Buddha's Brain:

The Power of Self-Directed Neuroplasticity

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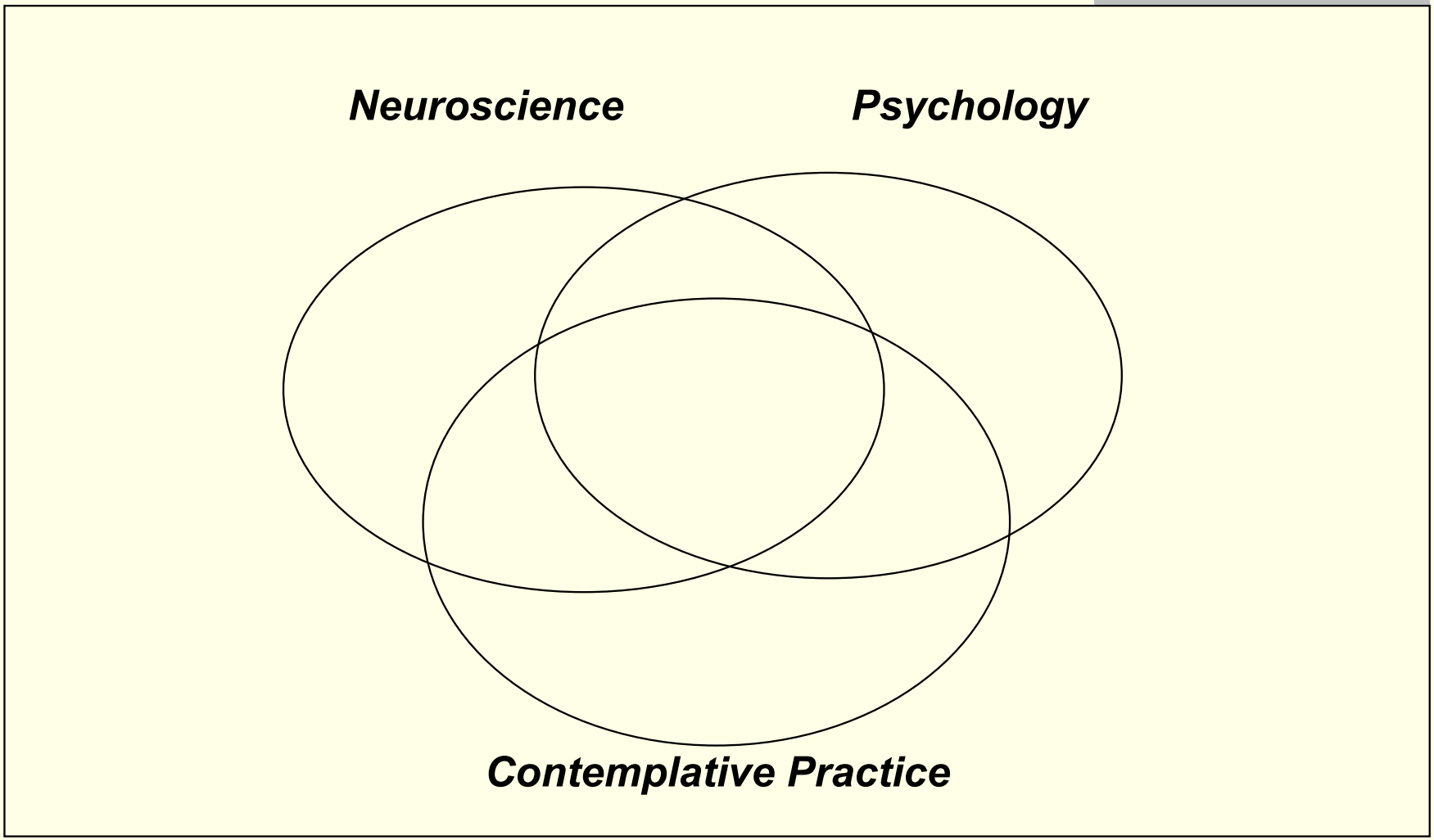
Topics

- **Self-directed neuroplasticity**
- **The evolving brain - and its challenges today**
- **“Taking in the good” (TIG)**

Perspectives

Common - and Fertile - Ground



The history of science is rich in the example
of the fruitfulness of bringing
two sets of techniques, two sets of ideas,
developed in separate contexts
for the pursuit of new truth,
into touch with one another.

J. Robert Oppenheimer

Great questioning, great enlightenment;
little questioning, little enlightenment;
no questioning, no enlightenment.

Dogen

Self-Directed Neuroplasticity

Fact #1

<u>As your brain changes, your mind changes</u>.

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.

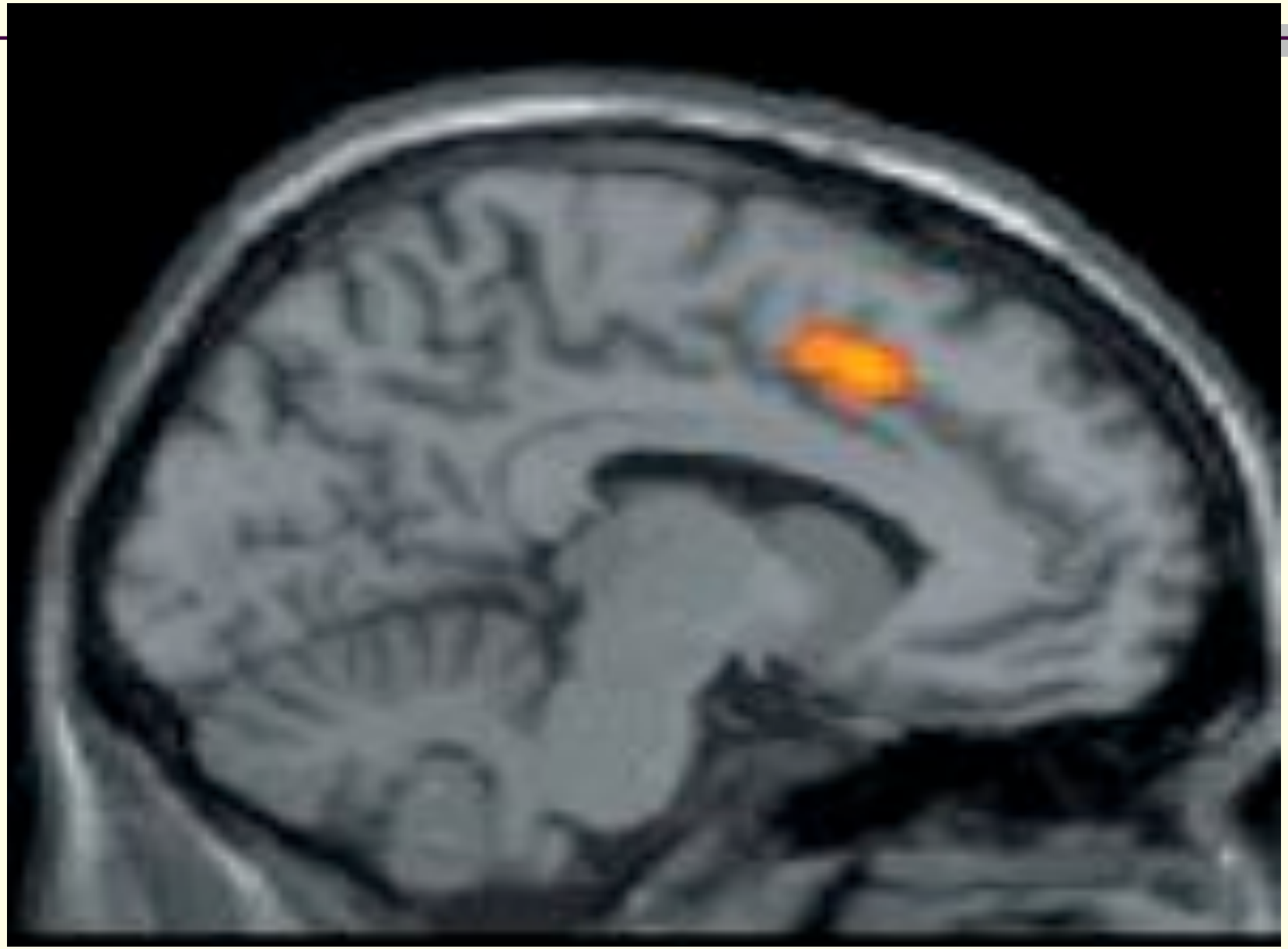
Immaterial mental activity maps to material neural activity.

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

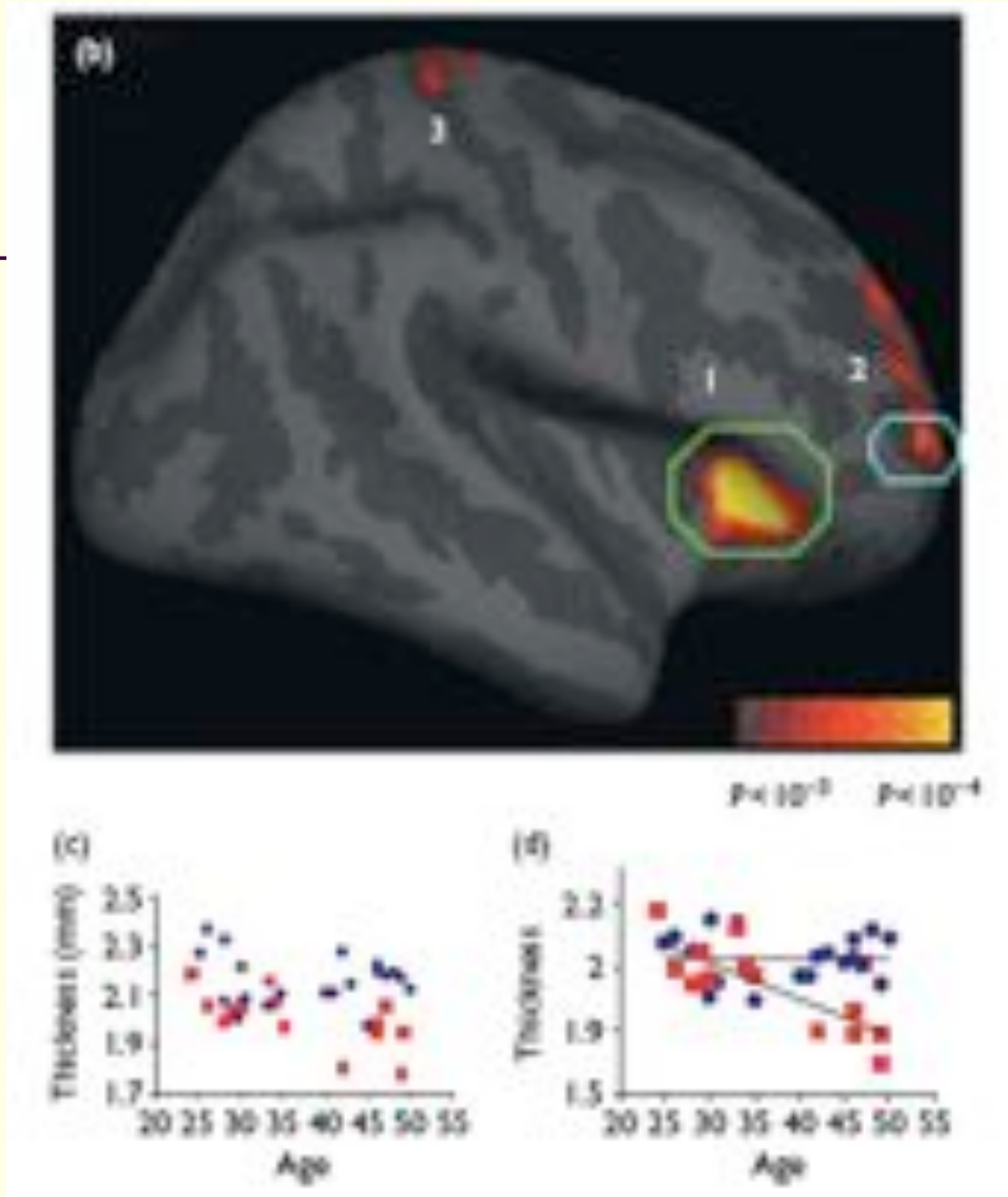
Tibetan Monk, Boundless Compassion



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?

The Power of Mindfulness

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

The education of attention
would be an education par excellence.
William James

Neuroplasticity in Context

- Neuroplasticity is not breaking news. It's been long presumed that mental activity changed neural structure: what else is learning?
- The news is in how the mind changes the brain.
- Most neuroplasticity is incremental, not dramatic.
- Neuroplasticity is ethically neutral.

How to use it for good?

Self-Compassion

- 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.

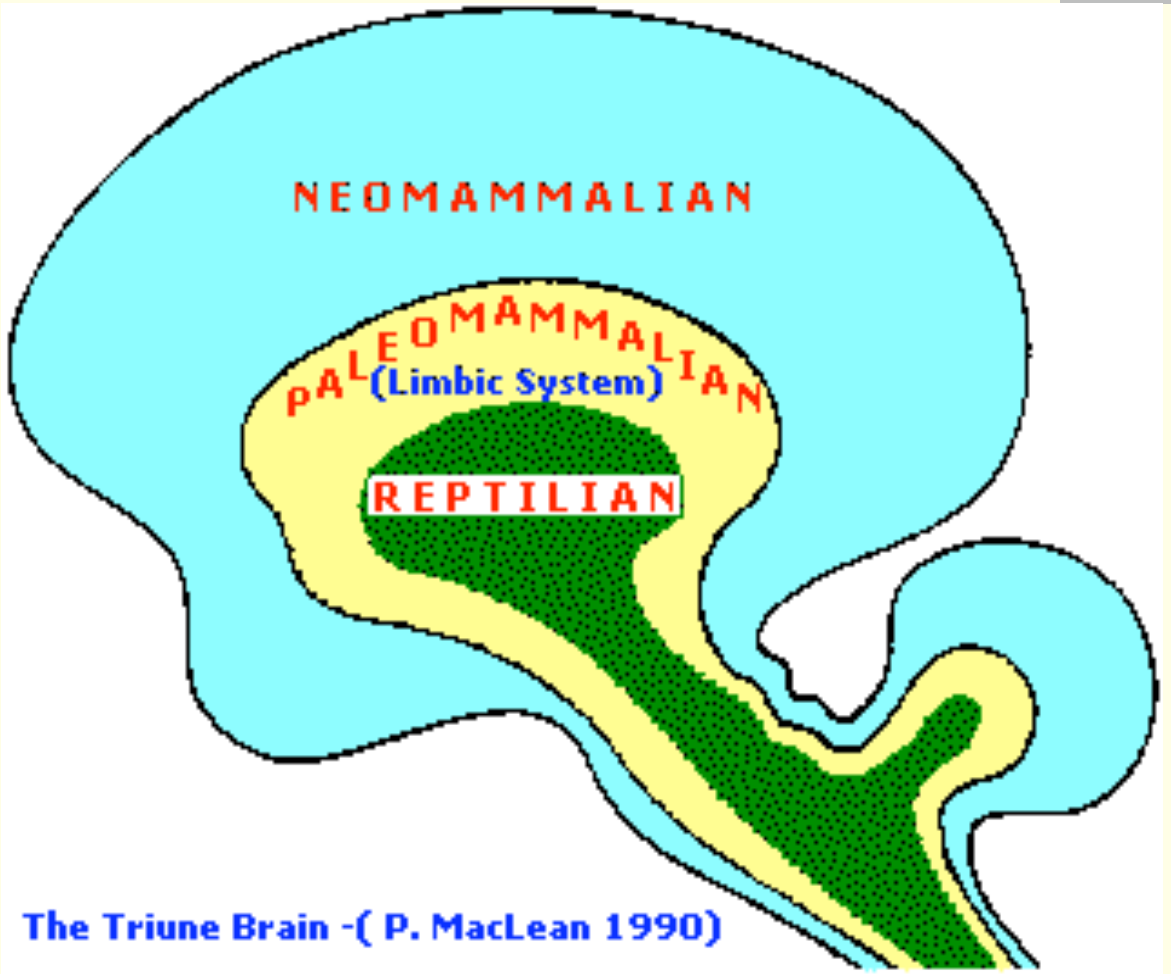
- But self-compassion is hard for many people, due to feelings of unworthiness, self-criticism, or “internalized oppression.” To encourage the neural substrates of self-compassion:
  - Get the sense of being cared about by someone else.
  - Bring to mind someone you naturally feel compassion for
  - 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 Evolving Brain - and Its Challenges

Evolution

- ~ 4+ billion years of earth
- 3.5 billion years of life
- 650 million years of multi-celled organisms
- 600 million years of nervous system
- ~ 200 million years of mammals
- ~ 60 million years of primates
- ~ 6 million years ago: last common ancestor with chimpanzees, our closest relative among the “great apes” (gorillas, orangutans, chimpanzees, bonobos, humans)
- 2.5 million years of tool-making (starting with brains 1/3 our size)
- ~ 150,000 years of *homo sapiens*
- ~ 50,000 years of modern humans
- ~ 5000 years of blue, green, hazel eyes

Evolutionary History



The Triune Brain

Negativity Bias: Causes in Evolution

- "Sticks" - Predators, natural hazards, social aggression, pain (physical and psychological)
- "Carrots" - Food, sex, shelter, social support, pleasure (physical and psychological)
- During evolution, avoiding "sticks" usually had more effects on survival than approaching "carrots."
  - Urgency - Usually, sticks must be dealt with immediately, while carrots allow a longer approach.
  - Impact - Sticks usually determine mortality, carrots not; if you fail to get a carrot today, you'll likely have a chance at a carrot tomorrow; but if you fail to avoid a stick today - whap! - no more carrots forever.

Negativity Bias: Physiology and Neuropsychology

- Physiology:
  - Greater bodily arousal to negative stimuli
  - Pain is produced anywhere; pleasure is circumscribed.

- Neuropsychology:
  - Separate, low-level systems for negative and positive stimuli
  - Right hemisphere specialized for negative stimuli
  - Greater brainwave responses to negative stimuli
  - ~ 65% of amygdala sifts for negative stimuli
  - The amygdala-hippocampus system flags negative experiences prominently in memory: *like Velcro for negative experiences but Teflon for positive ones.*
  - More negative “basic” emotions than positive ones

Negativity Bias: Some Consequences

- Negative stimuli get more attention and processing.
- We generally learn faster from pain than pleasure.
- People work harder to avoid a loss than attain an equal gain (“endowment effect”)
- Easy to create learned helplessness, hard to undo
- Negative interactions: more powerful than positive
- Negative experiences sift into implicit memory.

Health Consequences of Chronic Stress

- Physical:
  - Weakened immune system
  - Inhibits GI system; reduced nutrient absorption
  - Reduced, dysregulated reproductive hormones
  - Increased vulnerabilities in cardiovascular system
  - Disturbed nervous system
- Mental:
  - Lowers mood; increases pessimism
  - Increases anxiety and irritability
  - Increases learned helplessness (especially if no escape)
  - Often reduces approach behaviors (less for women)
  - Primes aversion (SNS-HPAA negativity bias)

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.

Taking in the Good

Being with, Releasing, Replacing

- There are three phases of psychological healing and personal growth (and spiritual practice):
  - Be mindful of, release, replace.
  - Let be, let go, let in.

- Mindfulness is key to the second and third phase, sometimes curative on its own, and always beneficial in strengthening its neural substrates. But often it is not enough by itself.

- And sometimes you need to skip to the third phase to build resources for mindfulness.

Just having positive experiences is not enough.

They pass through the brain like water through a sieve, while negative experiences are caught.

We need to engage positive experiences actively to weave them into the brain.

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.

Targets of TIG

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

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

Why It's Good to Take in the Good

- In general, adds positive contents to implicit memory
- Internalizes psychological growth (e.g., it usually feels good and goes well to speak from my heart)
- Associates rewards to good steps; boosts motivation
- Brings in missing "supplies" (e.g., love, worth) to help remedy deficits and heal painful experiences
- Encourages prosocial experiences and actions

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

“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

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.
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- Hanson, R. (with R. Mendius). 2009. *Buddha's Brain: The Practical Neuroscience of Happiness, Love, and Wisdom*. New Harbinger.
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- LeDoux, J. 2003. *Synaptic Self*. Penguin.
- Linden, D. 2008. *The Accidental Mind*. Belknap.
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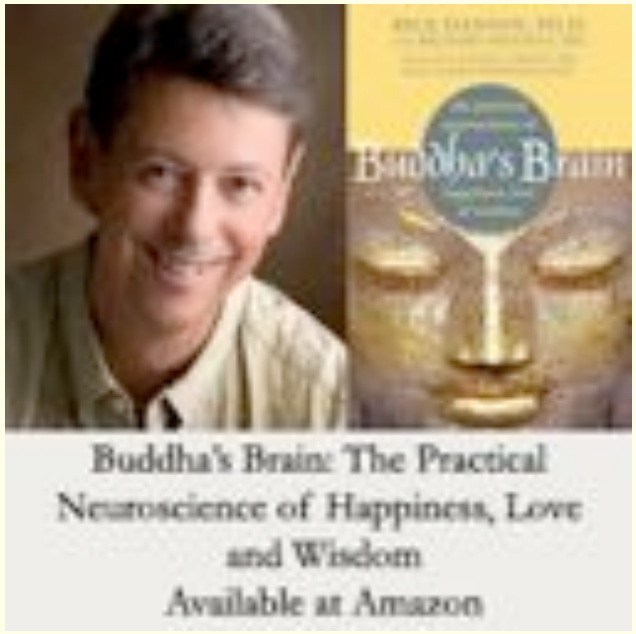
- Thompson, E. 2007. *Mind in Life*. Belknap.

Where to Find Rick Hanson Online

http://www.youtube.com/BuddhasBrain

http://www.facebook.com/BuddhasBrain



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