

Neurodharma:

Practicing with the Brain in Mind

HKU Centre of Buddhist Studies

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Rick Hanson, Ph.D.

The Wellspring Institute for Neuroscience and Contemplative Wisdom

WiseBrain.org RickHanson.net

drh@comcast.net



Grounding the Mind in Life

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.

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.

Naturalizing the Dharma

To “naturalize” something is to place it in the frame of the natural world, to operationalize it in natural terms.

Buddhist practice engages the *mental* causes of suffering and its end. What could be the natural, *neurobiological* (NB) causes of those causes?

What could be a NB operationalization of *dukkha*, *tanha*, *sila*, *samadhi*, *panna*, *bhavana*, or *nirodha*?

It is ironic that a practice that is so much about bringing awareness into the body can be reluctant to engage the full implications of embodiment in life.

We ask, "What is a thought?"


We don't know,

yet we are thinking continually.

Venerable Tenzin Palmo

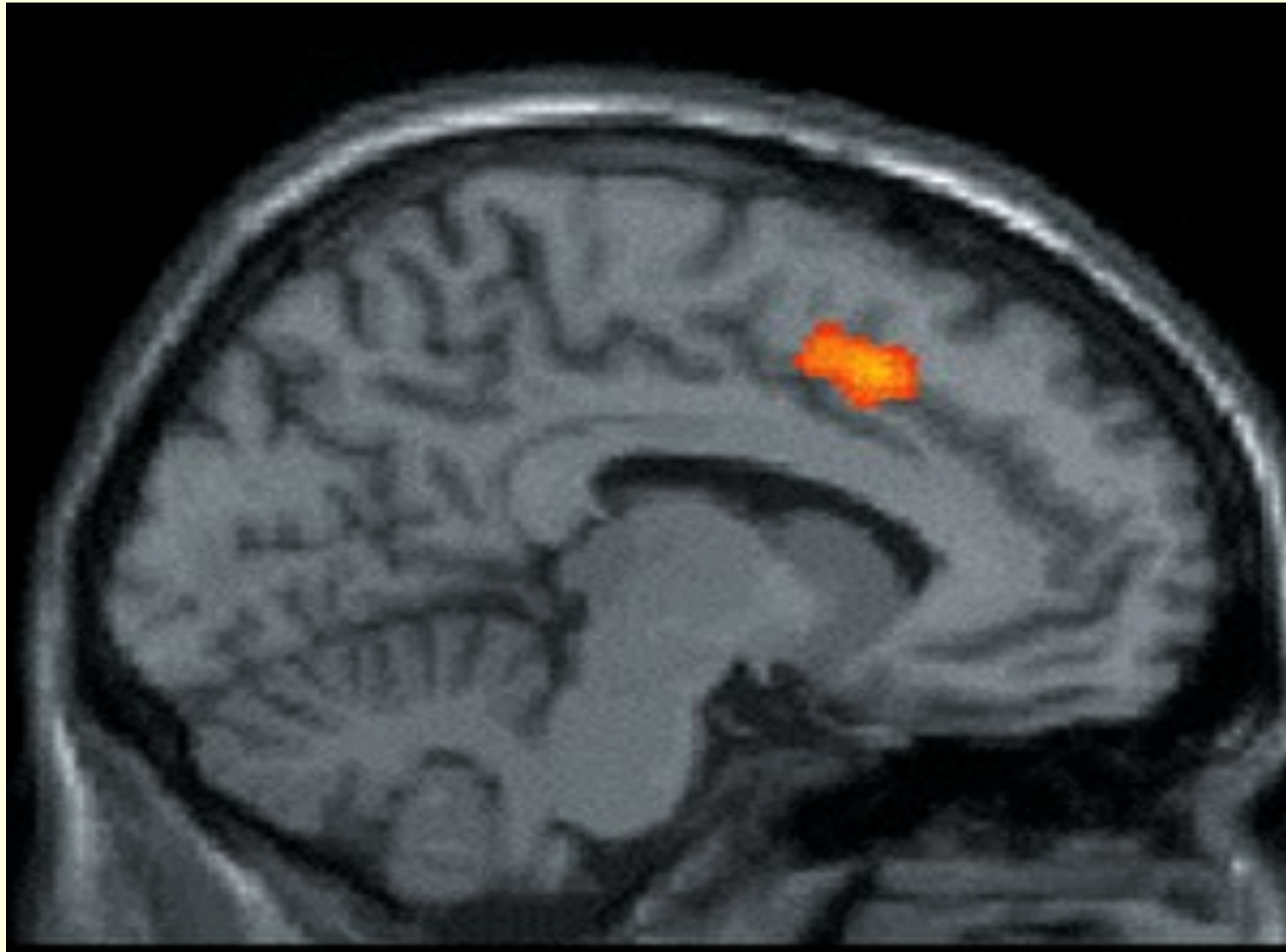


Experience-Dependent Neuroplasticity



**Mental activity entails
underlying neural activity.**

Ardent, Diligent, Resolute, and Mindful



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

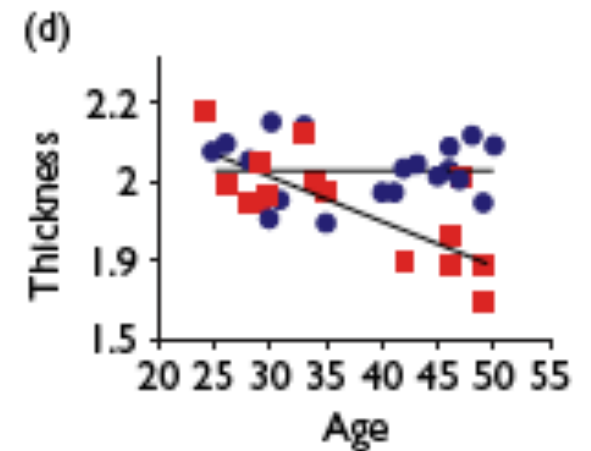
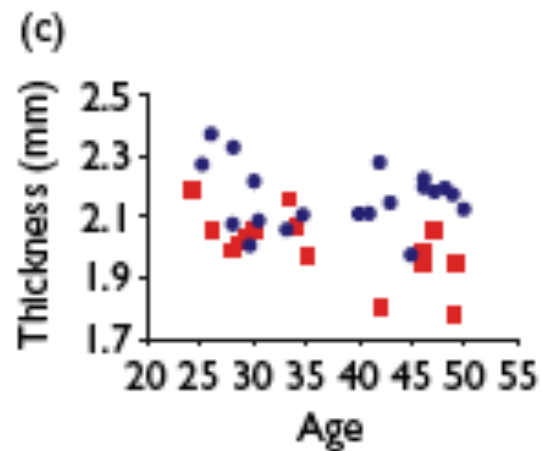
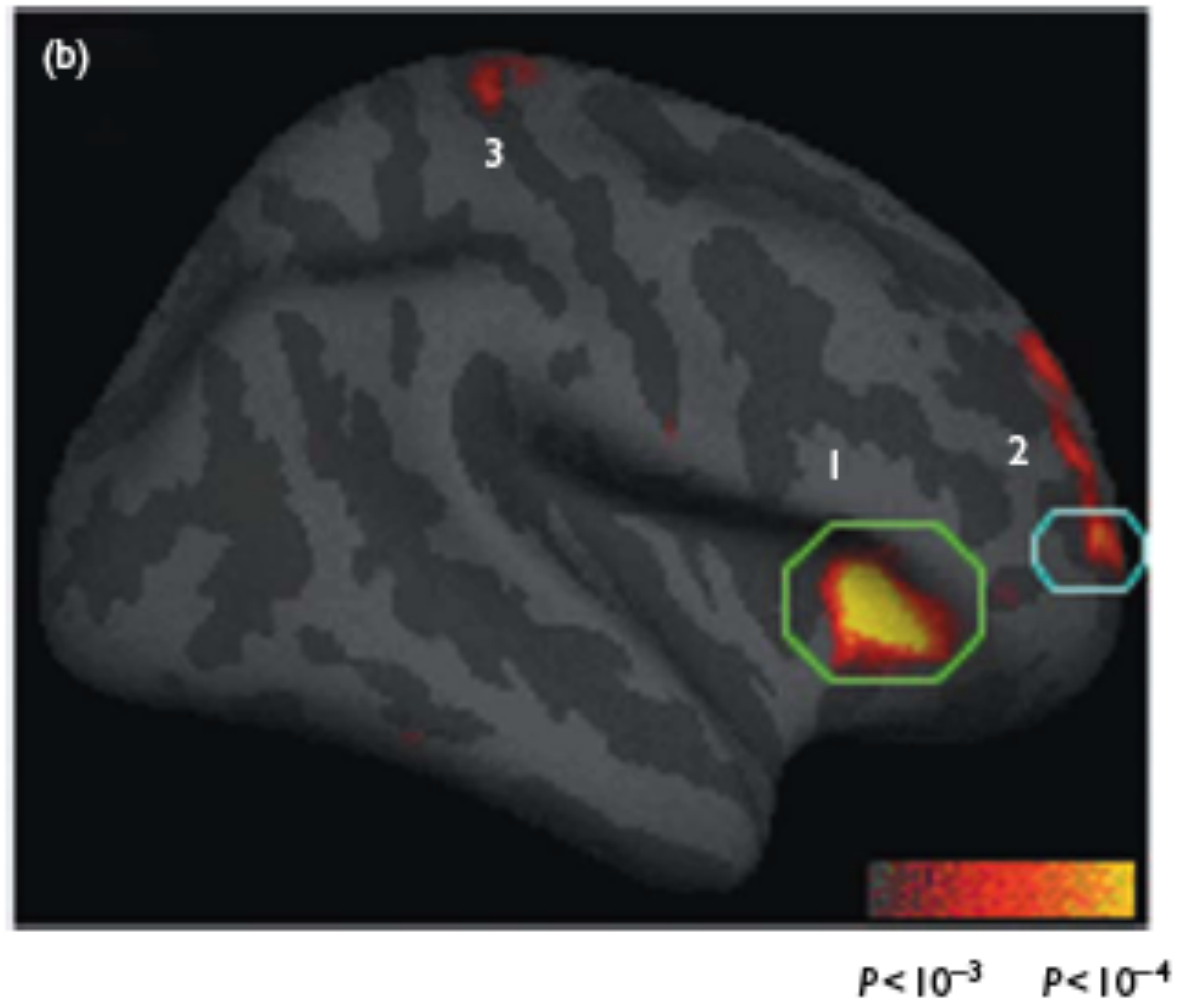
**Repeated neural activity
builds neural structure.**

A network of glowing yellow neurons with a central neuron highlighted in green. The neurons are interconnected by a dense web of fibers, creating a complex, interconnected structure. The background is dark, making the glowing neurons stand out. The text "Neurons that fire together," is overlaid on the top left, and "wire together." is overlaid on the bottom right.

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

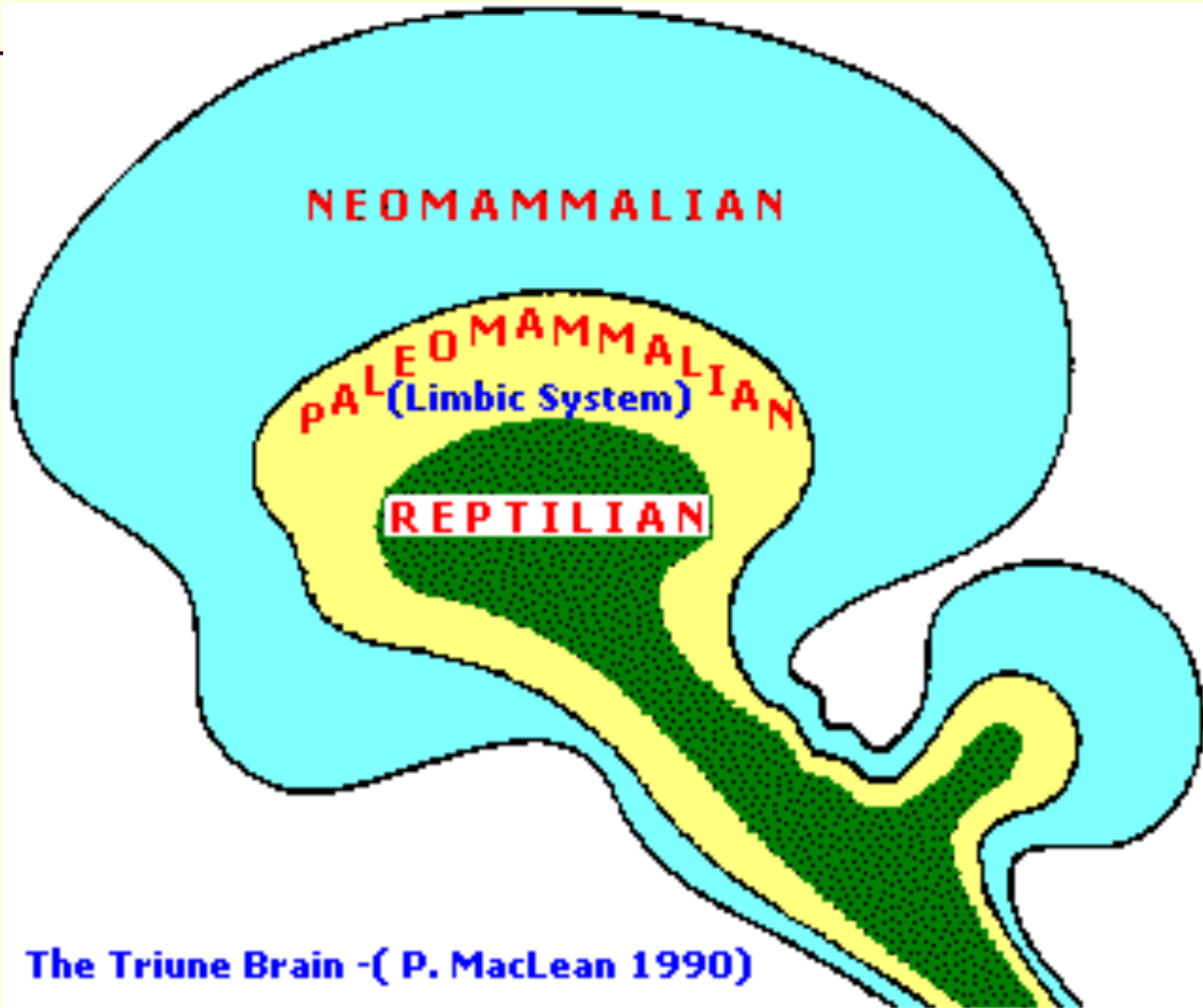
To change the mind for the better

To benefit ourselves and other beings.



The Evolution of Craving

Evolutionary History



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]

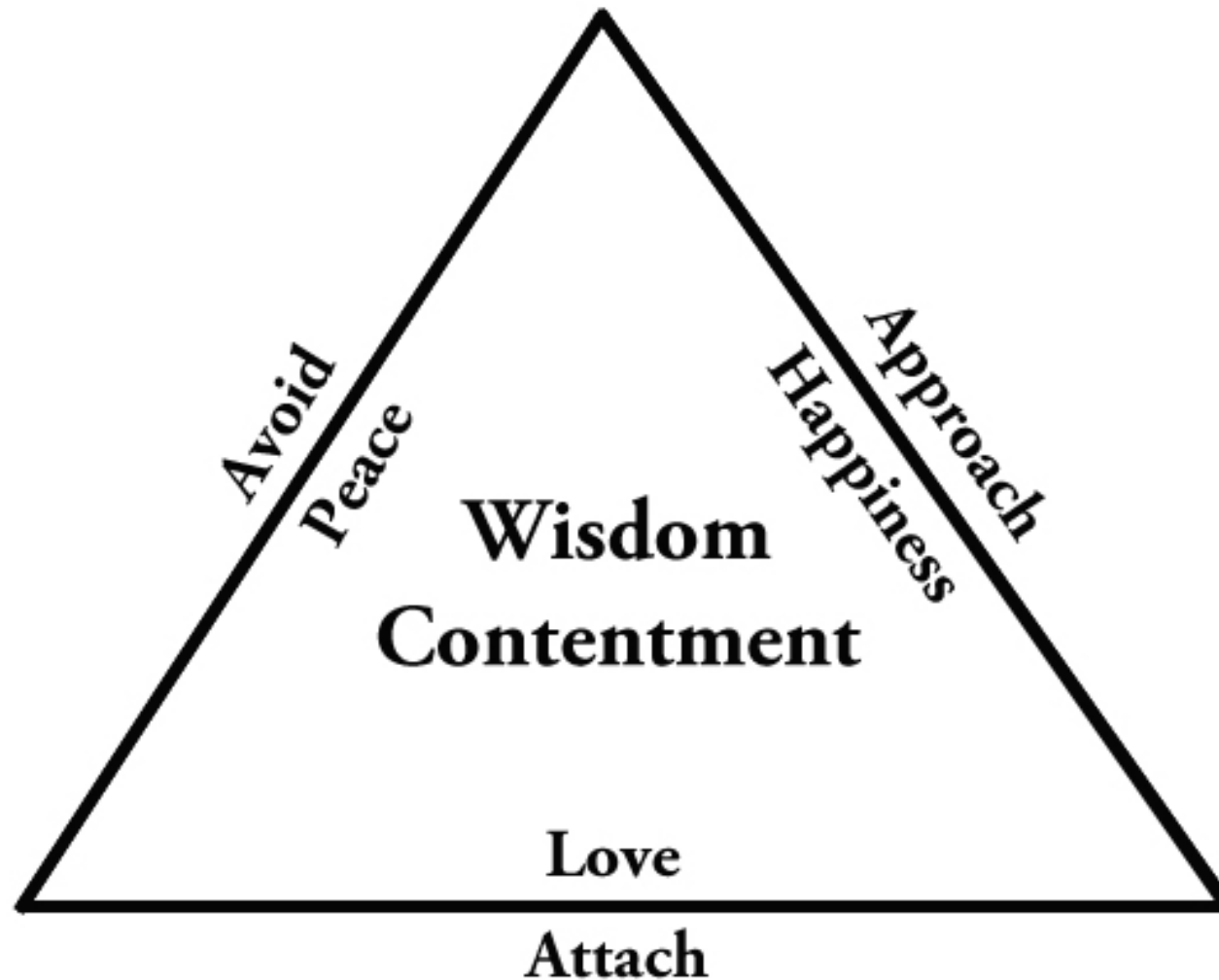
The body defaults to a sustainable equilibrium of refueling, repairing, and pleasant abiding.

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.

The Responsive Mode



Neurobiological Basis of Craving

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

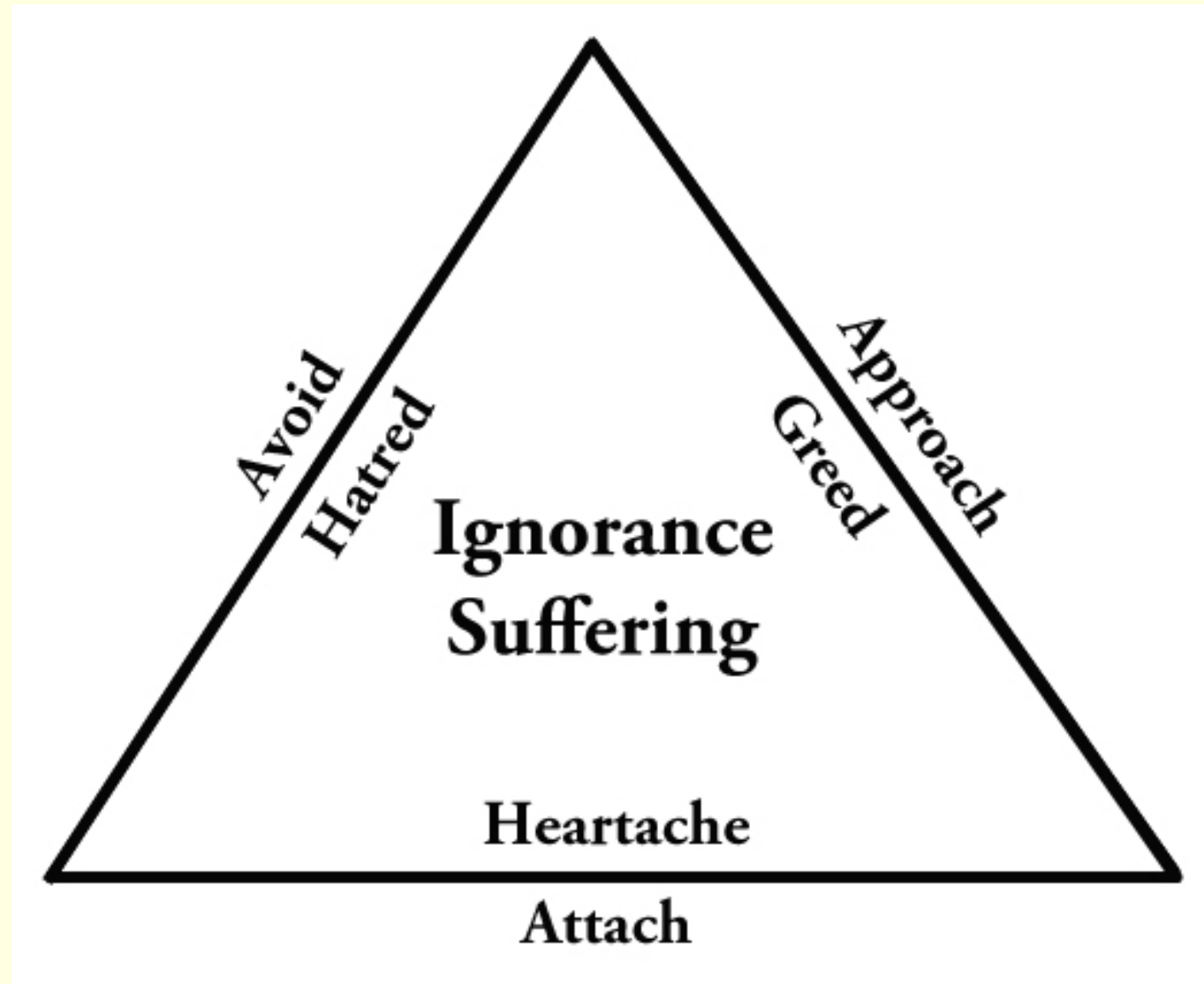
The body fires up into the stress response; outputs exceed inputs; long-term building is deferred.

The mind fires up into:

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

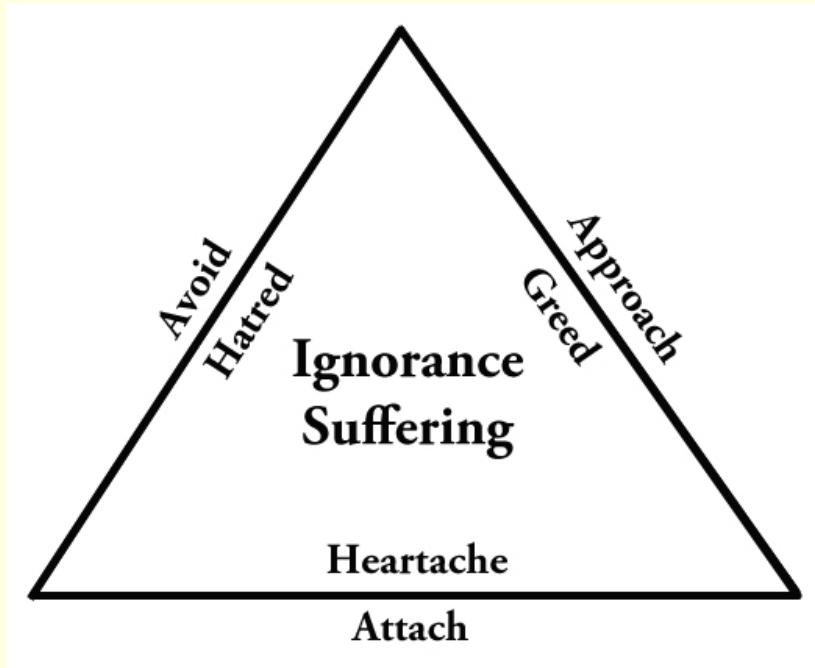
This is the brain in allostatic, **Reactive**, *craving* mode.¹⁹

The Reactive Mode

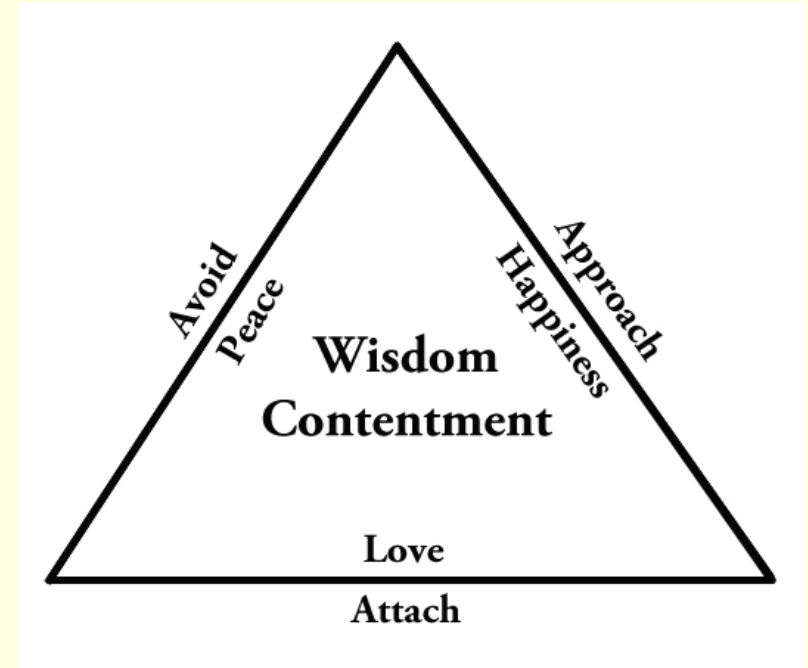


Choices . . .

Or?



Reactive Mode



Responsive Mode



The Negativity Bias

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 powerful than positive
 - Easy to create learned helplessness, hard to undo
 - Rapid sensitization to negative through cortisol
- Most good experiences are wasted on the brain: lowers both the results of practice and motivation

Velcro for Bad, Teflon for Good

The negativity bias

bad experiences

good experiences

Change in the Mind/Brain System

- Buddhism is a pragmatic study of change. Including in and of oneself. What is it that changes? And how could we help those changes go well?
- Changing the mind means changing the brain.
- Activated, transient mental states can become installed as enduring neural traits: neurobhavana.



Neurobhavana



SPIRIT ROCK MEDITATION CENTER



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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)

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 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

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.

The Fruit as the Path

Peace

Contentment

Love

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.

*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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- Kornfield, J. 2009. *The Wise Heart*. Bantam.
- 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.
- Braver, T. & Cohen, J. 2000. On the control of control: The role of dopamine in regulating prefrontal function and working memory; in *Control of Cognitive Processes: Attention and Performance XVIII*. Monsel, S. & Driver, J. (eds.). MIT Press.
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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.
- Farb, N.A.S., Segal, Z.V., Mayberg, H., Bean, J., McKeon, D., Fatima, Z., and Anderson, A.K. 2007. Attending to the present: Mindfulness meditation reveals distinct neural modes of self-reflection. *SCAN*, 2, 313-322.
- Gillihan, S.J. & Farah, M.J. 2005. Is self special? A critical review of evidence from experimental psychology and cognitive neuroscience. *Psychological Bulletin*, 131:76-97.
- 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.
- Hanson, R. 2008. Seven facts about the brain that incline the mind to joy. In *Measuring the immeasurable: The scientific case for spirituality*. Sounds True.

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.
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Key Papers - 4

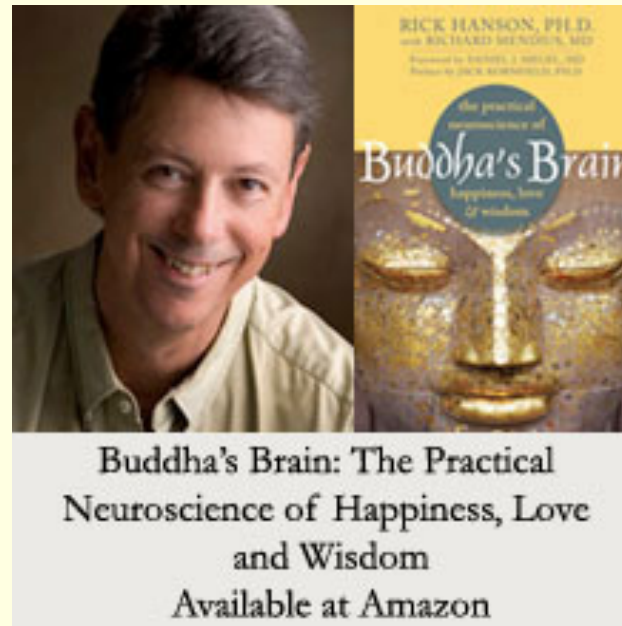
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- Thompson, E. & Varela F.J. 2001. Radical embodiment: Neural dynamics and consciousness. *Trends in Cognitive Sciences*, 5:418-425.
- Walsh, R. & Shapiro, S. L. 2006. The meeting of meditative disciplines and Western psychology: A mutually enriching dialogue. *American Psychologist*, 61:227-239.

Where to Find Rick Hanson Online



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

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



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www.WiseBrain.org

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**Buddhist Geeks Conference
August 16, 2013**

Rick Hanson, Ph.D.
The Wellspring Institute for Neuroscience and Contemplative Wisdom
WiseBrain.org RickHanson.net
drh@comcast.net