

*Think not lightly of good,
saying, "It will not come to me."*

Drop by drop is the water pot filled.

*Likewise, the wise one,
gathering it little by little,
fills oneself with good.*

Neurodharma: Growing a Wakeful And Loving Brain

InsightLA

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Rick Hanson, Ph.D.

The Wellspring Institute for Neuroscience and Contemplative Wisdom ²

WiseBrain.org RickHanson.net

Topics

- The mind and the brain
- Growing inner strengths
- The evolving brain
- The negativity bias
- Taking in the good
- Healing old pain
- Cultivation and craving



The Mind and the Brain

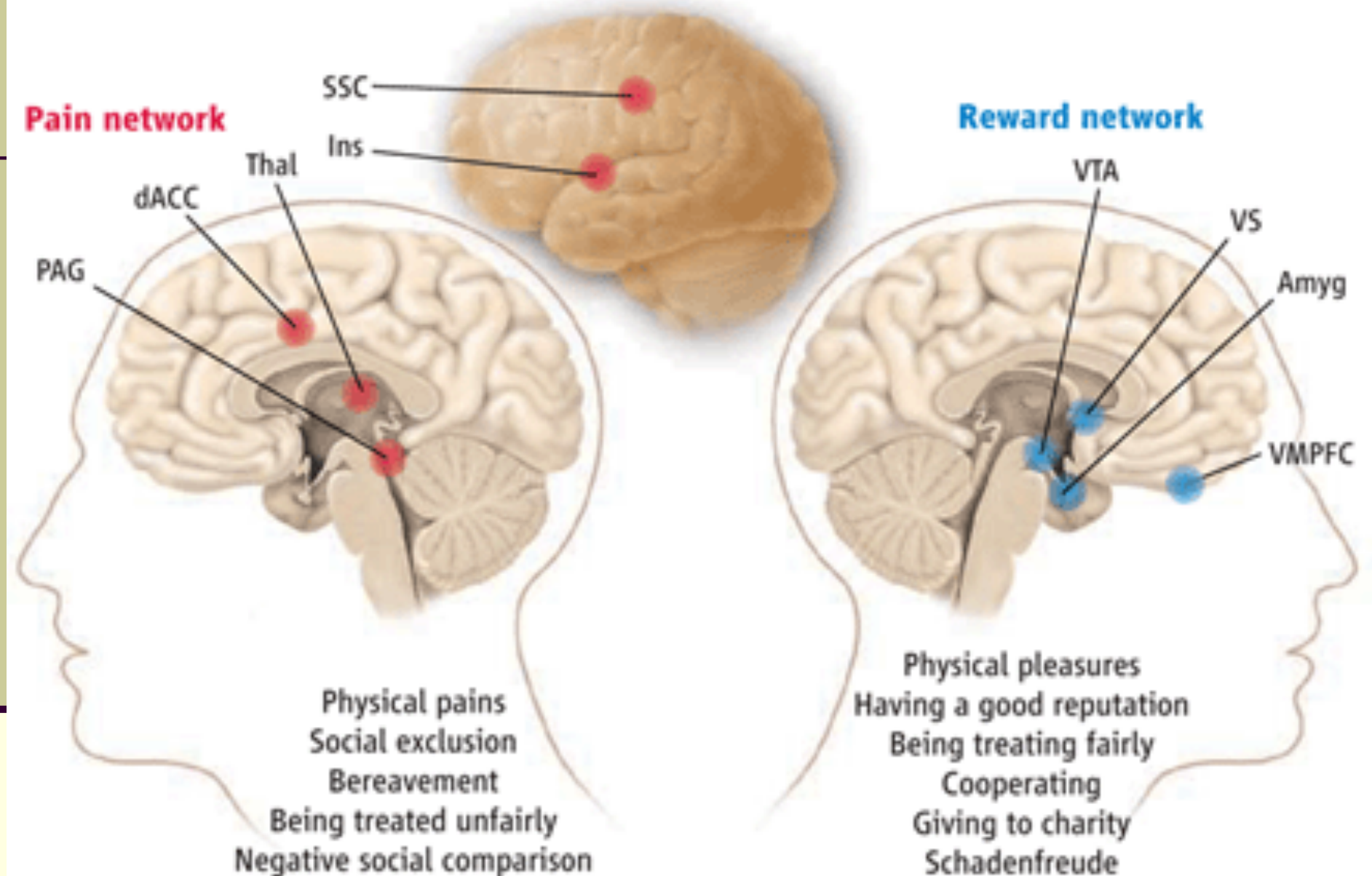
Naturalizing the Dharma

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

Buddhist 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, nirodha, sila, samadhi, panna, and bhavana?

It is ironic that a practice that is so much about coming into the body can be reluctant to engage the full implications of what embodiment in life means.



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

Three Facts about Brain and Mind

- As the brain changes, the mind changes.
 - Mental activity depends upon neural activity.

- As the mind changes, the brain changes.
 - Transient: brainwaves, local activation
 - Lasting: epigenetics, neural pruning, “neurons that fire together, wire together”
 - Experience-dependent neuroplasticity

- You can use the mind to change the brain to change the mind for the better: self-directed neuroplasticity.


Effects of Meditation on the Brain

- Increased gray matter in the:
 - Insula - interoception; self-awareness; empathy for emotions
 - Hippocampus - visual-spatial memory; establishing context; inhibiting amygdala and cortisol
 - Prefrontal cortex (PFC) - executive functions; attention control
- Reduced cortical thinning with aging in insula and PFC
- Increased activation of left frontal regions, which lifts mood
- Increased gamma-range brainwaves - may be associated with integration, “coming to singleness,” “unitary awareness”
- Preserved telomere length

Honoring Experience

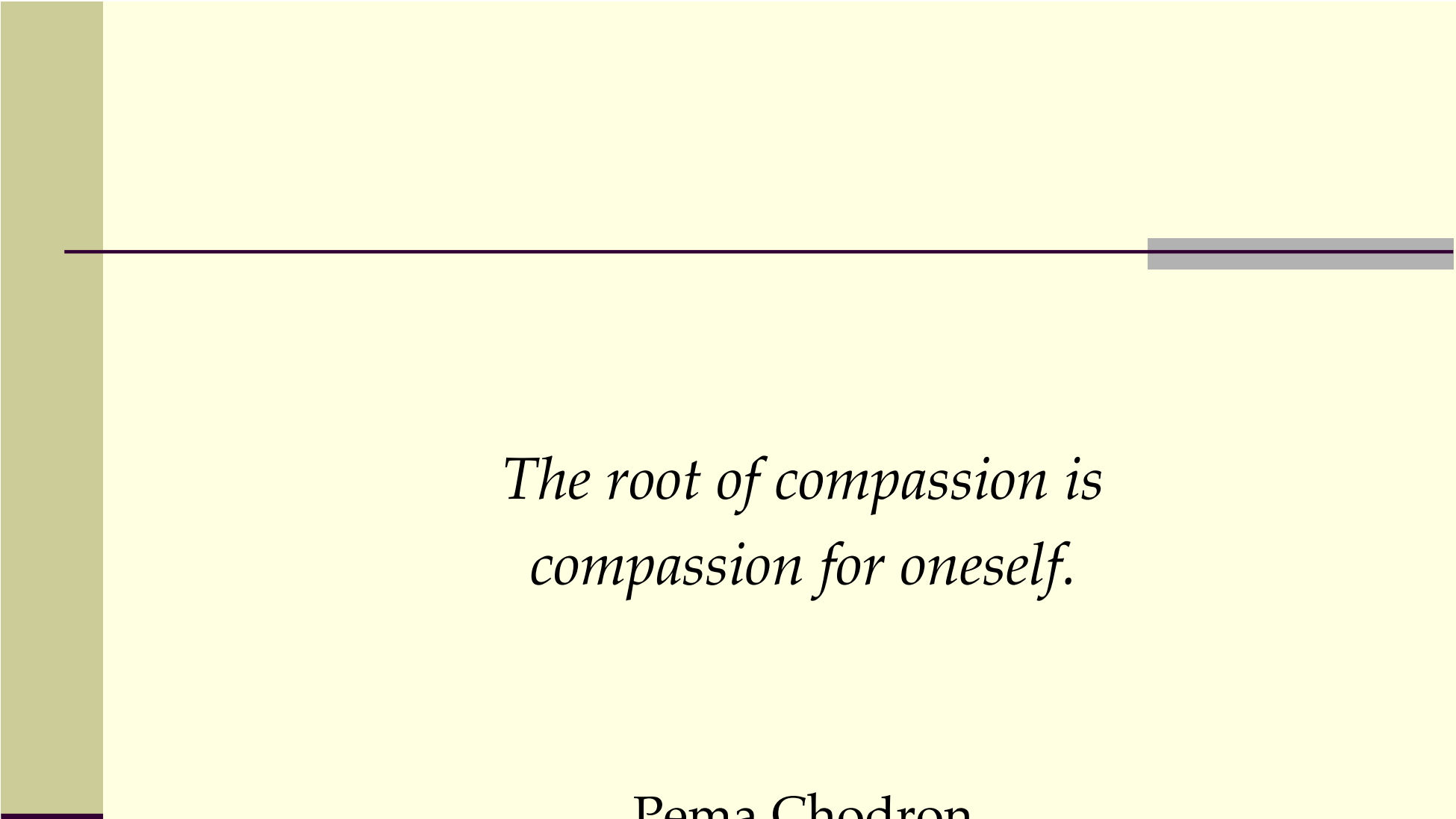
Your experience *matters*.

**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.**



*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

- 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”

*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



Growing Inner Strengths

Two wolves in the heart

Inner Strengths Include

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

Major Buddhist Inner Strengths

Mindfulness

Investigation

Energy

Bliss

Tranquility

Concentration

Equanimity

Compassion

Kindness

Altruistic joy

Virtue

Wisdom

View

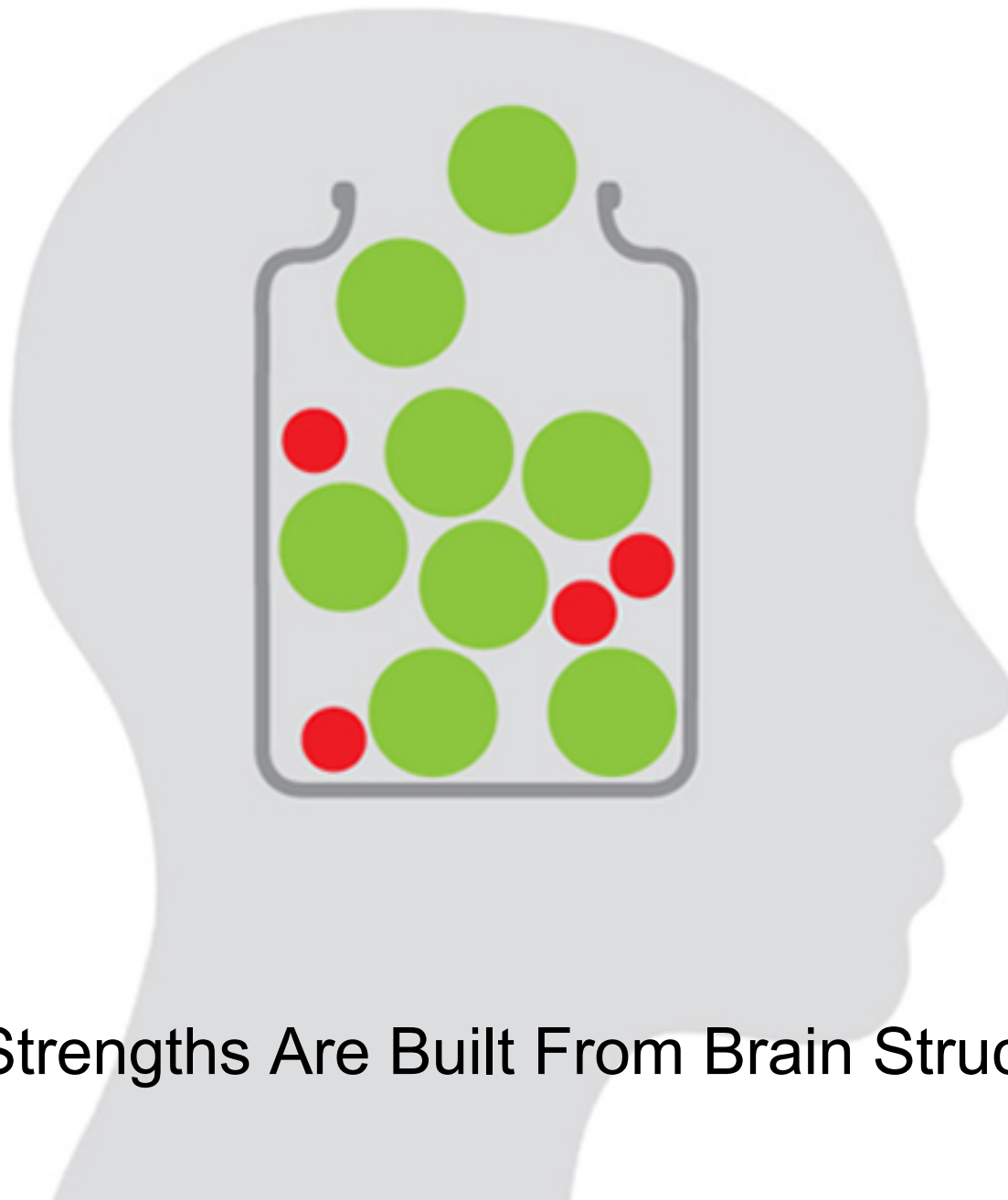
Intention

Effort

Conviction

Generosity

Patience



Inner Strengths Are Built From Brain Structure

Learning and Memory

- The sculpting of the brain by experience is memory:
 - Explicit - Personal recollections; semantic memory
 - Implicit - Procedural memory; bodily states; emotional tendencies; “views” (expectations, object relations, perspectives); behavioral repertoire and inclinations; what it feels like to be “me”
- Implicit memory is larger than explicit memory. Inner strengths are embedded mainly in implicit memory.
- Thus the key question: How can we embed inner strengths in implicit memory?

The Machinery of Memory

Change in neural structure and function - i.e., learning, memory - is essentially a two-stage process: from activation to installation.

Information - including our experiences - is held in short-term memory buffers and then transferred to and gradually consolidated in long-term storage

Activated mental states foster installed neural traits.

Activation/Installation Cycles

States are temporary, traits are enduring.

States foster traits, and traits foster states

Activated states --> Installed traits --> Reactivated states --> Reinforced traits

Negative states --> Negative traits --> Reactivated negative states --> Reinforced negative traits

Positive states --> Positive traits --> Reactivated positive states --> Reinforced positive traits

Negative Experiences In Context

- Negative about negative --> more negative
- Some inner strengths come only from negative experiences, e.g., knowing you'll do the hard thing.
- But negative experiences have inherent costs, in discomfort and stress.
- Could an inner strength have been developed without the costs of negative experiences?
- Many negative experiences are pain with no gain.

The Causes of Inner Strengths

How do we build the neural traits of inner strengths?

Traits are developed by installing experiences of the trait and related factors. Positive traits - inner strengths - come from positive states.

We develop mindfulness by repeatedly being mindful; we develop compassion by repeatedly feeling compassionate; etc.

The brain is like a VCR or DVR, not an iPod: we must play the song to record it - we must experience the strength to install it in the brain.

Cultivation in Context

- Three ways to engage the mind:
 - Be with it. Decrease negative. Increase positive.
 - The garden: Observe. Pull weeds. Plant flowers.
 - Let be. Let go. Let in.
 - Mindfulness present in all three ways to engage mind
- While “being with” is primary, it’s often isolated and privileged in mindfulness-based practices.
- Skillful means for decreasing the negative and increasing the positive have developed over 2500 years. Why not use them?



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Join us for

**Cultivating Inner Strength - Monastic
Daylong [Dana - No Fee Day]**

with Ayya Anandabodhi
and Ayya Santacitta
on

Sunday, July 8
from 9:30 am - 5 pm.

(Photo by Ed Ritger)

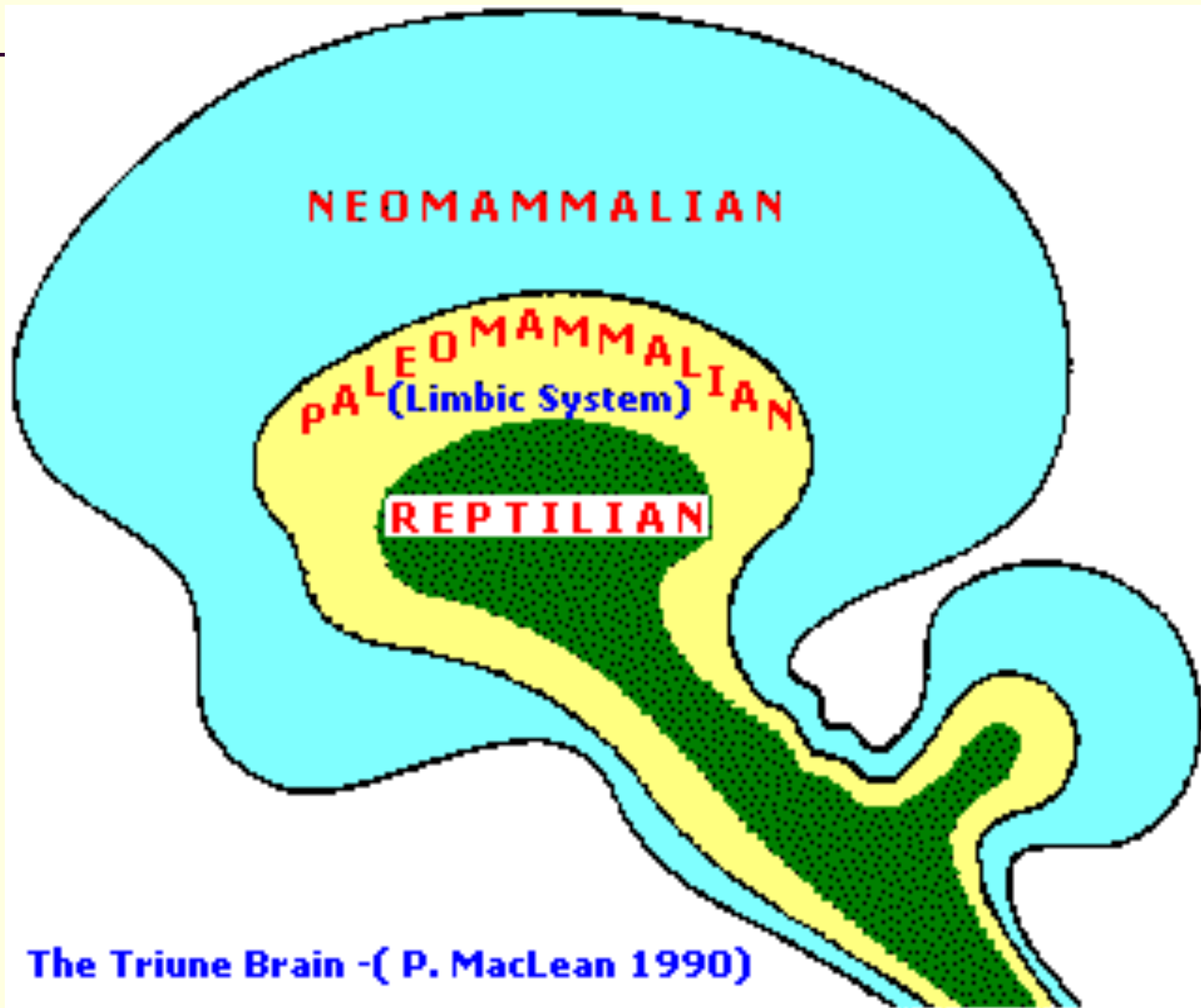


The Evolving Brain

Biological 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: ancestor with chimpanzees
- 2.5 million years of tool-making
- 150,000 years of *homo sapiens*

Evolutionary History



Three Fundamental Motivational and Self-Regulatory Systems

- **Avoid Harms:**

- Primary need, tends to trump all others

- **Approach Rewards:**

- Elaborated via sub-cortex in mammals for emotional valence, sustained pursuit

- **Attach to Others:**

- Very elaborated via cortex in humans for pair bonding, language, empathy, cooperative planning, compassion, altruism, etc.



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

The Homeostatic Home Base

When not disturbed by threat, loss, or rejection [no felt deficit of safety, satisfaction, and connection]

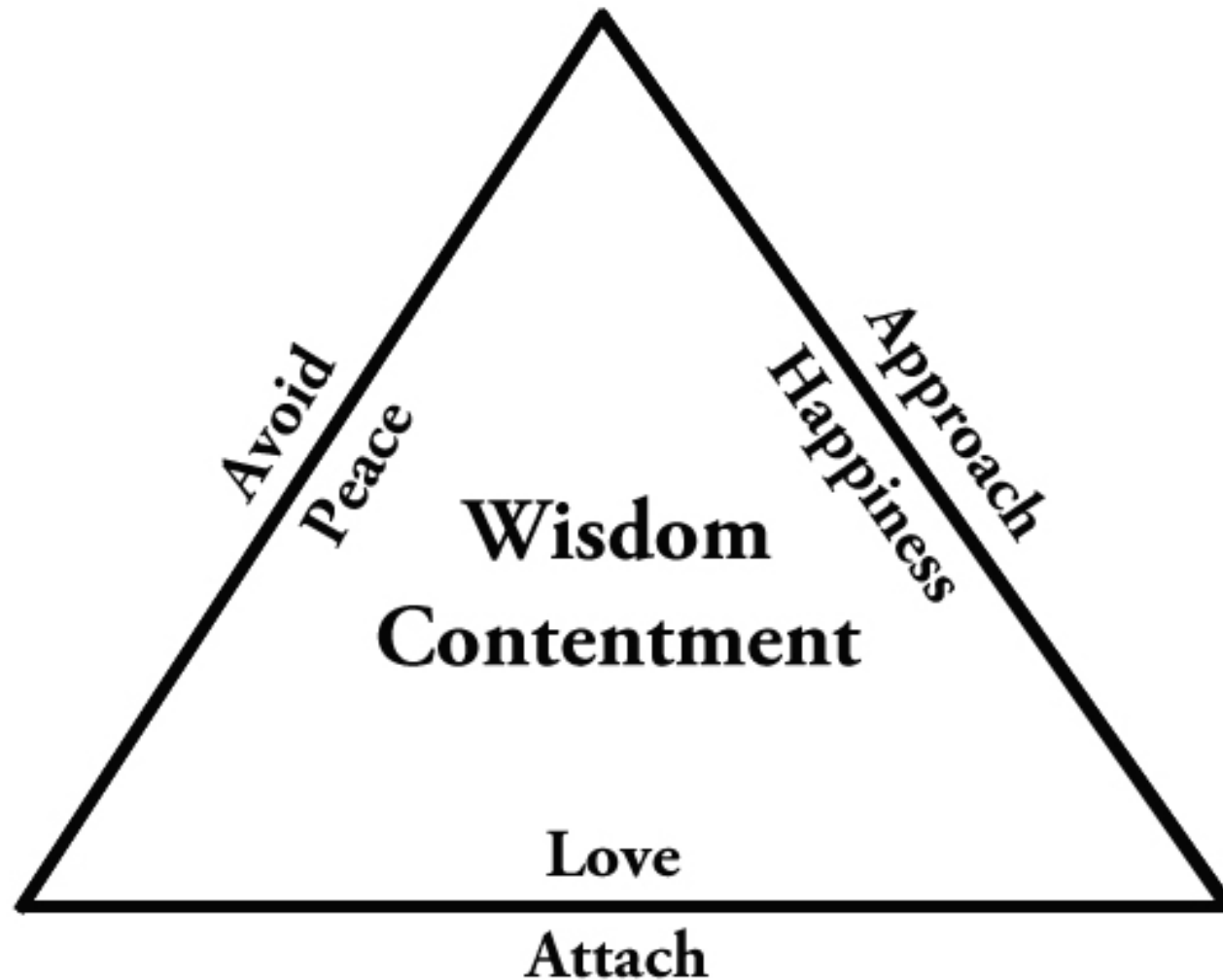
The body defaults to a sustainable equilibrium of refueling, repairing, and pleasant abiding.

The mind defaults to a sustainable equilibrium of:

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

This is the brain in its homeostatic ***Responsive,***
minimal craving mode.

The Responsive Mode



Coming Home, Staying Home

Positive experiences of core needs met - the felt sense of safety, satisfaction, and connection - activate Responsive mode.

Activated Responsive states can become installed Responsive traits. Responsive traits foster Responsive states.

Responsive states and traits enable us to stay Responsive with challenges.

Neurobiological Basis of Craving

When disturbed by threat, loss, or rejection [felt deficit of safety, satisfaction, or connection]:

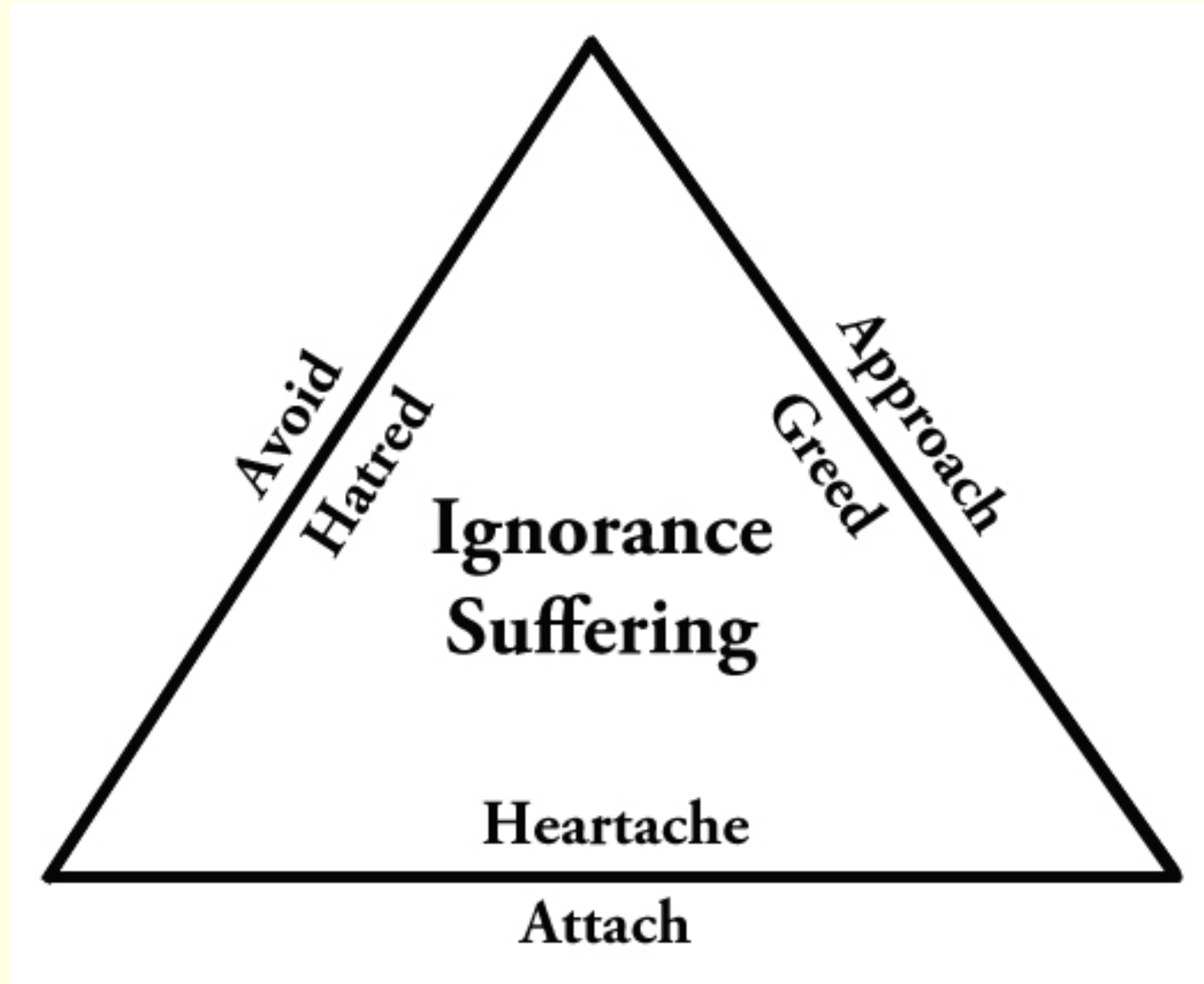
The body fires up into the stress response; outputs exceed inputs; long-term building is deferred.

The mind fires up into:

- **Fear** (the Avoiding system)
- **Frustration** (the Approaching system)
- **Heartache** (the Attaching system)

This is the brain in allostatic, **Reactive**, *craving* mode.³⁴

The Reactive Mode

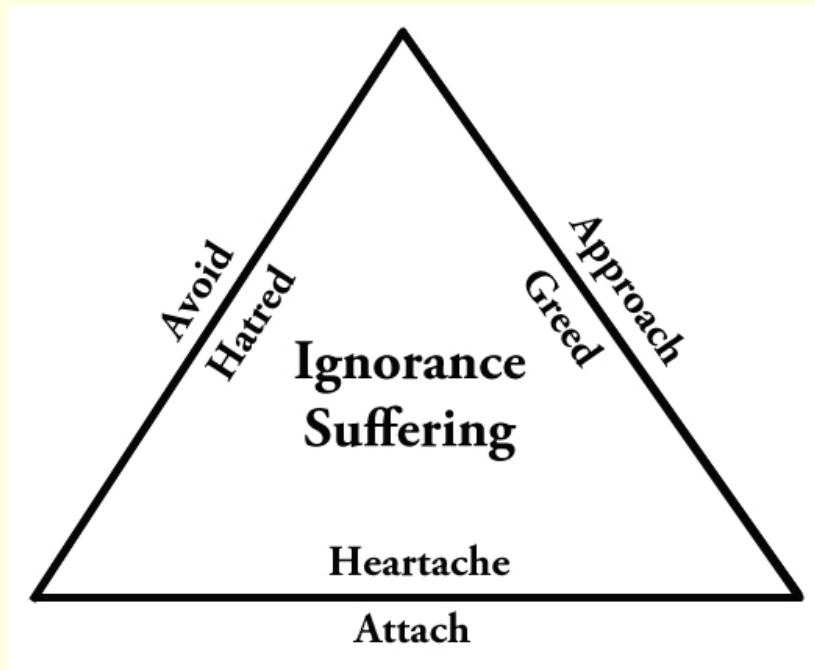


Reactive Dysfunctions in Each System

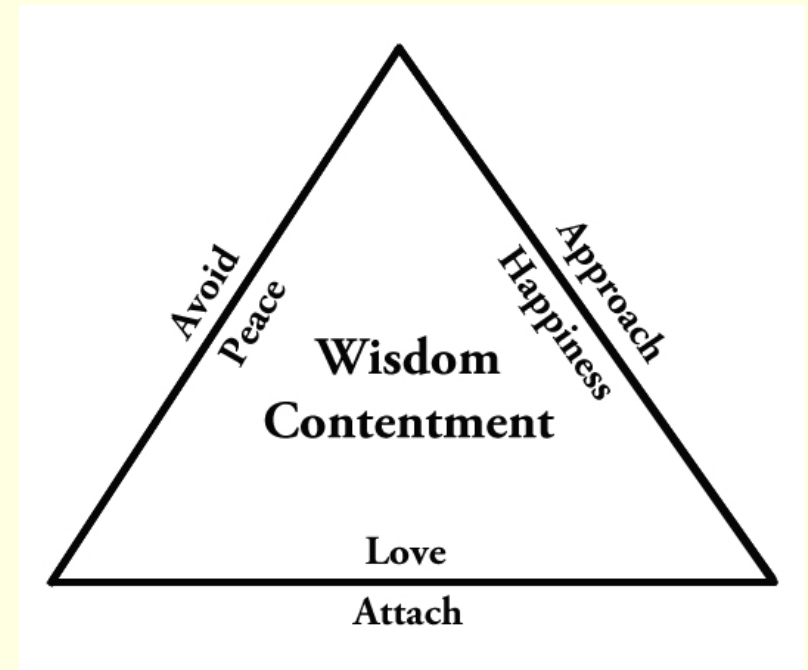
- **Avoid** - Anxiety disorders; OCD; PTSD; panic, terror; rage; violence
- **Approach** - Addiction; over-drinking, -eating, -gambling; hoarding; driving for goals at great cost
- **Attach** - Borderline, narcissistic, antisocial PD; “looking for love in all the wrong places”

Choices . . .

Or?



Reactive Mode



Responsive Mode



The Negativity Bias

The Brain's Negativity Bias

- As our ancestors evolved, avoiding “sticks” was more important for survival than getting “carrots.”
- Negative stimuli:
 - More attention and processing
 - Greater motivational focus: loss aversion
- Preferential encoding in implicit memory:
 - We learn faster from pain than pleasure.
 - Negative interactions: more impactful than positive
 - Easy to create learned helplessness, hard to undo
 - Rapid sensitization to negative through cortisol

Velcro for Bad, Teflon for Good

The negativity bias

bad experiences

good experiences

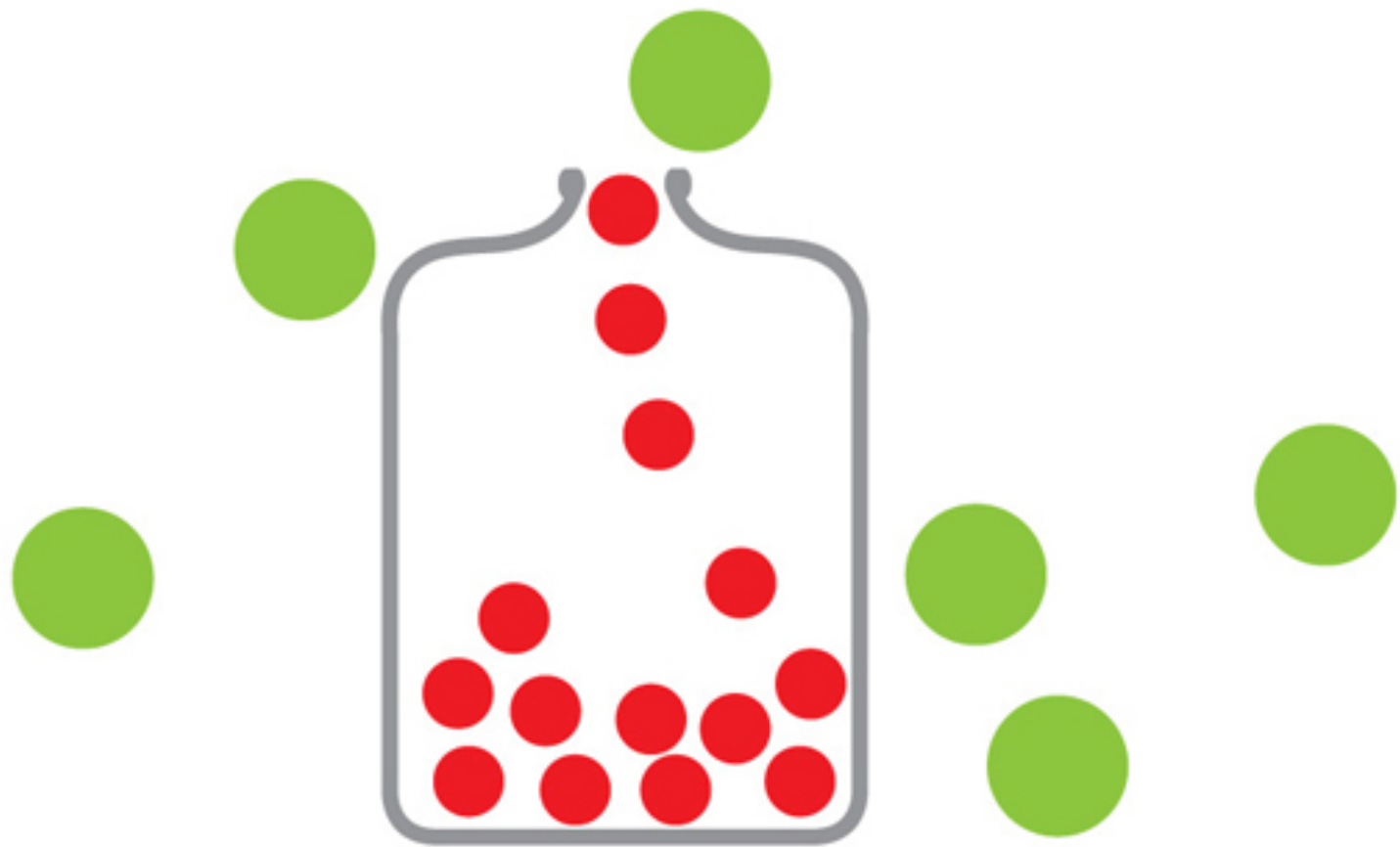
A Bottleneck For Growing Inner Strengths

Unfortunately, the brain is inefficient at turning positive experiences into neural structure.

This design feature of the brain creates a kind of bottleneck that reduces the conversion of positive mental states to positive neural traits.

Most positive experiences are wasted on the brain.


This is the fundamental weakness in psychotherapy, mindfulness training, character education, human resources training, and informal efforts at growth.



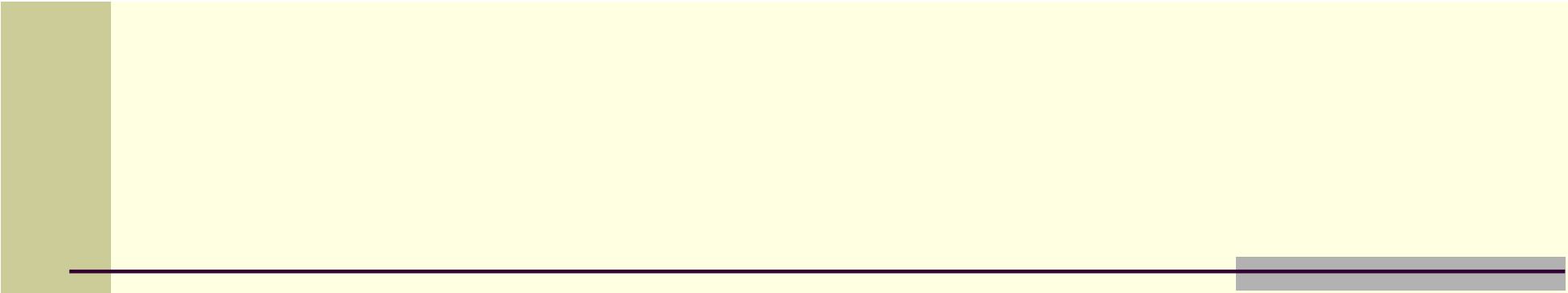
The Negativity Bias

Stone age brains in the 21st century

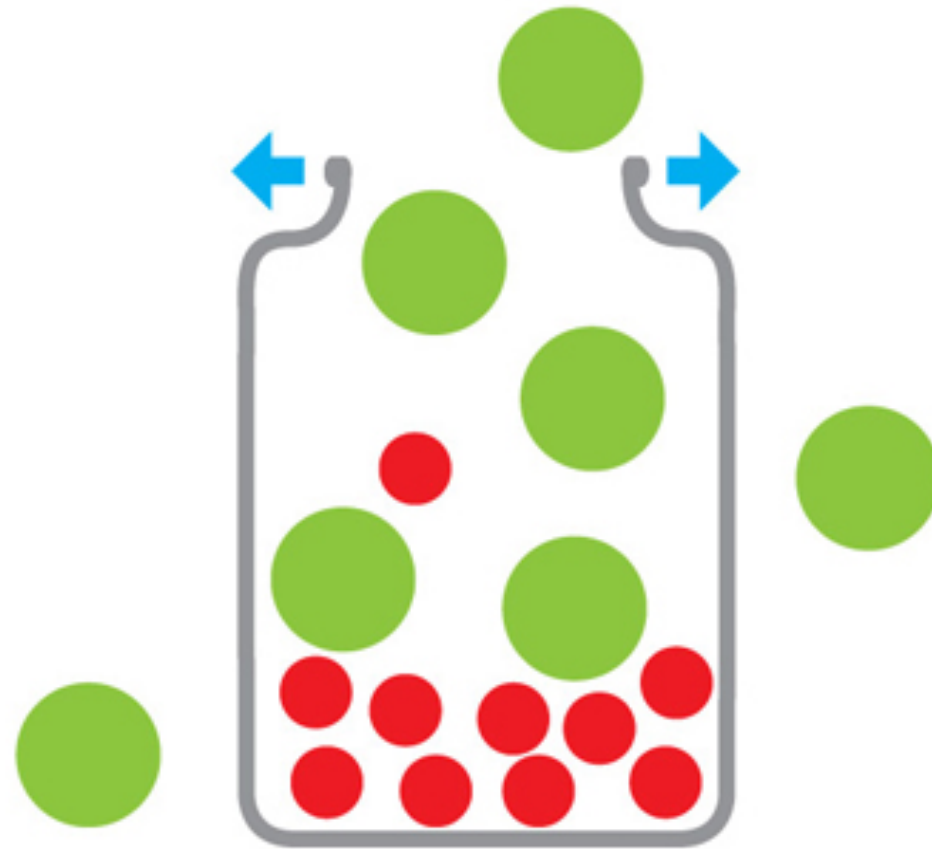




*We can deliberately use the mind
to change the brain for the better.*



Taking in the Good



Learning to Take in the Good

HEAL by Taking in the Good

1. Have a positive experience. Notice it or create it.
2. Enrich the experience through duration, intensity, multimodality, novelty, personal relevance
3. Absorb the experience by intending and sensing that it is sinking into you as you sink into it.
4. Link positive and negative material. [optional]

It's Good to Take in the Good

- Development of specific inner strengths
 - General - resilience, positive mood, feeling loved
 - “Antidote experiences” - Healing old wounds, filling the hole in the heart
- Implicit benefits:
 - Shows that there is still good in the world
 - Being active rather than passive
 - Treating yourself kindly, like you matter
 - Rights an unfair imbalance, given the negativity bias
 - Training of attention and executive functions
- Sensitizes brain to positive: like Velcro for good

Targets of TG

- **Thoughts** - expectations; object relations; perspectives on self, world, past and future
- **Perceptions** - sensations; relaxation; vitality
- **Emotions** - both feelings and mood
- **Desires** - values, aspirations, passions, wants
- **Behaviors** - repertoire; inclinations

Some Types of Resource Experiences

Avoiding Harms

- Feeling basically alright right now
- Feeling protected, strong, safe, at peace
- The sense that awareness itself is untroubled

Approaching Rewards

- Feeling basically full, the enoughness in this moment as it is
- Feeling pleased, glad, grateful, satisfied
- Therapeutic, spiritual, or existential realizations

Attaching to Others

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

Pet the Lizard



Feed the Mouse



Hug the Monkey



Resources for Taking in the Good

- Intention; willing to feel good
- Identified target experience
- Openness to the experience; embodiment
- Mindfulness of the steps of TG to sustain them
- Working through obstructions

The Four Ways to Offer a Method

- Doing it implicitly
- Teaching it and then leaving it up to the person
- Doing it explicitly with the person
- Asking the person to do it on his or her own

Synergies of TG and Mindfulness

- Improved mindfulness enhances TG.
- TG increases general resources for mindfulness (e.g., heighten the bodily calming that supports stable attention).
- TG increases specific factors of mindfulness (e.g., self-acceptance, self-compassion, tolerance of negative affect)
- TG heightens internalization of key mindfulness experiences:
 - The sense of stable mindfulness itself
 - Confidence that awareness itself is not in pain, upset, etc.
 - Presence of supportive others (e.g., meditation groups)
 - Peacefulness of realizing that experiences come and go

TG and Children

- All kids benefit from TG.
- Particular benefits for mistreated, anxious, spirited/ADHD, or LD children.
- Adaptations:
 - Brief
 - Concrete
 - Natural occasions (e.g., bedtimes)

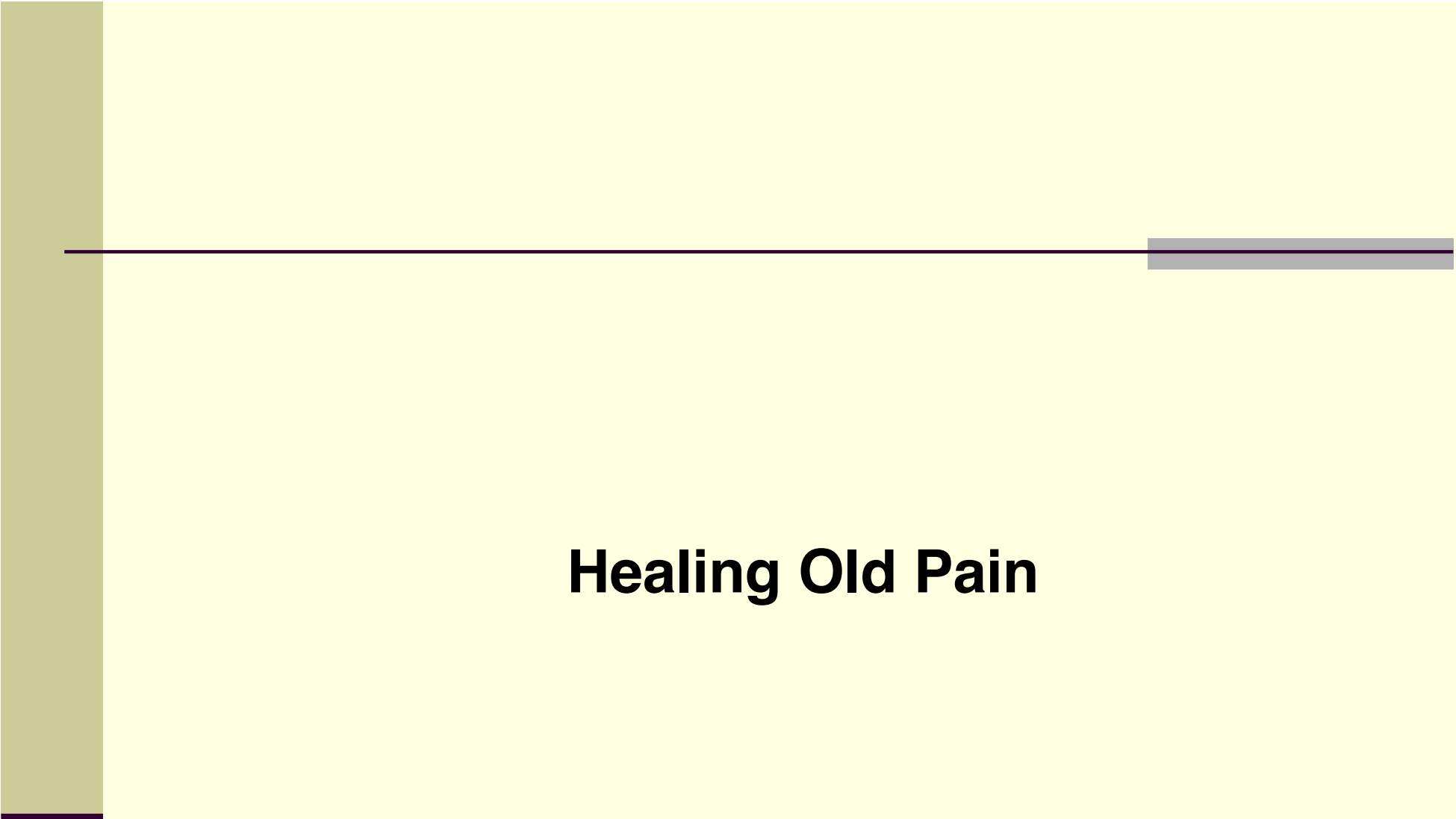
Obstructions to Taking in the Good

■ General

- Distractibility
- Blocks to self-awareness in general

■ Specific

- Fears of losing one's edge or lowering one's guard
- Sense of disloyalty to others (e.g., survivor guilt)
- Culture (e.g., selfish, vain, sinful)
- Gender style
- Associations to painful states
- Secondary gains in feeling bad
- Not wanting to let someone off the hook
- Thoughts that TG is craving that leads to suffering



Healing Old Pain

Using Memory Mechanisms to Help Heal Painful Experiences

- The machinery of memory:
 - When explicit or implicit memory is reactivated, it is rebuilt from schematic elements, not retrieved *in toto*.
 - When attention moves on, the memory gets reconsolidated.
- The open processes of memory reactivation and reconsolidation create a window of opportunity for shaping your internal world.
- Reactivated material associates with other things in awareness, especially if they are prominent and lasting.
- When memory returns to storage, it takes associations with it.
- You can imbue memory with positive associations.

The Fourth Step of TG

- 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 and cultivating positive resources in your mind.

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 Others

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

The Tip of the Root

- For the fourth step of TG, 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

TG and Trauma

- General considerations:
 - People vary in their resources and their traumas.
 - Often the major action is with “failed protectors.”
 - Cautions for awareness of internal states, including positive
 - Respect “yellow lights” and the client’s pace.
- The first three steps of TG are generally safe. Use them to build resources for tackling the trauma directly.
- As indicated, use the fourth step of TG to address the peripheral features and themes of the trauma.
- Then, with care, use the fourth step to get at the heart of the trauma.

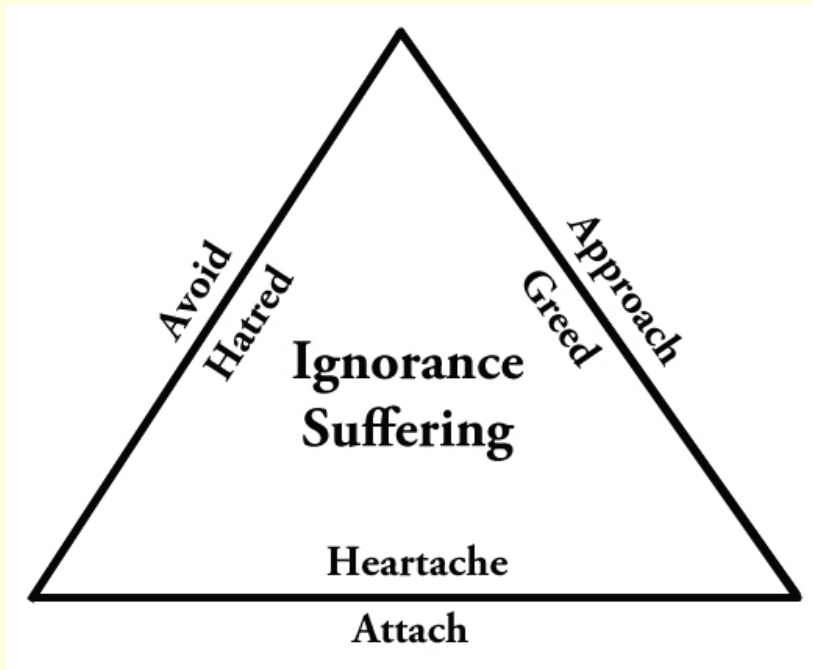
First of all, do no harm.



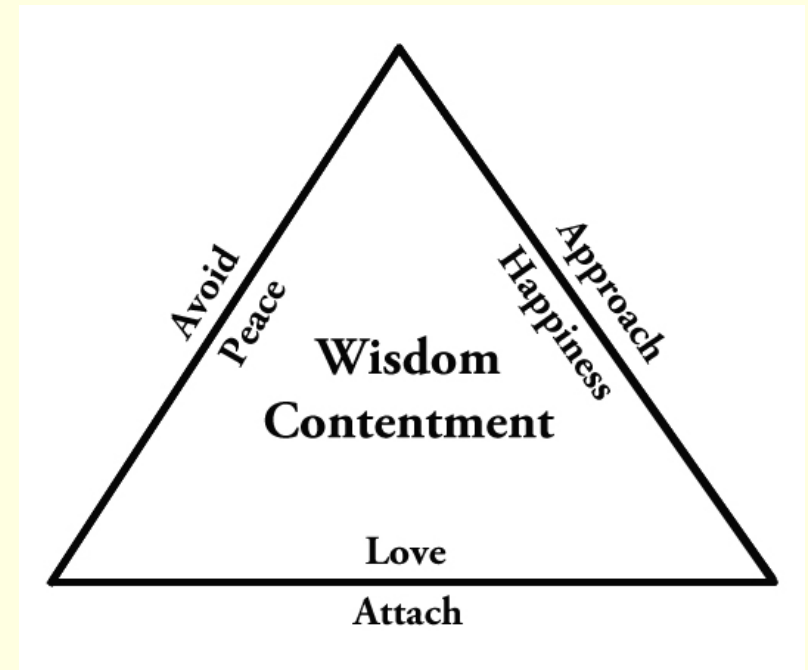
Cultivation and Craving

Choices . . .

Or?



Reactive Mode



Responsive Mode

Cultivation Undoes Craving

- All life has goals. The brain continually seeks to avoid harms, approach rewards, and attach to others - even that of a Buddha.
- It is wholesome to wish for the happiness, welfare, and awakening of all beings - including the one with your nametag.
- We rest the mind upon positive states so that the brain may gradually take their shape. This disentangles us from craving as we increasingly rest in a peace, happiness, and love that is independent of external conditions.
- With time, even the practice of cultivation falls away - like a raft that is no longer needed once we reach the farther shore.

“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 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.

A Fifth Yana?

The “Buddhastream” has developed through four major vehicles (*yanas*): Theravadan, Tibetan, Chan/Zen, and Pure Land.

Could we be helping develop an emergent Fifth Yana, with:

- Many householders engaging deep contemplative practice
- Multiculturalism as both a reality and a value
- Access to and eclectic use of the full array of Buddhist teachings
- Flattening hierarchies
- Naturalizing dharma practice; using science and psychology
- Skillful use of positive experiences; “Western tantra”
- Deconstructing and applying Buddhist practices in non-Buddhist settings (e.g., pain-control clinics, schools, psychotherapy)

Heartwood

This spiritual life does not have gain, honor, and renown for its benefit, or the attainment of moral discipline for its benefit, or the attainment of concentration for its benefit, or knowledge and vision for its benefit.

But it is this unshakable liberation of mind that is the goal of this spiritual life, its heartwood, and its end.


The Buddha

The Fruit as the Path

Peace

Contentment

Love



*Penetrative insight
joined with calm abiding
utterly eradicates
afflicted states.*

Shantideva

Great Books

See www.RickHanson.net for other great books.

- Austin, J. 2009. *Selfless Insight*. MIT Press.
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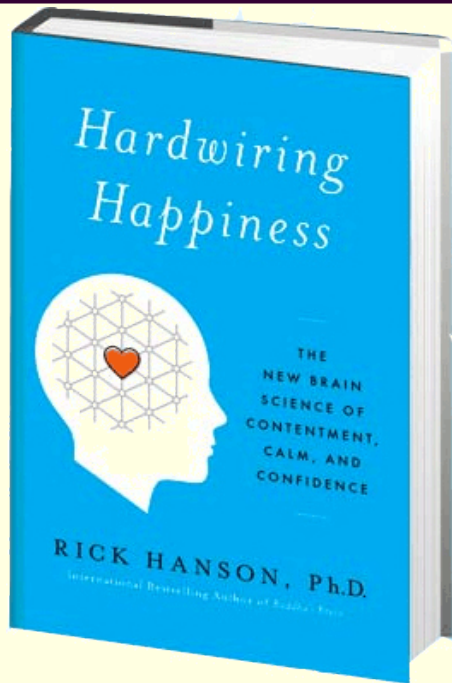
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Where to Find Rick Hanson Online



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



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