

The Benevolent Brain

Morro Bay
May 18, 2012

Rick Hanson, Ph.D.

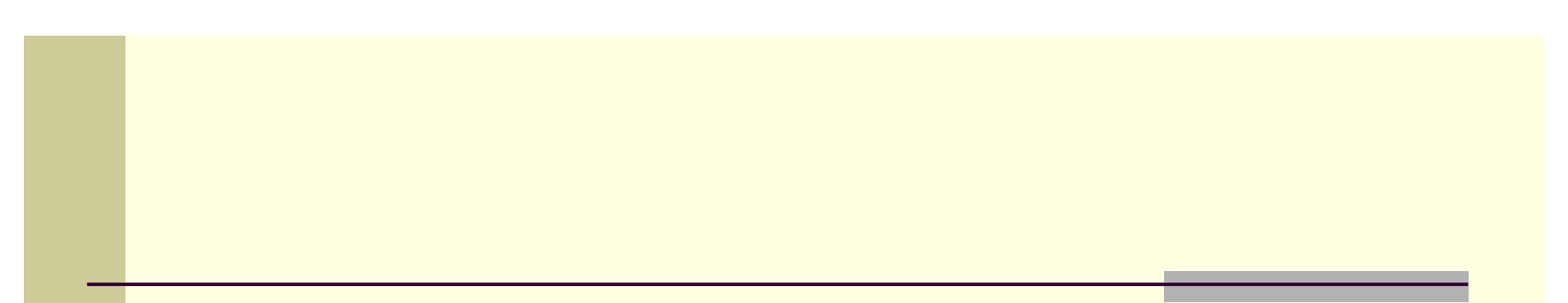
The Wellspring Institute for Neuroscience and Contemplative Wisdom

WiseBrain.org RickHanson.net

drh@comcast.net

Topics

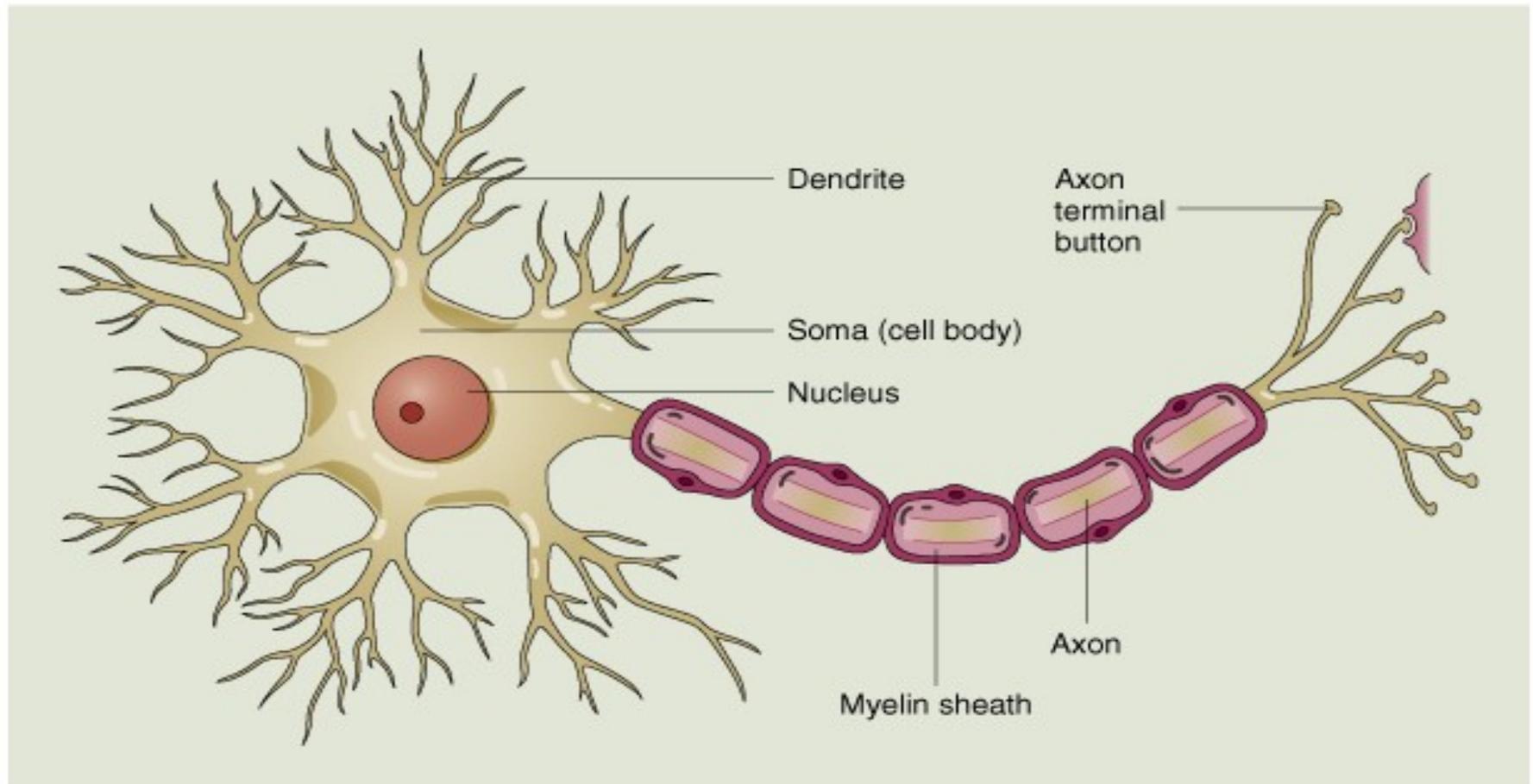
- **Using your mind to change your brain**
- **Loving nature**
- **Generosity**
- **Two wolves in the heart**
- **Taking in the good**



Using Your Mind to Change Your Brain



A Neuron



© 2000 John Wiley & Sons, Inc.

Fact #1

As your brain changes, your mind changes.



Ways That Brain Can Change Mind

■ 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

As your mind changes, your brain changes.

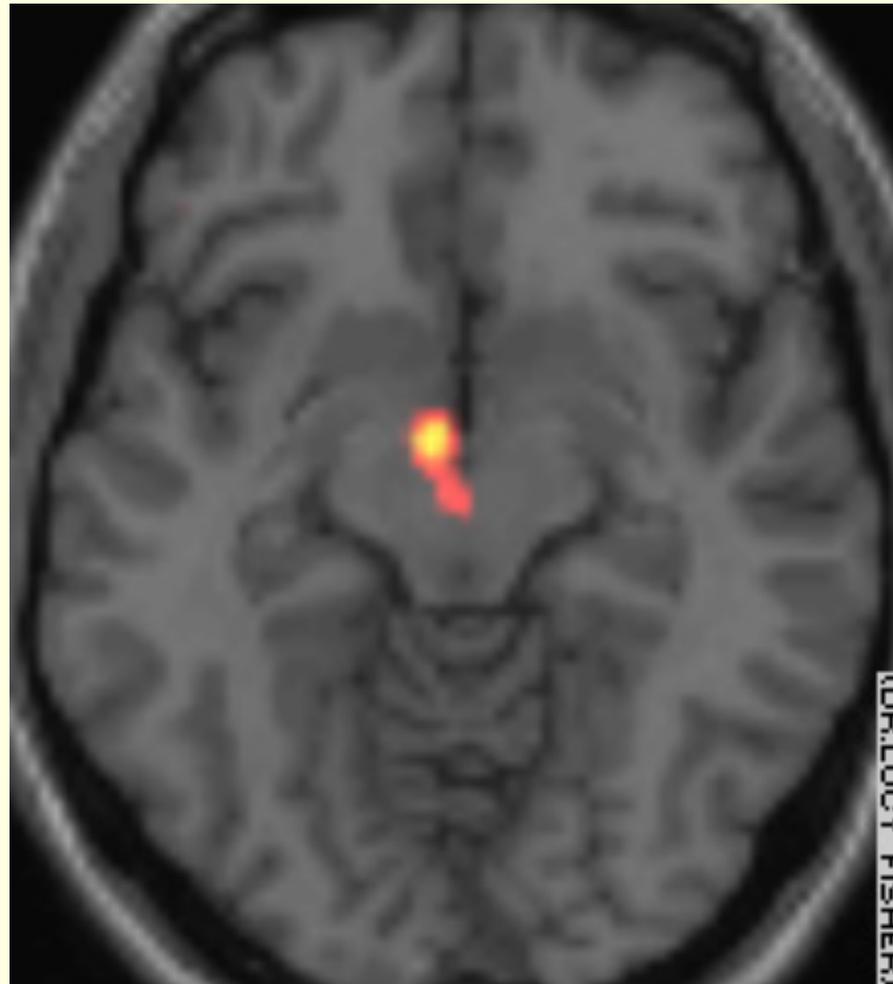
Immaterial mental activity maps to material neural activity.

This produces temporary changes in your brain and lasting ones.

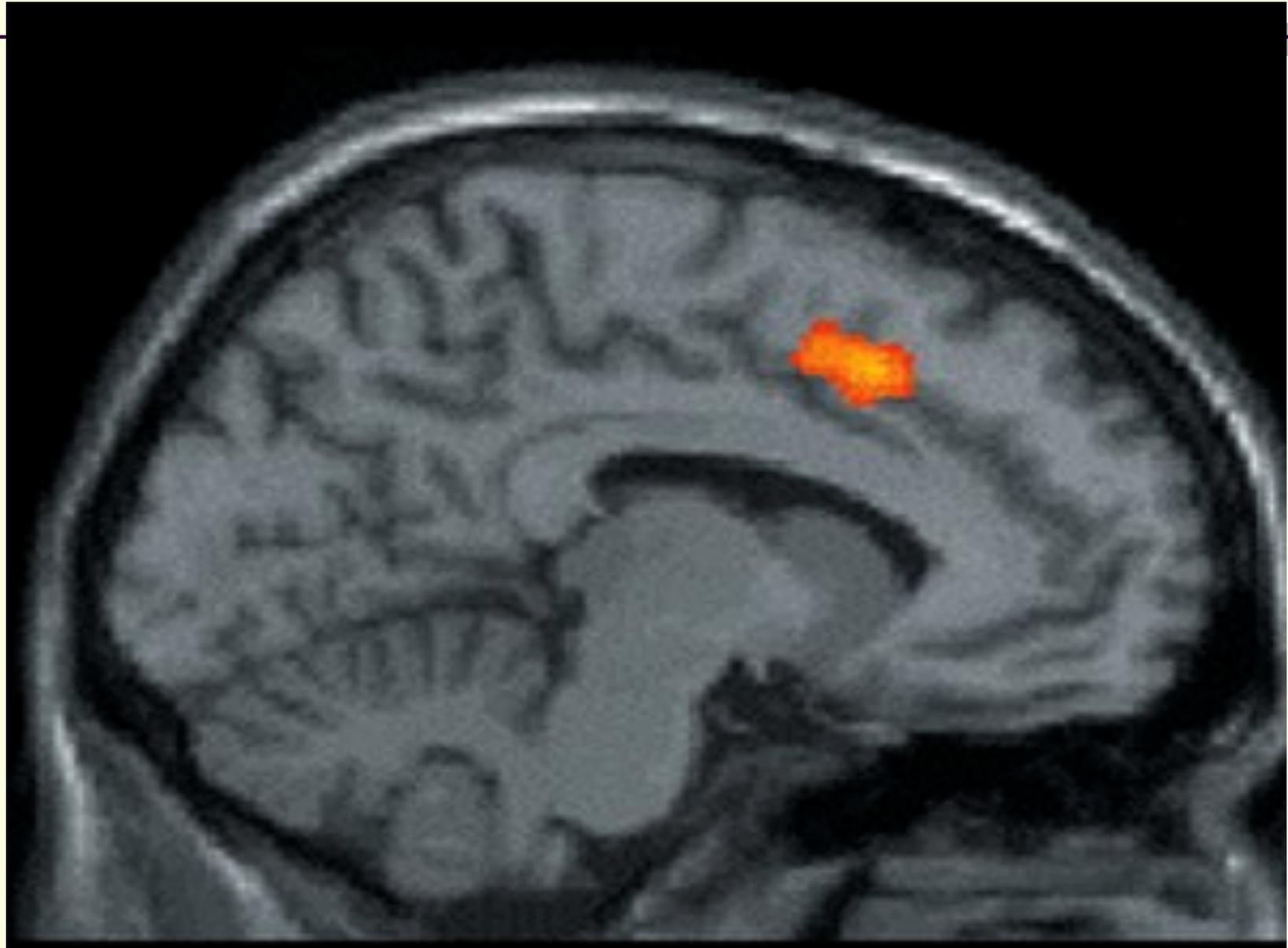
Temporary changes include:

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

The Rewards of Love



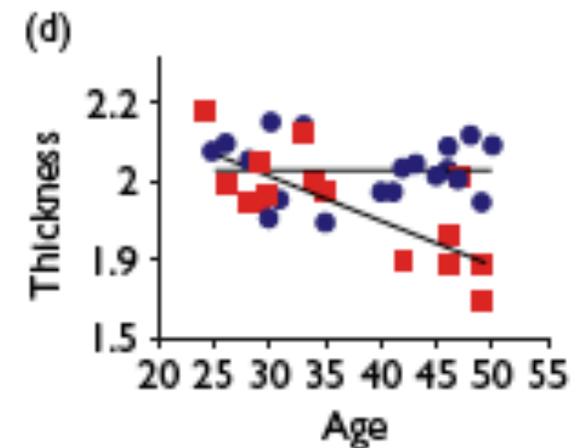
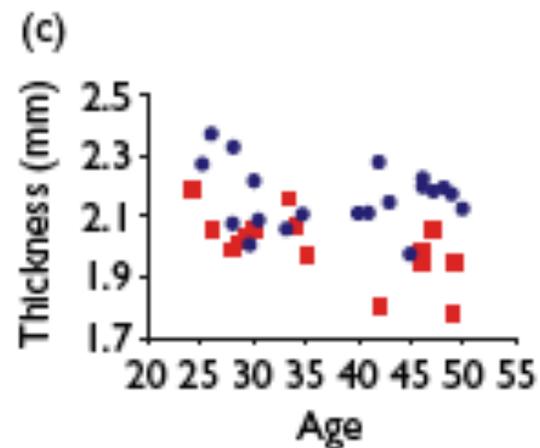
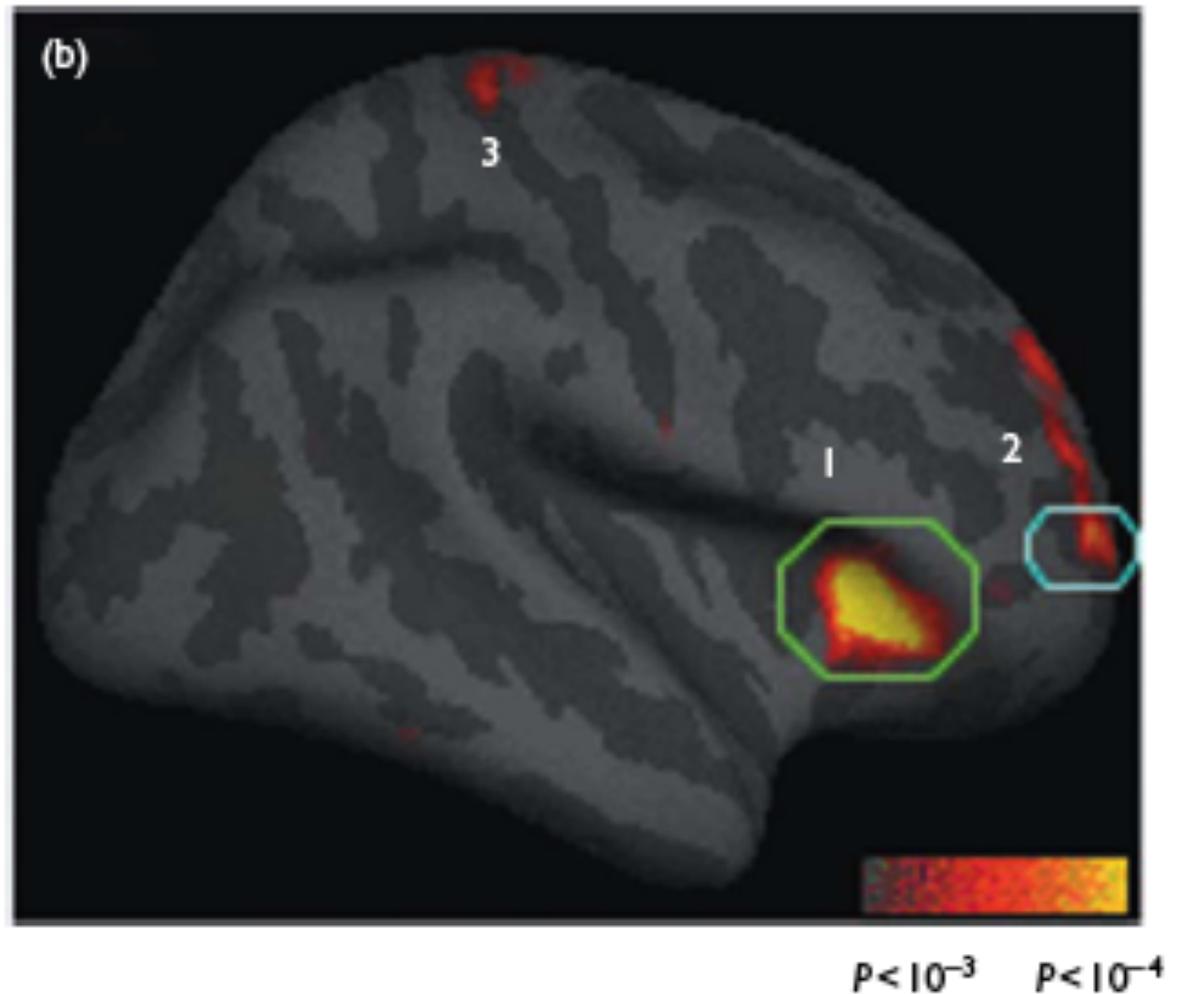
Tibetan Monk, Boundless Compassion



Mind Changes Brain in Lasting Ways

- 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

One's experience *matters*.

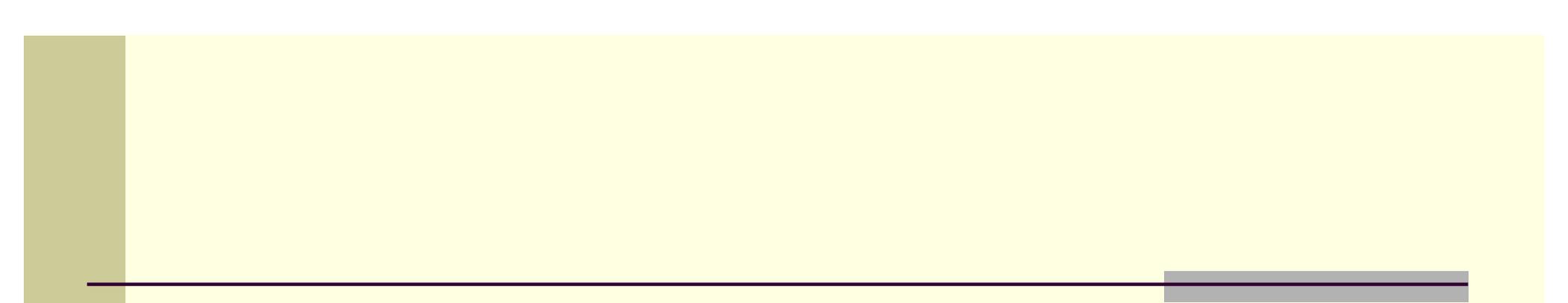
**Both for how it feels in the moment
and for the lasting residues it leaves behind,
woven into the fabric of a person's brain and being.**

Fact #3

You can use your mind
to change your brain
to change your mind for the better.

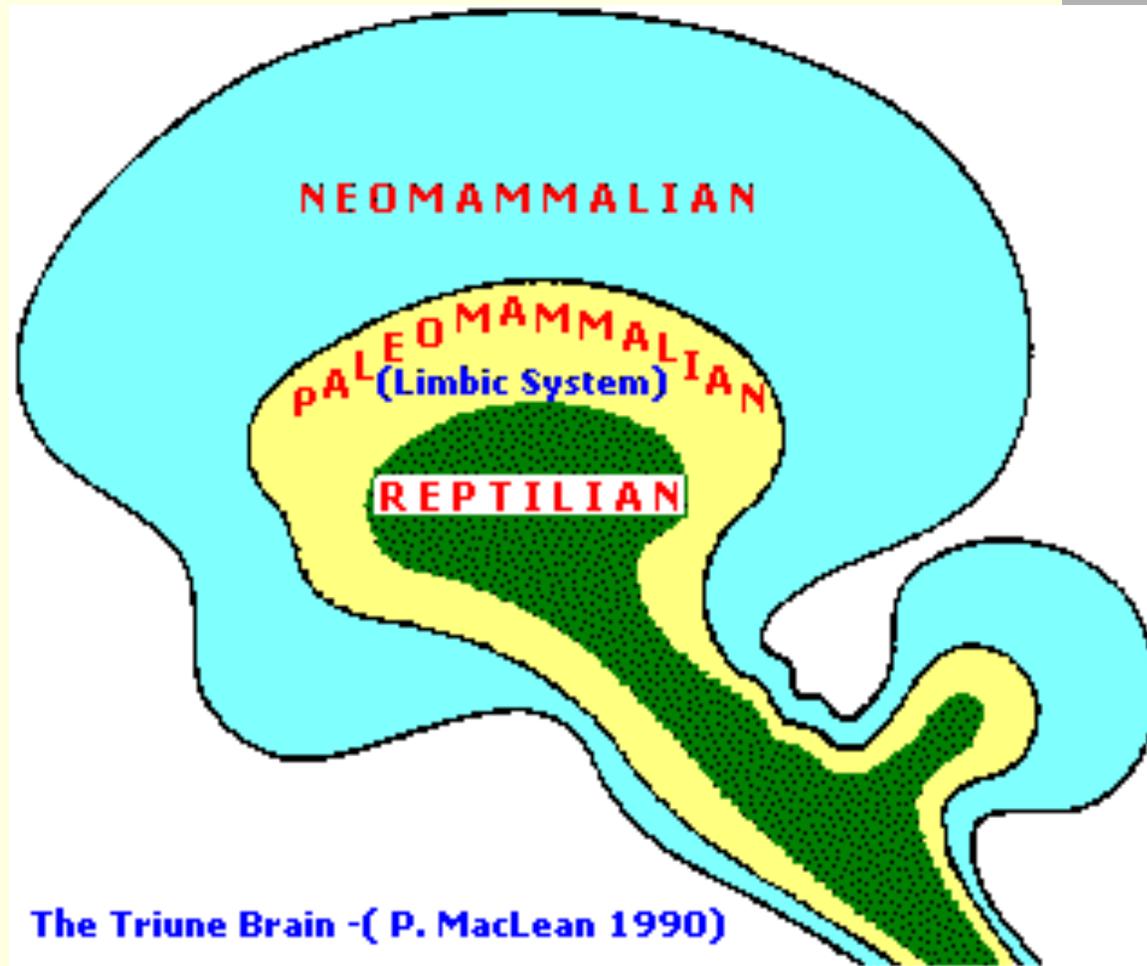
This is self-directed neuroplasticity.

How to do this, in skillful ways?



Loving Nature

Evolutionary History



The Triune Brain

Three Stages of Brain Evolution

■ Reptilian:

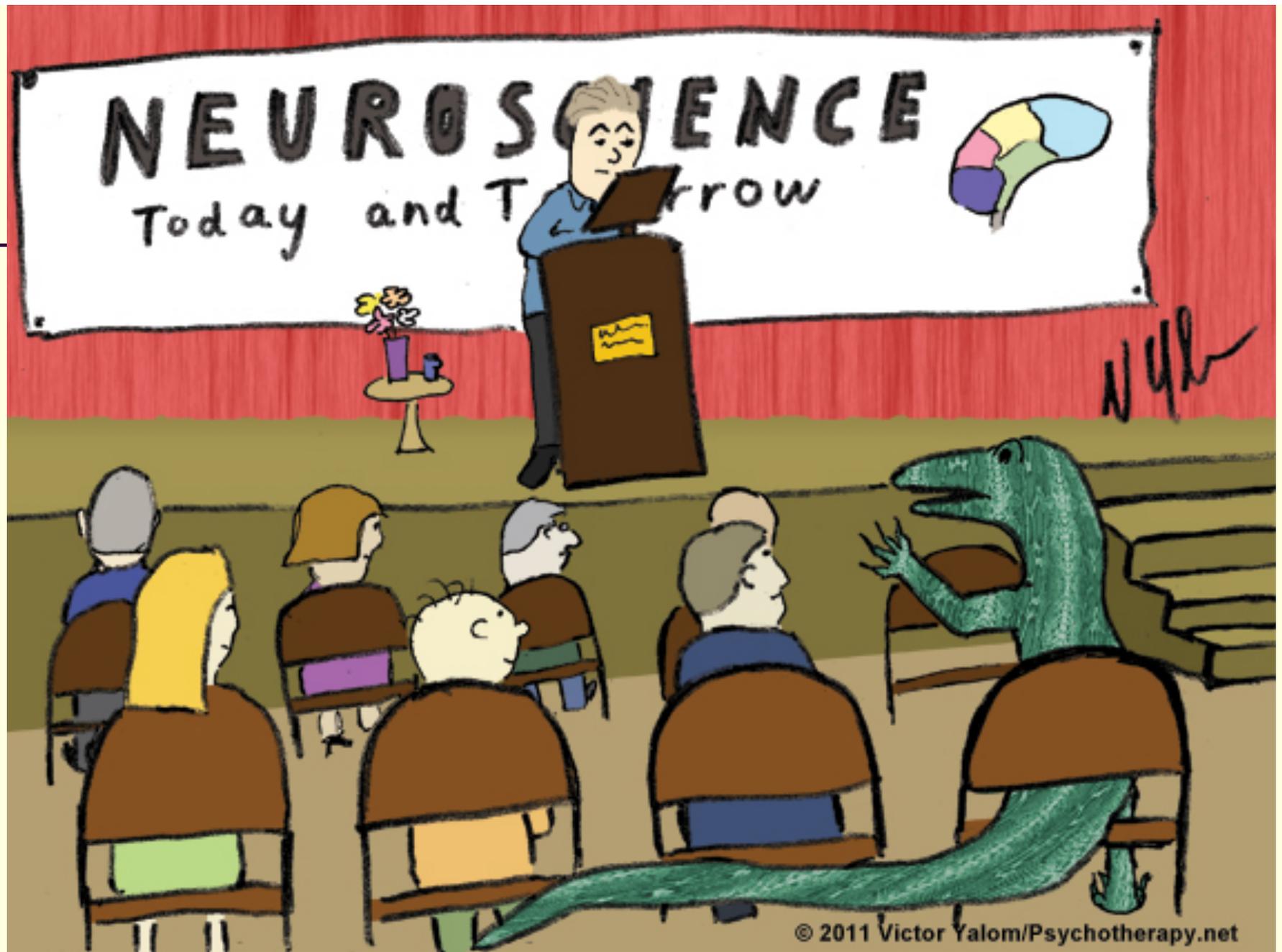
- Brainstem, cerebellum, hypothalamus
- Reactive and reflexive
- **Avoid** hazards

■ 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”



© 2011 Victor Yalom/Psychotherapy.net

"With all due respects, I find your disparaging remarks about the 'reptilian brain' unnecessary"

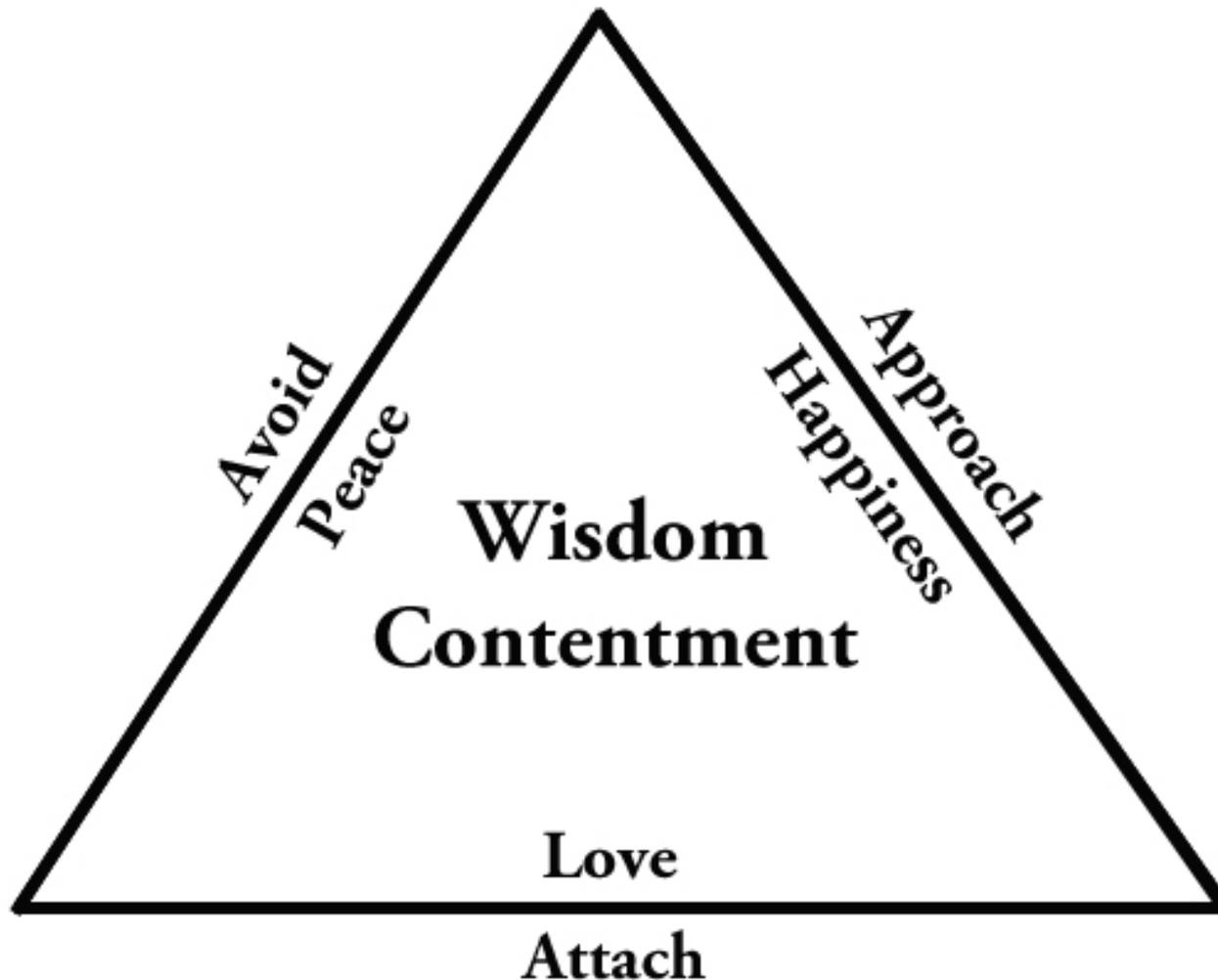
Home Base of the Human Brain

When not threatened, ill, in pain, hungry, upset, or chemically disturbed, most people settle into being:

- **Peaceful** (the Avoid system)
- **Happy** (the Approach system)
- **Loving** (the Attach system)

This is the brain in its natural, ***Responsive*** mode.

The Responsive Mode



The Social Brain

- Social capabilities have been a primary driver of brain evolution.
- Reptiles and fish avoid and approach. Mammals and birds *attach* as well - especially primates and humans.
- Mammals and birds have bigger brains than reptiles and fish.
- The more social the primate species, the bigger the cortex.
- Since the first hominids began making tools ~ 2.5 million years ago, the brain has roughly tripled in size, much of its build-out devoted to social functions (e.g., cooperative planning, empathy, language). The growing brain needed a longer childhood, which required greater pair bonding and band cohesion.







All sentient beings developed through natural selection in such a way that pleasant sensations serve as their guide, and especially the pleasure derived from sociability and from loving our families.

Charles Darwin















PTP Art - Copyright - P.T. Blue Moon













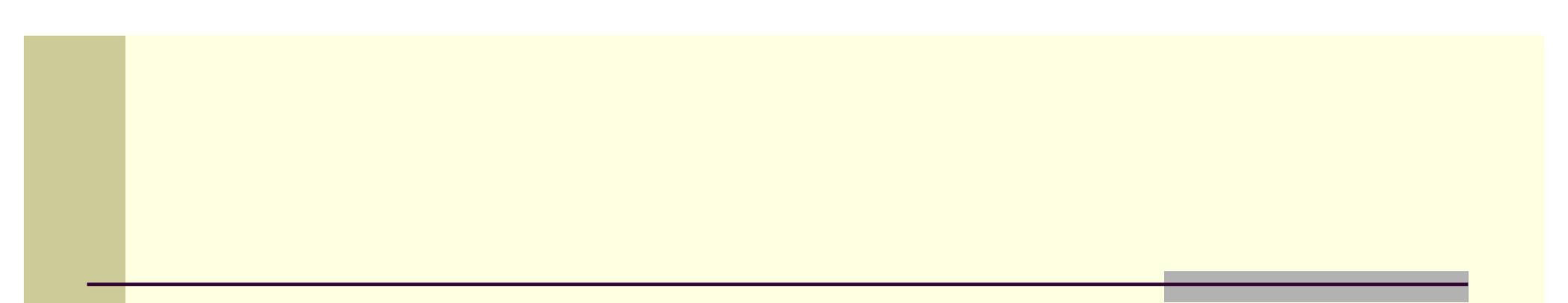












Generosity



If there is anything I have learned about [people], it is that there is a deeper spirit of altruism than is ever evident.

Just as the rivers we see are minor compared to the underground streams, so, too, the idealism that is visible is minor compared to what people carry in their hearts unreleased or scarcely released.

(Hu)mankind is waiting and longing for those who can accomplish the task of untying what is knotted, and bringing these underground waters to the surface.

*If people knew, as I know, the results of giving and sharing,
they would not eat without having given,
nor would they allow the stain of niggardliness
to obsess them and root in their minds.*

*Even if it were their last morsel, their last mouthful,
they would not eat without having shared it,
if there were someone to share it with.*

The Buddha

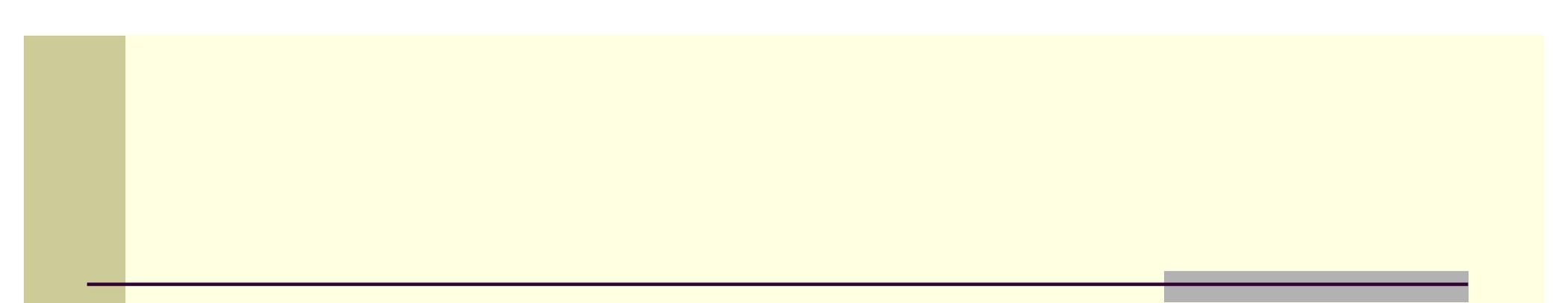
Generosity Takes Many Forms

- Attention
- Heart
- Practice
- Time
- Patience
- Service
- Food
- Money









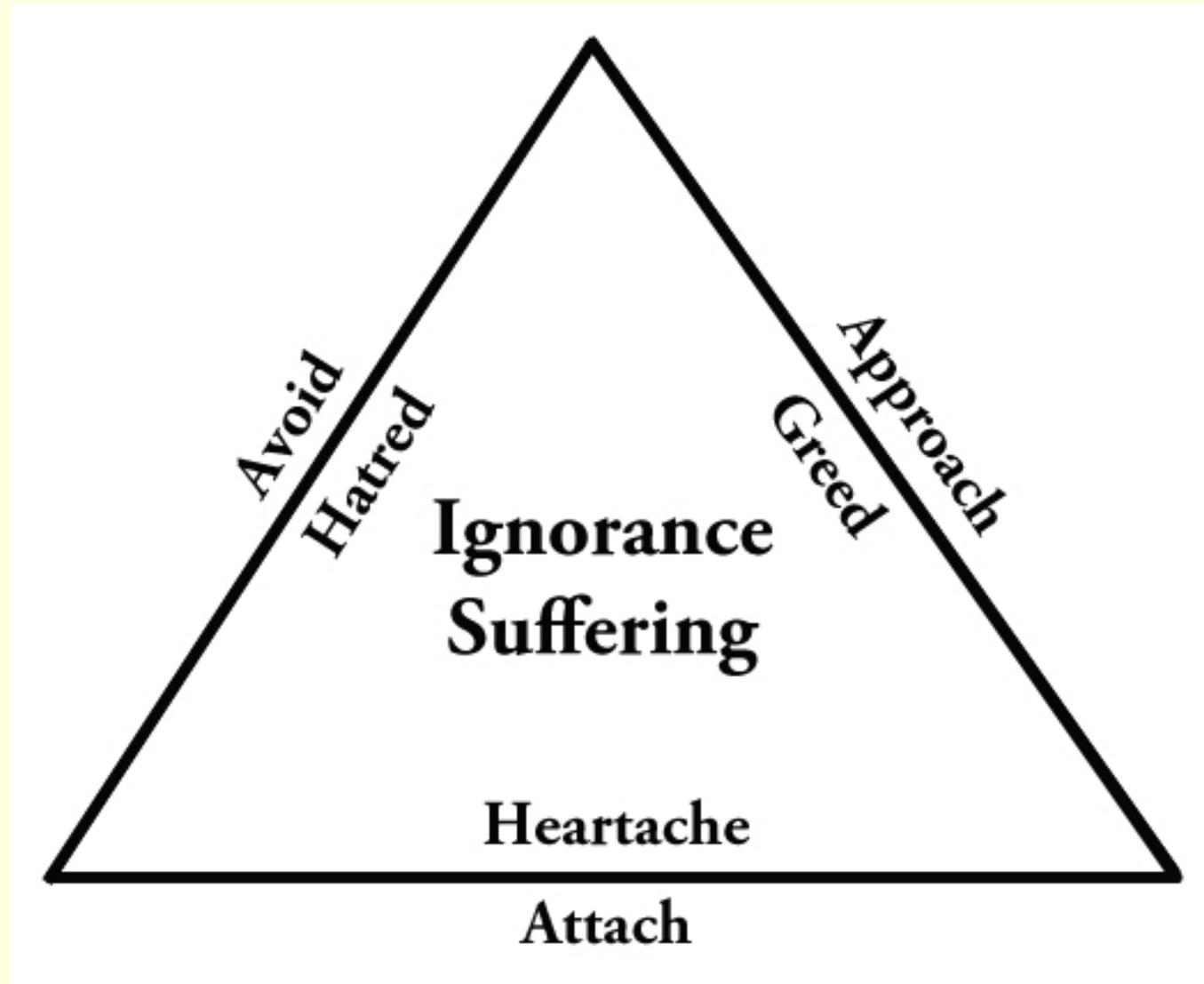
Two Wolves in the Heart

But to Cope with Urgent Needs, We Leave Home . . .

- **Avoid:** When we feel threatened or harmed
- **Approach:** When we can't attain important goals
- **Attach:** When we feel isolated, disconnected, unseen, unappreciated, unloved

This is the brain in its ***Reactive*** mode of functioning
- a kind of inner homelessness.

The Reactive Mode



Us and Them

- Core evolutionary strategy: within-group cooperation, and between-group aggression.
- Both capacities and tendencies are hard-wired into our brains, ready for activation. And there is individual variation.
- Our biological nature is much more inclined toward cooperative sociability than toward aggression and indifference or cruelty. We are just very reactive to social distinctions and threats.
- That reactivity is intensified and often exploited by economic, cultural, and religious factors.
- Two wolves in your heart:
 - Love sees a vast circle in which all beings are “us.”
 - Hate sees a small circle of “us,” even only the self.

Which one will you feed?

*In between-family fights, the baboon's 'I'
expands to include all of her close kin;
in within-family fights,
it contracts to include only herself.*

*This explanation serves for baboons
as much as for the Montagues and Capulets.*

A Poignant Truth

Mother Nature is tilted toward producing gene copies.

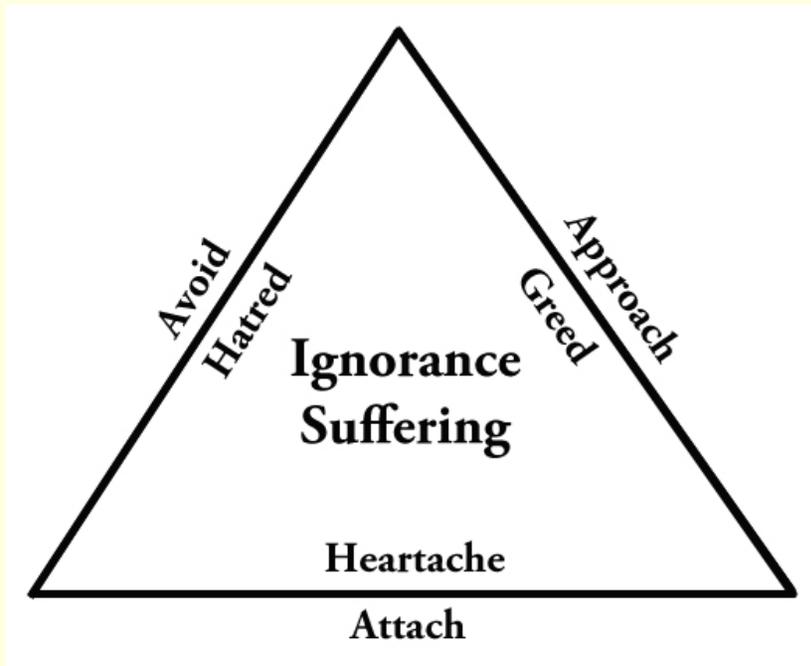
But tilted against personal quality of life.

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

What shall we do?

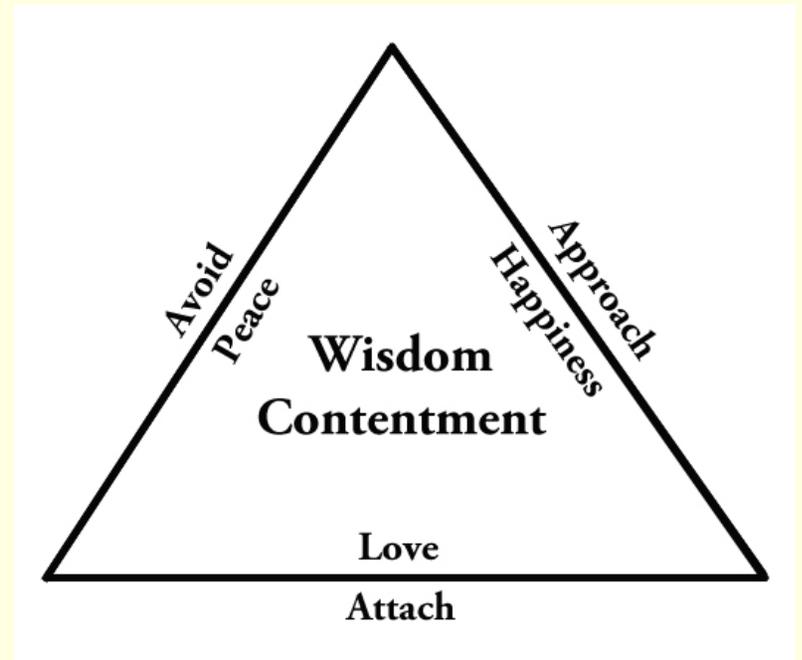
*We can deliberately use the mind
to change the brain for the better.*

Choices . . .

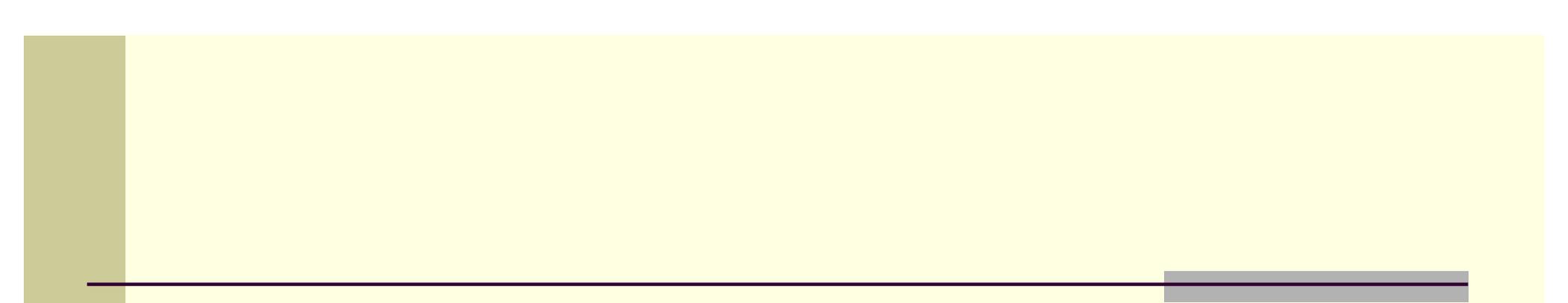


Reactive Mode

Or?



Responsive Mode



Taking in the Good

The Importance of Inner Resources

- Examples:
 - Freud's "positive introjects"
 - Intrapersonal factors/processes of resilience, such as: learned optimism, emotional intelligence, "ego strength," self-worth, determination, problem-solving skills, and personally meaningful spirituality

- Benefits
 - Lift mood and increase positive emotions: many physical and mental health benefits
 - Improve self-regulation
 - Improve outlook on world, self, and future
 - Increase resilience

How to Take in the Good (TIG)

1. Have a good experience.
 - You are already having one.
 - You deliberately recognize a good fact and let it become a good experience.
2. Extend the good experience in:
 - Time - for 10-20-30+ seconds
 - Space - in your body and feelings
 - Intensity - help it become stronger
3. Absorb the good experience by intending and sensing that is becoming a part of you, woven into the fabric of your brain and being.

Types of Good Facts

- Conditions (e.g., food, shelter, fresh air, have friends, dog loves you, flowers blooming, ain't dead yet)
- Events (e.g., finished a load of laundry, someone was friendly to you, this cookie tastes good)
- Qualities within oneself (e.g., fairness, decency, determination, good at baking, loving toward kids)

Components of a Good Experience

- Bodily states - healthy arousal; PNS; vitality
- Emotions - both feelings and mood
- Views - expectations; object relations; perspectives on self, world, past and future
- Behaviors - repertoire; inclinations

Instances of Taking in the Good

- You find yourself already having a good experience.

- You self-activate a good experience by:
 - Looking for a good fact
 - Recalling a good fact
 - Creating a good fact
 - Imagining a good fact that has never been

- Situations:
 - On the fly
 - At specific times (e.g., meals, before bed)
 - When prompted (e.g., by a therapist)

“Anthem”

*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

*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

Psychological Antidotes

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

True Nature

Peaceful

Happy

Loving



*Keep a green bough in your heart,
and a singing bird will come.*

Lao Tsu

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.
- 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. 74

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

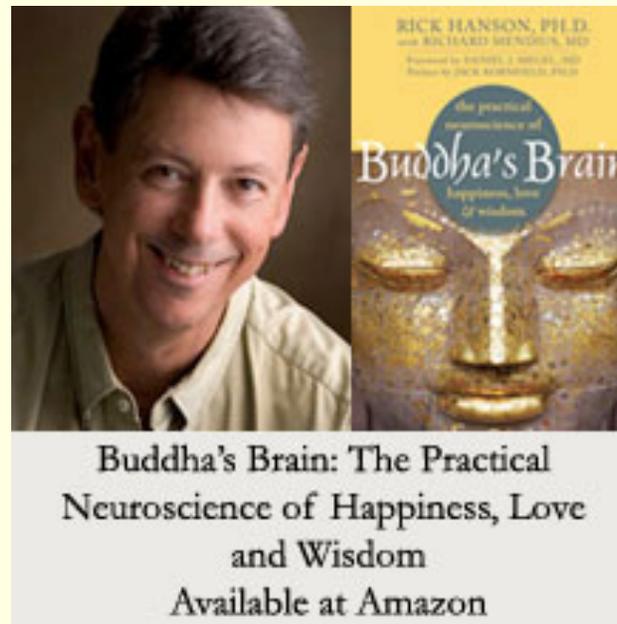
- Rozin, P. & Royzman, E.B. 2001. Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5:296-320.
- Takahashi, H., Kato, M., Matsuura, M., Mobbs, D., Suhara, T., & Okubo, Y. 2009. When your gain is my pain and your pain is my gain: Neural correlates of envy 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



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

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



www.RickHanson.net

www.WiseBrain.org