

# ***Buddha's Brain:***

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## ***The Practical Neuroscience Of Happiness, Love, and Wisdom***

**Ten Have     Psychologie Magazine**

**Amsterdam**

**June 27, 2012**

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# Topics

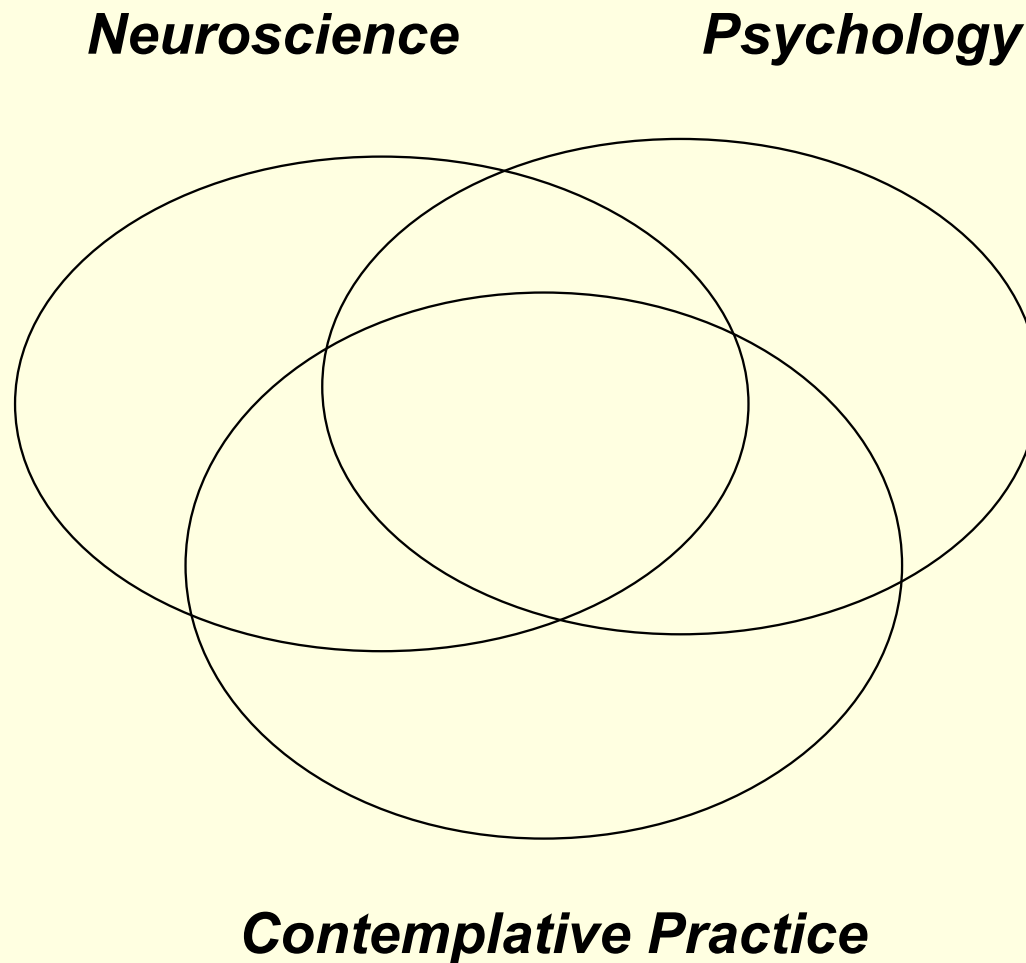
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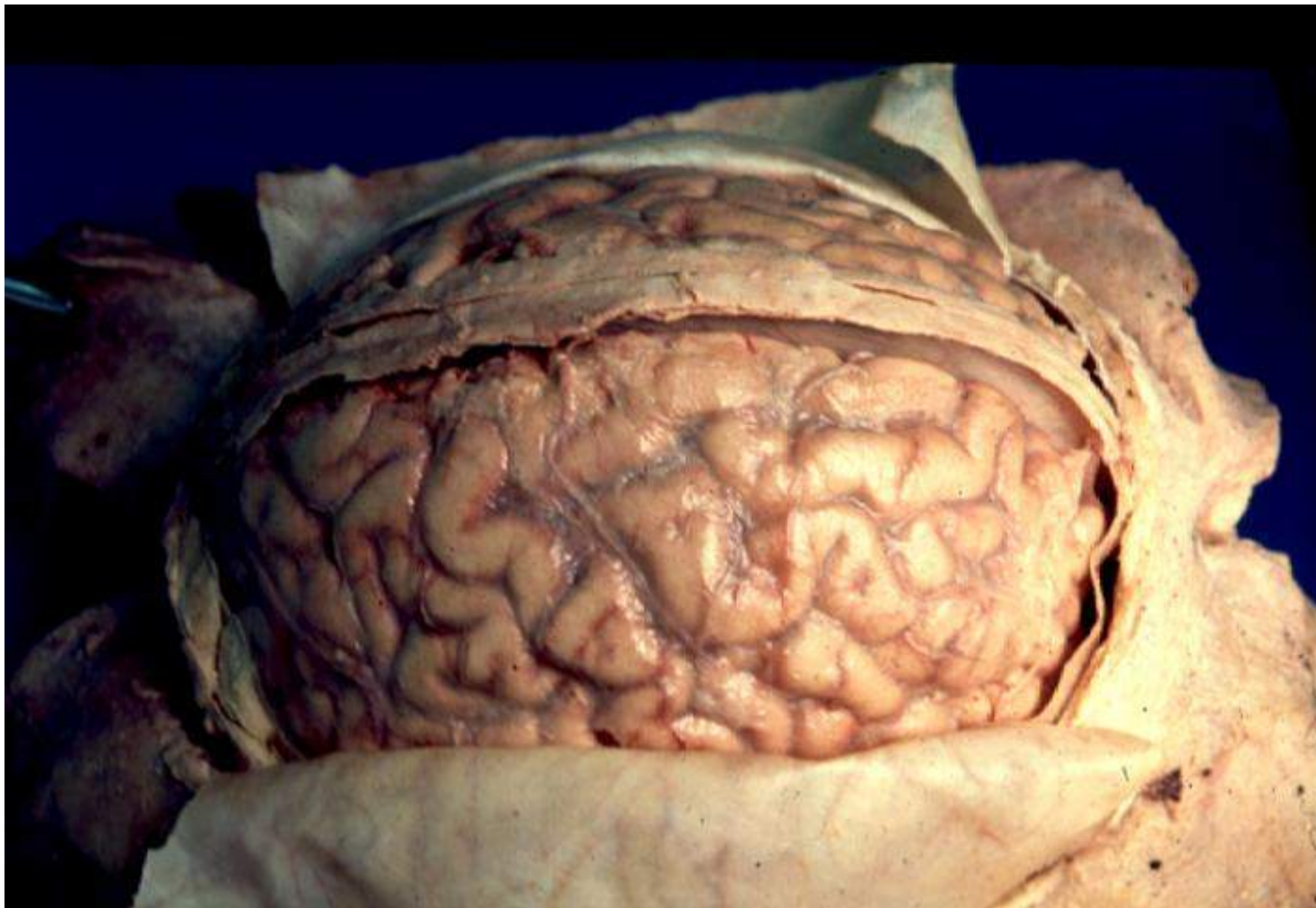
- **Using your mind to change your brain**
- **Being on your own side**
- **Inner resources**
- **Taking in the good**
- **The Responsive mode**
- **The Reactive mode**
- **Taking the fruit as the path**



# **Using Your Mind to Change Your Brain**

# Common - and Fertile - Ground



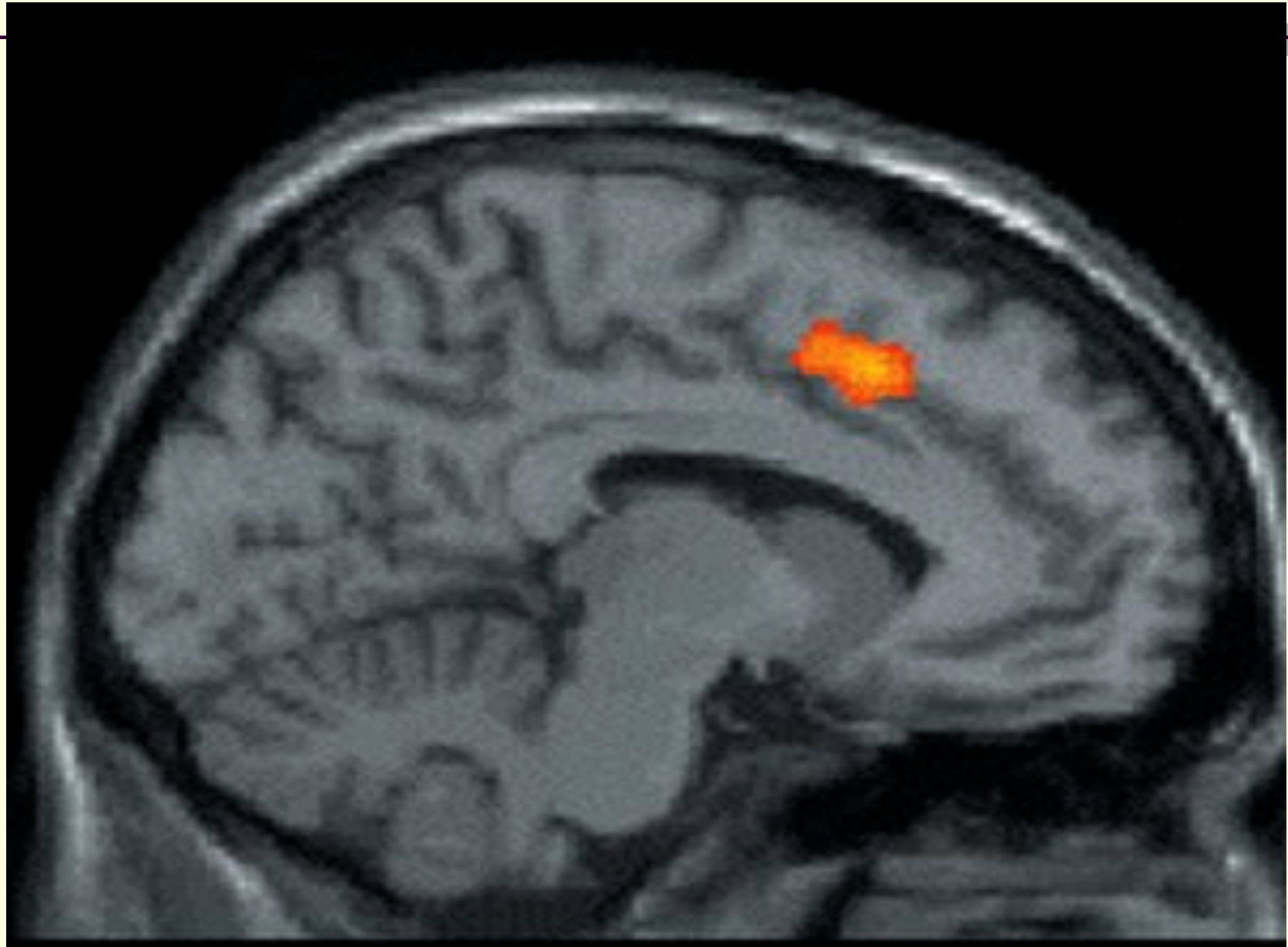


# Mental States Become Neural Traits

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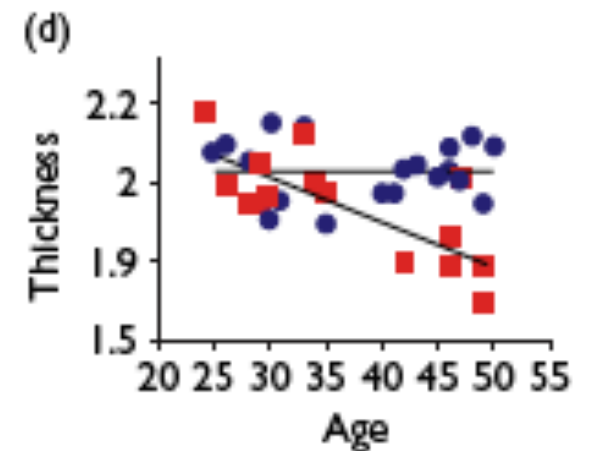
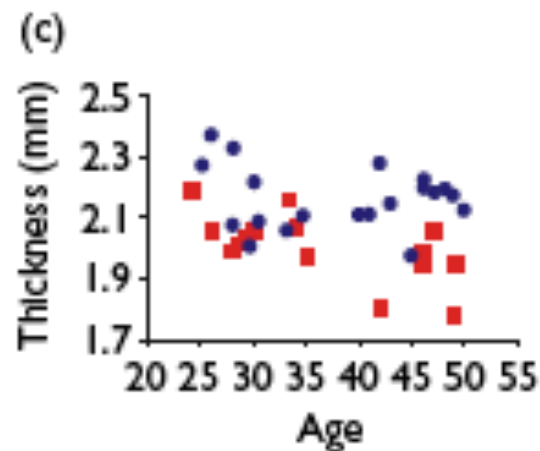
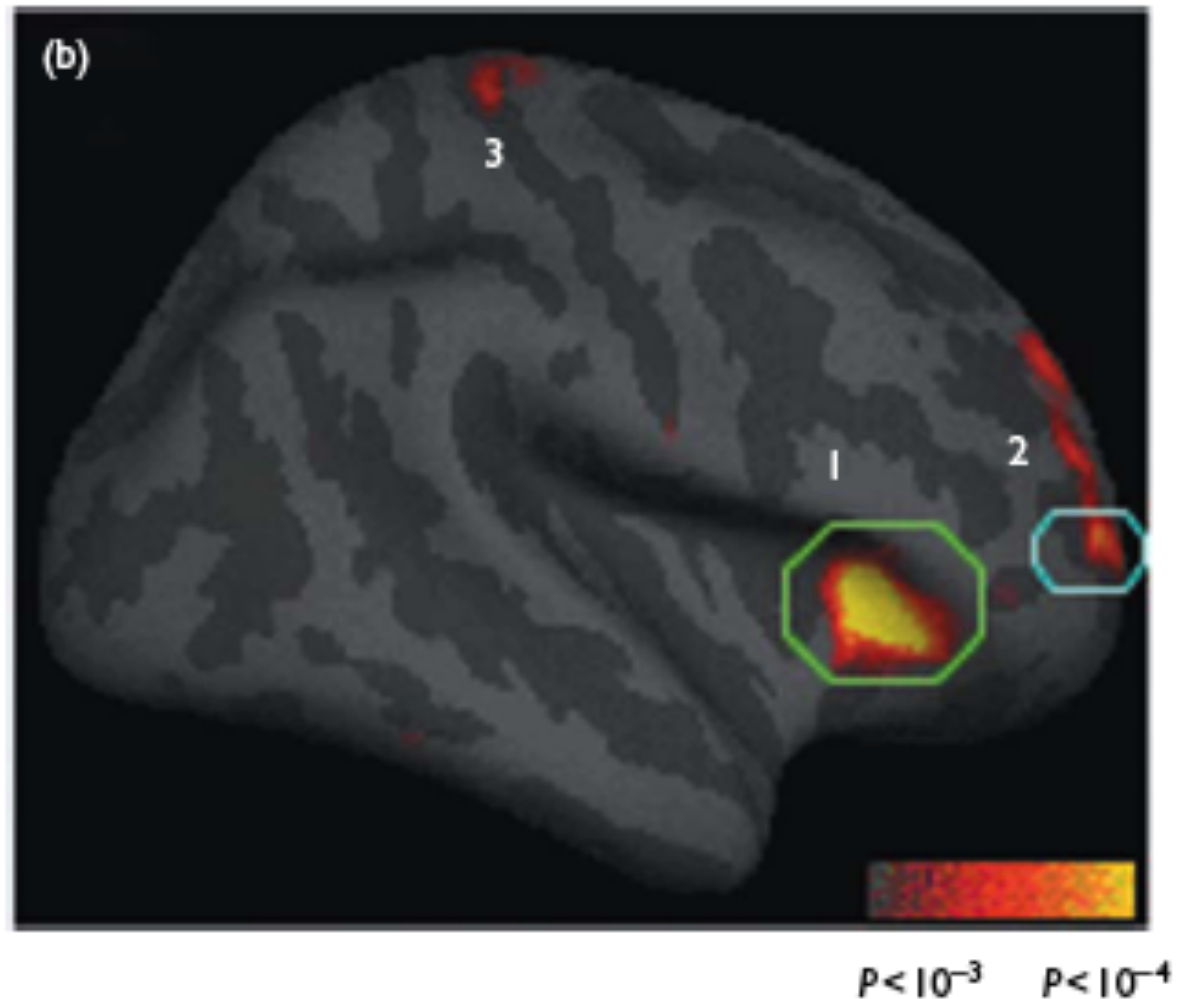
- The nervous system represents, stores, operates upon, and communicates *information*. This is the “mind,” which is mainly outside awareness.
- How neural activity becomes conscious experience remains a mystery - but there is no doubt that mental and neural activity co-arise.
- As the mind changes, the brain changes - both temporarily and in lasting ways.

# Tibetan Monk, Boundless Compassion





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





# Honoring Experience

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**Your experience *matters*.**

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

# The Power of Attention

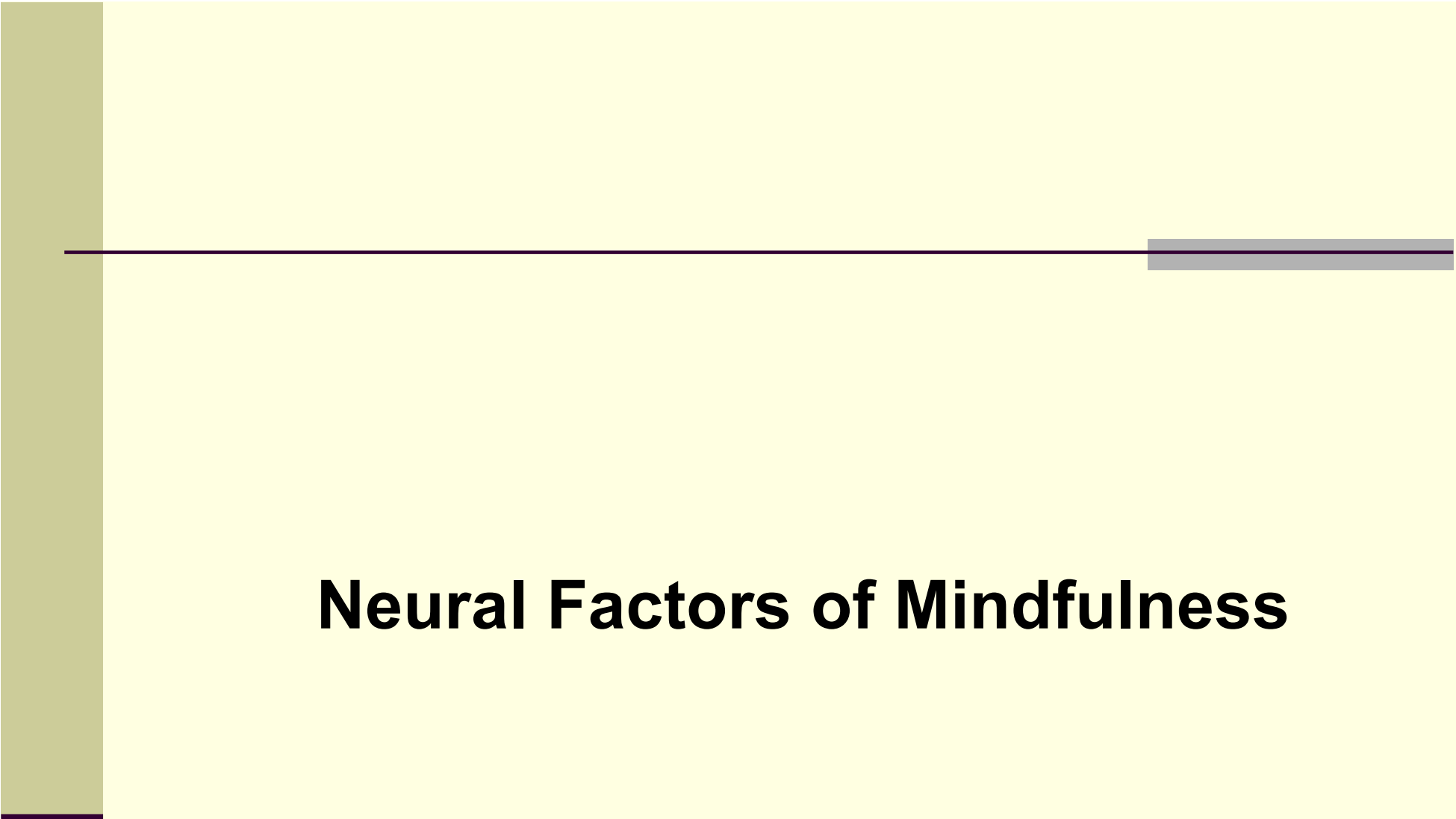
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- Attention is like a spotlight, lighting what it rests upon.
- Because neuroplasticity is heightened for what's in the field of focused awareness, attention is also like a vacuum cleaner, pulling its contents into the brain.
- Directing attention skillfully is therefore a fundamental way to shape the brain - and one's life over time.
- One of the many benefits of mindfulness training is the development of skillful attention.



*The education of attention  
would be the education par excellence.*

William James



# **Neural Factors of Mindfulness**

# Basics of Meditation

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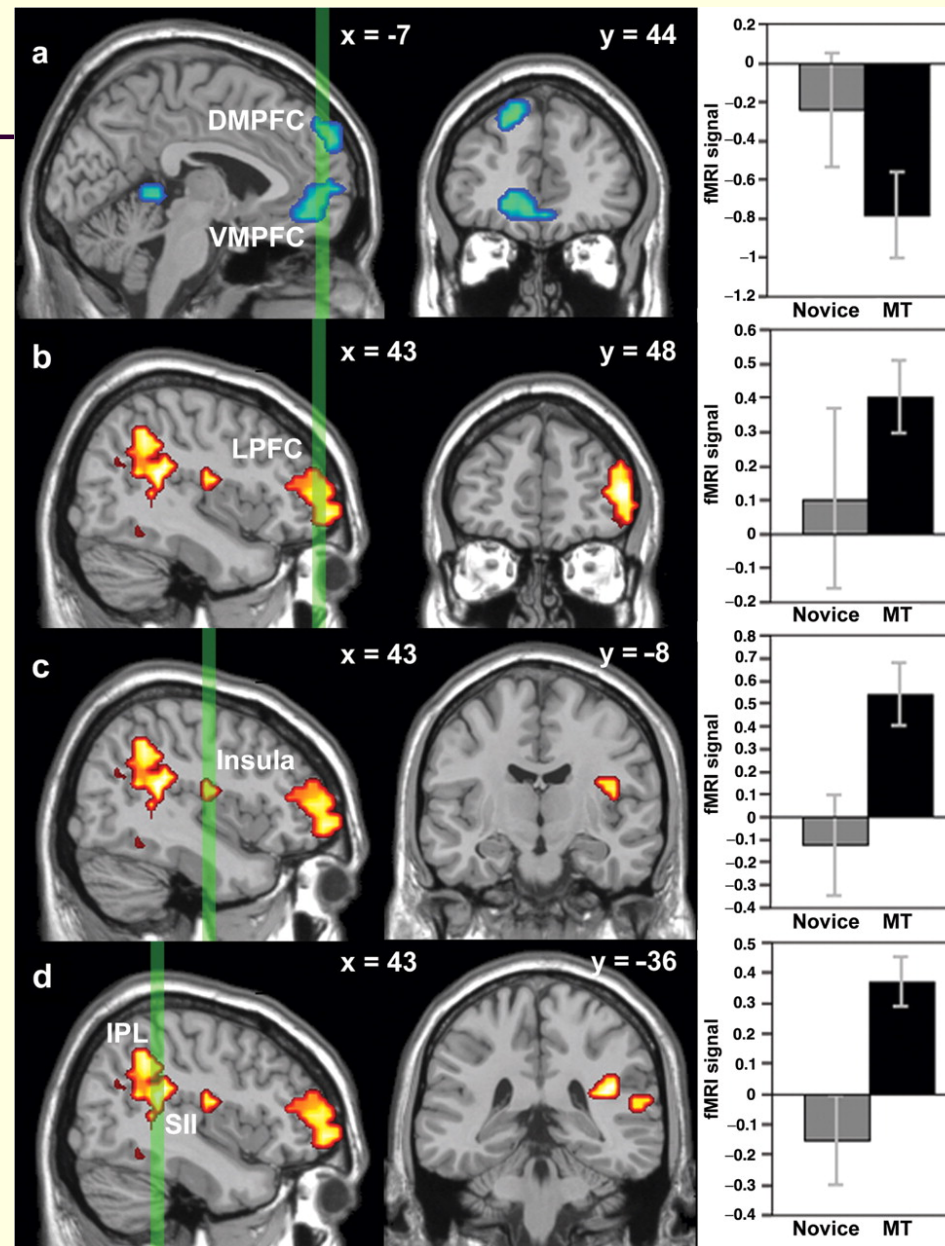
- Relax; posture that is comfortable and alert
- Simple good will toward yourself
- Awareness of your body
- Focus on something to steady your attention
- Accepting whatever passes through awareness
- Gently settling into peaceful well-being

# Seven 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
- **Panoramic view** - lateral networks
- **Absorbing the benefits** - positive implicit memories

# Self-Focused (blue) vs Open Awareness (red) Conditions (following 8 weeks of MT)

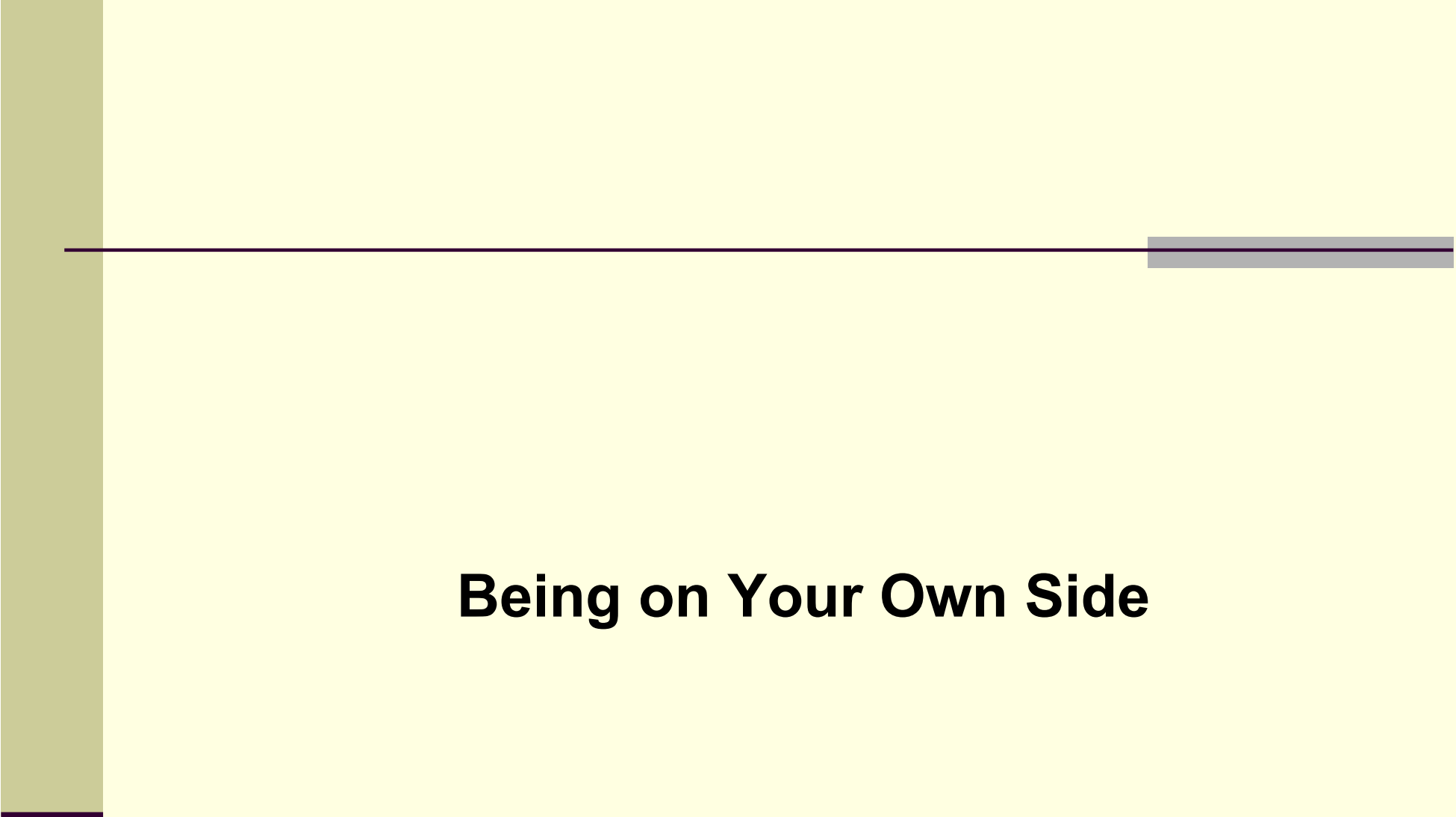





# Whole Body Awareness

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- Sense the breath in one area (e.g., chest, upper lip)
- Sense the breath as a whole: one gestalt, percept
- Sense the body as a whole, a whole body breathing
- Sense experience as a whole: sensations, sounds, thoughts . . . all arising together as one unified thing
- It's natural for this sense of the whole to be present for a second or two, then crumble; just open up to it again and again.

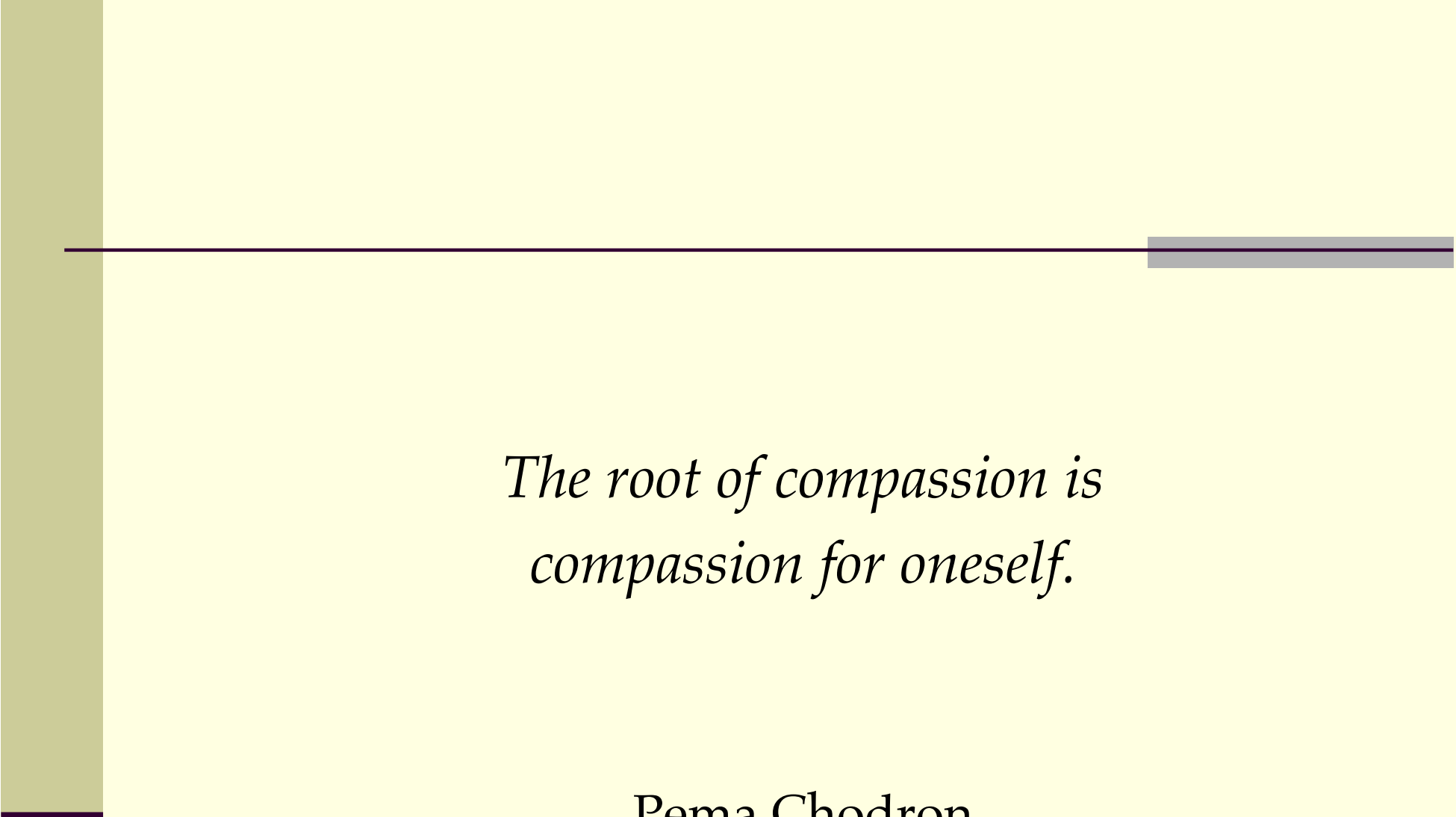


# **Being on Your Own Side**



*If one going down into a river,  
swollen and swiftly flowing,  
is carried away by the current --  
how can one help others across?*

The Buddha



*The root of compassion is  
compassion for oneself.*

Pema Chodron

# Self-Compassion

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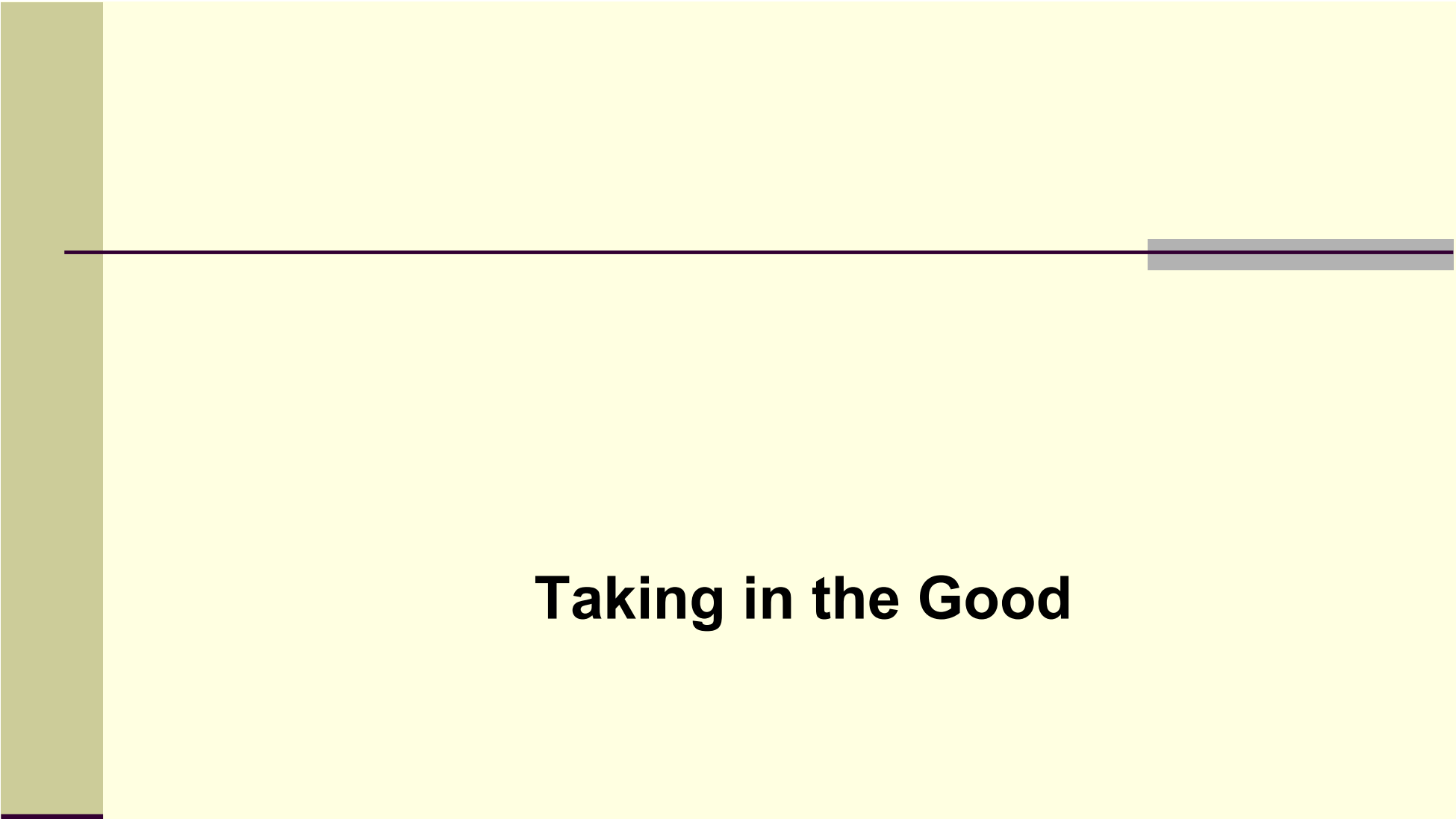
- Compassion is the wish that a being not suffer, combined with sympathetic concern. Self-compassion simply applies that to oneself. It is not self-pity, complaining, or wallowing in pain.
- Studies show that self-compassion buffers stress and increases resilience and self-worth.
- But self-compassion 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.”

# “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



# **Taking in the Good**



# Causes and Effects

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

The brain is shaped by the mental/neural states that are activated, installed, and reactivated within it.

Inner “poisons” (e.g., hatred, greed, heartache, delusion) cause suffering, harm, and negative cycles.

Inner resources (e.g., peace, happiness, love, wisdom) cause contentment, welfare, and positive cycles.

# Inner Resources Include

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- **Virtues** (e.g., patience, energy, generosity, restraint)
- **Executive functions** (e.g., meta-cognition)
- **Attitudes** (e.g., optimism, compassion, kindness)
- **Capabilities** (e.g., emotional intelligence, resilience)
- **Positive emotions** (e.g., gratitude, love, joy)
- **Approach orientation** (e.g., curiosity, exploration)

# How to Take in the Good (TG)

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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.

# Components of a Good Experience

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- **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

# Types of Good Experiences

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## **Avoiding Harms**

- Feeling basically alright right now
- Feeling protected, strong, safe, at peace

## **Approaching Rewards**

- Everyday sensual pleasures
- Satisfactions in accomplishing goals
- Feeling glad, grateful, contented, fulfilled
- Therapeutic, spiritual, or existential realizations

## **Attaching to Others**

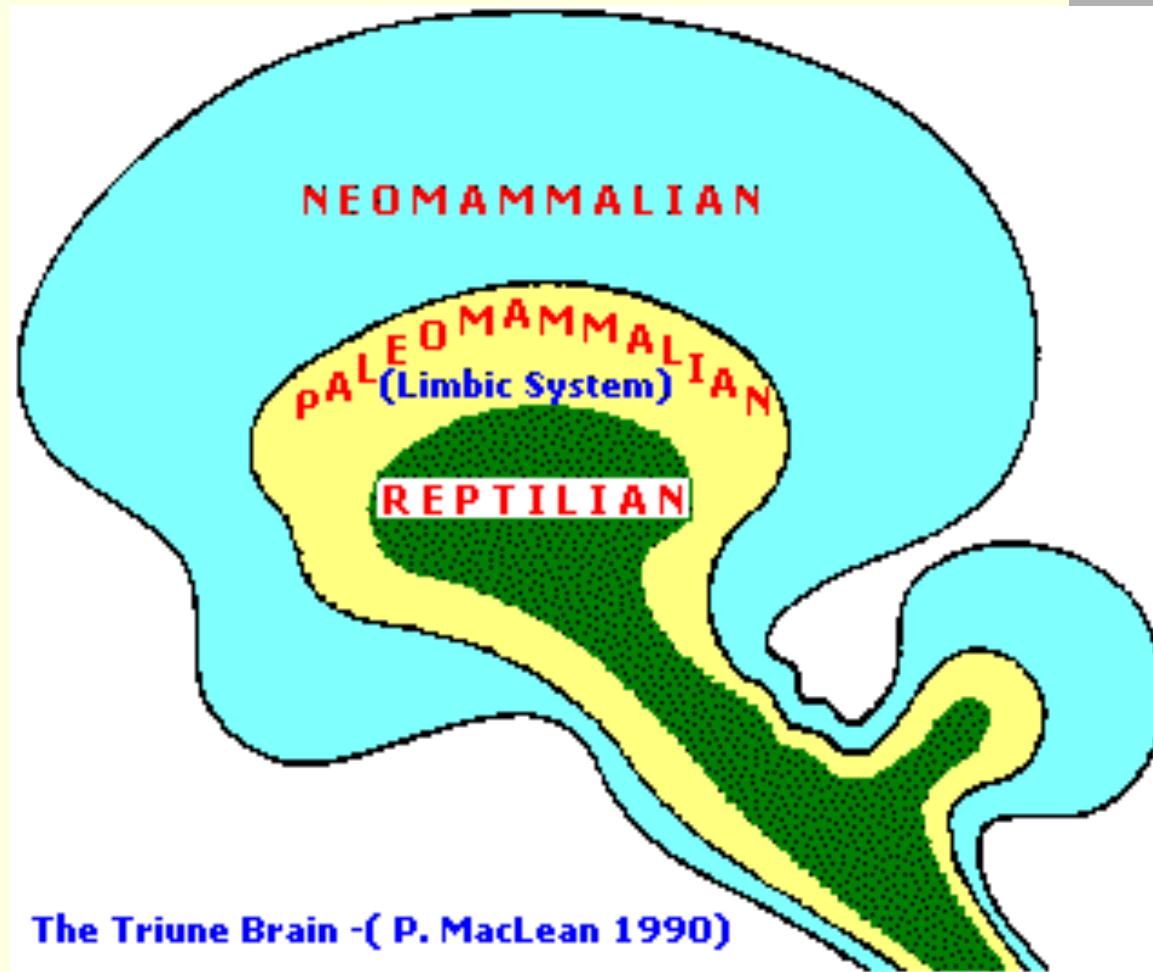
- Feeling included, seen, liked, appreciated, loved
- Feeling compassionate, kind, generous, loving



# **The Responsive Mode**

# Evolutionary History

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## The Triune Brain



# Three Motivational Systems

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## ■ Avoid Harms:

- Primary need, tends to trump all others
- Functional in first animals

## ■ Approach Rewards:

- Functional in first animals
- Elaborated in mammals via sympathetic arousal, limbic/emotional valence, sustained pursuit, etc.

## ■ Attach to Others:

- Functional in mammals and birds
- Very elaborated in humans via pair bonding, language, empathy, cooperative planning, altruism, etc.

# The Homeostatic Home Base

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*When not disturbed by threat, loss, or rejection:*

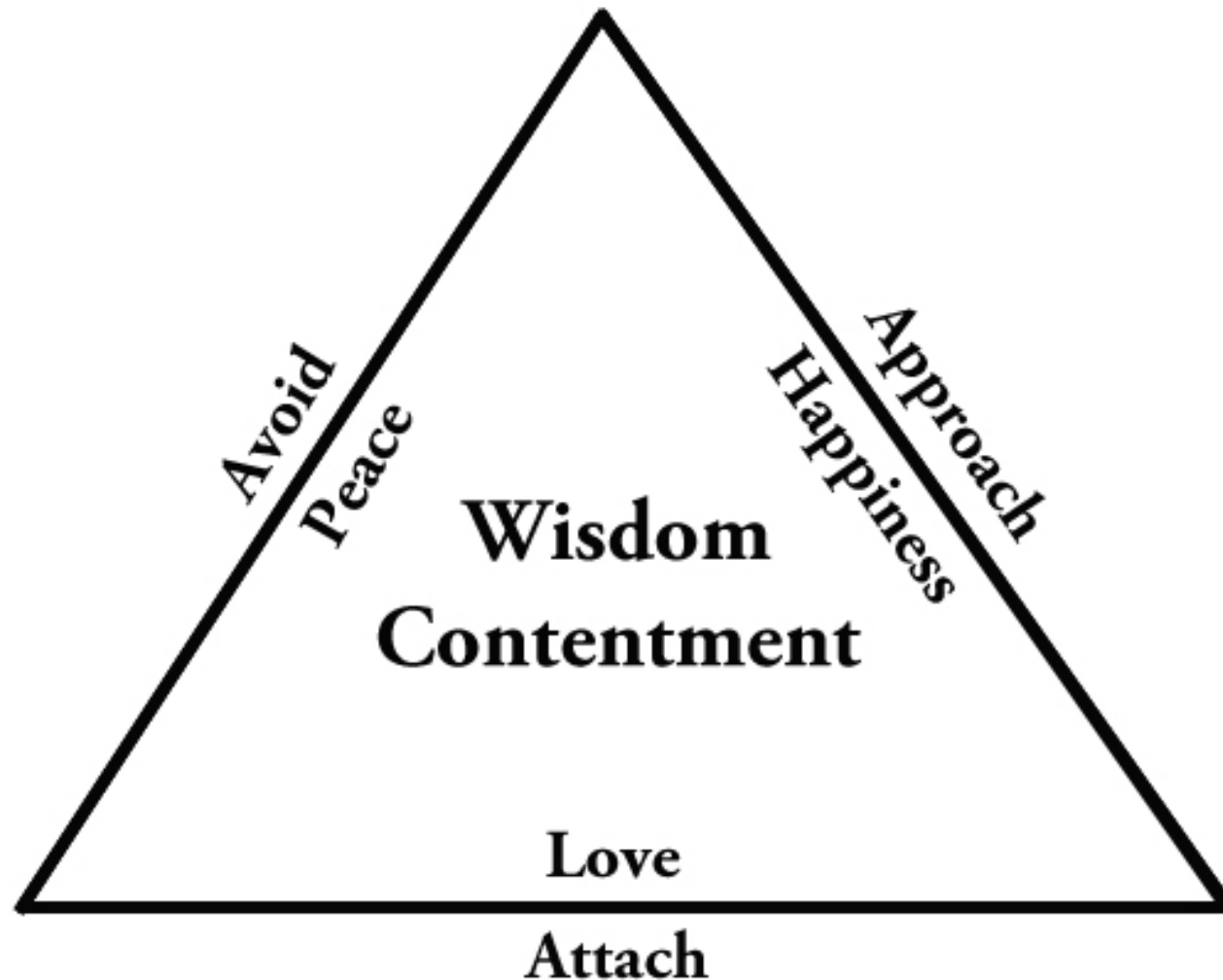
The body defaults to a sustainable equilibrium of refueling, repairing, and pleasant abiding.

The mind defaults to a sustainable equilibrium of:

- **Peace** (the Avoiding system)
- **Happiness** (the Approaching system)
- **Love** (the Attaching system)

This is the brain in its homeostatic ***Responsive*** mode.

# The Responsive Mode





© Kalyan Varma

# Key Benefits of Responsive Mode

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- Fueling for Reactive mobilizations; recovery after
- Positive emotions, cognitions, and behaviors
- Positive cycles
- Promotes virtue and benevolence

*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



# **The Reactive Mode**

# Fired up for Survival

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*When disturbed by threat, loss, or rejection:*

The body fires up into the stress response; resources are expended for immediate needs while long-term building is deferred; outputs exceed inputs; unsustainable.

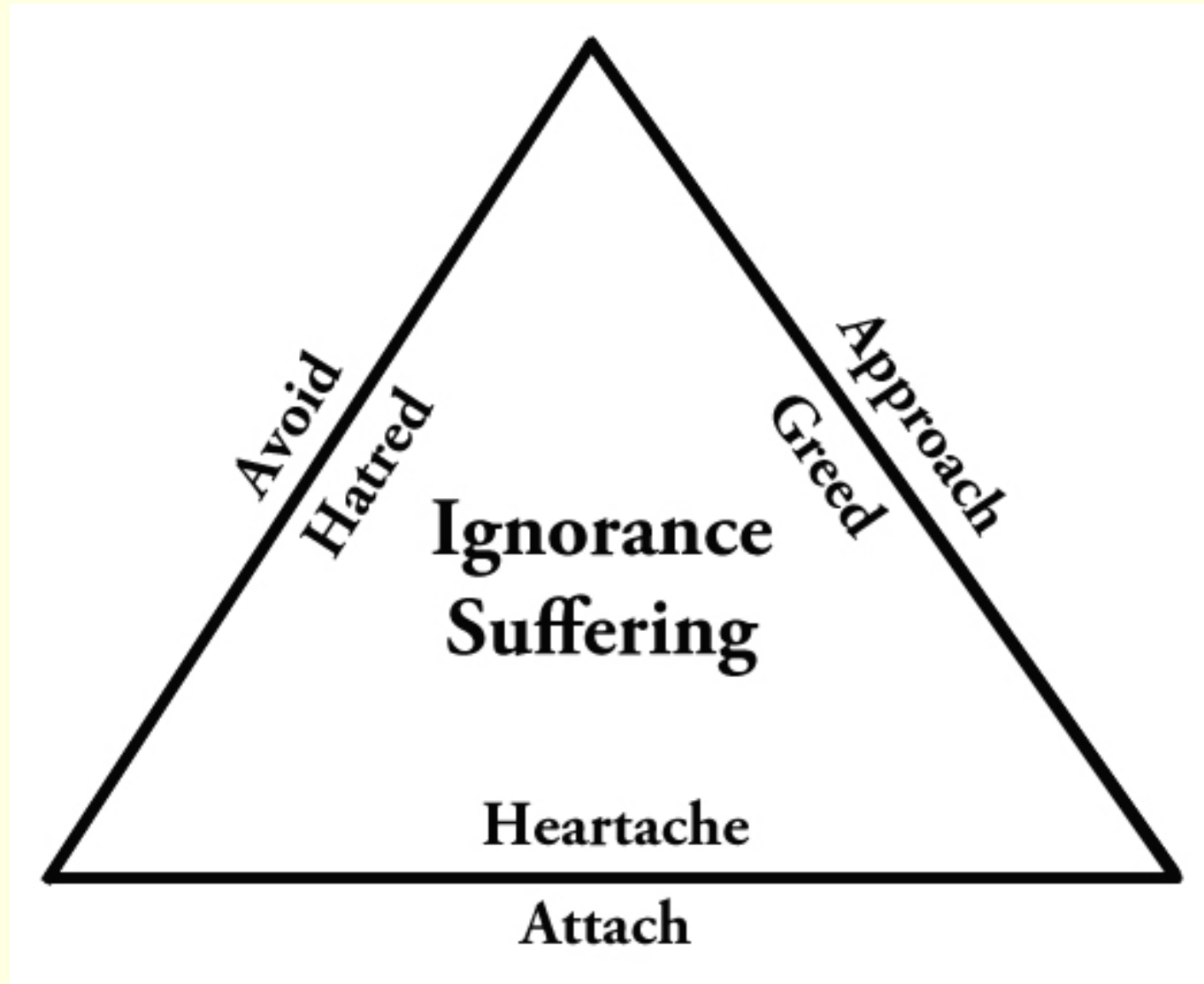
The mind fires up into:

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

This is the brain in its allostatic ***Reactive*** mode.



# The Reactive Mode



# Evolution of the Negativity Bias

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- **Harms** (“sticks”) - Predators, natural hazards, social aggression, pain (physical and psychological)
- **Rewards** (“carrots”) - Food, sex, shelter, social support, pleasure (physical and psychological)
- Avoiding “sticks” usually affects passing on genes more than approaching “carrots.”
  - Urgency - Usually, sticks must be avoided immediately while carrots allow a longer approach.
  - Impact - Often, the presence of a stick ends life while the absence of a carrot does not; if you fail to get a carrot today, you’ll likely have another chance tomorrow, but if you fail to avoid a stick today - whap! - no more carrots forever.

# Negativity Bias: Some Consequences

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- Negative stimuli get more attention and processing.
- Easy to create learned helplessness, hard to undo
- Negative interactions: more powerful than positive
- Negative experiences are internalized more efficiently into implicit memory than positive ones.
  - Like Velcro for the negative but Teflon for the positive
  - In life, therapy, meditation, and trainings, activated positive mental states routinely wash through the brain like water through a sieve without getting installed.

# A Major Result of the Negativity Bias: Threat Reactivity

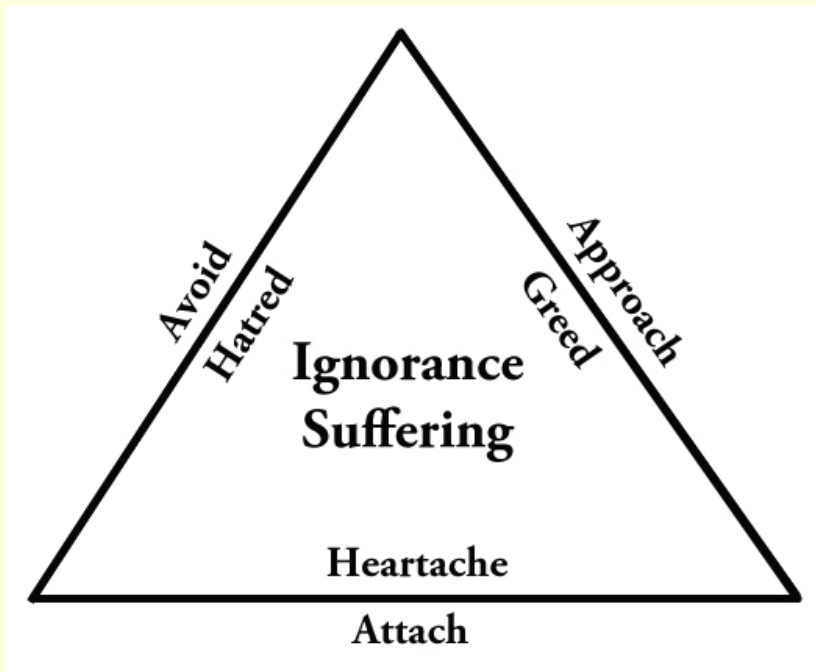
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- Two mistakes:
  - Thinking there is a tiger in the bushes when there isn't one.
  - Thinking there is no tiger in the bushes when there is one.
- We evolved to make the first mistake a hundred times to avoid making the second mistake even once.
- This evolutionary tendency is intensified by temperament, personal history, culture, and politics.
- Threat reactivity affects individuals, couples, families, organizations, nations, and the world as a whole.

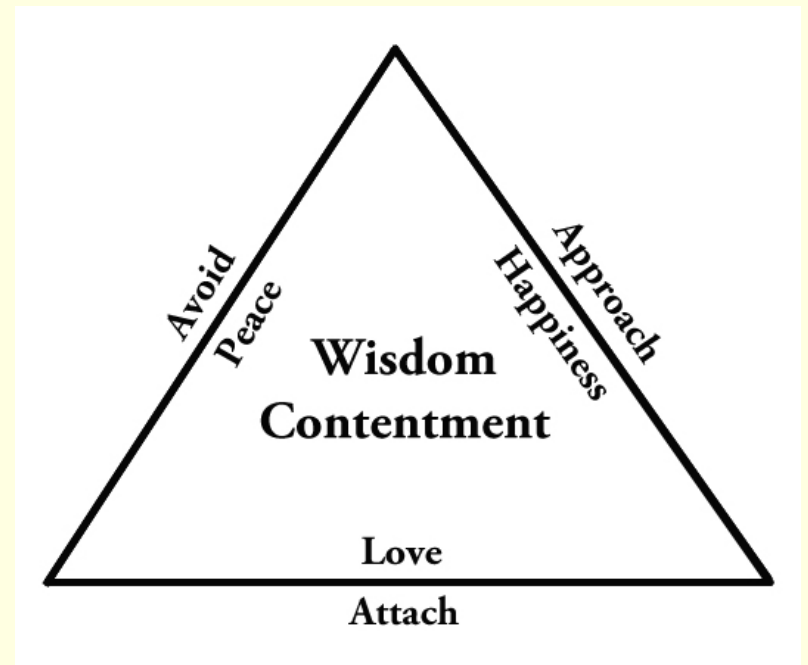
# Choices . . .

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Or?



**Reactive Mode**



**Responsive Mode**



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



# **Taking the Fruit as the Path**

# Coming Home . . .

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**Peace**

**Happiness**

**Love**







*Know the mind.*

*Shape the mind.*

*Free the mind.*

# Great Books

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See [www.RickHanson.net](http://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

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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.
- 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

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- 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

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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.
- 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

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- 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.

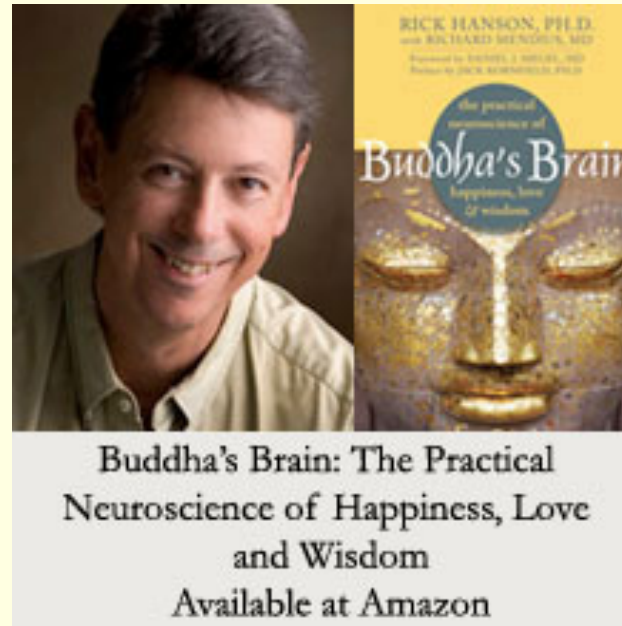
## ***Where to Find Rick Hanson Online***

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