Buddha’s Brain:

Strengthening the Neural Foundations of Mindfulness and Compassion

Openground
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Topics

- Grounding the mind in life
- Self-directed neuroplasticity
- The power of mindfulness
- Self-compassion
- Empathy
- Networks of spacious awareness
- Opening the heart
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.

Eric R. Kandel, 2006
Naturalizing Practice

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

Contemplative 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 Ani Tenzin Palmo
Self-Directed Neuroplasticity
A Neuron
Your Brain: The Technical Specs

- **Size:**
  - 3 pounds of tofu-like tissue
  - 1.1 trillion brain cells
  - ~ 100 billion “gray matter" neurons

- **Activity:**
  - Always on 24/7/365 - Instant access to information on demand
  - 20-25% of blood flow, oxygen, and glucose

- **Speed:**
  - Neurons firing around 5 to 50 times a second (or faster)
  - Signals crossing your brain in a tenth of a second

- **Connectivity:**
  - Typical neuron makes ~ 5000 connections with other neurons:
  - ~ 500 trillion synapses
Key Brain Areas for Consciousness

(adapted from) M. T. Alkire et al., Science 322, 876-880 (2008)
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
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
Tibetan Monk, Boundless Compassion
Pain network: Dorsal anterior cingulate cortex (dACC), insula (Ins), somatosensory cortex (SSC), thalamus (Thal), and periaqueductal gray (PAG). Reward network: Ventral tegmental area (VTA), ventral striatum (VS), ventromedial prefrontal cortex (VMPFC), and amygdala (Amyg). K. Sutliff, in Lieberman & Eisenberger, 2009, Science, 323:890-891
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”
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?
The Power of Mindfulness
Mindful Attention

- **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
Basics of Meditation

- Relax; find a 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
Neural Basis of Mindfulness Factors

- 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
- Absorbing the benefits - positive implicit memories
The Joy of Tech

IN YOUR MIND'S
BROWSER, CLEAR
YOUR CACHE...

NOW DELETE
YOUR HISTORY...

NOW NAVIGATE
TO A BLANK WEB
PAGE...
Self-Compassion
The root of compassion is compassion for oneself.

Pema Chodron
Wishing Yourself Well

- 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.”
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
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
“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
Empathy
What Is Empathy?

- It is sensing, feeling, and understanding how it is for the other person. In effect, you *simulate* his or her inner world.

- It involves (sometimes subtly) all of these elements:
  - Bodily resonance
  - Emotional attunement
  - Conceptual understanding

- Empathy is usually communicated, often tacitly.

- We can give empathy, we can receive it, and we can ask for it.
Empathy in Buddhist Practice

- Empathy expresses Wise View, which sees how we are all related to each other.
  - Empathy is thus, in a deep sense, self-understanding.

- Empathy is sila in action, the restraint of reactive patterns to be present with others.

- Empathy involves non-attachment to view, dropping our “case,” entering into “don’t know mind.”

- Empathy embodies non-harming.

- Compassion is not enough; we need to feel the weight of the other person’s experience.
Neural Substrates of Empathy

Three *simulating* systems:
- **Actions**: “mirror” systems; temporal-parietal
- **Feelings**: resonating emotionally; insula
- **Thoughts**: “theory of mind”; prefrontal cortex

These systems interact with each other through association and active inquiry.

They produce an automatic, continual re-creation of aspects of others’ experience.
Empathy Skills

- Pay attention.
- Be open.
- Read emotion in face and eyes.
- Sense beneath the surface.
- Drop aversion (judgments, distaste, fear, anger, withdrawal).
- Investigate actively.

Express empathic understanding:
  - Reflect the content
  - Resonate with the tone and implicit material
  - Questions are fine
  - Offer respect and wise speech throughout
Can you attend to the postures, facial expressions, and movements of another person?

Can you attune to and feel something of the emotions of another person?

Can you have some sense of the thoughts, hopes, and concerns of another person?
Reflections about Empathy

- You’re more likely to get empathy if you’re:
  - Open, present
  - Honest, real, authentic
  - Reasonably clear
  - Responsible for your own experience
  - Taking it in when you feel felt

- Empathy can be negotiated:
  - Name it as a topic in the relationship
  - Follow NVC format: “When X happens, I feel Y, because I need Z. So I request ______ .”
  - Stay with it.
Networks of Spacious Awareness
Increased **Medial** PFC Activation Related to Self-Referencing Thought

Self-Focused (blue) and Open Awareness (red) Conditions (in the novice, pre MT group)

Self-Focused (blue) and Open Awareness (red) Conditions (following 8 weeks of MT)
Ways to Activate Lateral Networks

- 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

- Involves insula and middle parietal lobes, which integrate sensory maps of the body, plus right hemisphere, for holistic (gestalt) perception

- Practice
  - 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

- This sense of the whole may be present for a second or two, then crumble; just open up to it 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
“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.
Opening the Heart
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.

Albert Schweitzer
Penetrative insight

joined with calm abiding

utterly eradicates

afflicted states.

Shantideva
Great Books

See www.RickHanson.net for other great books.

Key Papers - 1

See www.RickHanson.net for other scientific papers.


Key Papers - 2


- 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.


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