

Buddha's Brain

Wake Up Project

August 27, 2013

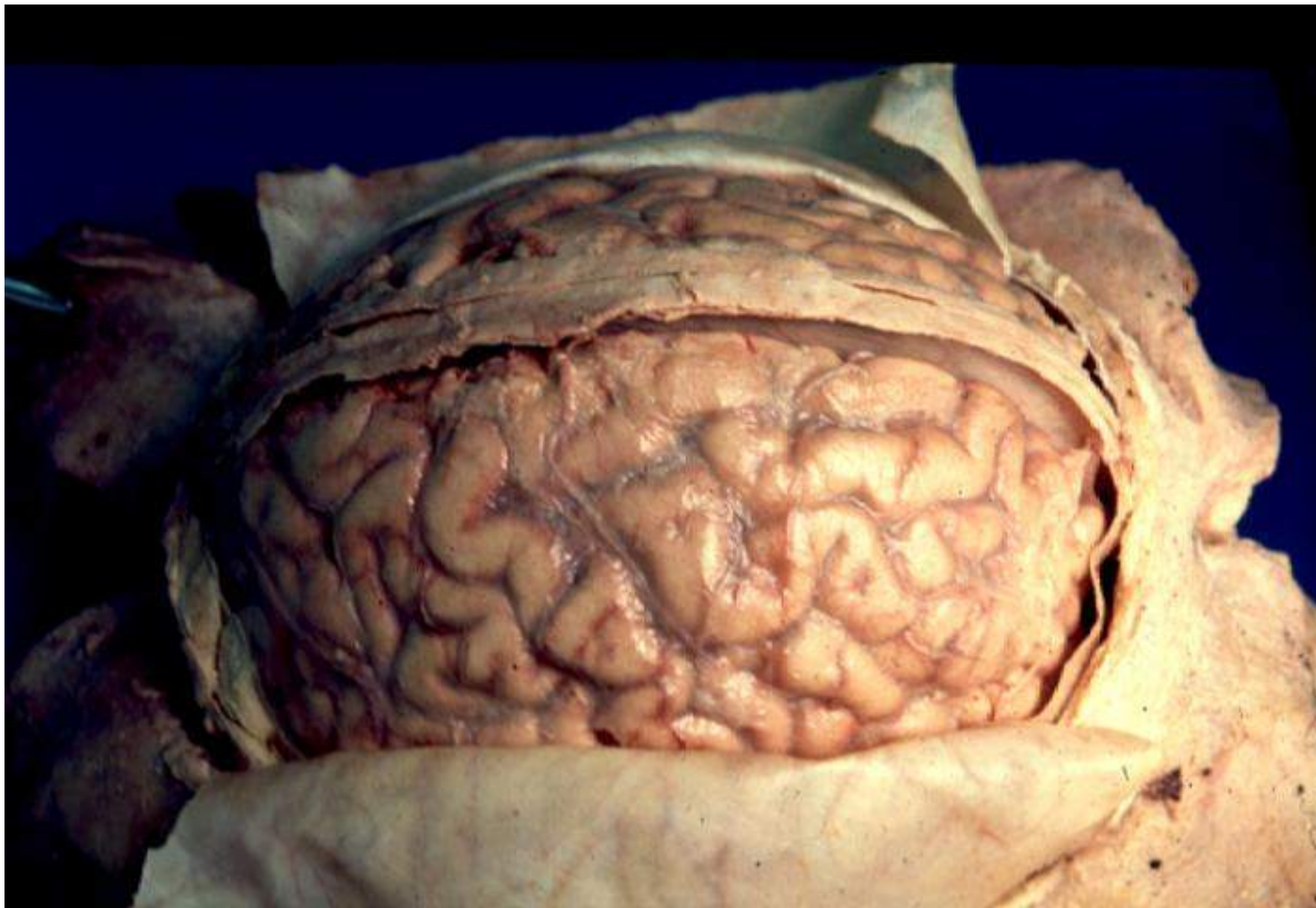
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WiseBrain.org RickHanson.net




Self-Directed Neuroplasticity



Three Facts about Brain and Mind


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



**Mental activity entails
underlying neural activity.**

Ardent, Diligent, Resolute, and Mindful





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

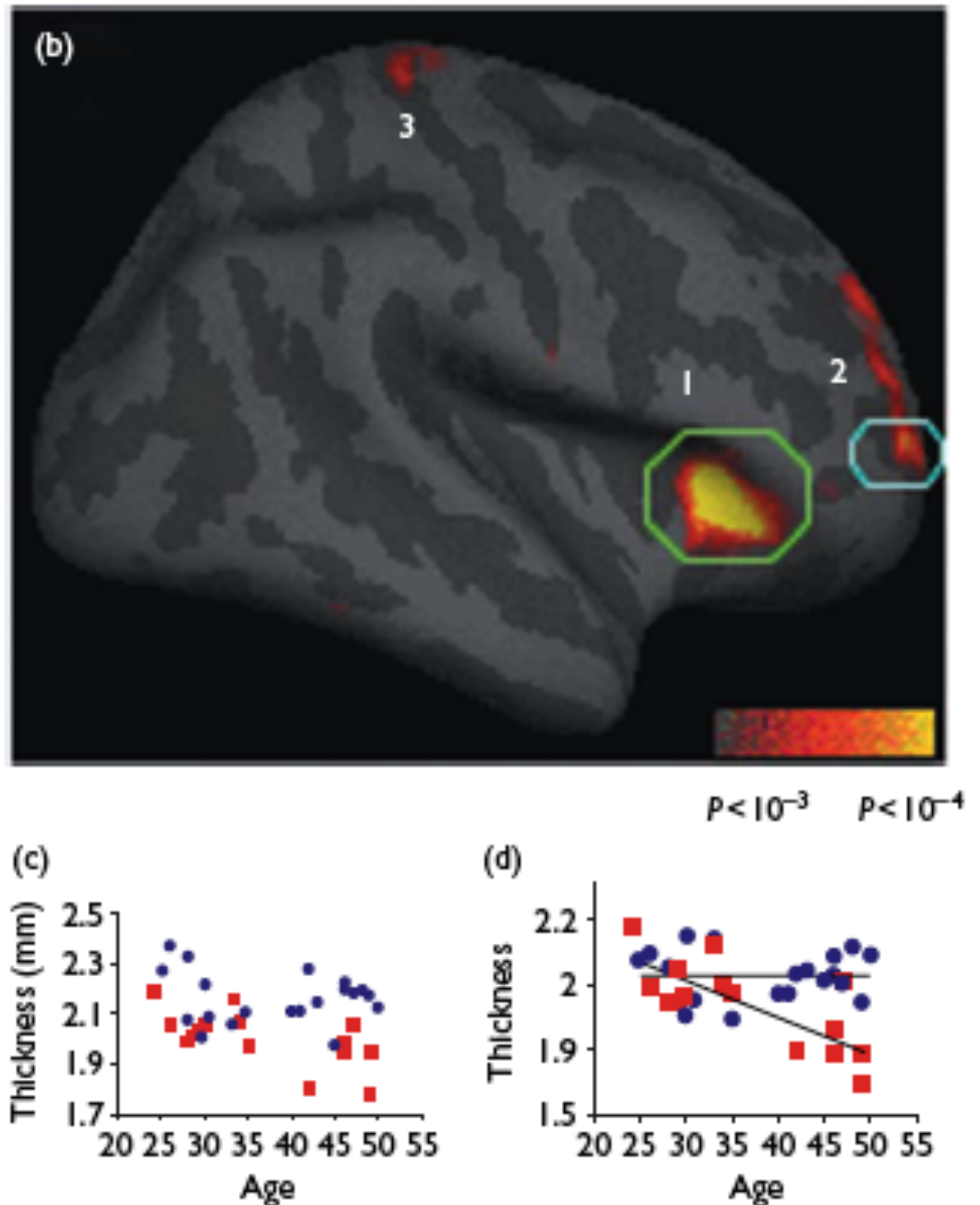
**Repeated neural activity
builds neural structure.**

A detailed illustration of a neural network. Numerous yellow, thread-like axons crisscross the frame, connecting various cell bodies. In the center, a single neuron is highlighted with a bright green nucleus and a glowing green cell body, making it stand out from the rest of the network. The background is dark, emphasizing the luminous quality of the neurons.

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.

Three Keys on the Path to a Buddha Brain

Cultivate yourself

Take in the good

Come home to green



Cultivate Yourself



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)

Causes of Suffering and Its End

- Mental and physical phenomena change due to causes.
- Causes in the brain are shaped by the mental/neural states that are activated and then installed within it.
- Inner “poisons” (e.g., hatred, greed, heartache, delusion) cause suffering and harm.
- **Inner strengths** (e.g., virtue, mindfulness, wisdom, peace, contentment, love) cause happiness and benefit for oneself and others.

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 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?

Negativity Bias

- As our ancestors evolved, not getting hit by “sticks” was more important for survival than getting “carrots.”
- Negative stimuli get more attention and processing. Loss aversion.
- Preferential encoding in implicit memory:
 - Easy to create learned helplessness, hard to undo
 - Negative interactions: more powerful than positive
 - Good at learning from bad, bad at learning from good
 - 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

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.



Take in the Good

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 (optional).

Benefits: Specific contents internalized. Implicit value of being active and treating yourself like you matter. Gradual sensitization of the brain to the positive.

A wide-angle photograph of the Grand Canyon at dusk or dawn. The foreground shows a rugged, layered rock cliff with some green shrubs. In the background, the vast canyon stretches out with its iconic buttes and mesas under a sky with soft, colorful clouds. The text "Savor the experience" is overlaid in a white serif font across the middle of the image.

Savor the experience

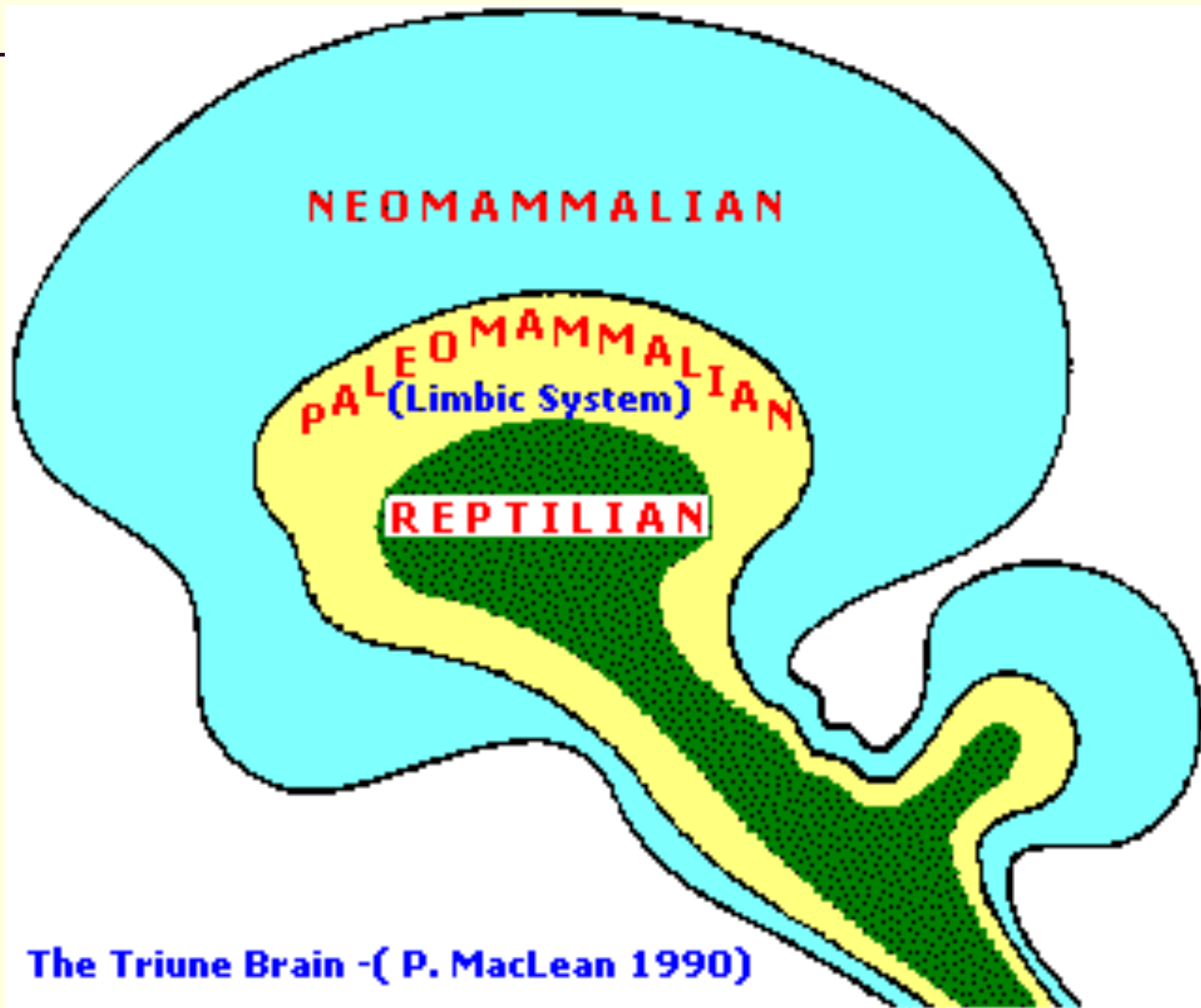


Sense the experience sinking into you.



Come Home to Green

Evolutionary History



Stone age brains in the 21st century



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]

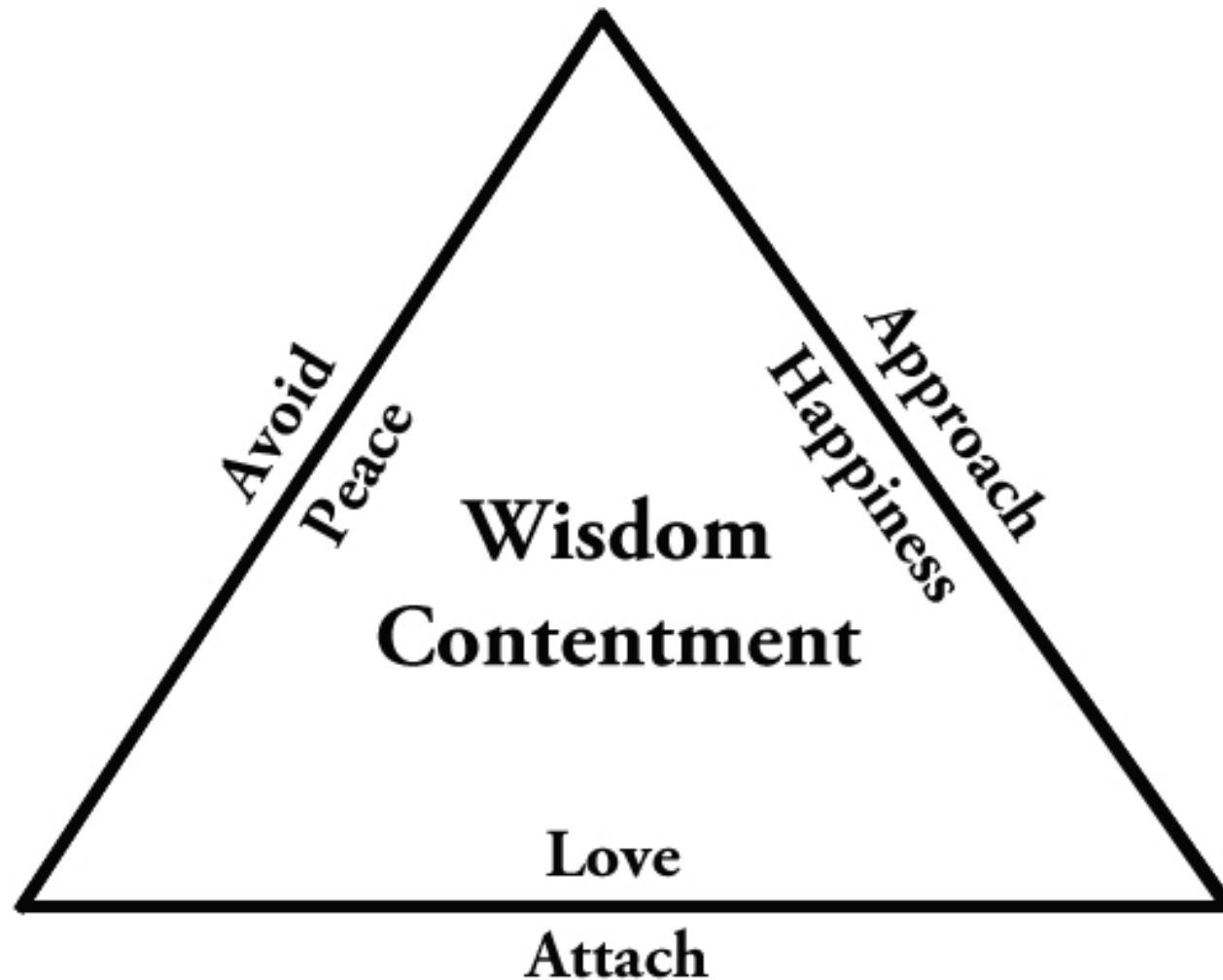
The body defaults to a sustainable equilibrium of refueling, repairing, and pleasant abiding.

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**, “green zone,” *minimal craving* mode.

The Responsive Mode



Neurobiological Basis of Craving

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

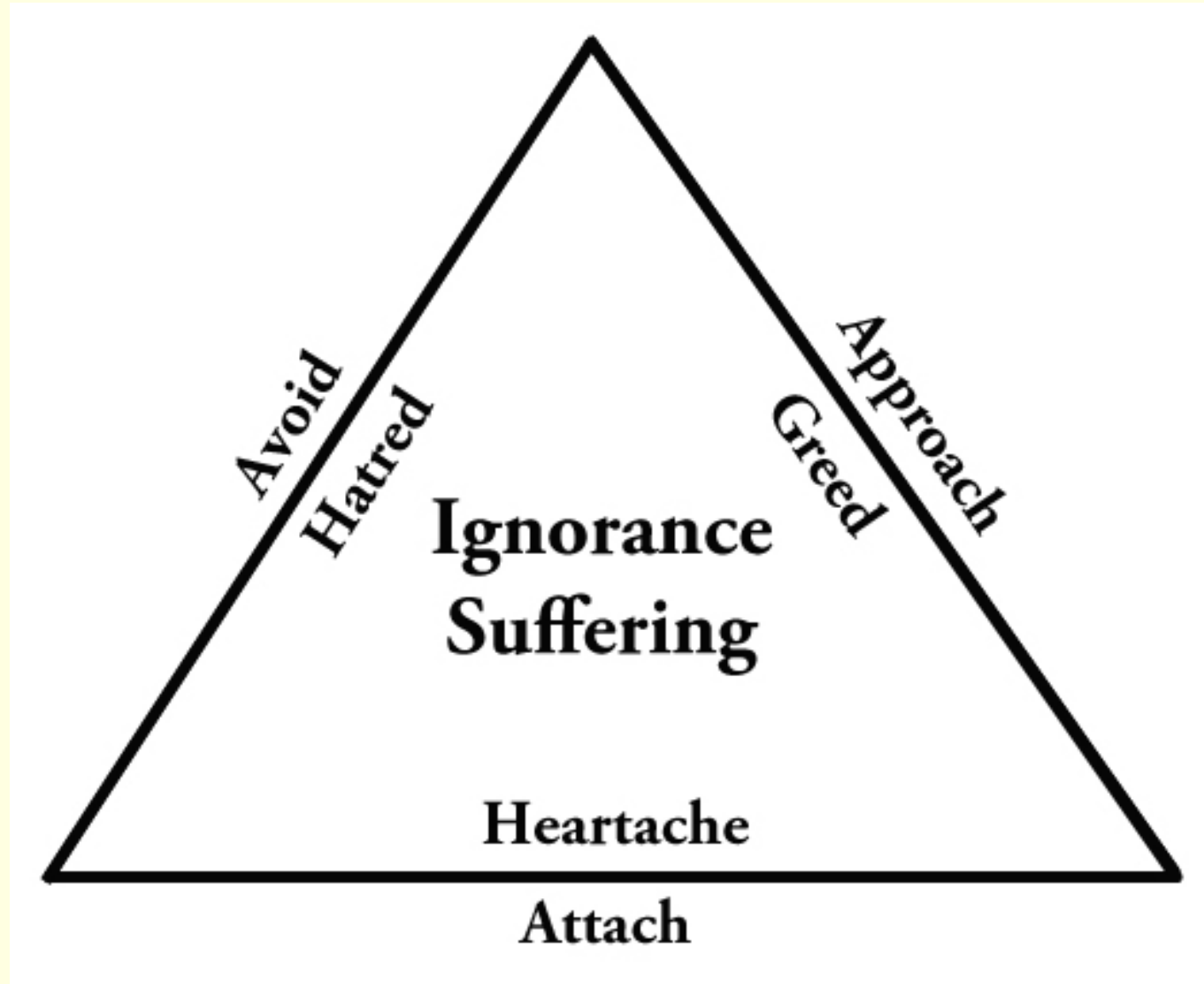
The body fires up into the stress response; outputs exceed inputs; long-term building is deferred.

The mind fires up into:

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

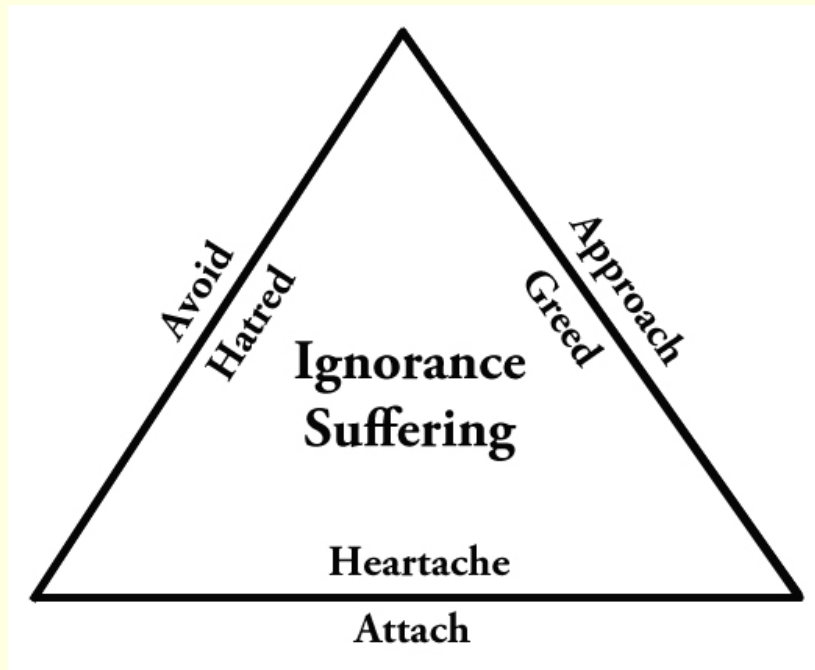
This is the brain in allostatic, ***Reactive***,
“red zone,” *craving* mode.

The Reactive Mode

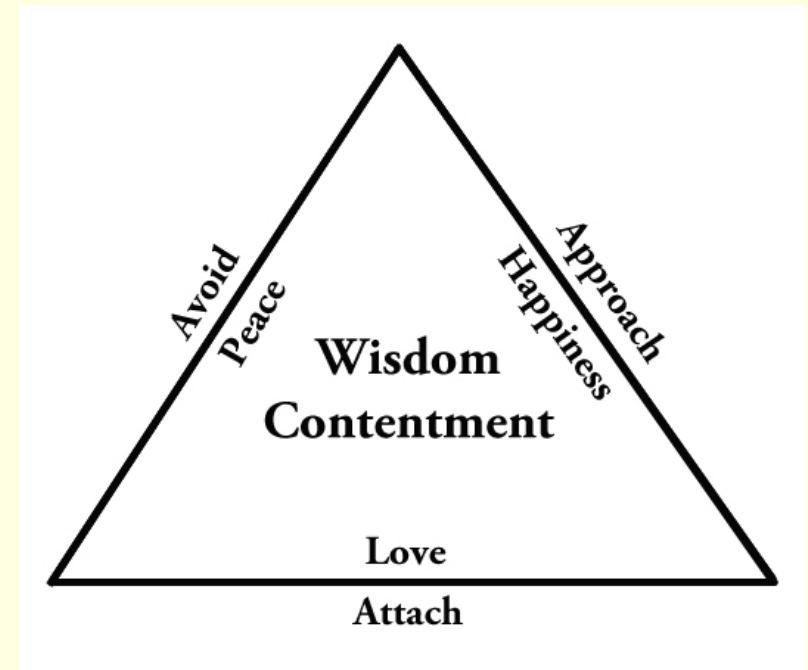


Choices . . .

Or?



Reactive Mode



Responsive Mode

The Fruit as the Path

Peace

Contentment

Love



The Law of Little Things

*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.
- Keltner, D. 2009. *Born to Be Good*. Norton.
- 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.
- Carter, O.L., Callistemon, C., Ungerer, Y., Liu, G.B., & Pettigrew, J.D. 2005. Meditation skills of Buddhist monks yield clues to brain's regulation of attention. *Current Biology*, 15:412-413.

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.
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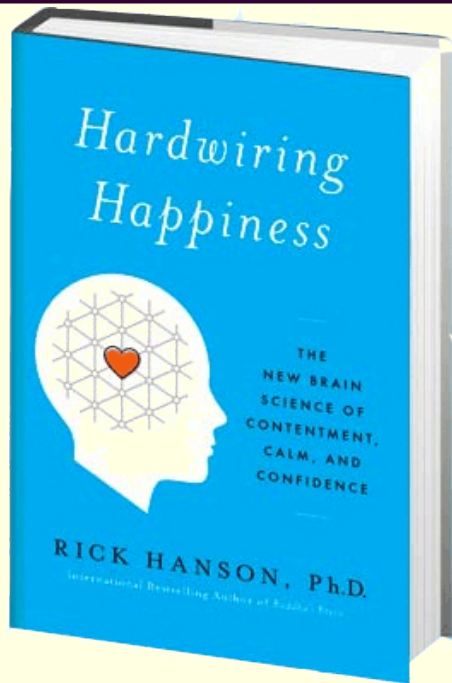
Key Papers - 3

- 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.
- Lutz, A., Slager, H.A., Dunne, J.D., & Davidson, R. J. 2008. Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, 12:163-169.

Key Papers - 4

- Rozin, P. & Royzman, E.B. 2001. Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5:296-320.
- 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.
- Tang, Y.-Y., Ma, Y., Wang, J., Fan, Y., Feng, S., Lu, Q., Yu, Q., Sui, D., Rothbart, M.K., Fan, M., & Posner, M. 2007. Short-term meditation training improves attention and self-regulation. *PNAS*, 104:17152-17156.
- 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



Hardwiring Happiness: The New Brain Science of Contentment, Calm, and Confidence

www.rickhanson.net/hardwiringhappiness

Personal website: www.rickhanson.net

Wellspring Institute: www.wisebrain.org



youtube.com/drrhanson



facebook.com/rickhansonphd