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Greater
Good
Science
Center

The Greater Good Science Center

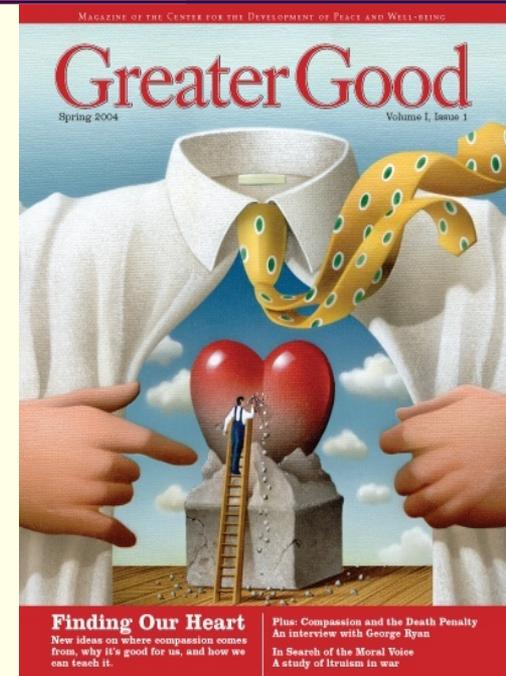
Resources for a compassionate and resilient society

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Hardwiring Happiness:
The New Brain Science of
Lasting Inner Strength and Peace

Greater Good Science Center
UC Berkeley, November 16, 2013

Rick Hanson, Ph.D.

The Wellspring Institute for Neuroscience and Contemplative Wisdom

www.WiseBrain.org

www.RickHanson.net

Topics

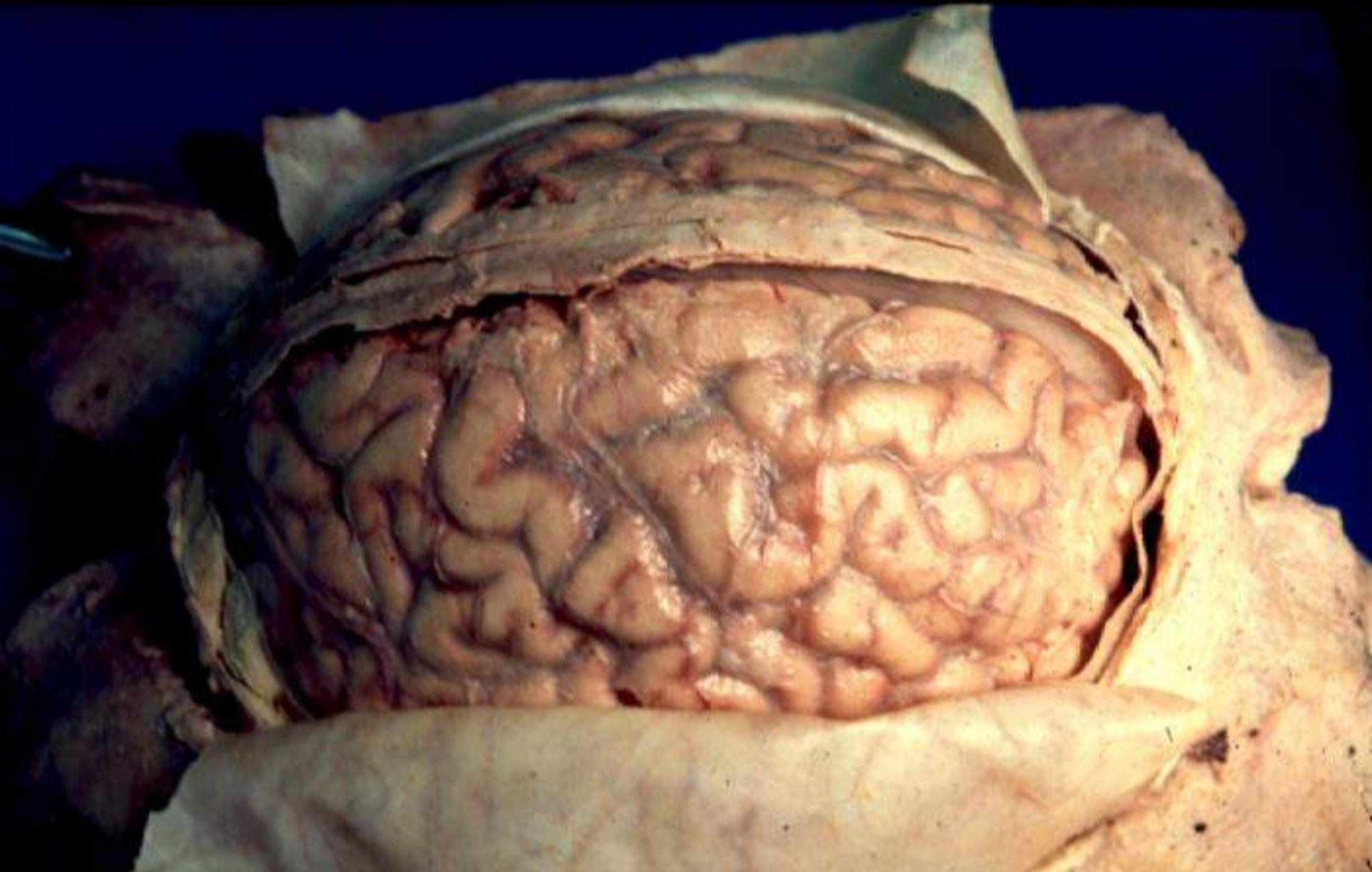
- **Self-directed neuroplasticity**
- **“Taking in the good” (TG)**
- **The evolving brain**
- **Healing old pain**



Self-Directed Neuroplasticity

*[People] ought to know that
from nothing else but the brain
come joys, delights, laughter and sports,
and sorrows, griefs, despondency, and lamentations.*

Hippocrates



**Mental activity entails
underlying neural activity.**

**Repeated mental activity entails
repeated neural activity.**

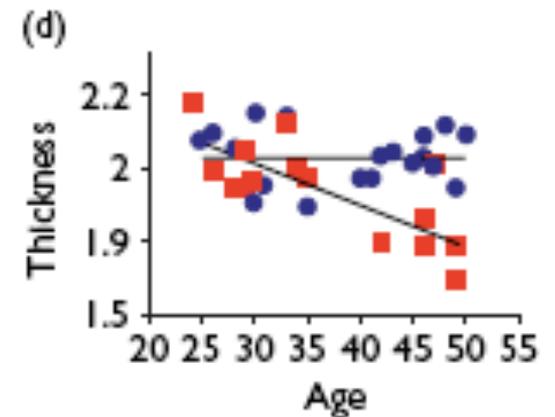
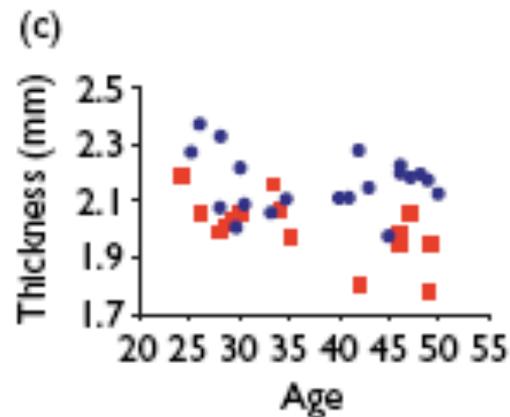
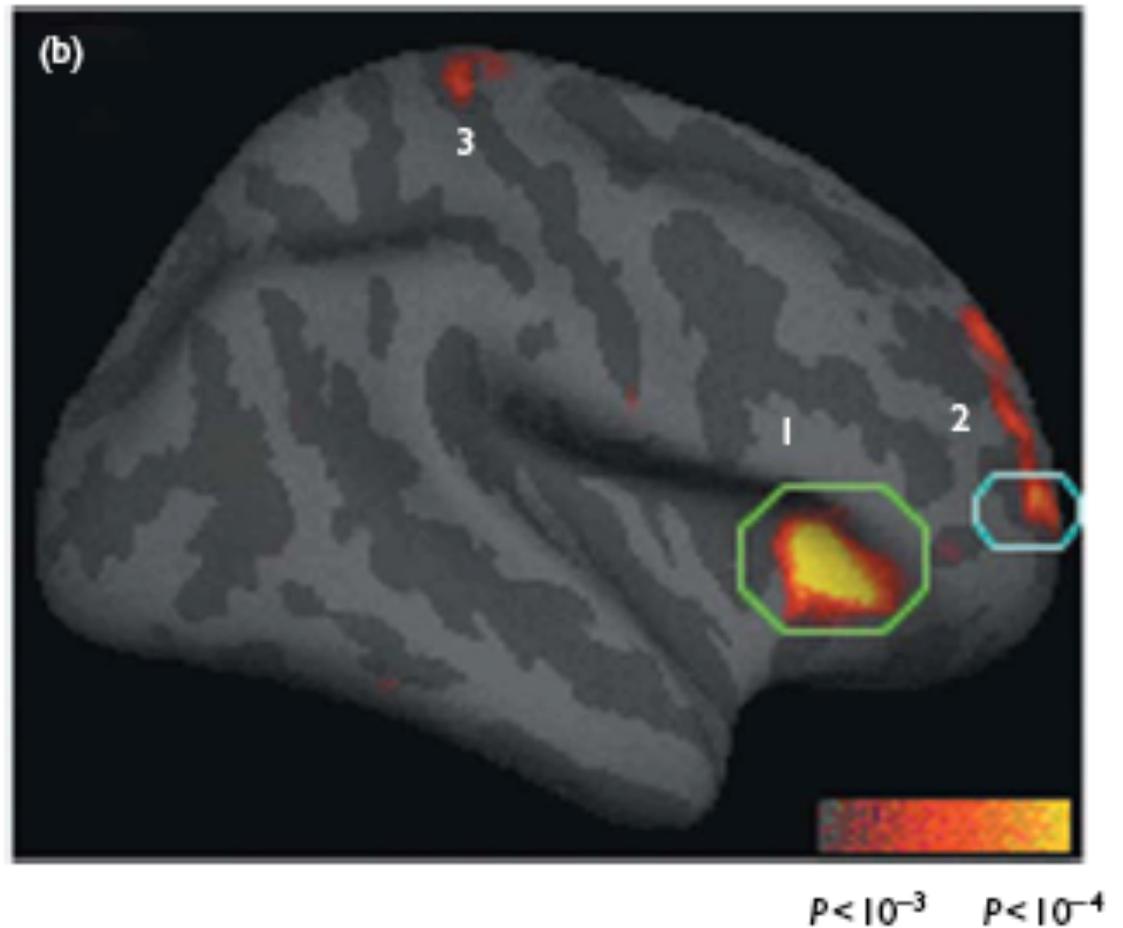
**Repeated neural activity
builds neural structure.**



Neurons that fire together,

wire together.

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



The Opportunity

We can use the mind

To change the brain

To change the mind for the better

To benefit ourselves and other beings.

*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



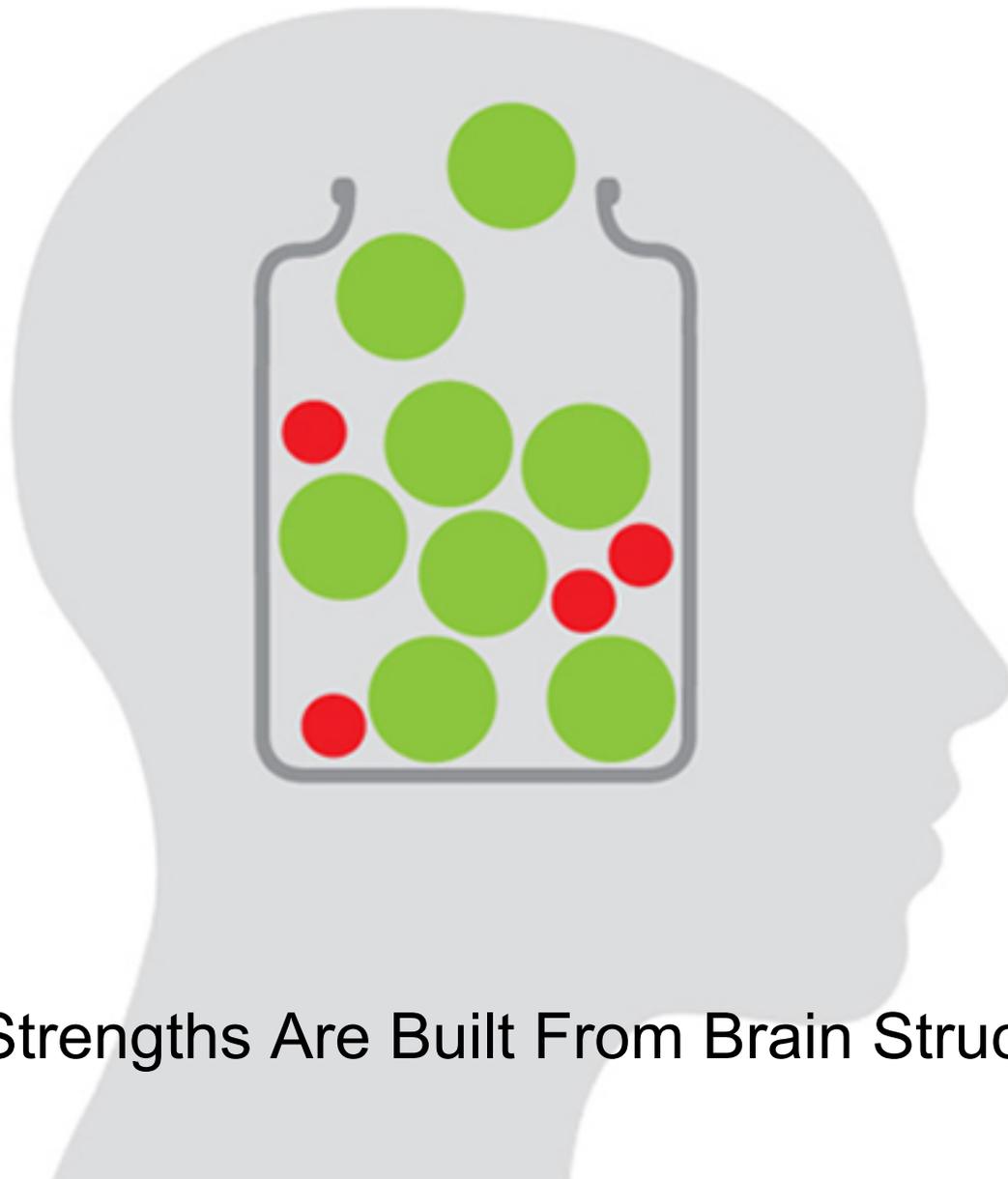
Growing Inner Strengths

The image is a split-screen comparison of two wolves. The left side shows a domesticated wolf, likely a Malamute, with thick, grey and white fur, looking slightly to the right with a calm expression. The right side shows a wild wolf with more varied, brown and grey fur, looking down and to the left with a more intense, focused gaze. The text "Two wolves in the heart" is centered across both images in a white, serif font.

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)



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 in mindfulness-based practices.
- Skillful means for decreasing the negative and increasing the positive have developed over 2500 years. Why not use them?



SPIRIT ROCK MEDITATION CENTER



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)

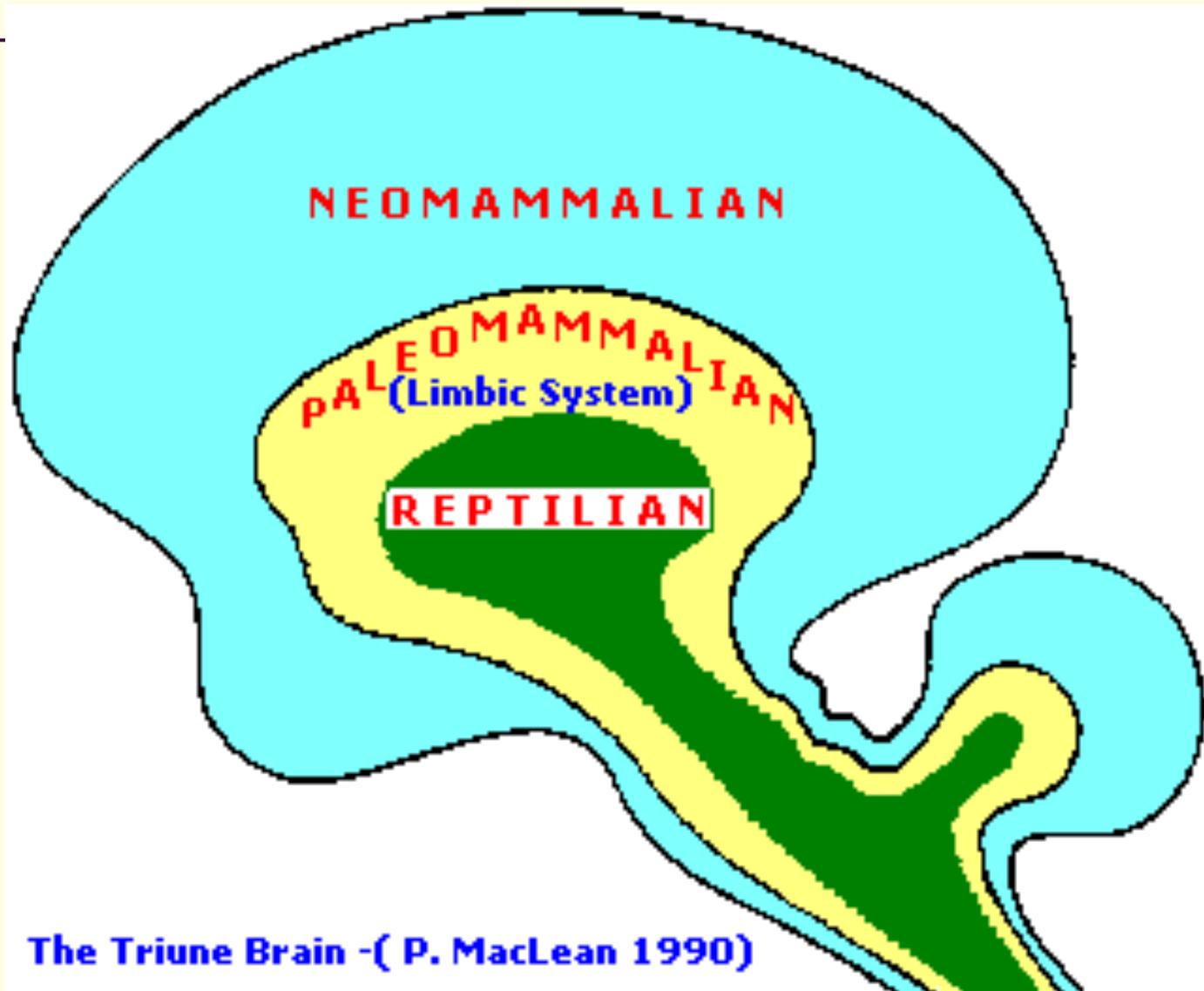


The Evolving Brain

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*

Evolution of the Brain



The Triune Brain - (P. MacLean 1990)

Three Motivational and Self-Regulatory Systems

■ Avoid Harms:

- Predators, natural hazards, aggression, pain
- Primary need, tends to trump all others

■ Approach Rewards:

- Food, shelter, mating, pleasure
- Mammals: rich emotions and sustained pursuit

■ Attach to Others:

- Bonding, language, empathy, cooperation, love
- Taps older Avoiding and Approaching networks

Each system can draw on the other two for its ends.²⁹



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"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]

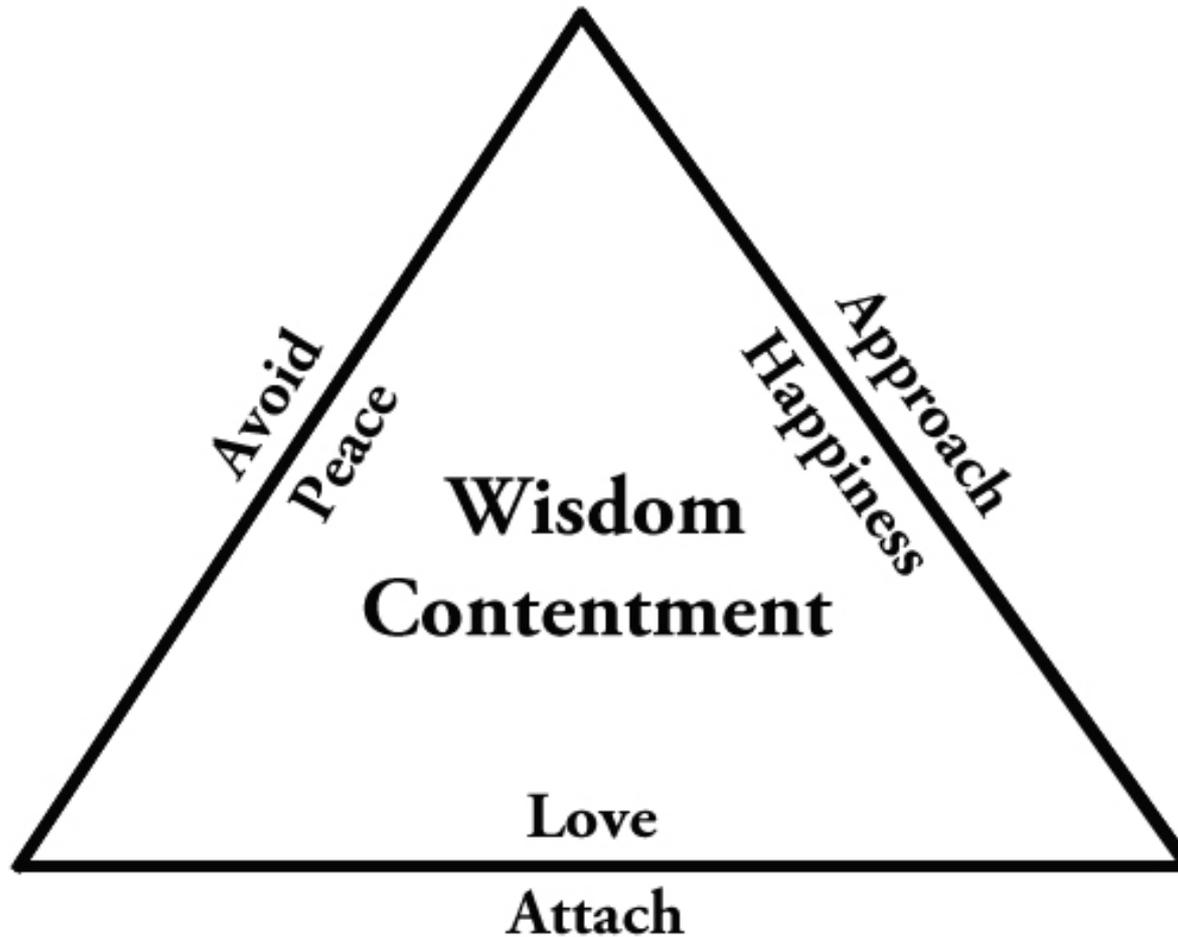
The body defaults to a sustainable equilibrium of refueling, repairing, and pleasant abiding.

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



The Responsive Mode

<u> </u>	<u>View</u>	<u>Action</u>	<u>Experience</u>
Avoid	Resources, challenges-in- context	Govern/restrain, truth-to-power, forgive	Strength, safety, peace
Approach	Sufficiency, abundance, disenchantment	Aspire, give, let go	Glad, grateful, fulfilled, satisfied
Attach	Connection, belonging, social supplies	Open to others; join; be empathic, compassionate, kind, caring; love	Membership, closeness, friend- ship, bonding loved and loving

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.

But to Cope with Urgent Needs, We Leave Home . . .

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

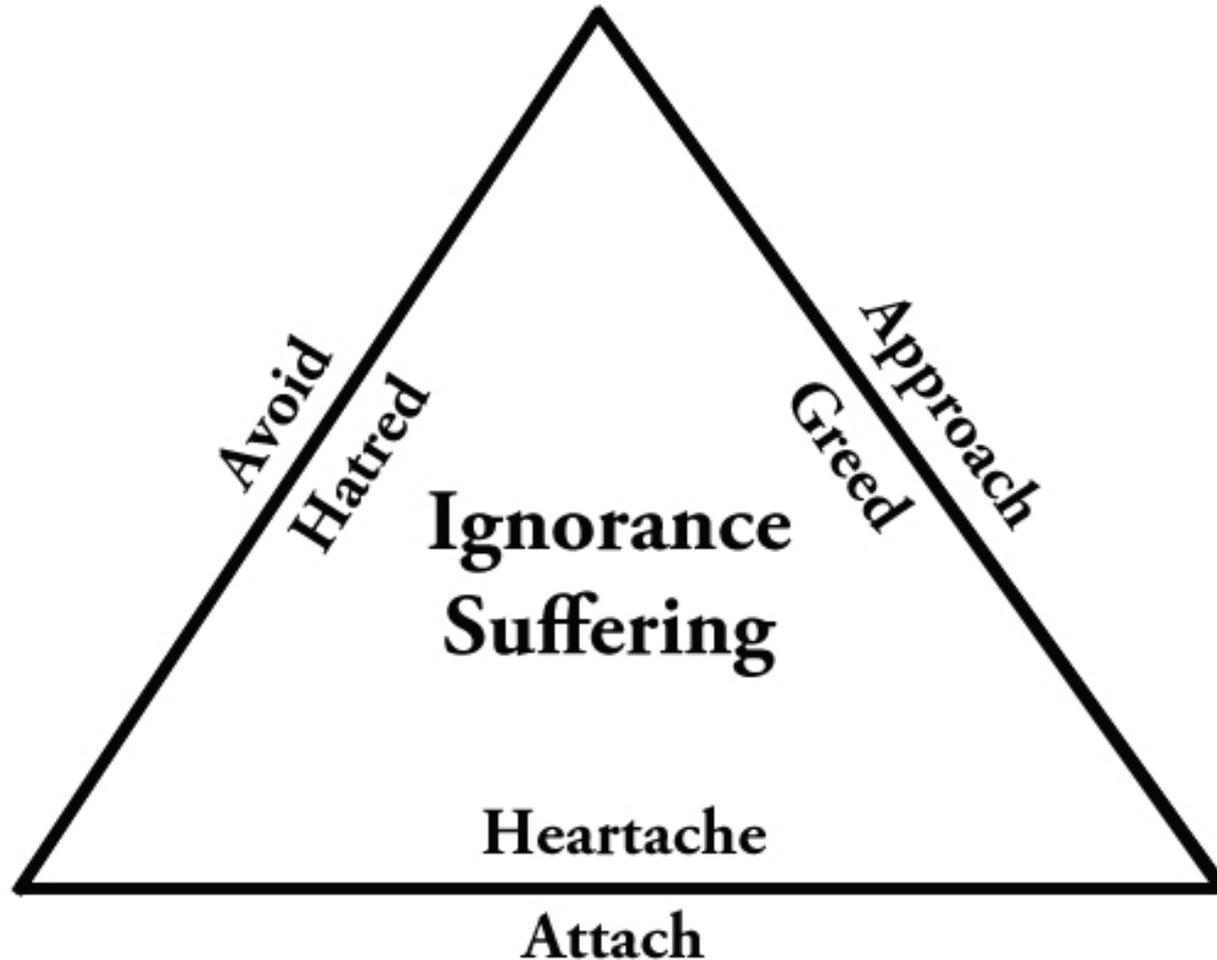
The body fires up into the stress response; outputs exceed inputs; long-term building is deferred.

The mind fires up into:

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

This is the brain in allostatic, **Reactive**, *craving* mode.³⁵

The Reactive Mode



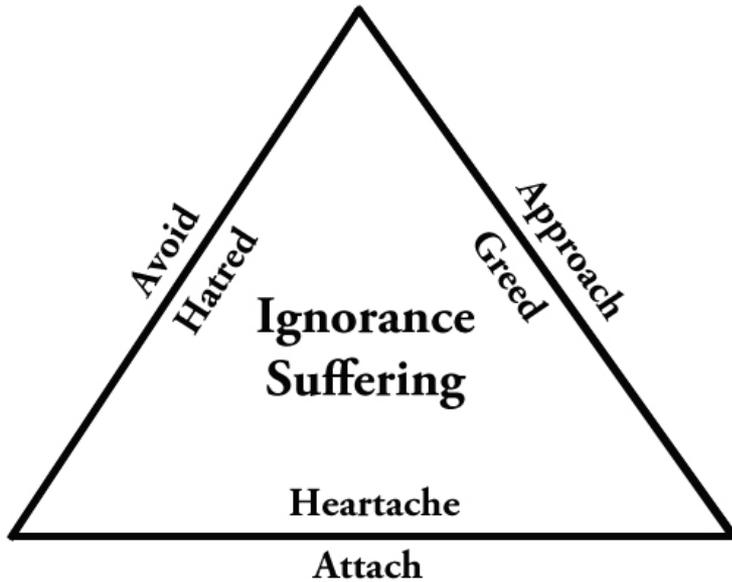
The Reactive Mode

	<u>View</u>	<u>Action</u>	<u>Experience</u>
Avoid	Harms present or lurking	Fight, flight, freeze	Fear, anger, weakness
Approach	Scarcity, loss, unreliability, not expected rewards	Grasp, acquire	Greed, longing, frustration, disappointment
Attach envy,	Separated, being “beta,” devalued	Cling, reproach	Loneliness, heart- break, jealousy, shame

Reactive Dysfunctions in Each System

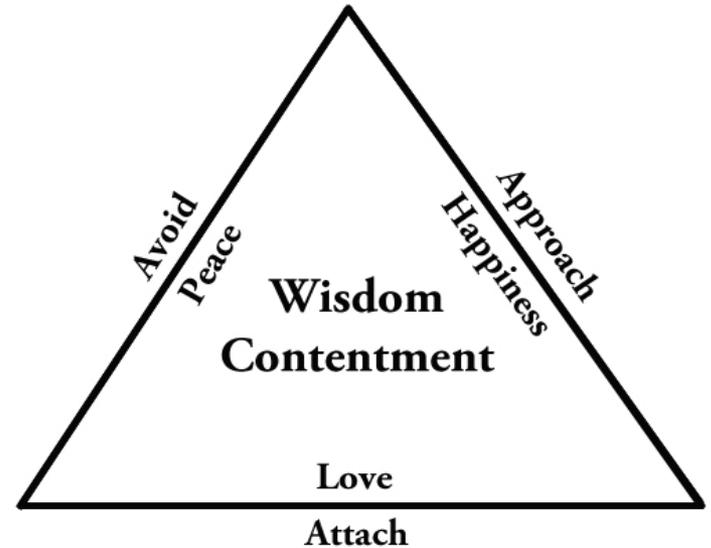
- **Avoiding** - Anxiety disorders; PTSD; panic, terror; rage; violence
- **Approaching** - Addiction; over-drinking, -eating, -gambling; compulsion; hoarding; driving for goals at great cost
- **Attaching** - Borderline, narcissistic, antisocial PD; symbiosis; “looking for love in all the wrong places”

Choices . . .



Reactive Mode

Or?



Responsive Mode₃₉



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 Major Result of the Negativity Bias: Threat Reactivity

- 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.

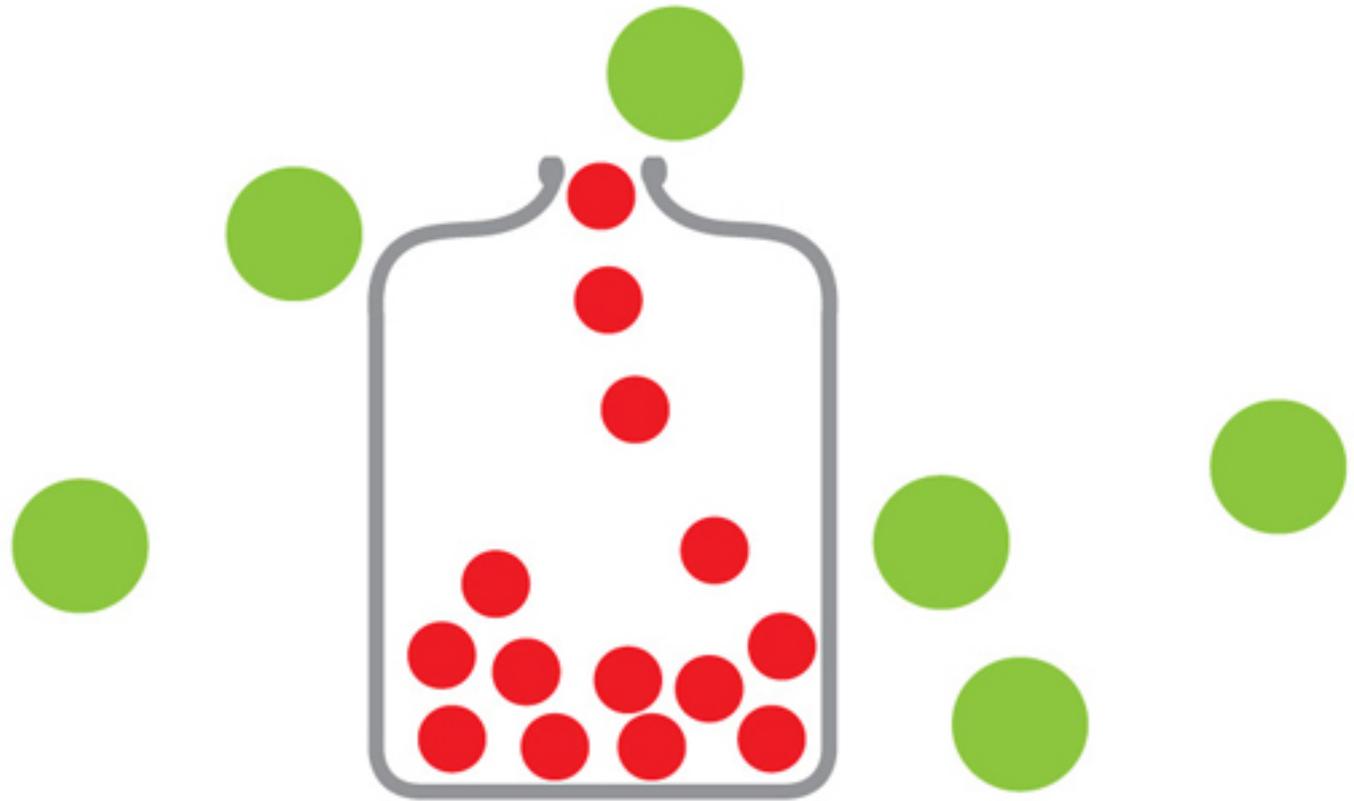
A Bottleneck For Growing Inner Strengths

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

A composite image showing Stone Age people in a modern city park. In the background, there are tall, modern apartment buildings. In the foreground, three Stone Age people are sitting on a grassy lawn. One man in the center is looking towards the camera, while two others are looking away. The scene is set in a lush, green park with many trees and bushes.

Stone age brains in the 21st century

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

Taking in the Good

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.

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]

Let's Try It

- **Notice** the experience already present in awareness that you are alright right now
 - Have the experience
 - Enrich it
 - Absorb it

- **Create** the experience of compassion
 - Have the experience - bring to mind someone you care about . . . Feel caring . . . Wish that he or she not suffer . . . Open to compassion
 - Enrich it
 - Absorb it

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

*Keep a green bough in your heart,
and a singing bird will come.*

Lao Tsu

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 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 implicit and explicit 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 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

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.



The Fruit as the Path

Cultivation Undoes Craving

- All life has goals. The brain continually seeks to avoid harms, approach rewards, and attach to others - even that of a sage.
- 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.

The Goal as the Method

Peace

Contentment

Love

*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.*

Great Books

See www.RickHanson.net for other great books.

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See www.RickHanson.net for other scientific papers.

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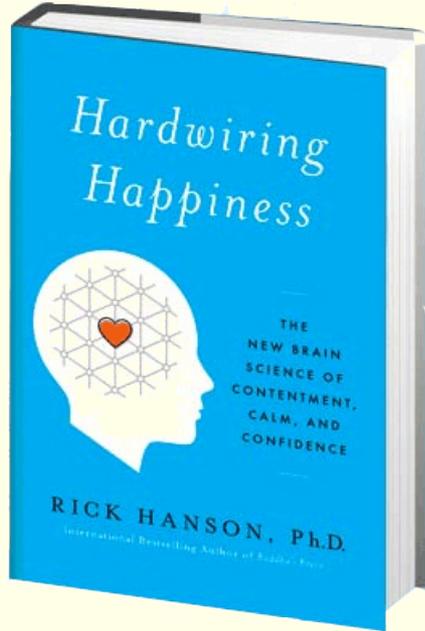
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Hardwiring Happiness: The New Brain Science of Contentment, Calm, and Confidence

www.rickhanson.net/hardwiringhappiness

Personal website: www.rickhanson.net

Wellspring Institute: www.wisebrain.org



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