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# ***The Promise of Self-Directed Neuroplasticity***

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# Topics

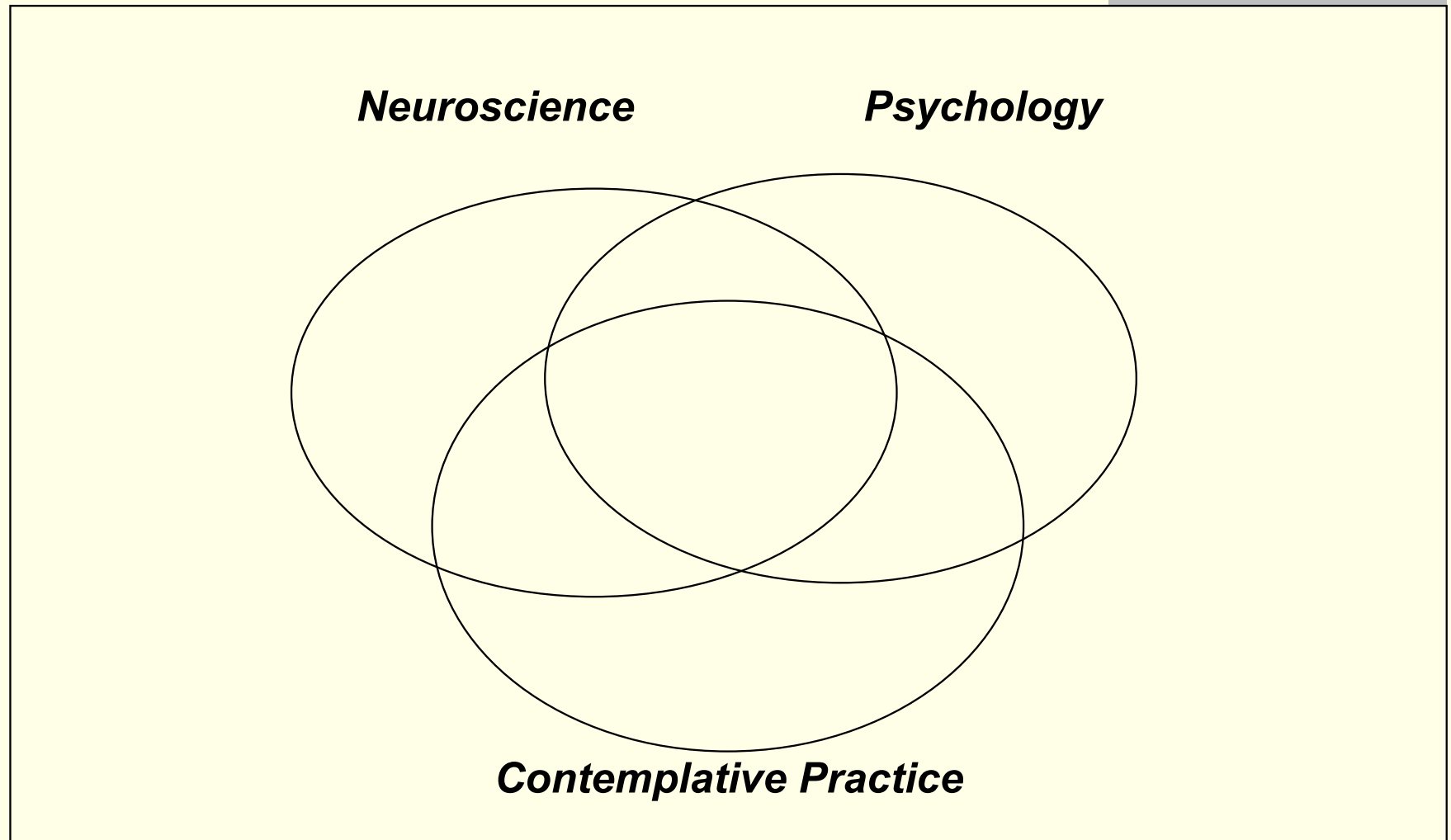
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- **Perspectives**
- **Self-directed neuroplasticity**
- **The power of mindfulness**
- **The brain - so what?**
- **Self-compassion and safety**



# 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

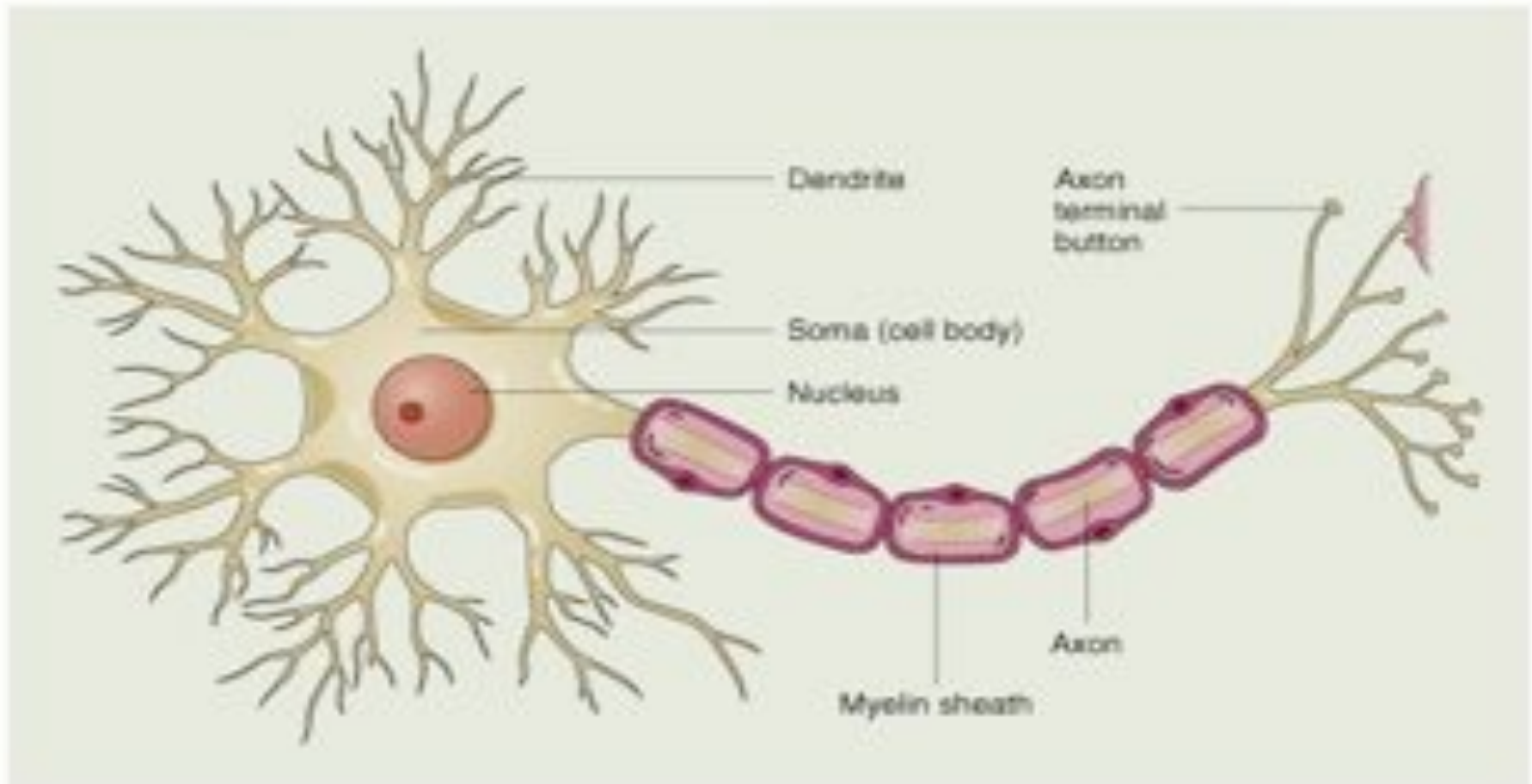


# **Self-Directed Neuroplasticity**

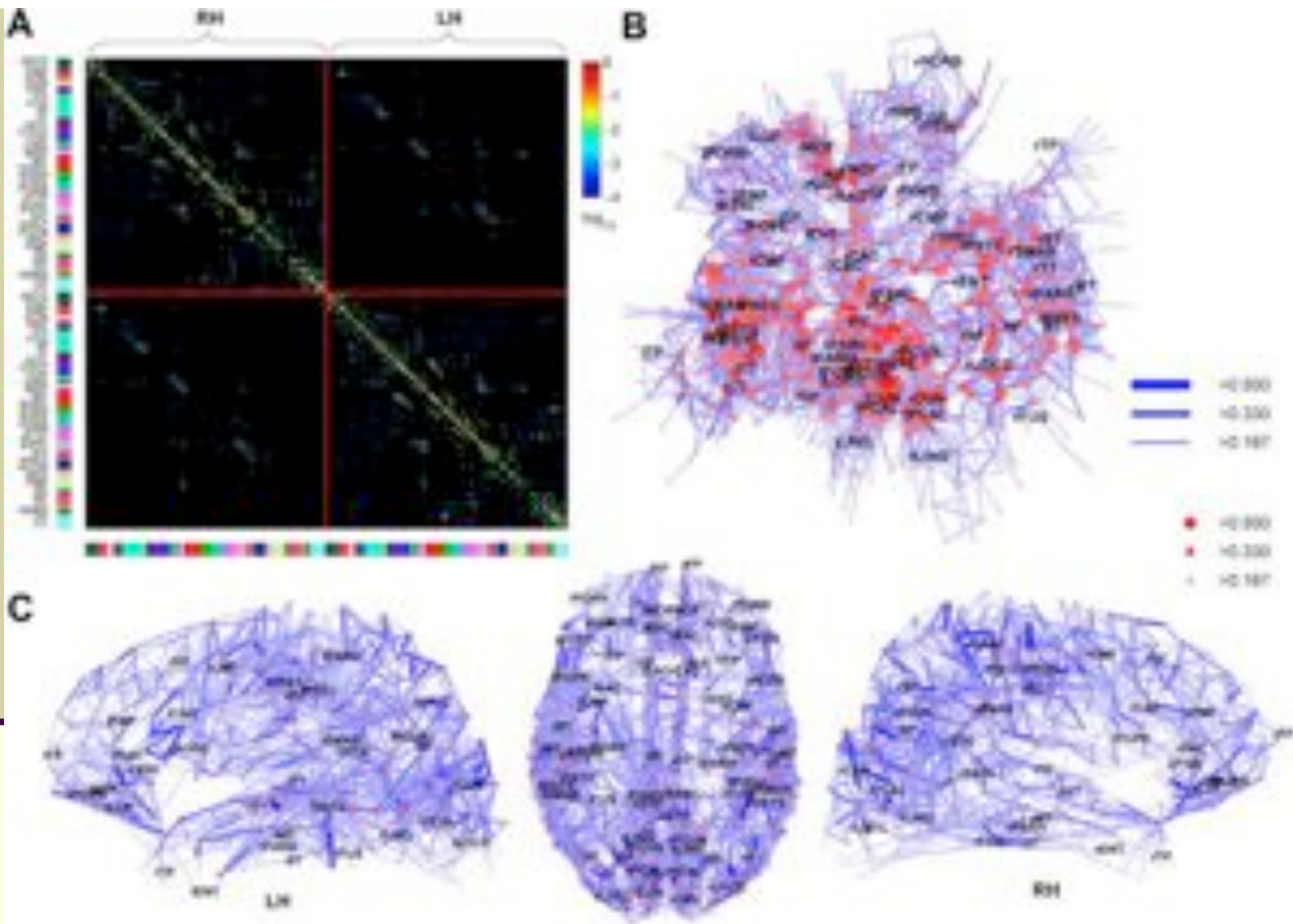




# A Neuron



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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.

# Fact #1

As your brain changes, your mind changes.



# Ways That Brain Can Change Mind

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## ■ For better:

- A little caffeine: more alertness
- Thicker insula: more self-awareness, empathy
- More left prefrontal activation: more happiness

## ■ For worse:

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

# Fact #2

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## As your mind changes, your brain changes.

Immaterial mental activity maps to material neural activity.

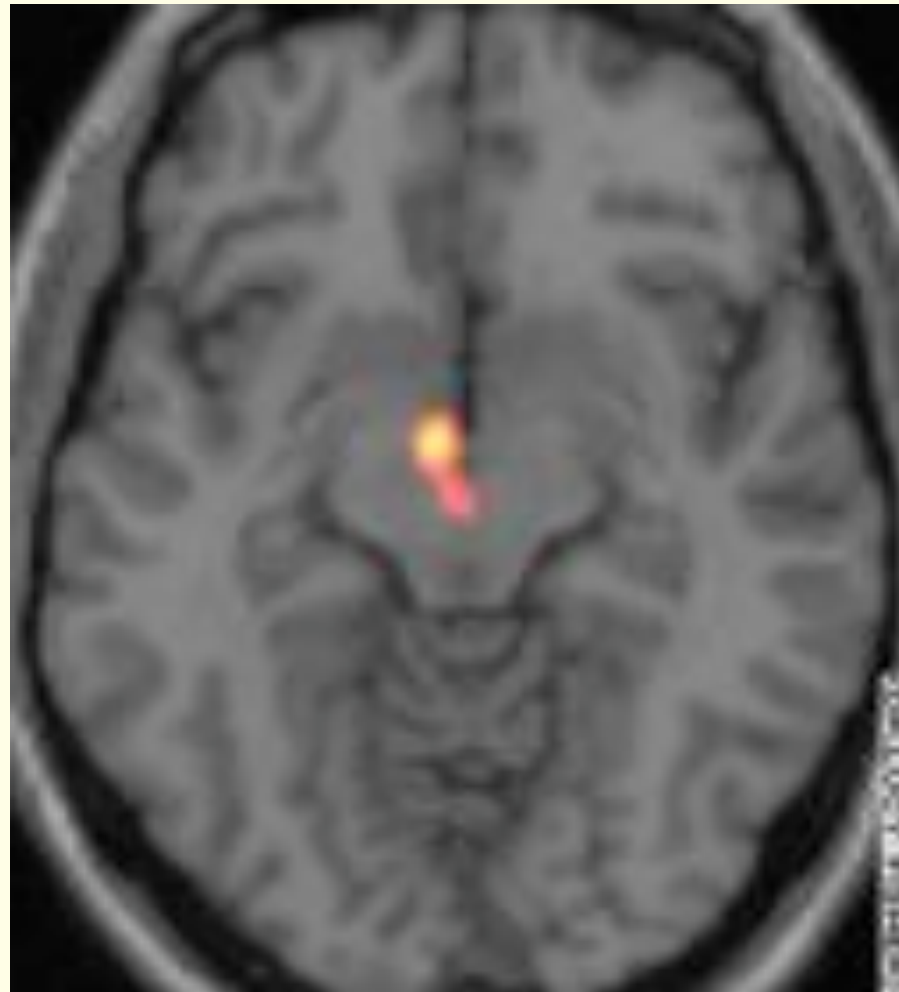
This produces temporary changes in your brain and lasting ones.

*Temporary* changes include:

- Alterations in brainwaves (= changes in the firing patterns of synchronized neurons)
- Increased or decreased use of oxygen and glucose
- Ebbs and flows of neurochemicals

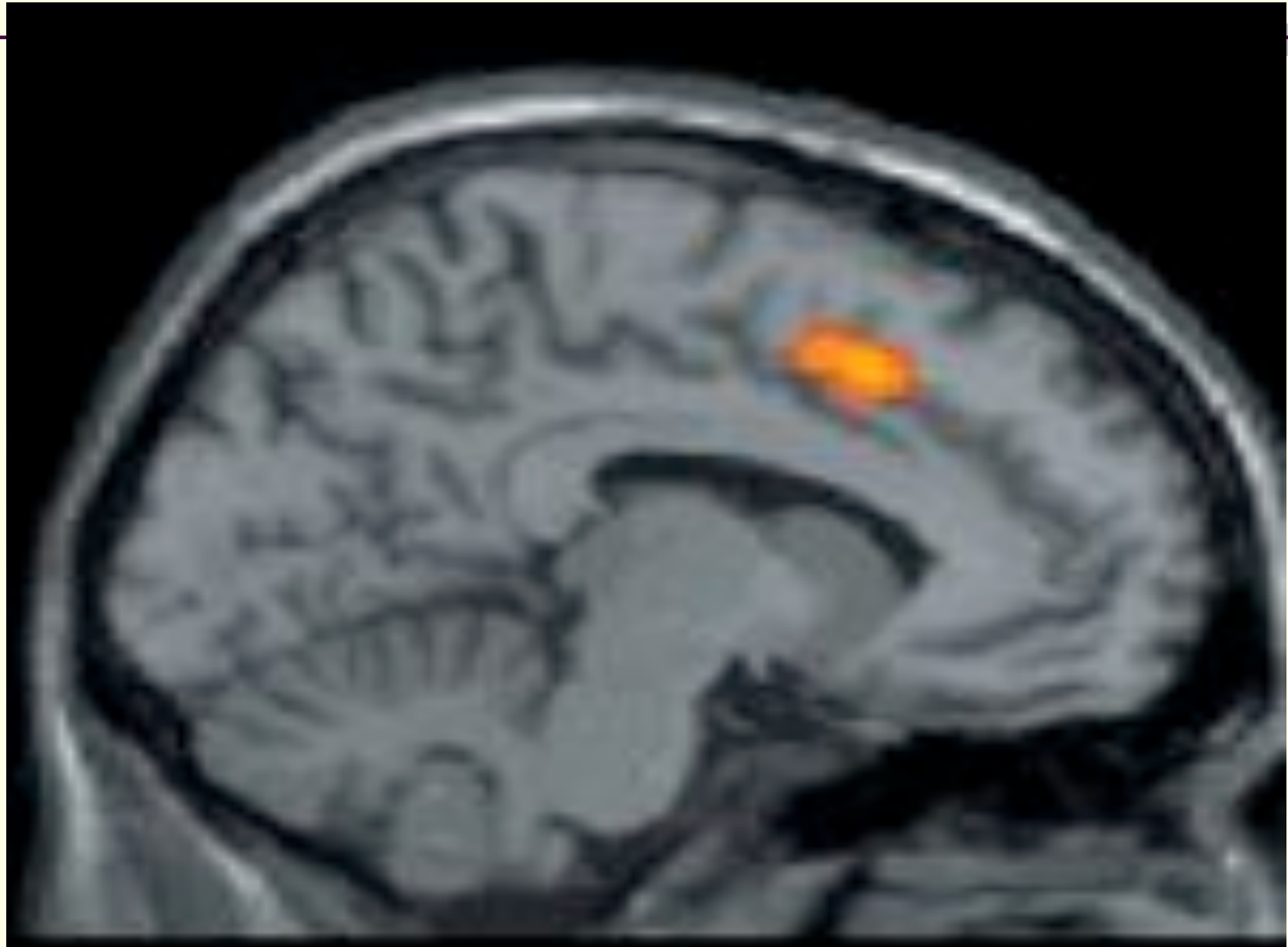
# Rewards of Love

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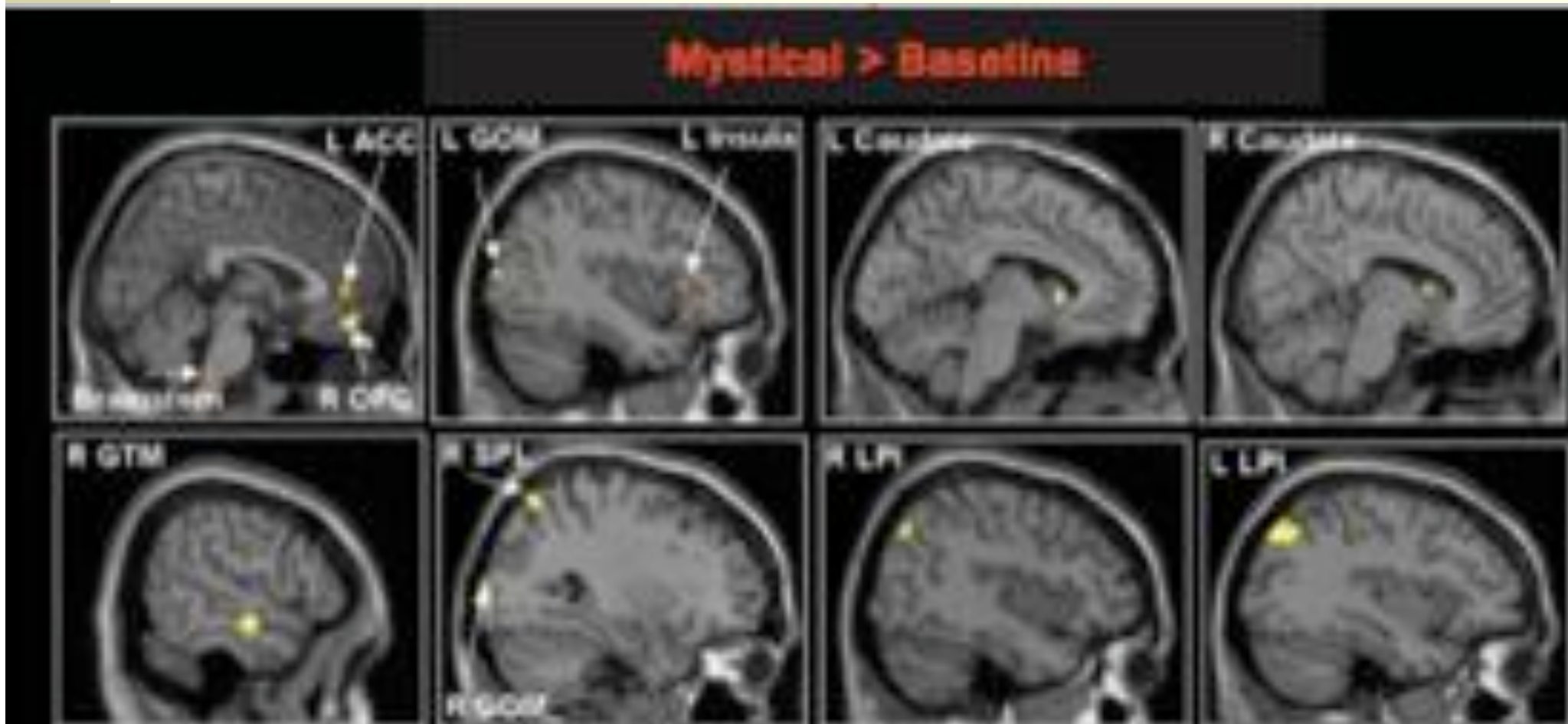


# Tibetan Monk, Boundless Compassion



# Christian Nuns, Recalling a Profound Spiritual Experience

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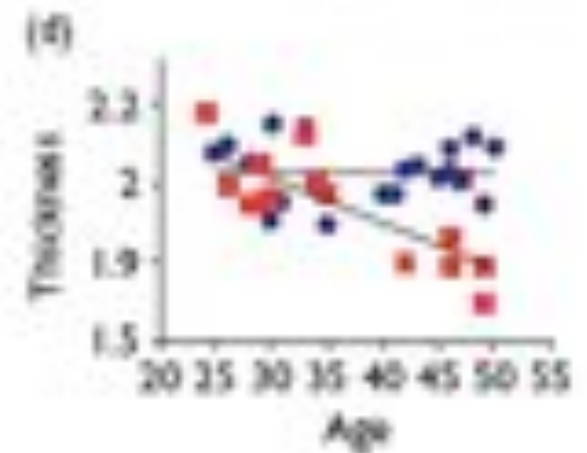
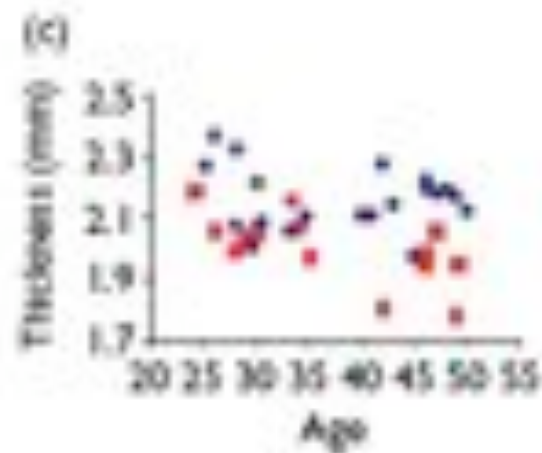
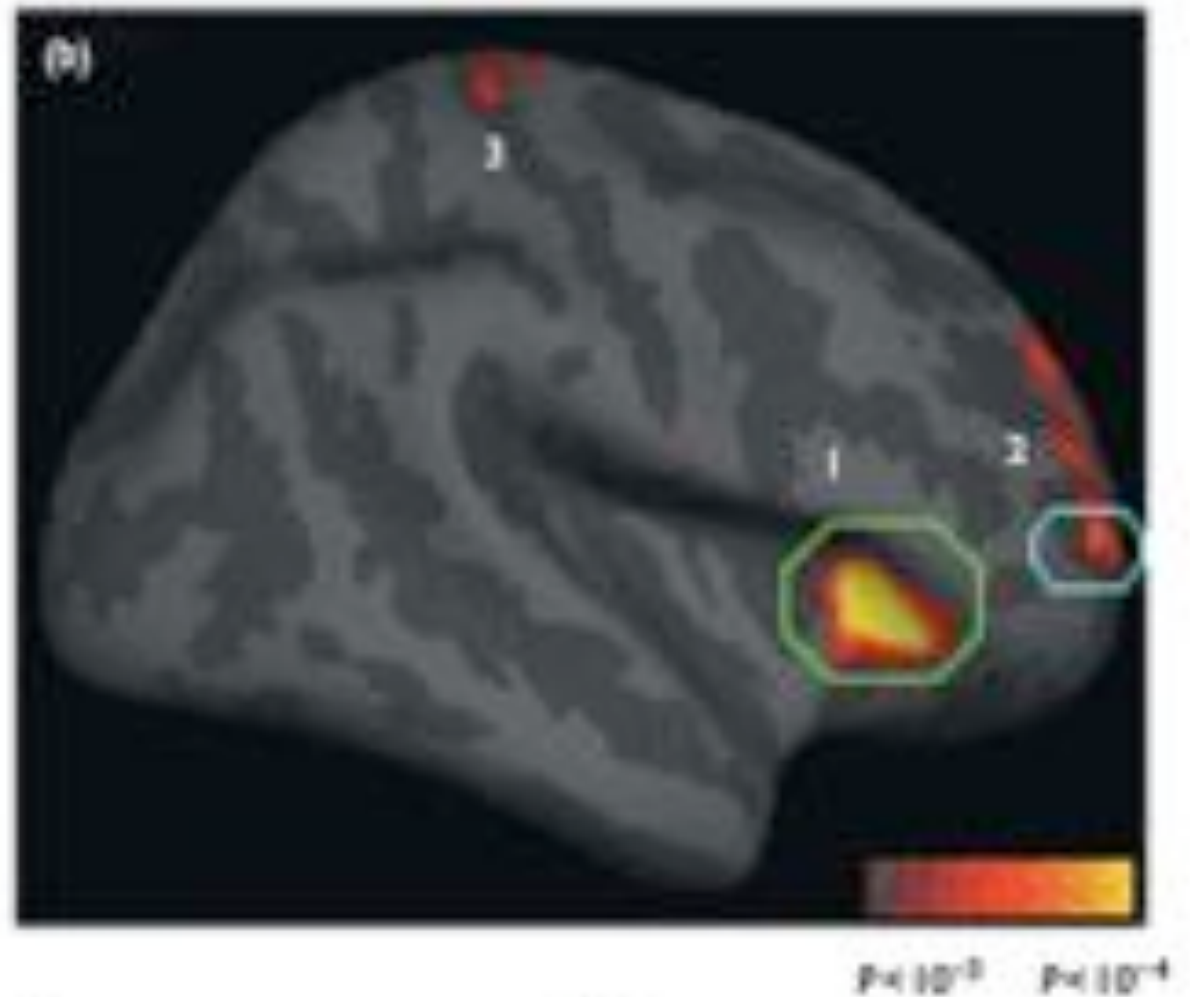


# Mind Changes Brain in Lasting Ways

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- 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.



# 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.

# Fact #3

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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?***



# **The Power of Mindfulness**

# 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



# Some Neural Factors of Mindfulness


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- **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
- **Absorbing the benefits** - positive implicit memories

# Being with, Releasing, Replacing

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- There are three phases of psychological healing and personal growth (and spiritual practice):
  - Be mindful of, release, replace.
  - Let be, let go, let in.
- Mindfulness is key to the second and third phase, sometimes curative on its own, and always beneficial in strengthening its neural substrates. But often it is not enough by itself.
- And sometimes you need to skip to the third phase to build resources for mindfulness.



# **The Brain: So What?**

# Neuroplasticity in Context

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- Neuroplasticity is not breaking news. It's been long presumed that mental activity changed neural structure: what else is learning?
- The news is in how the mind changes the brain.
- Most neuroplasticity is incremental, not dramatic.
- Neuroplasticity is ethically neutral.

# Grounding in the Brain - Benefits

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- Organizing framework
  - Evolutionary neuropsychology
  - Common ground across theories and methods
- Motivating to clients, clinicians, policy-makers
  - Concrete, in the body, *physical*
  - Status of medicine, hard science
- Highlighting key principles and practices
  - Implicit memory
  - Nonverbal processes
- Innovating with truly new methods
  - Neurofeedback
  - Fear extinction

# Grounding in the Brain - Pitfalls

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- Adding little new meaning
  - Replacing psych terms with neuro (“amygdala made me do it”)
- Over-simplifying
  - Over-localizing function (e.g., empathy = mirror neurons)
  - Over-emphasizing one factor (e.g., attachment experiences)
  - Exaggerated terms (“God-gene,” “female brain”)
  - Materialistic reductionism, though brain and mind co-arise
- Claiming authority
  - Using neuro data to argue a political or cultural case
  - Using the secular religion of science to elevate status
- Underestimating the mind
  - Most big changes in psyche involve tiny changes in soma; mental plasticity holds more promise than neural plasticity.
  - Overlooking the insights and effectiveness of psychology
  - Ducking existential choices in values



# **Self-Compassion and Safety**

# Self-Goodwill

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- Moral teachings tell us to be compassionate and kind toward all beings. And that whatever we do to the world affects us, and whatever we do to ourselves affects the world.
- You are one of the “all beings!” And kindness to yourself benefits the world, while hurting yourself harms the world.
- It’s a general moral principle that the more power you have over someone, the greater your duty is to use that power wisely. Well, who is the one person in the world you have the greatest power over? It’s your future self. You hold that life in your hands, and what it will be depends on how you care for it.
- Consider yourself as an innocent child, as deserving of care and happiness as any other.



# “Anthem”

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*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

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*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

# Feeling Cared About

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- As we evolved, we increasingly turned to and relied on others to feel safer and less threatened.
  - Exile from the band was a death sentence in the Serengeti.
  - Attachment: relying on the secure base
  - The well-documented power of social support to buffer stress and aid recovery from painful experiences
- Methods:
  - Recognize it's kind to others to feel cared about yourself.
  - Look for occasions to feel cared about and take them in.
  - Deliberately bring to mind the experience of being cared about in challenging situations.
  - Be caring yourself.

# 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.”

# 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

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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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- Begley, S. 2007. *Train Your Mind, Change Your Brain*. Ballantine.
- Carter, C. 2010. *Raising Happiness*. Ballantine.
- Hanson, R. (with R. Mendius). 2009. *Buddha's Brain: The Practical Neuroscience of Happiness, Love, and Wisdom*. New Harbinger.
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# Key Papers - 1

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

- Atmanspacher, H. & Graben, P. 2007. Contextual emergence of mental states from neurodynamics. *Chaos & Complexity Letters*, 2:151-168.
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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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- Takahashi, H., Kato, M., Matsuura, M., Mobbs, D., Suhara, T., & Okubo, Y. 2009. When your gain is my pain and your pain is my gain: Neural correlates of envy and schadenfreude. *Science*, 323:937-939.
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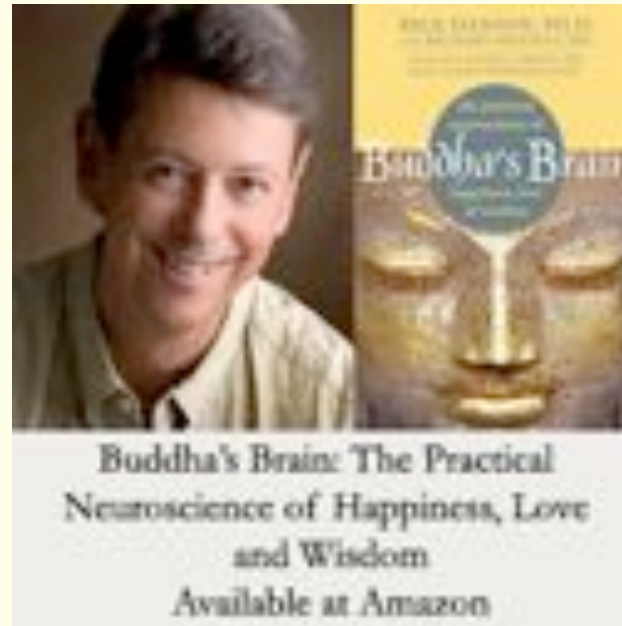
## *Where to Find Rick Hanson Online*

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<http://www.youtube.com/BuddhasBrain>

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