

Neurodharma:

Practicing with the Brain in Mind

Buddhist Geeks Conference

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Topics

- **Self-directed neuroplasticity**
- **The negativity bias**
- **Neurobhavana**
- **The fruit and the path**



Self-Directed Neuroplasticity

The Natural Mind

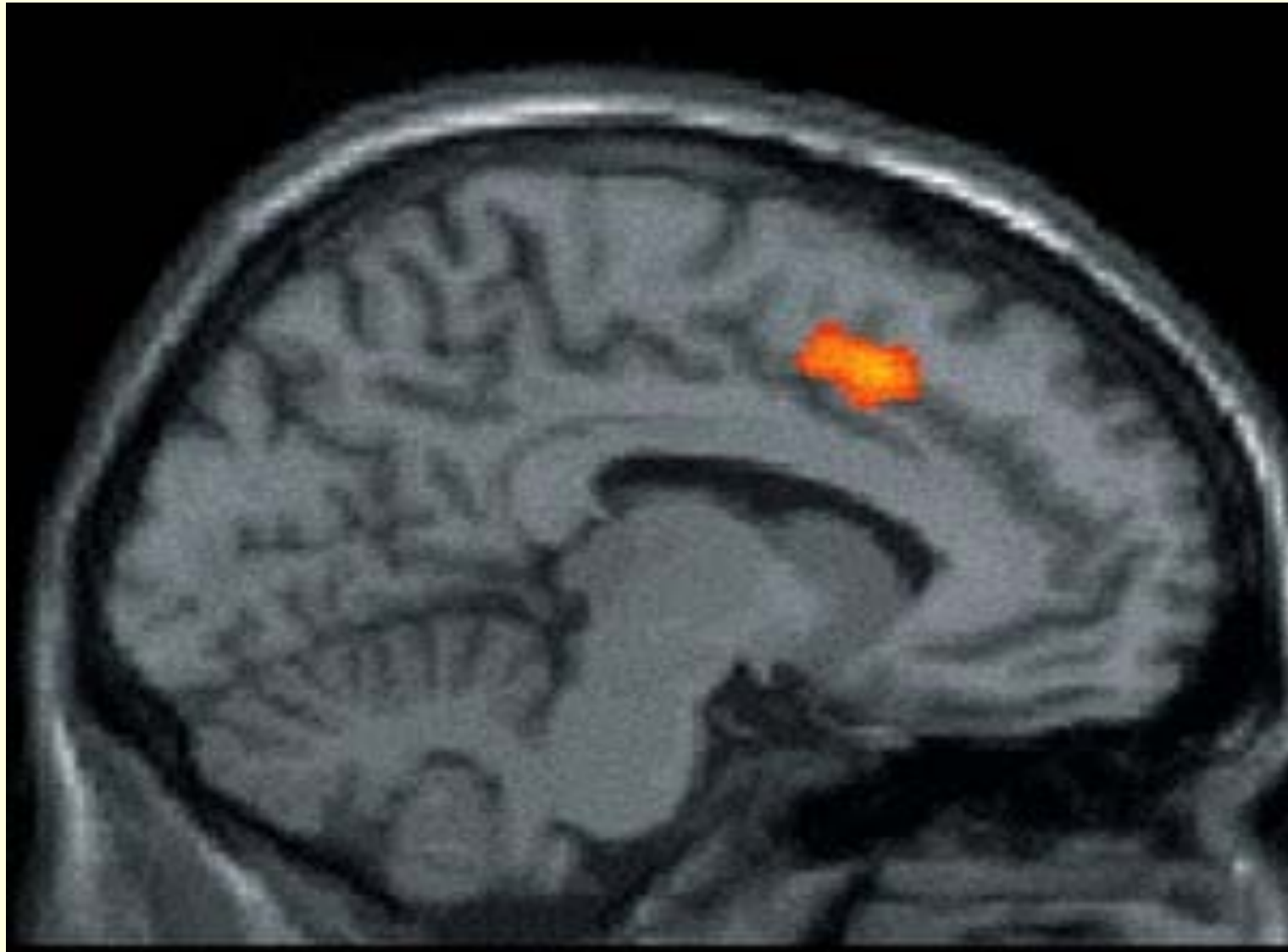
Apart from the hypothetical influence of a transcendental X factor . . .

Awareness and unconsciousness, mindfulness and delusion, and happiness and suffering must be natural processes.

Mind is grounded in life.

**Mental activity entails
underlying neural activity.**

Ardent, Diligent, Resolute, and Mindful



**Repeated mental activity entails
repeated neural activity.**

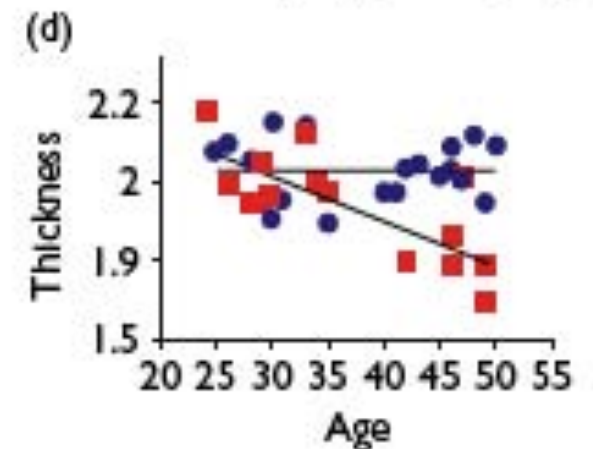
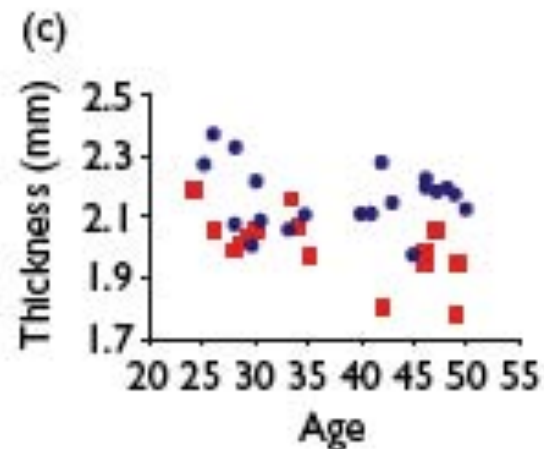
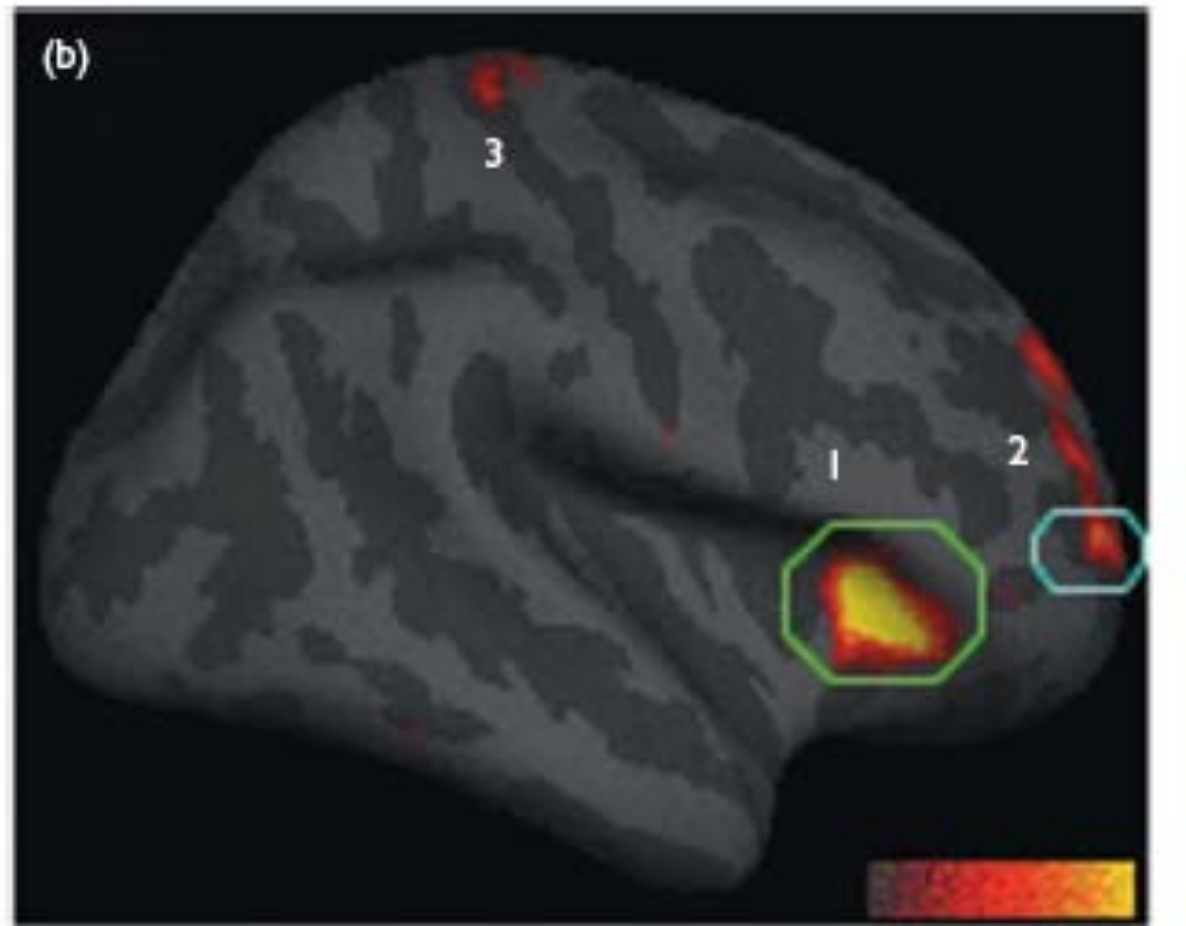
**Repeated neural activity
builds neural structure.**

A network of glowing yellow neurons with a central neuron highlighted in green. The neurons are interconnected by a dense web of thin, yellow fibers, creating a complex, interconnected structure. The central neuron is a larger, more prominent cell with a bright green nucleus and several thin, branching processes extending outwards. The overall appearance is that of a neural network or a brain scan visualization.

Neurons that fire together,

wire together.

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



The Opportunity

We can use the mind

To change the brain

To change the mind for the better

To benefit ourselves and other beings.

Working with Causes and Effects

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

Causes in the brain are shaped by the mental/neural states that are activated and then installed within it. States become traits.

The neural traits of inner “poisons” (e.g., hatred, greed, heartache, delusion) cause suffering and harm.

The neural traits of **inner strengths** (e.g., virtue, mindfulness, wisdom, resilience, compassion, etc.) cause happiness and benefit for oneself and others.

The Causes of Inner Strengths

How do we build the neural traits of inner strengths?

Inner strengths are mainly built from positive experiences.

You develop mindfulness by repeatedly being mindful; you develop compassion by repeatedly feeling compassionate; etc.

The brain is like a VCR or DVR, not an iPod: you must play the song to record it - you must experience the strength to install it in your brain.

A Bottleneck For Growing Inner Strengths

The problem is that, for survival reasons, the brain is poor at turning positive states into neural traits.

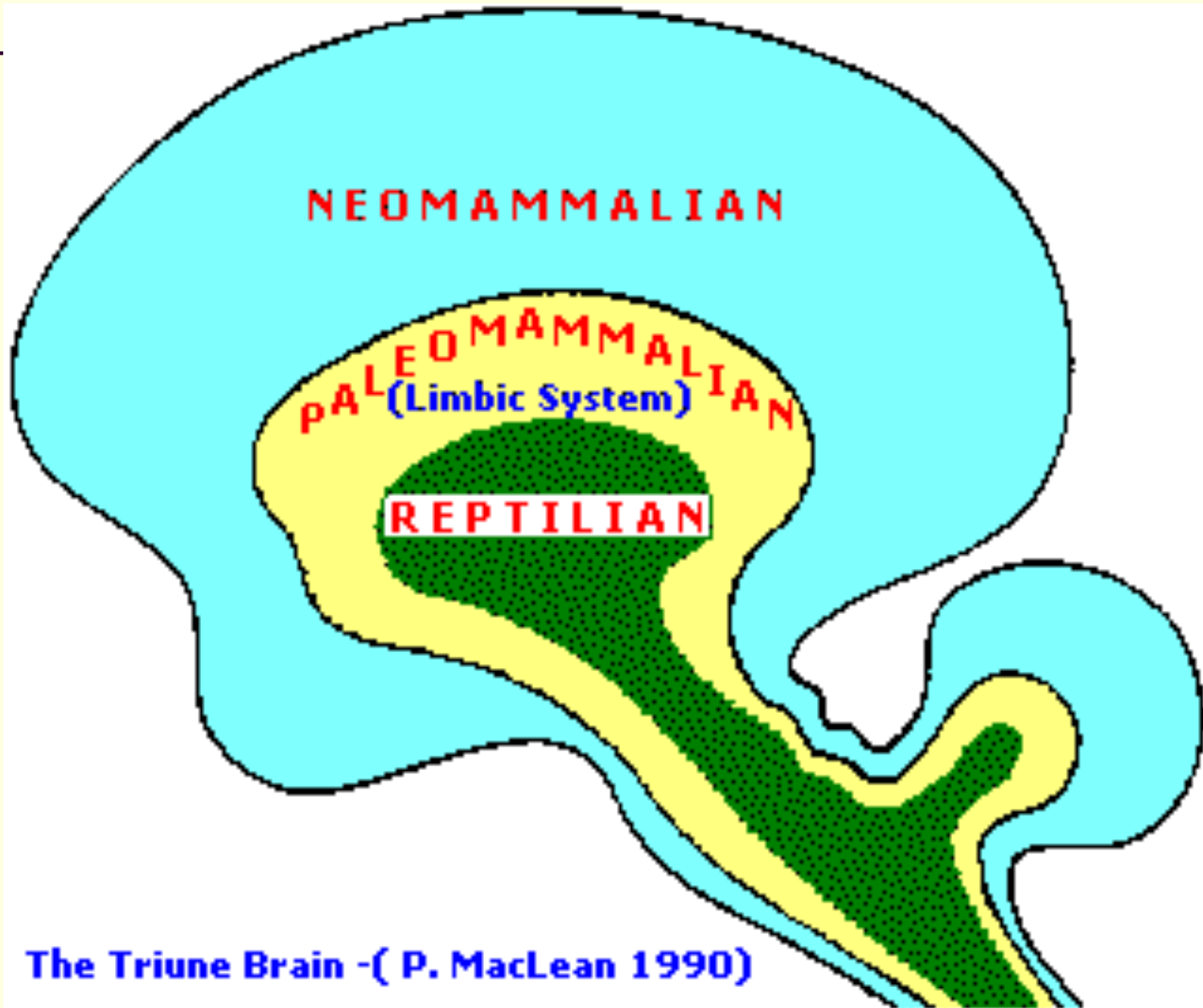
It is bad at learning from good experiences compared to how good it is at learning from bad experiences.

This design feature of the brain creates a kind of bottleneck that reduces the conversion of positive mental states to positive neural traits.



The Negativity Bias

Evolutionary History



The Triune Brain -(P. MacLean 1990)

Three Fundamental Motivational and Self-Regulatory Systems

- **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

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.

Neurobiological Basis of Craving

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.

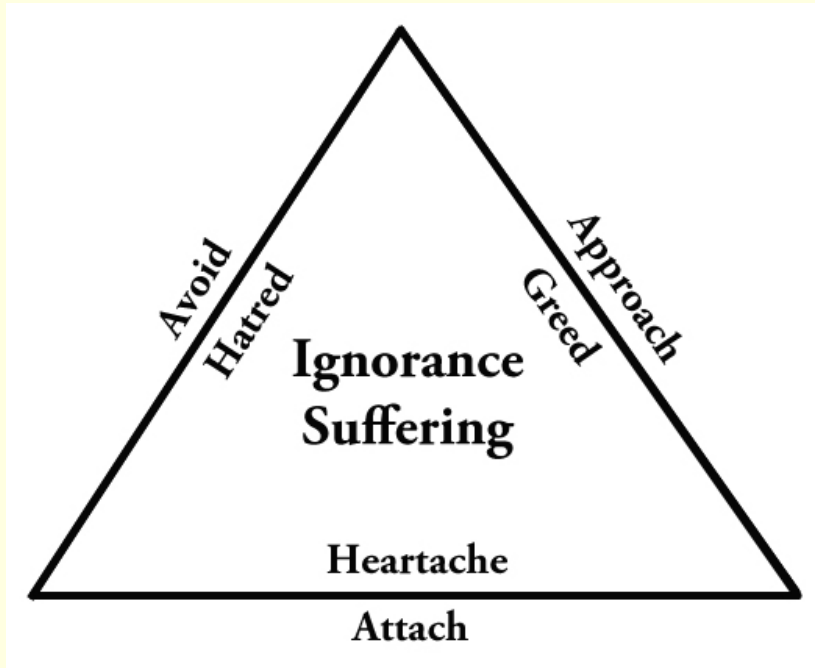
The mind fires up into:

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

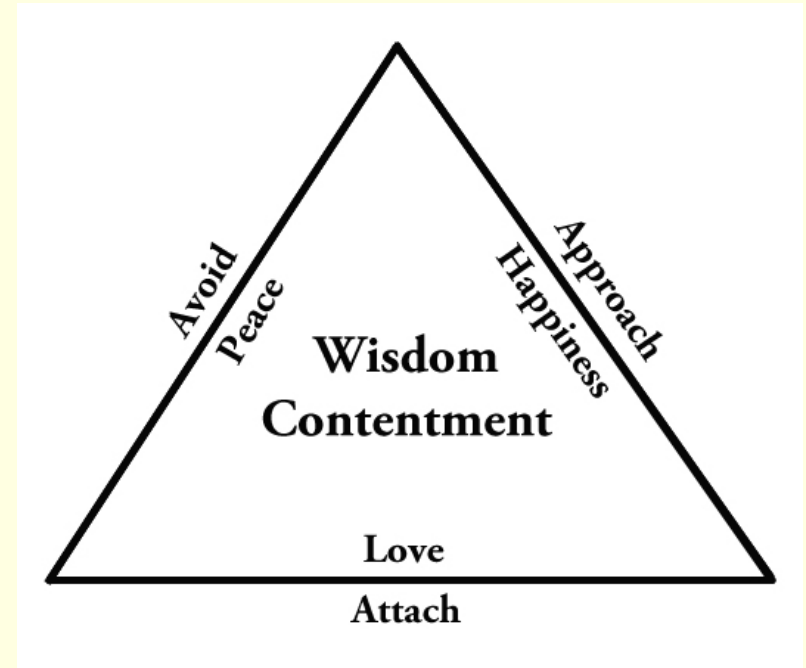
This is the brain in allostatic, **Reactive**, *craving* mode.¹⁸

Choices . . .

Or?



Reactive Mode



Responsive Mode

The Negativity Bias

- As our ancestors evolved, avoiding “sticks” was more important for survival than getting “carrots.”
- Preferential encoding in implicit memory:
 - We learn faster from pain than pleasure.
 - Negative interactions: more impactful than positive
 - Easy to create learned helplessness, hard to undo
 - Rapid sensitization to negative through cortisol

Velcro for Bad, Teflon for Good

The negativity bias

bad experiences

good experiences

Considering the Costs and Benefits

- As we evolved, the short-term benefits of the negativity bias outweighed its long-term costs.
- But now - when we want to live long and well, and when we are exposed to chronic mild to moderate Reactive stressors with little time for Responsive recovery - this design feature is a kind of “bug” for human brains in the 21st century.
- This is also a key weakness of therapy, human potential trainings, and character education: many hard-won positive states are wasted on the brain.

A composite image showing Stone Age people in a modern city park. In the foreground, three Stone Age people are crouching in a grassy field. The person in the center is looking towards the camera, while the others are looking away. They are wearing simple, primitive clothing made of animal skins. In the background, there are lush green trees and a dense forest. Behind the trees, several tall, modern apartment buildings with many windows are visible, suggesting a city setting. The overall scene is a juxtaposition of ancient and modern environments.

Stone age brains in the 21st century



Neurobhavana

The image is a split-screen comparison of two wolves. The left side shows a domestic-looking wolf with thick, grey and white fur, looking slightly to the right with a calm expression. The right side shows a wild-looking wolf with thinner, grey and brown fur, looking down and to the left with a more intense, focused expression. The text "Two wolves in the heart" is centered across both images in a white, serif font.

Two wolves in the heart

Cultivation in Context

- 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 and privileged in mindfulness-based practices.
- Skillful means for decreasing the negative and increasing the positive have developed over 2500 years. Why not use them?



SPIRIT ROCK MEDITATION CENTER



Join us for

**Cultivating Inner Strength - Monastic
Daylong [Dana - No Fee Day]**

with Ayya Anandabodhi
and Ayya Santacitta
on

Sunday, July 8

from 9:30 am - 5 pm.

(Photo by Ed Ritger)

HEAL by Taking in the Good

1. Have a positive experience. Notice it 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.

Let's Try It

- **Notice** the experience already present in awareness that you are alright right now
 - Have the experience
 - Enrich it
 - Absorb it

- **Create** the experience of compassion
 - Have the experience - bring to mind someone you care about . . . Feel caring . . . Wish that he or she not suffer . . . Open to compassion
 - Enrich it
 - Absorb it

It's Good to Take in the Good

- Development of specific inner strengths
 - “Antidote experiences” - “By love they will quench the fires of hate” (the Buddha)
- Implicit benefits:
 - Being active rather than passive
 - Treating yourself like you matter
 - Training of attention and executive functions
- Gradual sensitization of the brain to the positive: like Velcro for the good



The Fruit and the Path

The Fruit as the Path

Peace

Contentment

Love

*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

See www.RickHanson.net for other great books.

- Austin, J. 2009. *Selfless Insight*. MIT Press.
- 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.
- Johnson, S. 2005. *Mind Wide Open*. Scribner.
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- LeDoux, J. 2003. *Synaptic Self*. Penguin.
- Linden, D. 2008. *The Accidental Mind*. Belknap.
- Sapolsky, R. 2004. *Why Zebras Don't Get Ulcers*. Holt.
- Siegel, D. 2007. *The Mindful Brain*. Norton.
- Thompson, E. 2007. *Mind in Life*. Belknap.

Key Papers - 1

See 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.
- Baumeister, R., Bratlavsky, E., Finkenauer, C. & Vohs, K. 2001. Bad is stronger than good. *Review of General Psychology*, 5:323-370.
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Key Papers - 2

- Davidson, R.J. 2004. Well-being and affective style: neural substrates and biobehavioural correlates. *Philosophical Transactions of the Royal Society*, 359:1395-1411.
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- Hagmann, P., Cammoun, L., Gigandet, X., Meuli, R., Honey, C.J., Wedeen, V.J., & Sporns, O. 2008. Mapping the structural core of human cerebral cortex. *PLoS Biology*, 6:1479-1493.
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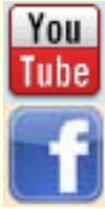
Key Papers - 3

- 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.
- Lewis, M.D. & Todd, R.M. 2007. The self-regulating brain: Cortical-subcortical feedback and the development of intelligent action. *Cognitive Development*, 22:406-430.
- Lieberman, M.D. & Eisenberger, N.I. 2009. Pains and pleasures of social life. *Science*, 323:890-891.
- Lutz, A., Greischar, L., Rawlings, N., Ricard, M. and Davidson, R. 2004. Long-term meditators self-induce high-amplitude gamma synchrony during mental practice. *PNAS*, 101:16369-16373.
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Key Papers - 4

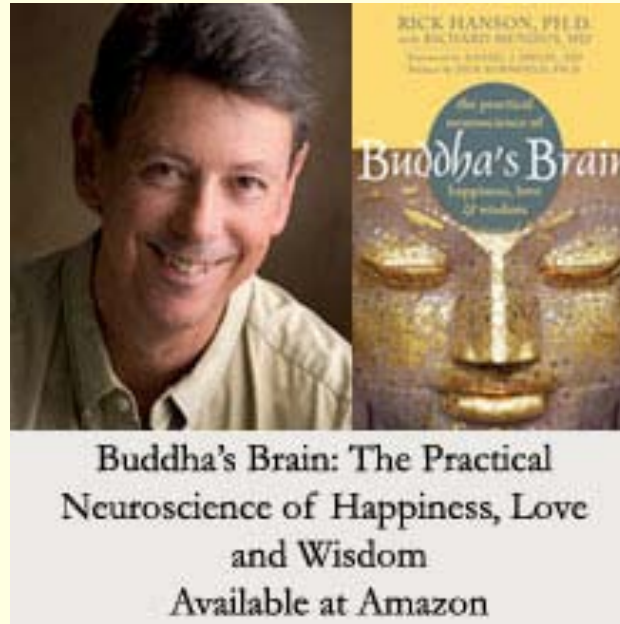
- Rozin, P. & Royzman, E.B. 2001. Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5:296-320.
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- Walsh, R. & Shapiro, S. L. 2006. The meeting of meditative disciplines and Western psychology: A mutually enriching dialogue. *American Psychologist*, 61:227-239.

Where to Find Rick Hanson Online



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

<http://www.facebook.com/rickhansonphd>



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