

# “Bahiya, you should train yourself thus.”

---

*In reference to the seen, there will be only the seen. To the heard, only the heard. To the sensed, only the sensed. To the cognized, only the cognized.*

*When for you there will be only the seen in reference to the seen, only the heard in the heard, only the sensed in the sensed, only the cognized in the cognized, then, Bahiya, there's no you in that.*

*When there's no you in that, there's no you there. When there's no you there, you are neither here nor yonder nor between the two.*

*This, just this, is the end of all suffering.*

---

# ***The Neuropsychology of Anatta: Not-Self in the Brain***

***London Insight***

*October 30, 2010*

Rick Hanson, Ph.D.

**The Wellspring Institute For Neuroscience and Contemplative Wisdom**

[www.WiseBrain.org](http://www.WiseBrain.org)

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

[drh@comcast.net](mailto:drh@comcast.net)

# Topics

---

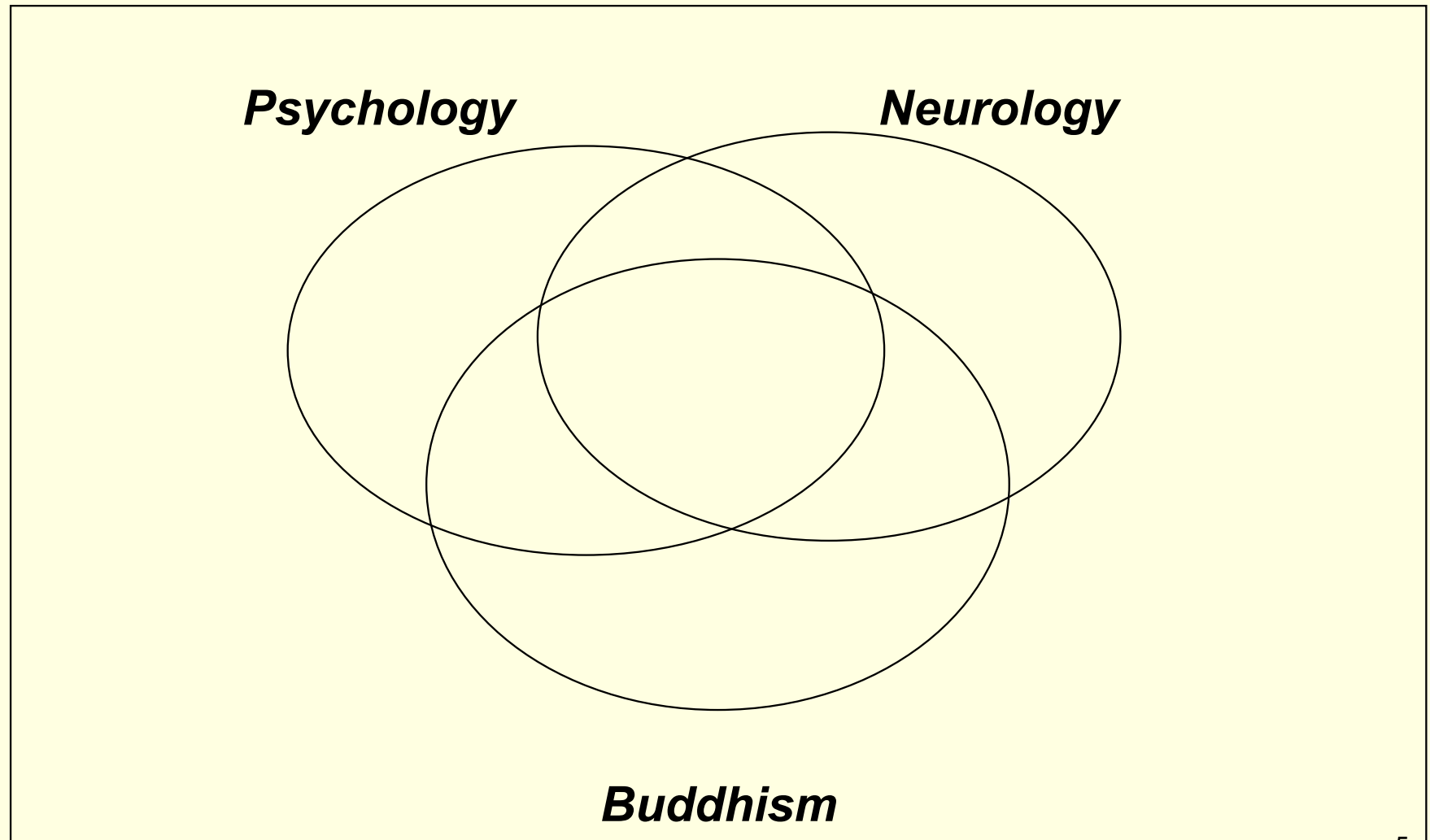
- **“Self” in the mind**
- **“Self” in the brain**
- **Healthy narcissistic supplies**
- **“Doing” and “Being”**
- **“Only the seen in the seen . . .”**



# Perspectives

# Common - and Fertile - Ground

---



---

*Do not go by oral tradition, by lineage of teaching, by hearsay,  
by a collection of texts, by logic, by inferential reasoning,  
by reasoned cognition, by the acceptance of a view after  
pondering it, by the seeming competence of a speaker,  
or because you think, “this . . . is our teacher.”*

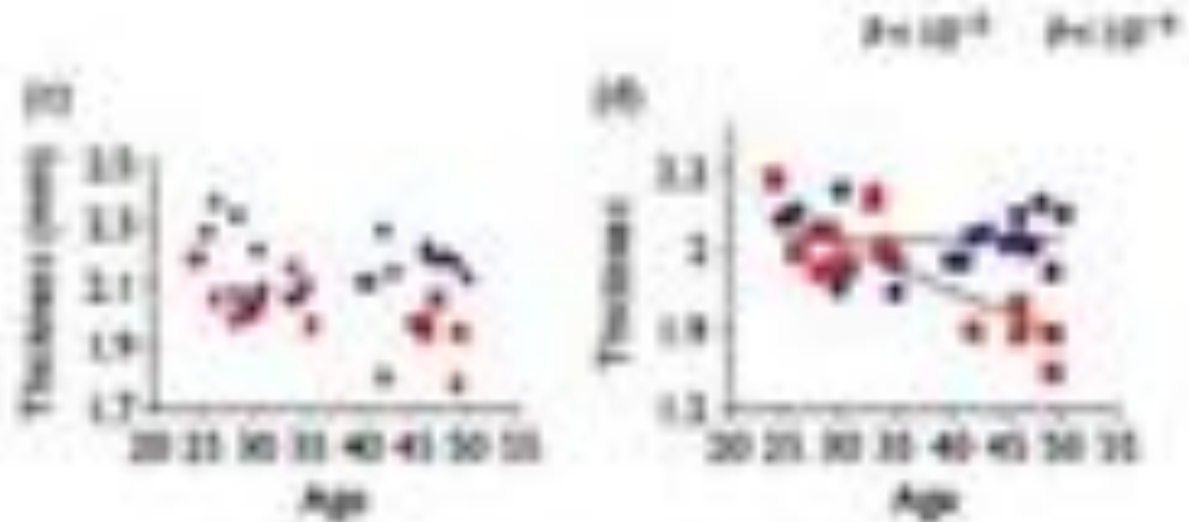
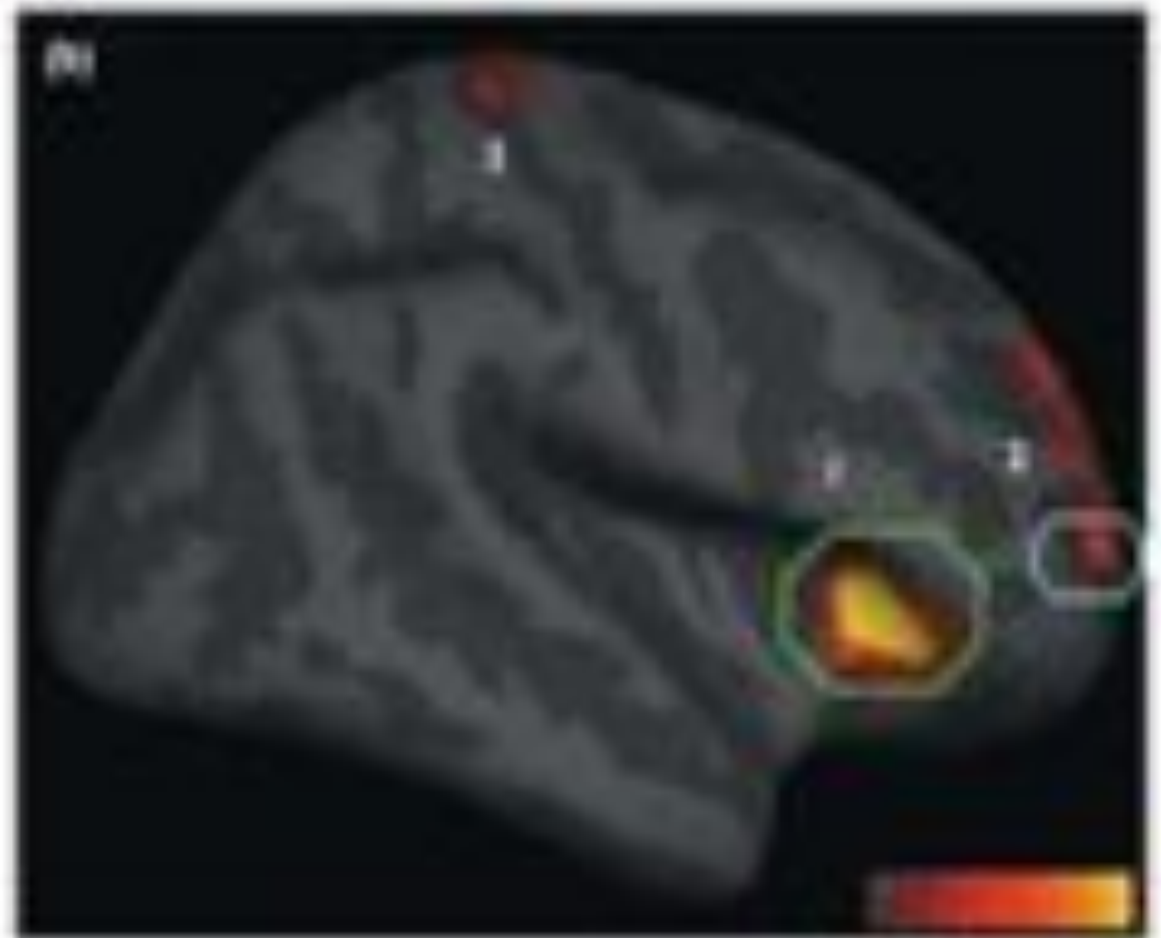
*But when you know for yourselves, “these things are wholesome,  
these things are blameless; these things are praised  
by the wise; these things, if undertaken and practiced,  
lead to welfare and happiness,”  
then you should engage in them.*

# 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.





*The principal activities of brains  
are making changes in themselves.*

Marvin L. Minsky

# Physical Effects of Meditation

---

- Thickens and strengthens anterior (frontal) cingulate cortex and insula. Results include improved attention, empathy, and compassion.
- Less cortical thinning with aging
- Increases activation of left frontal regions, which lifts mood
- Increases power and reach of gamma-range brainwaves
- Decreases stress-related cortisol
- Stronger immune system

---

*Know the mind.*

*Shape the mind.*

*Free the mind.*

# Basics of Meditation

---

- 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, not resisting it or chasing it
- Gently settling into peaceful well-being

# Foundations of Meditation

---

- Setting an intention - “top-down” frontal lobes, “bottom-up” limbic system
- Relaxing the body - parasympathetic nervous system
- Feeling safer - inhibits amygdala/ hippocampus vigilance circuits
- Evoking positive emotion - dopamine, norepinephrine
- Absorbing the benefits - primes memory circuits throughout the brain



# **“Self” in the Mind**

# Definitions

---

- **Person** - The body-mind as a whole
  - Contains knowledge, personal memories, skills, temperament, personality tendencies, mood, etc.
  - Has considerable consistency over time
  - Deserves kindness and justice; is morally culpable
  
- **Self** - “I, me, and mine”
  - The psychological self; the “I” in “I am happy, I want a cookie, I know  $2+2=4$ , I am for justice”; the “me” in “Do you love me?”
  - Sense of being the owner of experiences and the agent of actions
  
- **Awareness** - The field in which the mind (as yet mysteriously) represents aspects of the mind to itself
  - The “global workspace” in which representations of the person, self-related functions, and subjectivity arise and pass away

# Conventional Notions of “Self”

---

- **Unified** - coherent; just one; a being, an entity; some one looking out through your eyes.
- **Stable** - unchanging in its fundamentals; the core self as a child still feels present in you today
- **Independent** - things happen to the self, but it remains free of their effects in its essence.
- **Identity** - That which one is; that with which there is the greatest identification

# Actual Experience of “Self”

---

- **Compounded** – Made up of many parts; one self vows to exercise early, another self turns off the alarm clock
- **Impermanent** – More or less present at different times; different aspects come forward at different times
- **Dependent** – Developed in interactions with caregivers and peers and encounters with the world; grounded in evolution; activating and deactivating as a means to the ends of the organism; especially responsive to opportunities and threats; self organizes around clinging; there is a process of *selfing* rather than a static, fixed, unchanging entity.
- **Part of the person** – There is awareness of aspects of self as contents within awareness like any others

---

*The dualistic ego-mind is essentially a survival mechanism, on a par with the fangs, claws, stingers, scales, shells, and quills that other animals use to protect themselves.*

*By maintaining a separate self-sense, it attempts to provide a haven of security.*

*Yet the very boundaries that create a sense of safety also leave us feeling cut off and disconnected.*

# Actual Experience of “Self”

---

- **Compounded** – Made up of many parts; one self vows to exercise early, another self turns off the alarm clock.
- **Impermanent** – More or less present at different times; different aspects come forward at different times; there is a process of *selfing* rather than a static, fixed, unchanging entity.
- **Dependent** – Developed in interactions with caregivers and peers and encounters with the world; grounded in evolution; activating and deactivating as a means to the ends of the organism; especially responsive to opportunities and threats; self organizes around clinging.
- **Part of the person** – There is awareness of aspects of self as contents within awareness like any others.

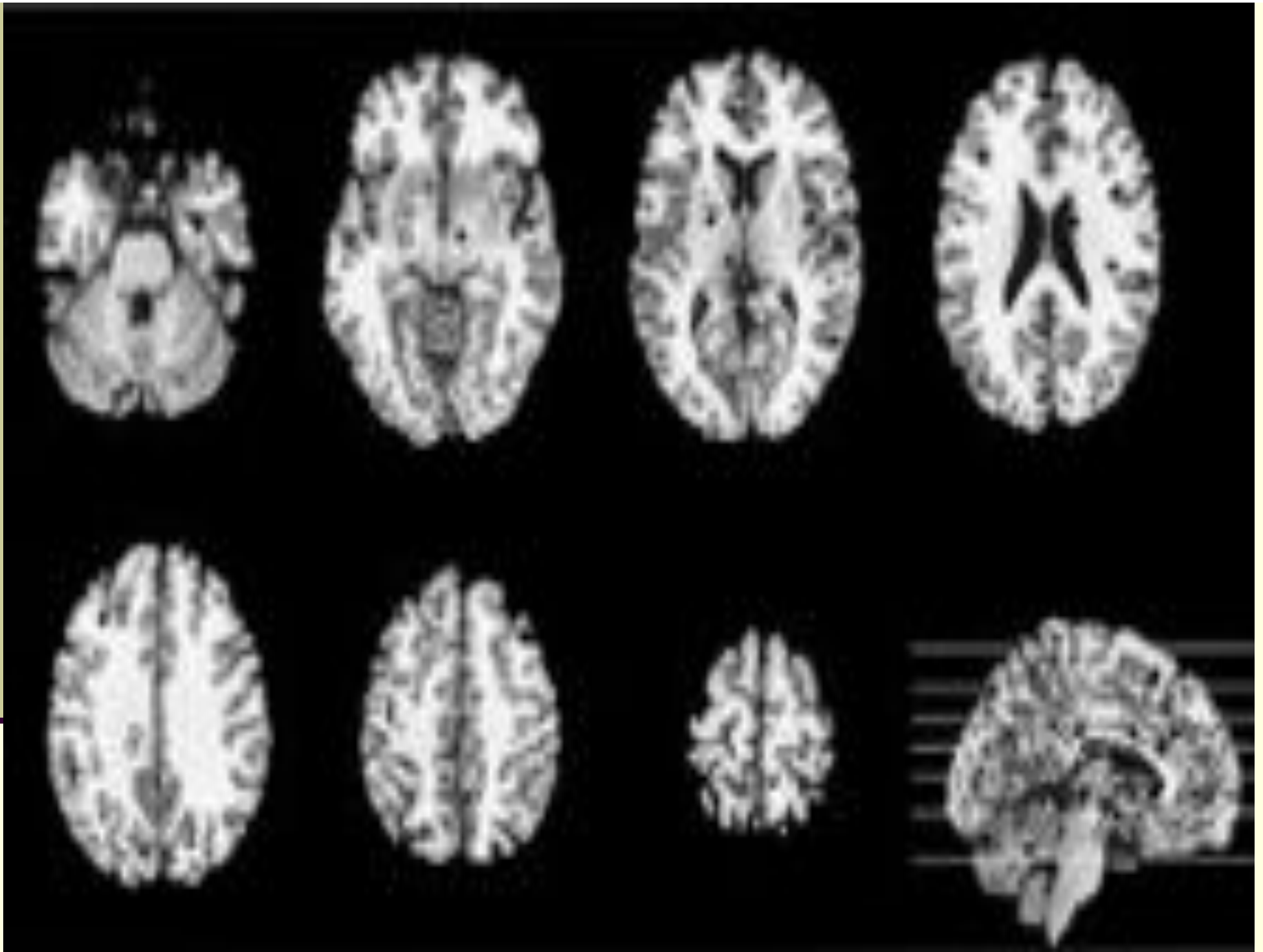


# **“Self” in the Brain**

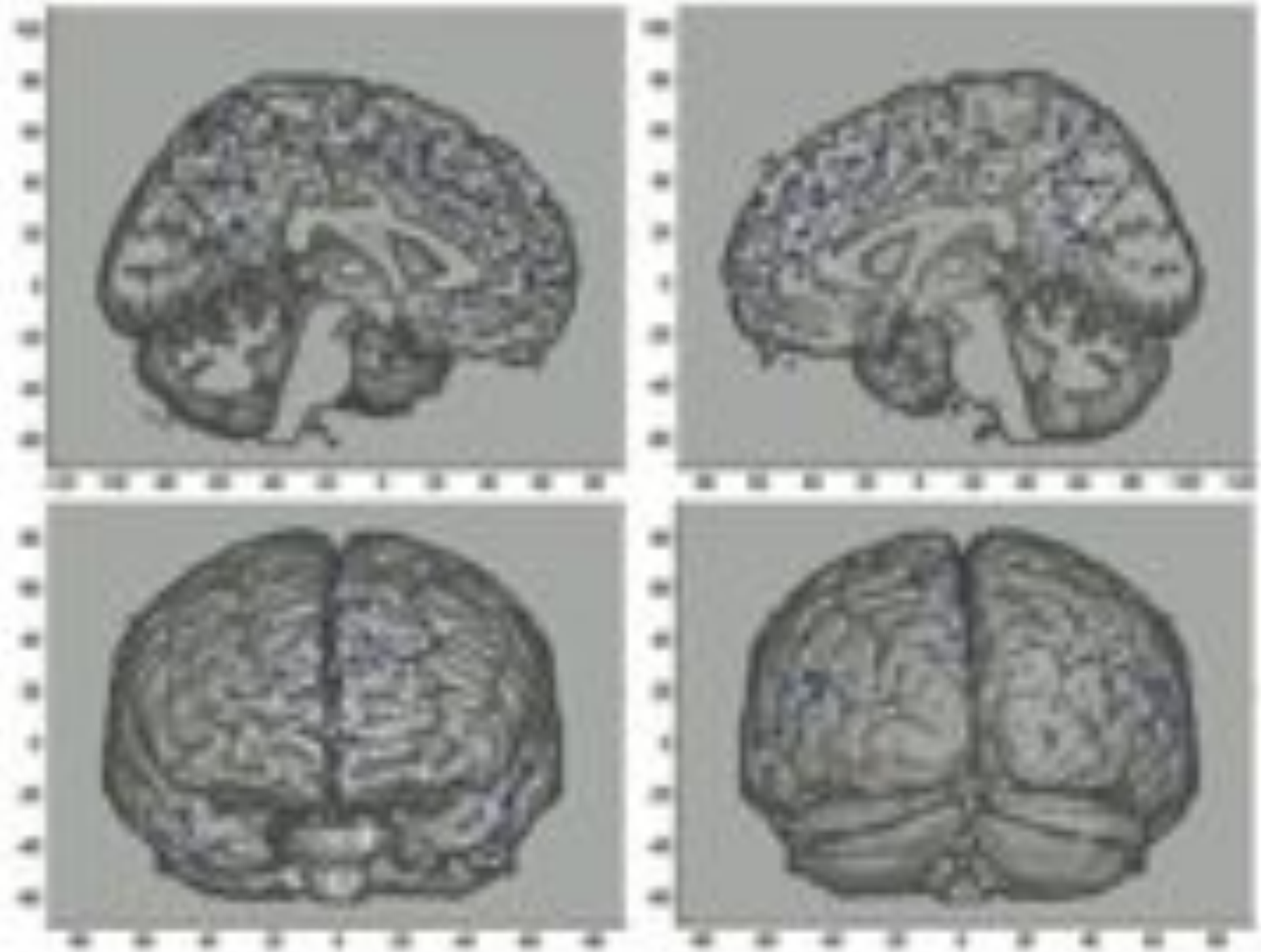
# Properties of Self in Your Brain

---

- **Compounded** – Distributed systems and sub-systems; no homunculus looking through your eyes
- **Impermanent** – Circuits light up and deactivate; fluid, transient
- **Dependent** – Dependent on neural structures and processes; dependent on the evolution of specialized neural tissues (e.g., spindle cells); responsive to stimuli;
- **Part of the person** – Self-related activations in neural circuitry are just a tiny fraction of the total activations in the brain
  - The neural circuitry associated with self representations or functions also performs many other activities unrelated to self.
  - In the brain, self is not special.



**Brain activations of “selfing” - Gillihan, et al., Psych Bulletin, 1/2005**



Legrand and Ruby, 2009. What is self-specific? [White = self; blue = other]

# Subjectivity Doesn't Equal a Subject

---

- Ordinary awareness has an inherent subjectivity, a localization to a particular perspective (e.g., to my body, not yours).
- The brain indexes across experiences of subjectivity to create an apparent subject.
- That apparent subject is elaborated and layered through the maturation of the brain, notably regions of the prefrontal cortex.
- But there is no subject *inherent* in subjectivity!
- Awareness requires subjectivity, but not a subject.

# What Self?

---

In sum, from a neurological standpoint, the everyday feeling of being a unified self is an utter illusion:

- The apparently coherent and solid “I” is actually built from many neural subsystems, with no fixed center.
- The apparently stable “I” is produced by variable and transient activations of neural circuits.
- The apparently independent “I” depends on neural circuitry, the evolutionary processes that built them, critical interactions with others to shape those circuits, and the stimuli of the moment.

*Neurologically, self is “empty” - without absolute, inherent existence.*

---

*Selflessness is not a case of something that existed in the past becoming nonexistent. Rather, this sort of “self” is something that never did exist. What is needed is to identify as nonexistent something that always was nonexistent.*

The Dalai Lama

*When we recognize that the things we identify as our self are impermanent and bound up with suffering, we realize they lack the essential marks of authentic selfhood and we thereby stop identifying with them.*

Bhikkhu Bodhi

# Self Is Like a Unicorn

---

- Self-related patterns of information and neural activity are as real as those that underlie the smell of roses.
- But that which they point to – a unified, enduring, independent “I” – just doesn’t exist.
- Just because we have a sense of self does not mean that we are a self. The brain strings together heterogenous moments of self-ing and subjectivity into an illusion of homogenous coherence and continuity.
- Real representations in the brain of a horse point to something that is also real. But the real representations of a unicorn in the brain point to something that is not real.
- The real representations of the self in the brain point to another mythical creature: the apparent self.

# “Self” Has Its Uses


---

- A convenient way to distinguish one person from another
- Brings a sense of continuity to life’s experiences
- Adds verve and commitment to relationships
- People without self structures have impaired relationships.
- Self-related processes helped our ancestors succeed in increasingly social hunter-gatherer bands in which interpersonal dynamics played a strong role in survival.
- The evolution of relationships fostered the evolution of self and vice versa; the benefits of self have thus been a factor in the evolution of the brain.
- Self has been stitched into human DNA by reproductive advantages slowly accumulating across a hundred thousand generations.

# Selfing Leads to Suffering

---

- When “I, me, and mine” are mental objects like any other, there’s no problem.
  - For example, the Buddha routinely used “I” and “you.”
- But when we privilege self-representations through identifying with them or defending or glorifying them . . . Then we suffer, and create suffering for others.
- The key is to be able to move dextrously into and back out of self-representations; that’s skillful means.



*No self,  
no problem*

---

*Blissful is passionlessness in the world,  
The overcoming of sensual desires;  
But the abolition of the conceit I am --  
That is truly the supreme bliss.*

The Buddha, Udāna 2.11

---

*To study the Way is to study the self.*

*To study the self is to forget the self.*

*To forget the self is  
To be enlightened by all things.*

Dogen



# Healthy “Narcissistic Supplies”

# Feeding the Hungry Heart

---

- Healthy development requires caregivers to give a child extensive mirroring, attunement, and prizing; healthy adult relationships require much the same.
- These are normal “narcissistic supplies.” Deficits in them lead to:
  - Feelings of inadequacy, worthlessness, and shame
  - Tendencies toward extremes of clinging or distance
- As an adult, you can take in narcissistic supplies, gradually weaving them into your brain and your being.
- This is not clinging to praise, etc. It is filling the hole in your heart so your happiness is increasingly unconditional - not dependent on external events.

# “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

# How to Take in the Good

---

1. Look for positive **facts**, and let them become positive experiences.
2. Savor the positive experience:
  - Sustain it for 10-20-30 seconds.
  - Feel it in your body and emotions.
  - Intensify it.
3. Sense and intend that the positive experience is soaking into your brain and body - registering deeply in emotional memory.

# Kinds of “Good” to Take in

---

- The small pleasures of ordinary life
- The satisfaction of attaining goals or recognizing accomplishments - especially small, everyday ones
- Feeling grateful, contented, and fulfilled
  
- Things are alright; nothing is wrong; there is no threat
- Feeling safe and strong
- The peace and relief of forgiveness
  
- Being included, valued, liked, respected, loved by others
- The good feelings that come from being kind, fair, generous
- Feeling loving
  
- Recognizing your positive character traits
- Spiritual or existential realizations

# Using Memory to Help Heal Painful Experiences

---

- The machinery of memory:
  - When explicit or implicit memory is re-activated, it is re-built from schematic elements, not retrieved *in toto*.
  - When attention moves on, elements of the memory get re-consolidated.
- The open processes of memory activation and consolidation create a window of opportunity for shaping your internal world.
- Activated memory tends to associate with other things in awareness (e.g., thoughts, sensations), esp. if they are prominent and lasting.
- When memory goes back into storage, it takes associations with it.
- You can imbue memory with positive associations.

# The Fourth Step of TIG

---

- When you are having a positive experience:
  - Sense the current positive experience sinking down into old pain, and soothing and replacing it.
- When you are having a negative experience:
  - Bring to mind a positive experience that is its antidote.
- In both cases, have the positive experience be big and strong, in the forefront of awareness, while the negative experience is small and in the background.
- You are not resisting negative experiences or getting attached to positive ones. You are being kind to yourself<sup>39</sup> and cultivating positive resources in your mind.

# TIG4 Capabilities, Resources, Skills

---

## ■ Capabilities:

- Dividing attention
- Sustaining awareness of the negative material without getting sucked in (and even retraumatized)

## ■ Resources:

- Self-compassion
- Internalized sense of affiliation

## ■ Skills:

- Internalizing “antidotes”
- Accessing “the tip of the root”

# Psychological Antidotes

---

## Approaching Opportunities

- Satisfaction, fulfillment --> Frustration, disappointment
- Gladness, gratitude --> Sadness, discontentment, “blues”

## Affiliating with “Us”

- Attunement, inclusion --> Not seen, rejected, left out
- Recognition, acknowledgement --> Inadequacy, shame
- Friendship, love --> Abandonment, feeling unloved or unlovable

## Avoiding Threats

- Strength, efficacy --> Weakness, helplessness, pessimism
- Safety, security --> Alarm, anxiety
- Compassion for oneself and others --> Resentment, anger

# The Tip of the Root

---

- For the fourth step of TIG, try to get at the youngest, most vulnerable layer of painful material.
- The “tip of the root” is commonly in childhood. In general, the brain is most responsive to negative experiences in early childhood.
- Prerequisites
  - Understanding the need to get at younger layers
  - Compassion and support for the inner child
  - Capacity to “presence” young material without flooding

# Feeling Cared About

---

- As we evolved, we increasingly turned to and relied on others to feel safer and less threatened.
  - Exile from the band was a death sentence in the Serengeti.
  - Attachment behaviors: relying on the secure base
  - The well-documented power of social support to buffer stress and aid recovery from painful experiences
- Methods:
  - Recognize it's kind to others to feel cared about yourself.
  - Look for occasions to feel cared about and take them in.
  - Deliberately bring to mind the experience of being cared about in challenging situations.
  - Be caring yourself.



# **“Doing” and “Being”**

# Dual Modes

---

## “Doing”

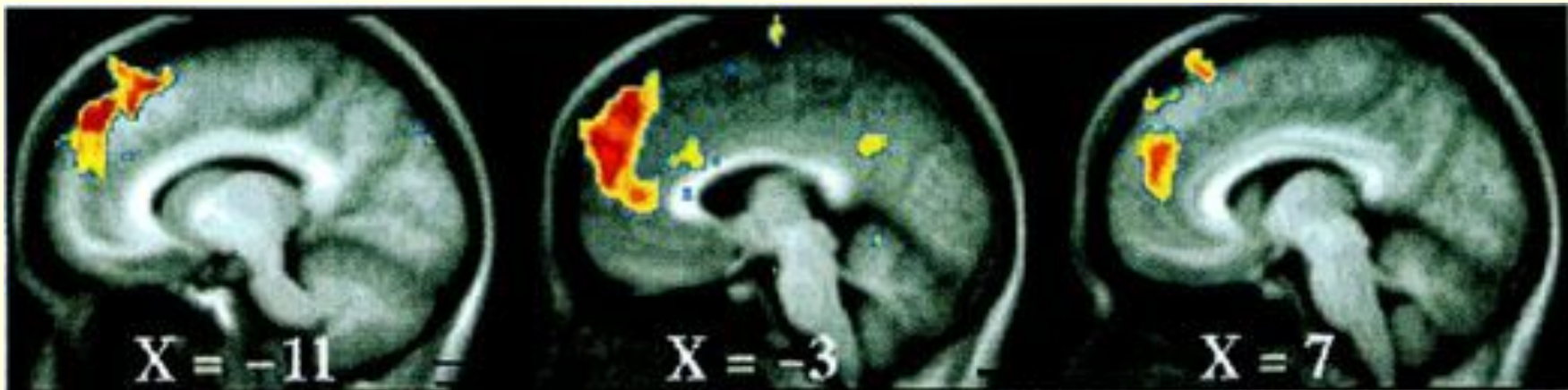
Mainly representational  
Much verbal activity  
Abstract  
Future- or past-focused  
Recursive contents of mind  
Goal-directed  
Sense of craving  
Personal, self-oriented perspective  
Firm beliefs  
Evaluative  
Lost in thought, mind wandering  
Tightly connected experiences  
Focal view  
Prominent self-as-object  
Prominent self-as-subject

## “Being”

Mainly sensory  
Little verbal activity  
Concrete  
Now-focused  
Transient contents of mind  
Nothing to do, nowhere to go  
Sense of peace  
Impersonal, 3<sup>rd</sup> person perspective  
Uncertainty, not-knowing  
Nonjudgmental  
Mindful presence  
Loosely connected experiences  
Panoramic view  
Minimal or no self-as-object  
Minimal or no self-as-subject

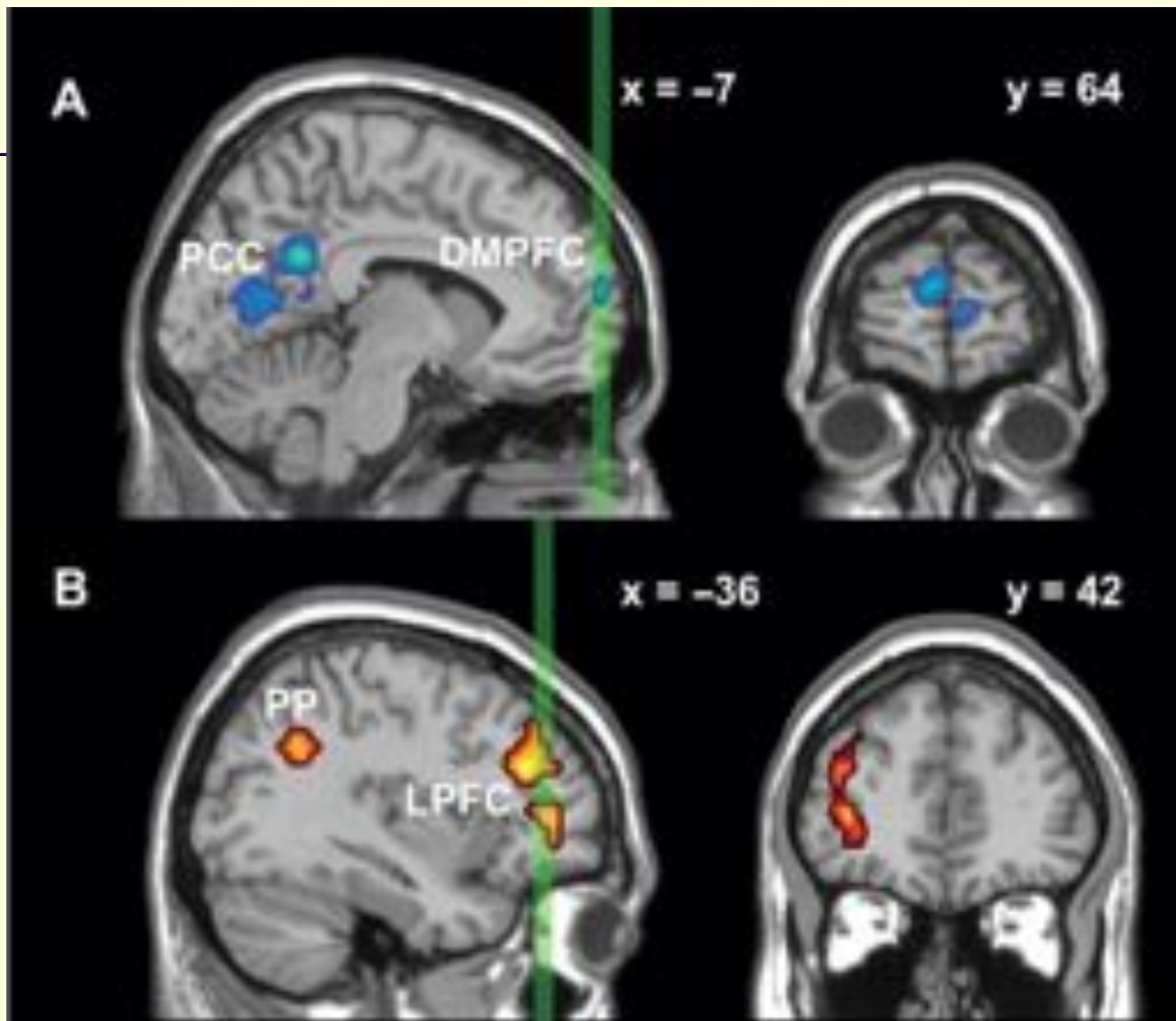
# Increased Dorsal MPFC Activation Related to Self-Referencing Thought

---

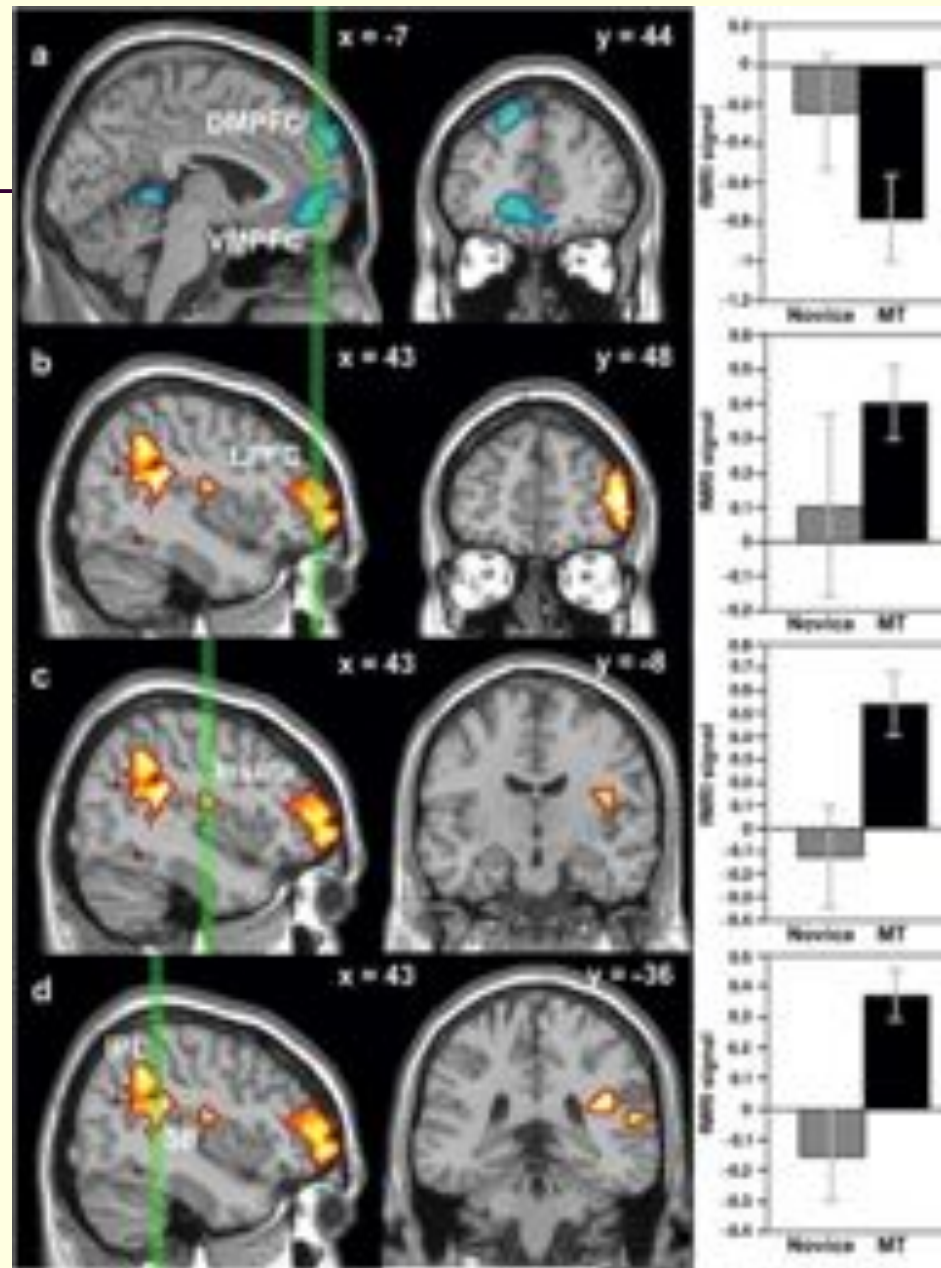


Gusnard D. A. et.al. PNAS 2001;98:4259-4264

Narrative (blue) and Experiential (red) conditions in the novice (pre MT) group



# Narrative (blue) vs Experiential (red) conditions following 8 weeks of MT



Farb, et al. Soc Cogn Affect Neurosci 2007 2:313-322

# Dual Modes


---

## “Doing”

Mainly representational  
Much verbal activity  
Abstract  
Future- or past-focused  
Recursive contents of mind  
Goal-directed  
Sense of craving  
Personal, self-oriented perspective  
Firm beliefs  
Evaluative  
Lost in thought, mind wandering  
Tightly connected experiences  
Focal view  
Prominent self-as-object  
Prominent self-as-subject

## “Being”

Mainly sensory  
Little verbal activity  
Concrete  
Now-focused  
Transient contents of mind  
Nothing to do, nowhere to go  
Sense of peace  
Impersonal, 3<sup>rd</sup> person perspective  
Uncertainty, not-knowing  
Nonjudgmental  
Mindful presence  
Loosely connected experiences  
Panoramic view  
Minimal or no self-as-object  
Minimal or no self-as-subject



**“Only the Seen in the Seen . . .”**

# **“Bahiya, you should train yourself thus.”**

---

*In reference to the seen, there will be only the seen. To the heard, only the heard. To the sensed, only the sensed. To the cognized, only the cognized.*

*When for you there will be only the seen in reference to the seen, only the heard in the heard, only the sensed in the sensed, only the cognized in the cognized, then, Bahiya, there's no you in that.*

*When there's no you in that, there's no you there. When there's no you there, you are neither here nor yonder nor between the two.*

*This, just this, is the end of all suffering.*

The Buddha

# Ways to Activate “Being” Mode

---

- Relax
- Focus on bare sensations and perceptions
- Sense the body as a whole
- Take a panoramic, “bird’s-eye” view
- Engage “don’t-know mind”; release judgments
- Don’t try to connect mental contents together
- Let experience flow, staying here now
- Relax the sense of “I, me, and mine”

# Whole Body Awareness

---

- 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.

# Panoramic Awareness

---

- Recall a bird's-eye view (e.g., mountain, airplane)
- Be aware of sounds coming and going in an open space of awareness, without any edges: boundless
- Open to other contents of mind, coming and going like clouds moving across the sky.
- Pleasant or unpleasant, no matter: just more clouds
- No cloud ever harms or taints the sky.

*Trust in awareness, in being awake,  
rather than in transient and unstable conditions.*

Ajahn Sumedho

---

*Be wisdom itself,  
rather than a person who isn't wise  
trying to become wise.*

*Trust in awareness, in being awake,  
rather than in transient and unstable conditions.*

Ajahn Sumedho

# Relaxing the Sense of Self

---

- Cautions: dissociative disorders, borderline PD
- Distinguish between the person (the body-mind as a whole) and the apparent self (the supposedly unified, stable, and independent owner of experiences and agent of actions).
- Notice that many activities need little if any sense of “I” (e.g., reaching for salt, cuddling).
- Notice how “I” changes; see how it grows in response to threats, opportunities, and contact with others; consider the apparent “I” as a process rather than as an entity: “selfing.”
- Focus on present moment experience itself, continually dropping any story of “I, me, and mine.”
- Enjoy the peace of less selfing.

---

*Indeed, the sage who's fully quenched  
Rests at ease in every way;  
No sense desire adheres to him or her  
Whose fires have cooled, deprived of fuel.*

*All attachments have been severed,  
The heart's been led away from pain;  
Tranquil, he or she rests with utmost ease.  
The mind has found its way to peace.*

The Buddha

---

*Outstanding behavior,  
blameless action,  
open hands to all,  
and selfless giving:*

*This is a blessing supreme.*

The Buddha

---

*Penetrative insight*

*joined with calm abiding*

*utterly eradicates*

*afflicted states.*

Shantideva

# Thank you

---

*Be still*

*Listen to the stones of the wall*

*Be silent, they try*

*To speak your*

*Name.*

*Listen to the living walls.*

*Who are you?*

*Who*

*Are you? Whose*

*Silence are you?*

Thomas Merton

# Great Books

---

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

---

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

---

- 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.
- 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*

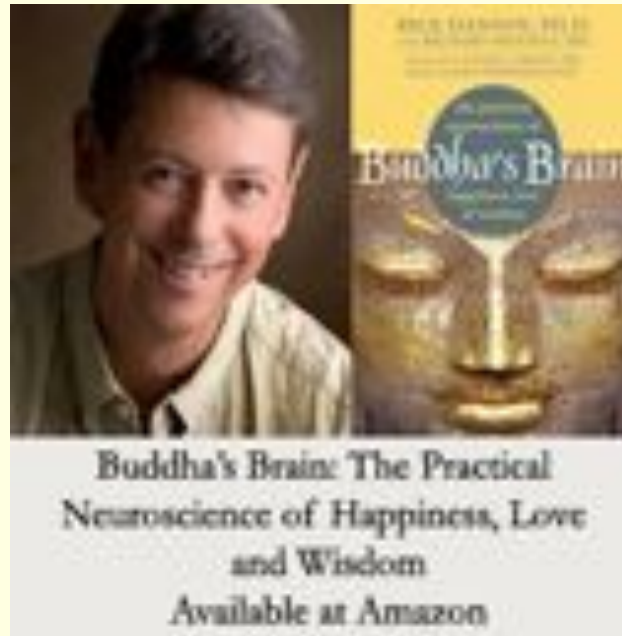
---



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



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



[www.RickHanson.net](http://www.RickHanson.net)  
[www.WiseBrain.org](http://www.WiseBrain.org)