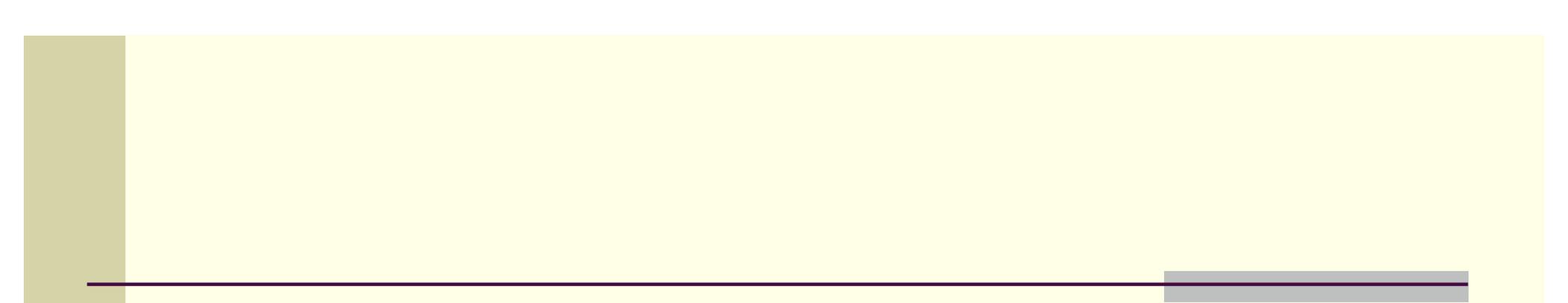
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- Be mindful of an experience of strength (e.g., physical challenge, standing up for someone).
- Staying grounded in strength, let things come to you without shaking your roots, like a mighty tree in a storm.
- Be mindful of:
  - Protections (e.g., being in a safe place, imagining a shield)
  - People who care about you
  - Resources inside and outside you
- Let yourself feel as safe as you reasonably can:
  - Noticing any anxiety about feeling safer
  - Feeling more relaxed, tranquil, peaceful
  - Releasing bracing, guardedness, vigilance

# Elemental Safety

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- Fear learning associates an inherently unpleasant stimulus - the “unconditioned stimulus” (US) - with a “conditioned stimulus” (CS) that is not inherently aversive - e.g., rats trained to expect an awful noise (US) following a puff of air (CS).
- Living itself can become the conditioned stimulus for anxious people.
- What’s needed are many small moments of associating basic parasympathetic alrightness to life: this breath is alright; this interaction is alright; I’m actually alright even if there is anxiety.
- Repeatedly practice feeling safe while engaged in basic, simple, brief bodily activities, such as touching, breathing, chewing, walking, hearing, seeing, etc.



# Neural Networks of Inner Peace

# Dual Modes

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## “Doing”

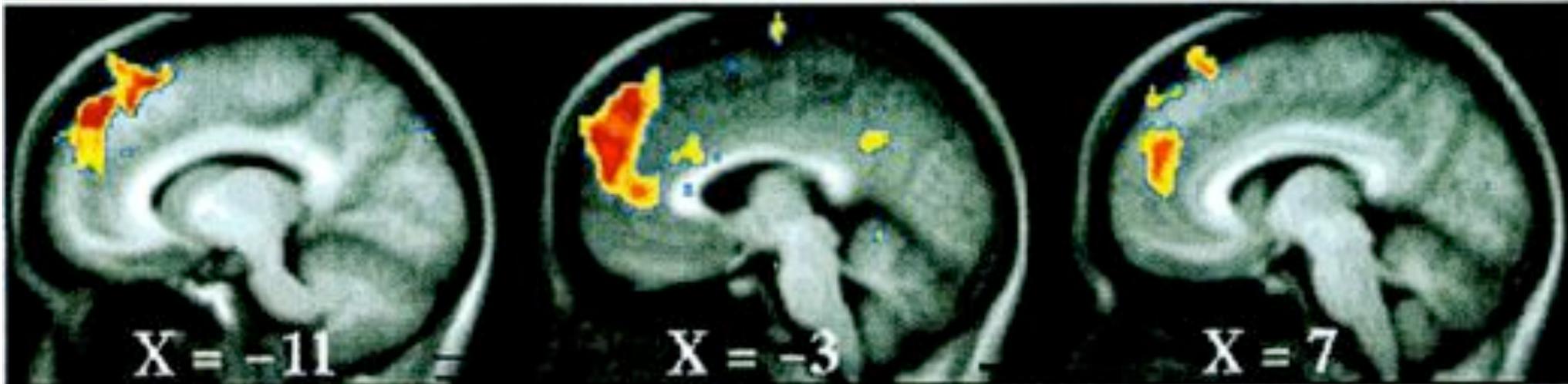
Focused attention  
Goal-directed  
Sense of craving  
Personal, self-oriented perspective  
Lost in thought, mind wandering  
Conceptual  
Future- or past-focused  
Much verbal activity  
Firm beliefs  
Evaluative  
Looping contents of mind  
Tightly connected experiences  
Focal view  
Prominent self-as-object  
Prominent self-as-subject

## “Being”

Open awareness  
Nothing to do, nowhere to go  
Sense of peace  
Impersonal, 3<sup>rd</sup> person perspective  
Mindful presence  
Sensory  
Now-focused  
Little verbal activity  
Uncertainty, not-knowing  
Nonjudgmental  
Transient contents of mind  
Loosely connected experiences  
Panoramic view  
Minimal or no self-as-object  
Minimal or no self-as-subject

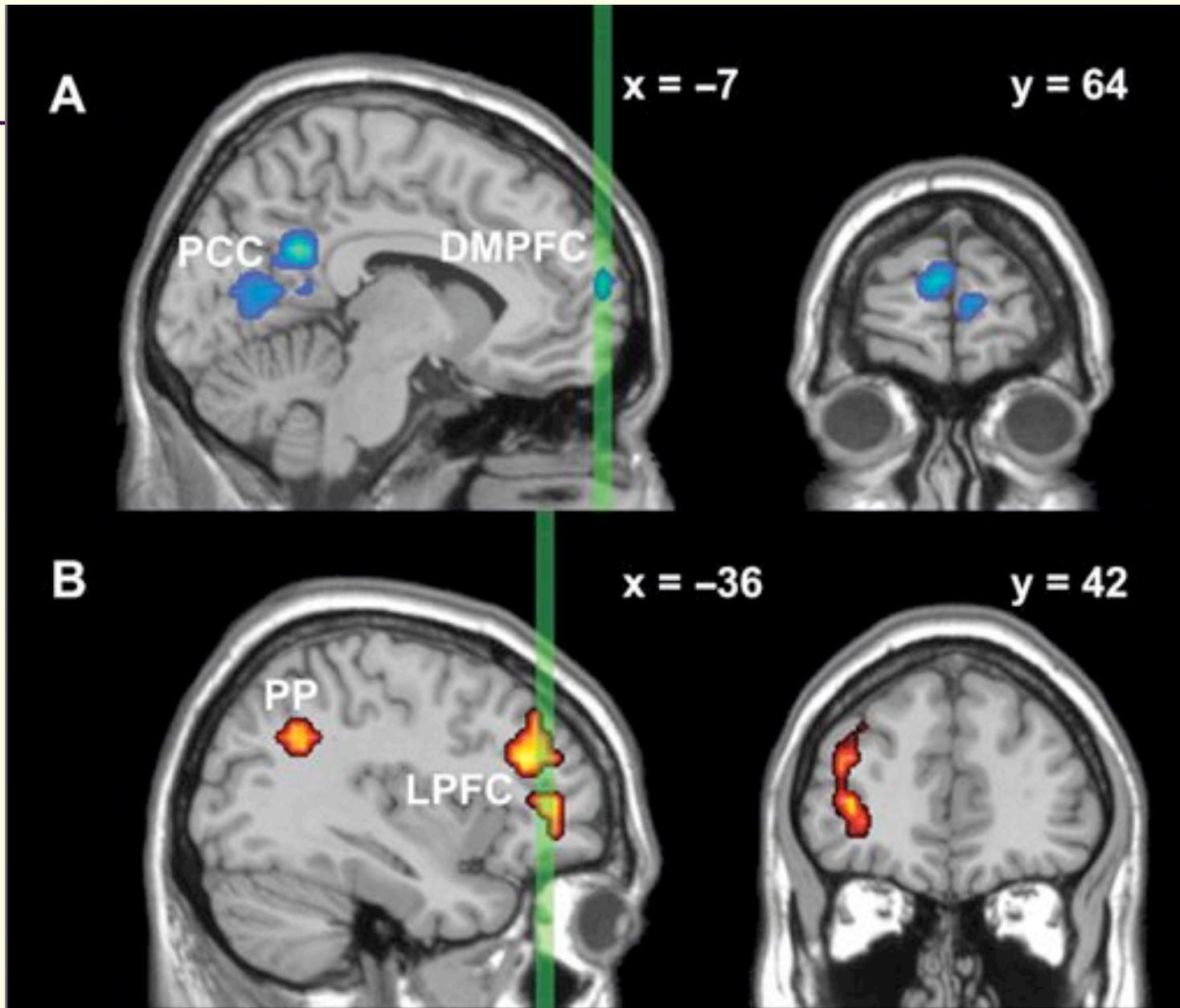
# Increased Medial PFC Activation Related to Self-Referencing Thought

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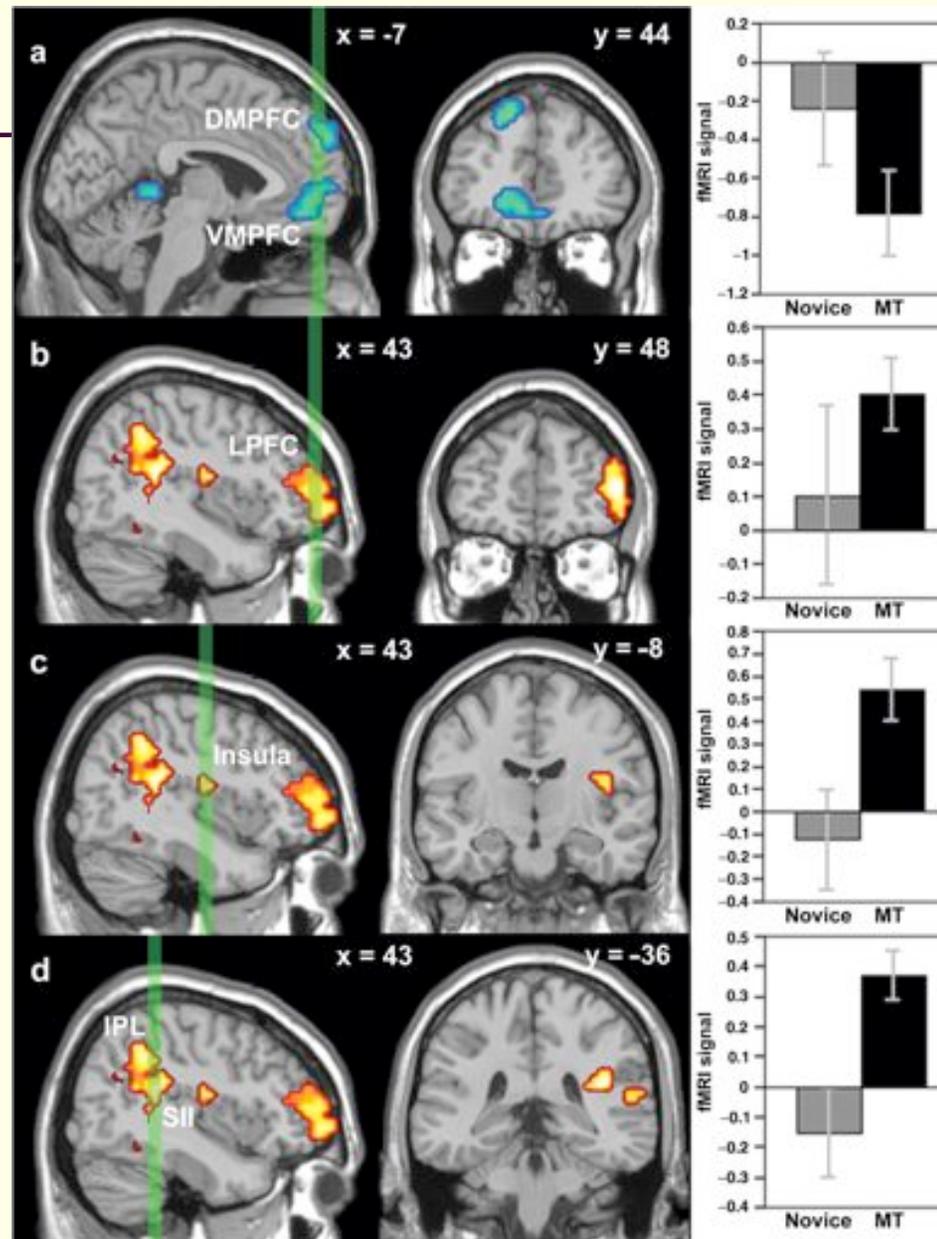
Gusnard D. A., et.al. 2001. *PNAS*, 98:4259-4264

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



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

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



# Dual Modes

---

## “Doing”

Focused attention  
Goal-directed  
Sense of craving  
Personal, self-oriented perspective  
Lost in thought, mind wandering  
Conceptual  
Future- or past-focused  
Much verbal activity  
Firm beliefs  
Evaluative  
Looping contents of mind  
Tightly connected experiences  
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Sensory  
Now-focused  
Little verbal activity  
Uncertainty, not-knowing  
Nonjudgmental  
Transient contents of mind  
Loosely connected experiences  
Panoramic view  
Minimal or no self-as-object  
Minimal or no self-as-subject

# Ways to Activate “Being” Mode

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- 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.”

# Whole Body Awareness

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- Involves insula and mesial (middle) parietal lobes, which integrate sensory maps of the body, plus right hemisphere, for holistic (gestalt) perception
- Practice
  - 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
- This sense of the whole may be present for a second or two, then crumble; just open up to it again.

# Panoramic Awareness

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- 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.

*Trust in awareness, in being awake,  
rather than in transient and unstable conditions.*

Ajahn Sumedho

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*Be wisdom itself,  
rather than a person who isn't wise  
trying to become wise.*

*Trust in awareness, in being awake,  
rather than in transient and unstable conditions.*

Ajahn Sumedho

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*Penetrative insight*

*joined with calm abiding*

*utterly eradicates*

*afflicted states.*

Shantideva

# Great Books

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

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# Key Papers - 1

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

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- Lazar, S., Kerr, C., Wasserman, R., Gray, J., Greve, D., Treadway, M., McGarvey, M., Quinn, B., Dusek, J., Benson, H., Rauch, S., Moore, C., & Fischl, B. 2005. Meditation experience is associated with increased cortical thickness. *Neuroreport*, 16:1893-1897.
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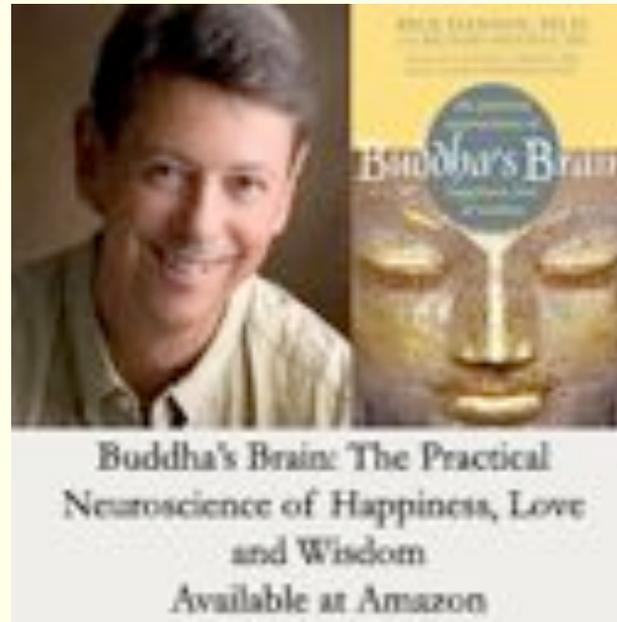
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