The Practical Neuroscience of Happiness

Greater Good Science Center

Summer Institute for Educators

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The Wellspring Institute for Neuroscience and Contemplative Wisdom

WiseBrain.org **RickHanson.net**

Topics

- Self-directed neuroplasticity
- Resource yourself

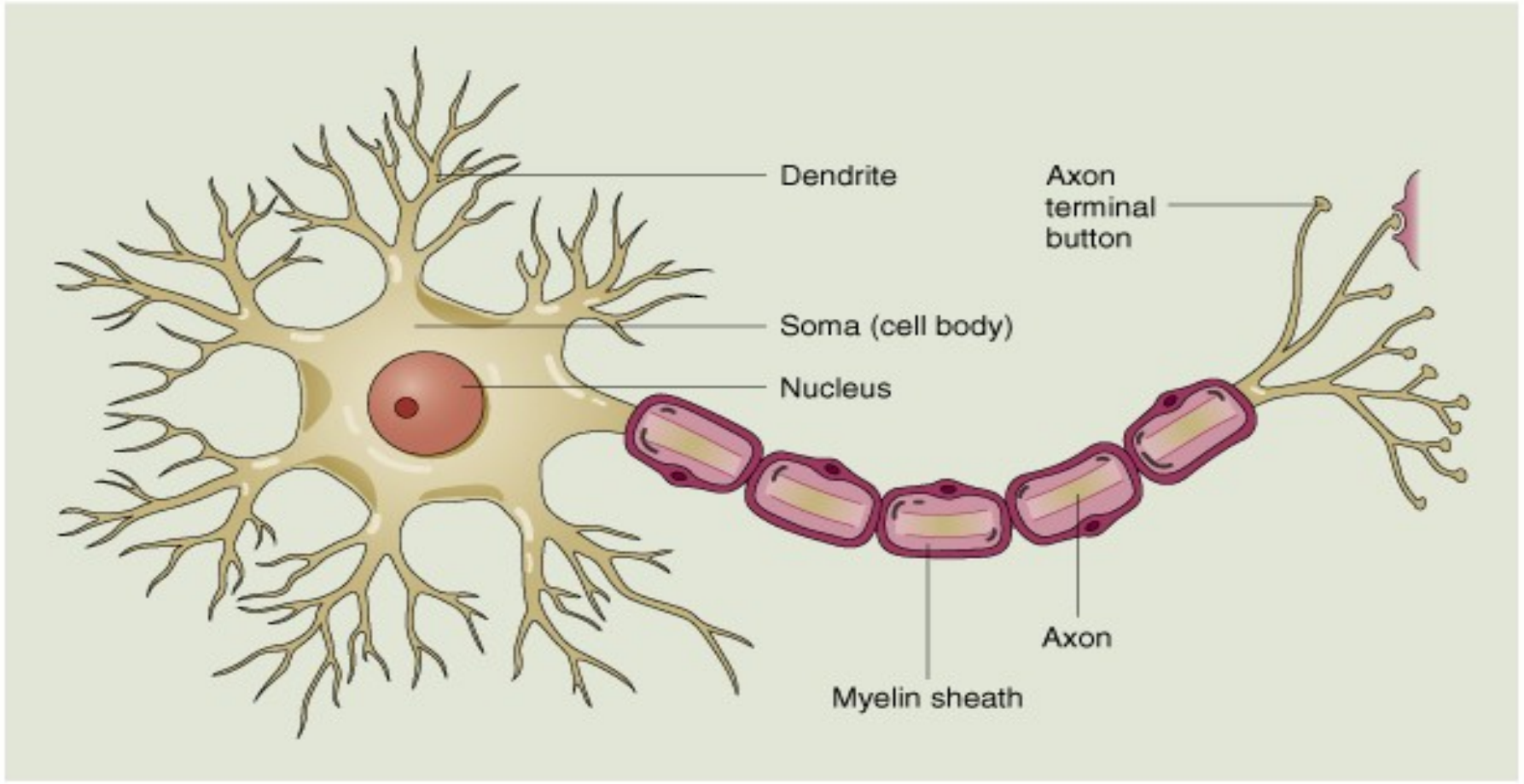
- How to grow inner strengths
- The negativity bias

- Positive neuroplasticity: taking in the good
- Using positive neuroplasticity with children

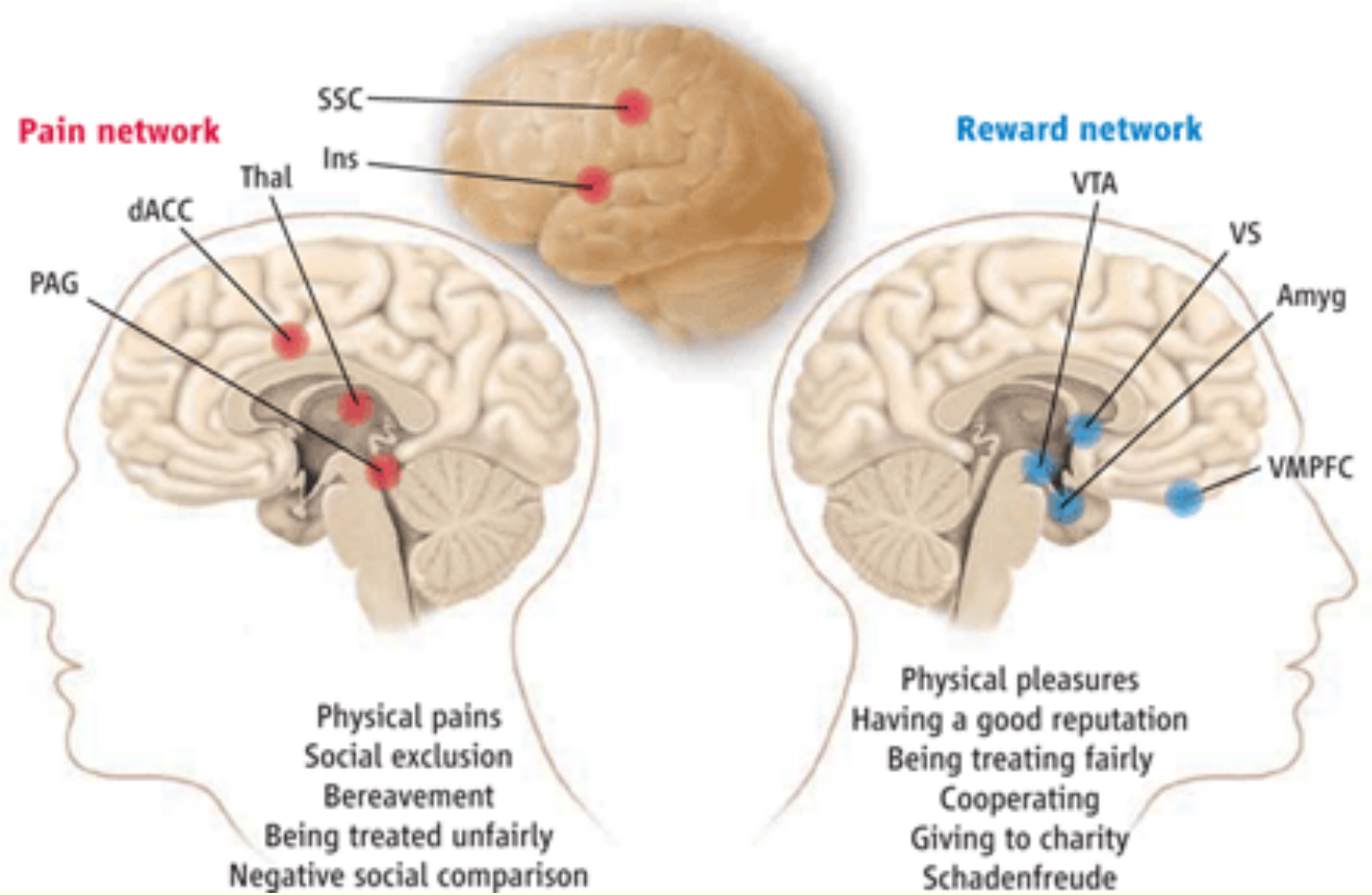
- Key resource experiences
- Coming home

Self-Directed Neuroplasticity

A Neuron



Mental activity entails underlying neural activity.



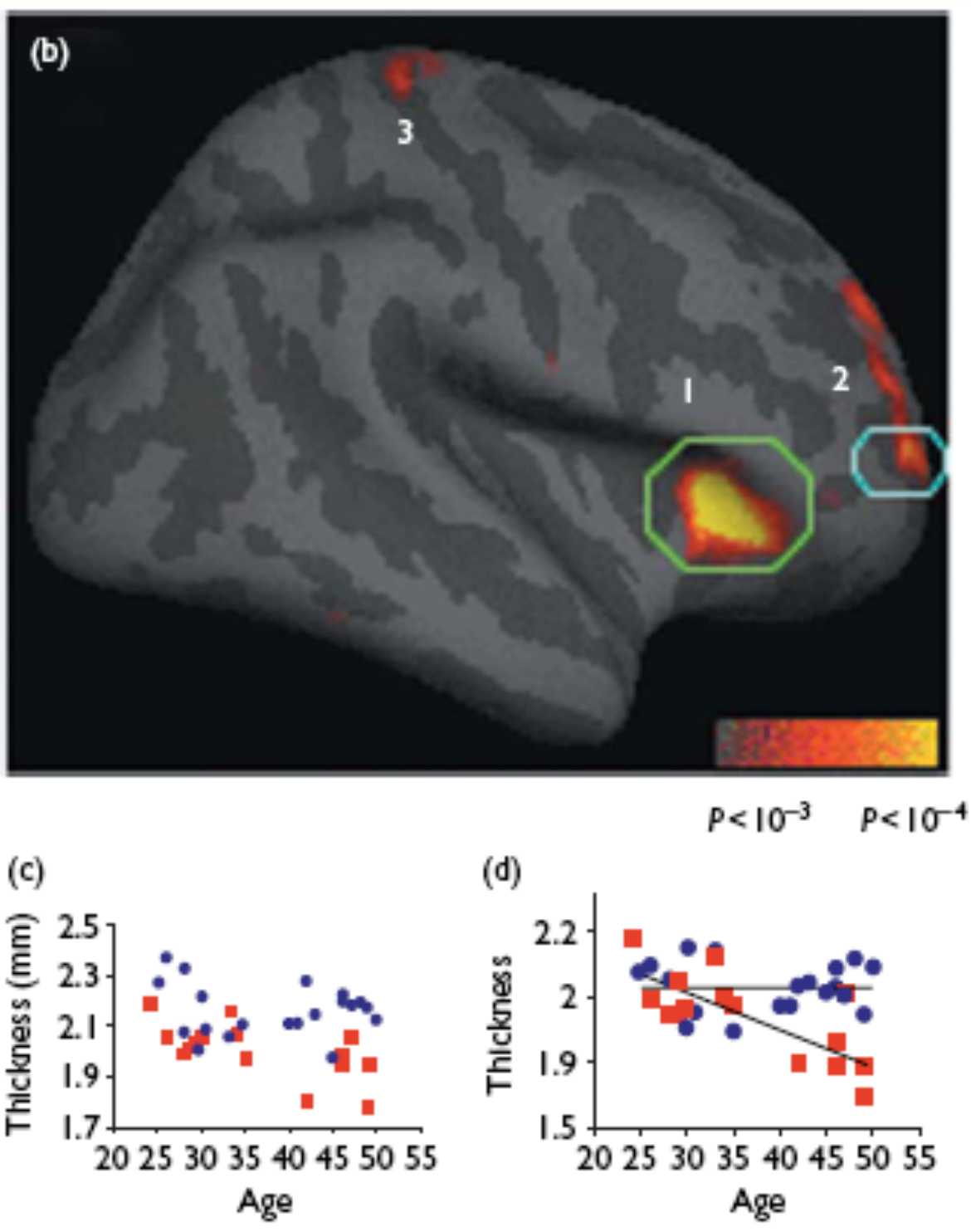
Pain network: Dorsal anterior cingulate cortex (dACC), insula (Ins), somatosensory cortex (SSC), thalamus (Thal), and periaqueductal gray (PAG). Reward network: Ventral tegmental area (VTA), ventral striatum (VS), ventromedial prefrontal cortex (VMPFC), and amygdala (Amyg). K. Sutliff, in Lieberman & Eisenberger, 2009, *Science*, 323:890-891

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.



We can use the mind

To change the brain

To change the mind for the better

To benefit ourselves and other beings.

Resource Yourself

What Is Happiness?

- **"Hedonia"** – Pleasure, delight, gratitude, fun; friendliness, kindness, love, feeling cared about, happiness for others; accomplishment, worth; enjoyment of learning, beauty, music, making things

- **"Eudaimonia"** – Sense of purpose, contribution, service, meaning, fulfillment, harmony

Neural Substrates of Happiness: Absence of the Negative

- Pain – nocioceptive networks
- Hunger, thirst – hypothalamic detection of deficit, disturbance
- Illness – neuroimmunology, inflammation→depression

- Frustration – drops in dopamine; enlistment of stress and negative emotion networks

- Stress – hypothalamic-adrenal-pituitary axis; sympathetic (fight-flight) or parasympathetic (freeze) activity; inflammation; allostatic load

- Negative emotions (fear, anger, sorrow, shame) – specific networks; enlistment of nocioceptive, stress, and frustration networks; pessimistic appraisals in PFC

Neural Substrates of Happiness: Presence of the Positive

- Pleasure – increased dopamine, natural opiods
- Satiety – hypothalamic detection of sufficiency, balance
- Health – vitality, less inflammation

- Success – increased dopamine

- Resilience – sympathetic or parasympathetic activity with positive emotion and sense of successful coping

- Positive emotions (confidence, peace, contentment, worth) – sometimes increased dopamine; increased opiods; optimistic appraisals in PFC

How can we decrease the negative and increase the positive?

What Shapes Your Course in Life?

Challenges

Vulnerabilities

Resources

What Can You Usually Affect the Most?

Resources

Where Are Resources Located?

The World

The Body

The Mind

What Can You Usually Affect the Most?

The Mind

Pick a partner and choose an A and a B (A's go first). Then you'll take turns, with one partner mainly speaking while the other person listens, exploring two questions:

What are some of the resources – inner strengths – inside your own mind?

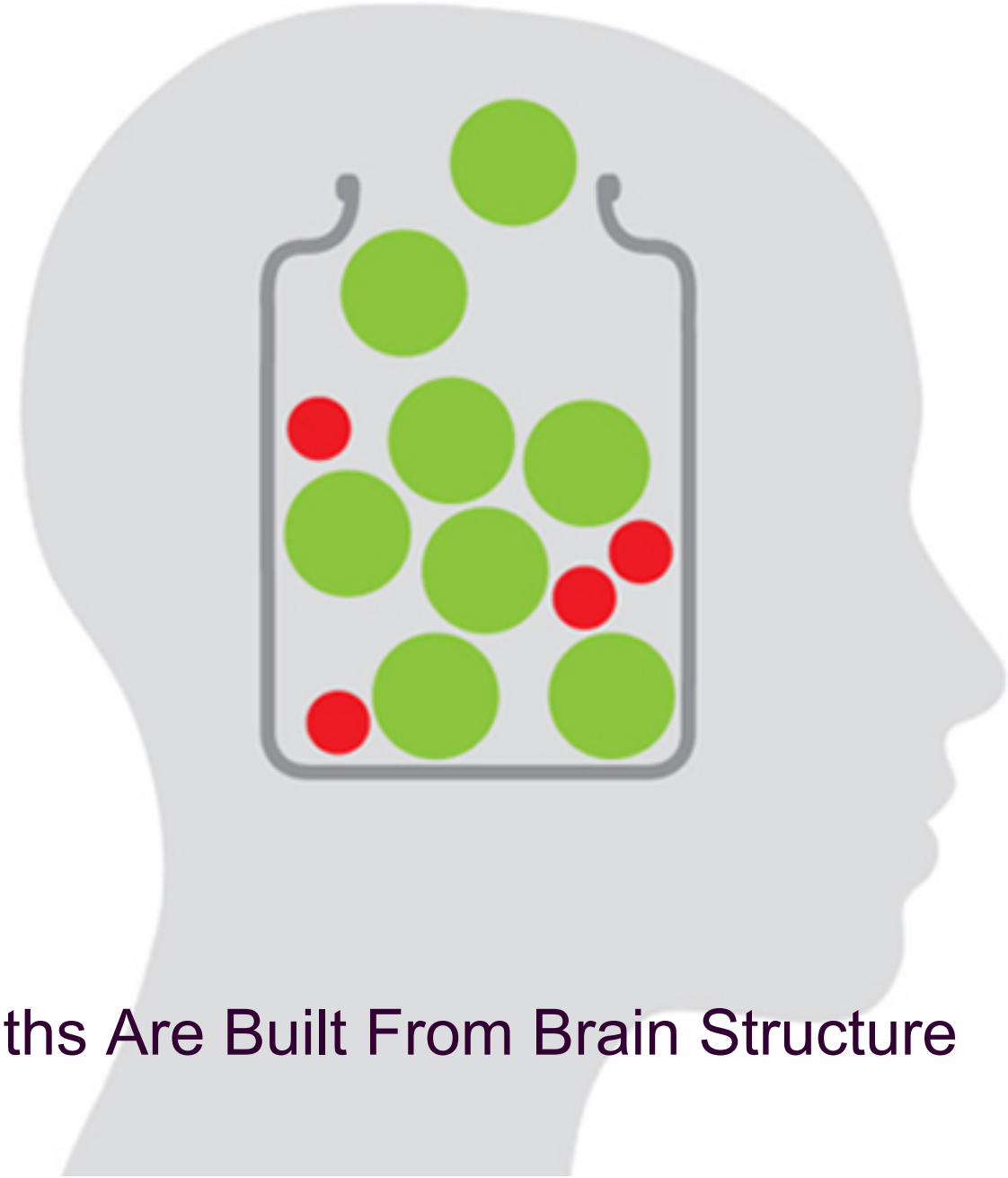
What are some of the inner strengths that would be good to develop in the minds of your students?

How to Grow Inner Strengths


Two wolves in the heart

Inner Strengths Include

- **Capabilities** (e.g., mindfulness, insight, emotional intelligence, resilience, executive functions, impulse control)
- **Positive emotions** (e.g., gratitude, self-worth, love, self-compassion, secure attachment, gladness, awe, serenity)
- **Attitudes** (e.g., openness, determination, optimism, confidence, approach orientation, tolerance, self-respect)
- **Somatic inclinations** (e.g., vitality, relaxation, grit, helpfulness)
- **Virtues** (e.g., wisdom, patience, energy, generosity, restraint)



Inner Strengths Are Built From Brain Structure

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

Be mindful of the difference between:

An idea and an experience

Noticing an experience and creating one

Having an experience and internalizing it

Why are we emphasizing internalization through enriching and absorbing?

The Neuropsychology of Learning

Learning – changing neural structure and function – proceeds in two stages:

From state to trait

From activation to installation

From short-term memory buffers to long-term storage

Growing Inner Strengths

Inner strengths are grown from experiences of them or related factors - activated states - that are installed as traits.

You become more compassionate
by repeatedly installing experiences of compassion.

You become more grateful
by repeatedly installing experiences of gratitude.

You become more mindful
by repeatedly installing experiences of mindfulness.

Most experiences of inner strengths – resilience, kindness, insight, mindfulness, self-worth, love, etc. – are enjoyable.

Without this installation,

there is no learning,

no change in the brain.

We're good at activation
but bad at installation.

This is the fundamental weakness in most patient education, human resources training, psychotherapy, coaching, and mindfulness training.

The same research that proves therapy works shows no improvement in outcomes over the last 30 or so years.

Scott Miller

Installation

Installation

Installation

Installation

Installation

Installation

To see what is in front of one's nose takes a constant struggle.

George Orwell

Meanwhile your painful,
harmful experiences
are being rapidly converted
into neural structure.

The Negativity Bias

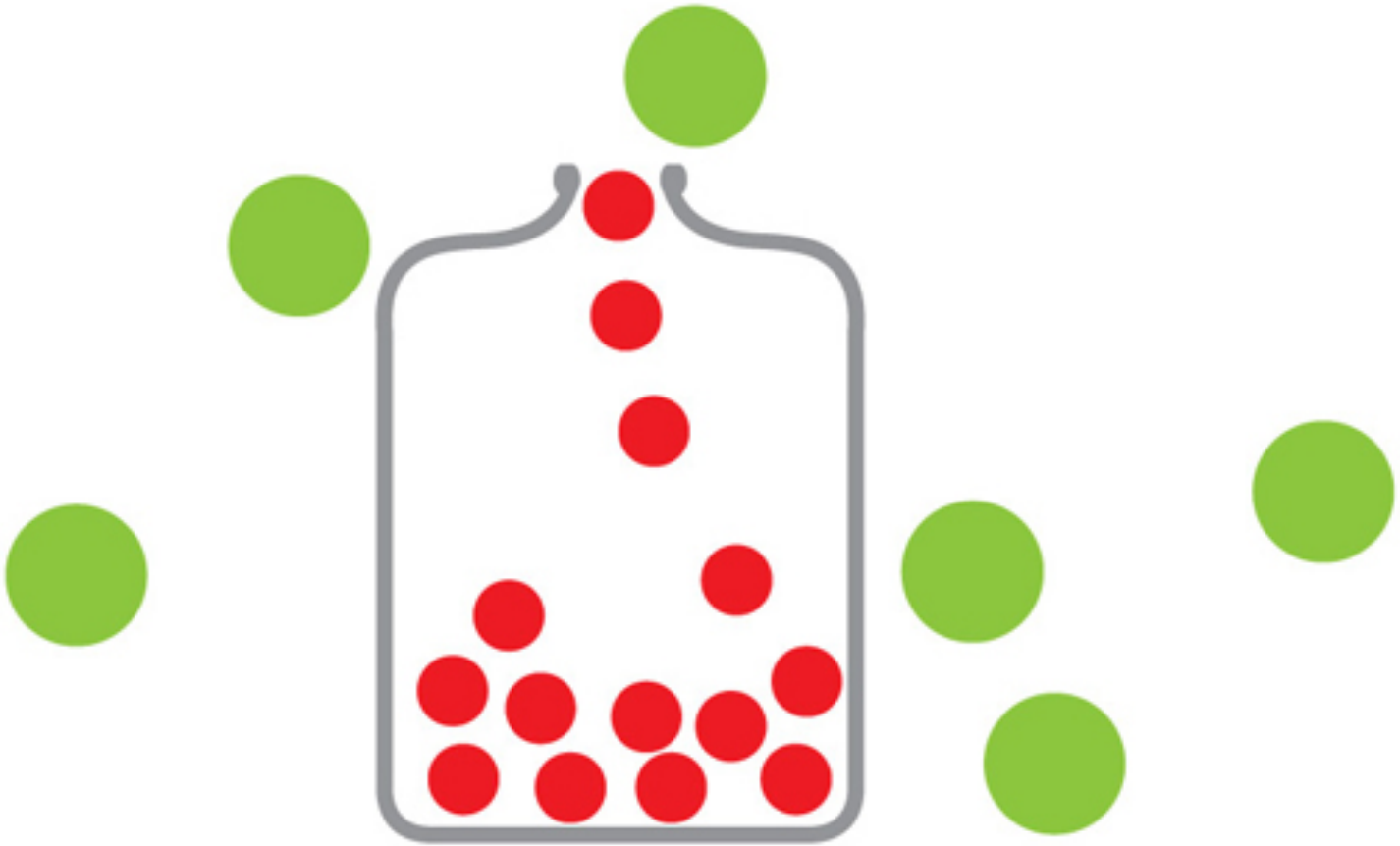
Unpleasant Experiences In Context

- Life contains unavoidable unpleasant experiences. Resisting them just adds to the stress, upset, etc.
- Some inner strengths come only from unpleasant experiences, e.g., knowing you'll do the hard thing.
- But unpleasant experiences have inherent costs, in their discomfort and stress.
- Many inner strengths could have been developed without the costs of unpleasant experiences.
- Most unpleasant experiences are pain with no gain.

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



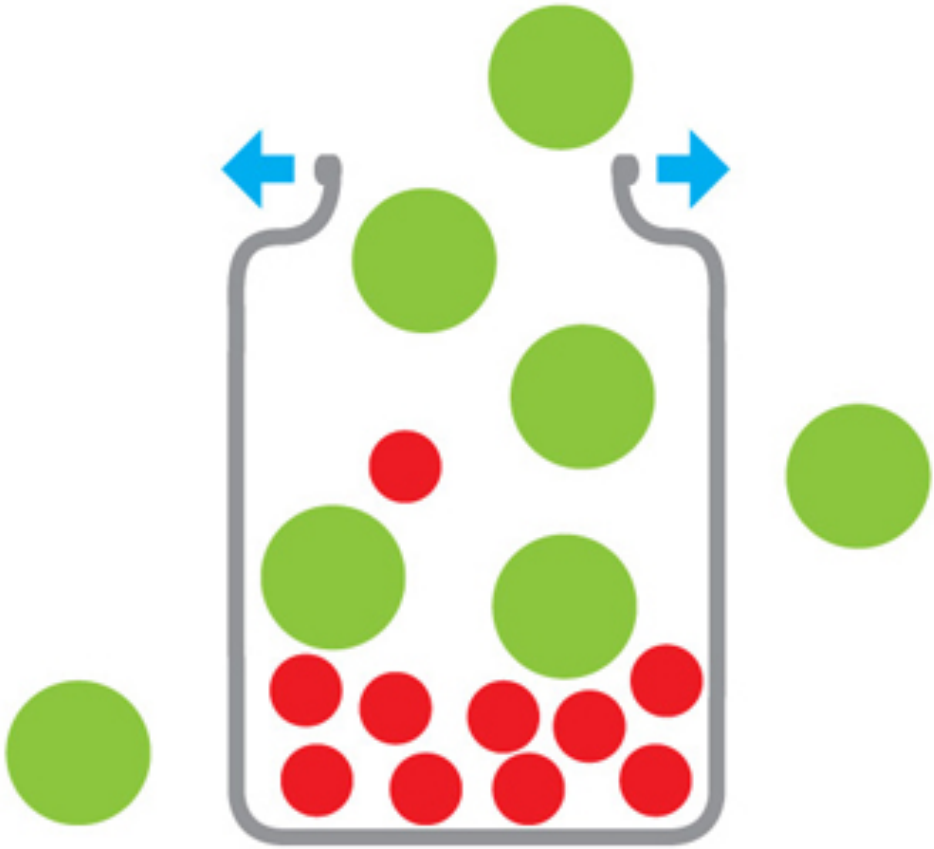
The Negativity Bias


Stone age brains in the 21st century

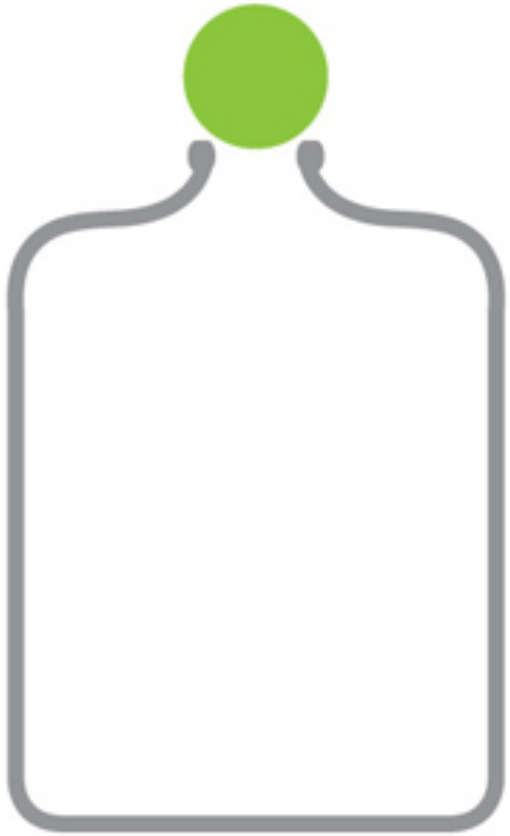
We can deliberately use the mind

to change the brain for the better.

Positive Neuroplasticity: Taking in the Good



Learning to Take in the Good



Have a Good Experience

The Two Ways To Have a Beneficial Experience

Notice one you are already having.

- **In the foreground of awareness**
- **In the background**

Create one.

Elements of Experience

- **Thoughts** – beliefs; expectations; relationship paradigms; perspectives; appraisals; attributions
- **Perceptions -** sensations; relaxation; vitality
- **Emotions -** both feelings and mood
- **Desires** – values; aspirations; passions; wants
- **Behaviors -** reportoire; inclinations

How to Create A Beneficial Experience

Look for good facts in:

1. **Immediate situation**
2. **Current or recent events**
3. **Stable conditions**
4. **Your character**
5. **The past**
6. **The future**
7. **Bad situations**
8. **The lives of others**
9. **Your imagination**
10. **Care about others**
11. **Directly evoke a beneficial experience**
12. **Produce good facts**
13. **Share about good facts with others**

Types of Good Facts

- Events (e.g., finished a load of laundry, someone was friendly to you, this cookie tastes good)
- Conditions (e.g., food, shelter, fresh air, have friends, dog loves you, flowers blooming, ain't dead yet)
- Qualities within oneself (e.g., fairness, decency, determination, good at baking, loving toward kids)

Turning a Good Fact Into a Good Experience

- Bring awareness to your body.
- Soften and open yourself.
- Be a little active in your mind, recognizing aspects of the good fact that naturally elicit an experience.
- Imagine how another person might naturally feel in response to the good fact.
- Have kindness for yourself, encouraging yourself to have a beneficial experience.

Reflections So Far

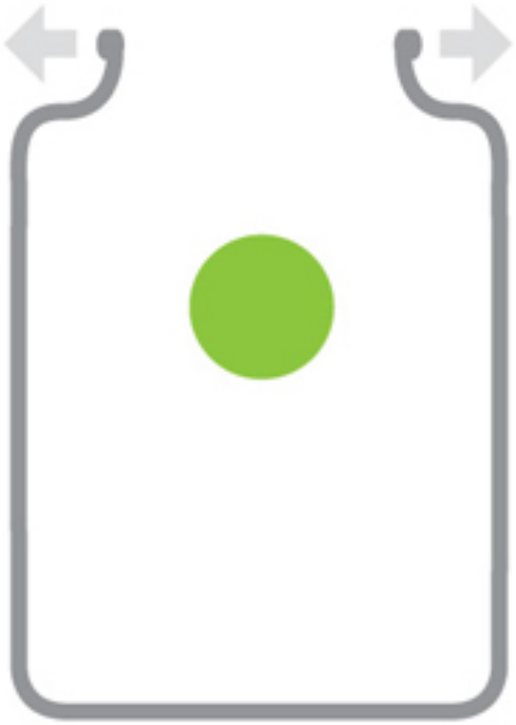
Noticing and creating an experience are different.

There are lots of ways to create experiences.

Beneficial experiences are usually based on facts.

Recognizing good facts does not deny bad ones.

Good facts about yourself are facts like any other.



Enrich It

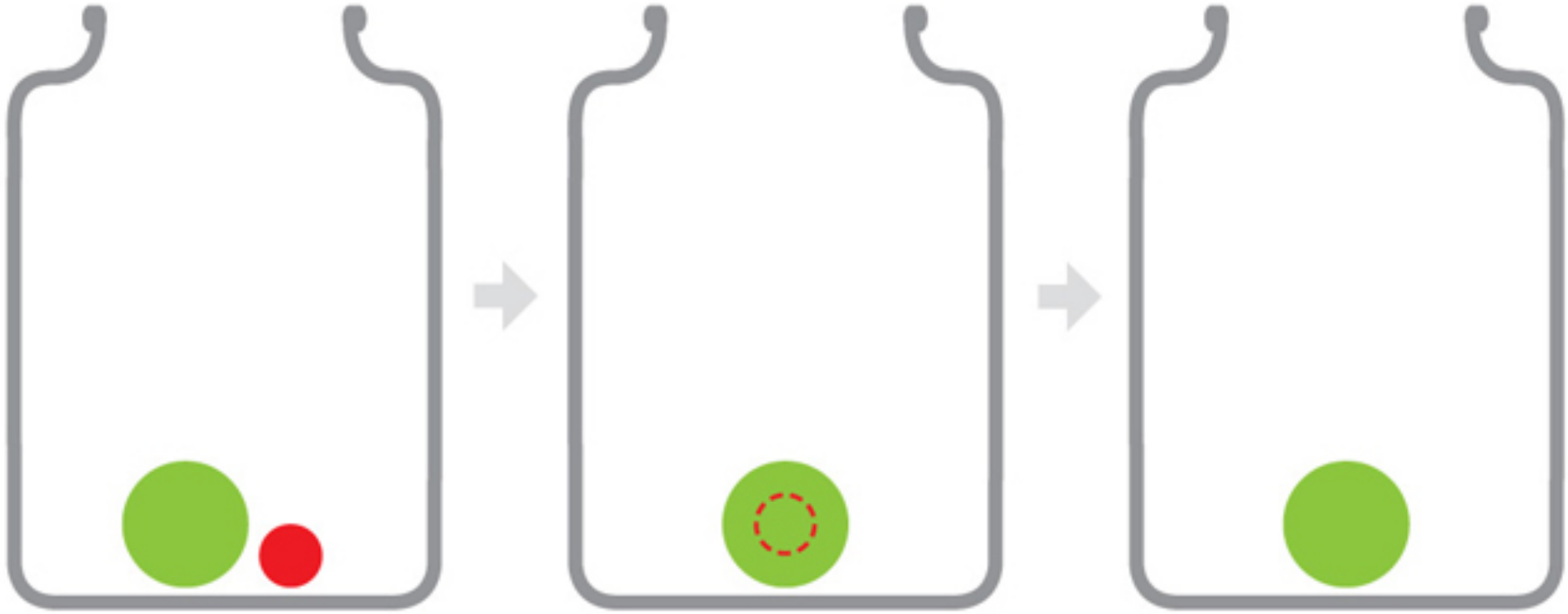
How to Enrich an Experience

- **Duration** – 5+ seconds; protecting it; keeping it going
- **Intensity** – opening to it in the mind; helping it get big
- **Multimodality** – engaging multiple aspects of experience, especially perception and emotion
- **Novelty** – seeing what is fresh; “don’t know mind”
- **Salience** – seeing why this is personally relevant

Absorb It

How to Absorb an Experience

- Enriching makes the experience more powerful. Absorbing makes memory systems more receptive by priming and sensitizing them.
- Intend and sense the experience is sinking into you.
  - Imagery – Water into a sponge; golden dust sifting down; a jewel into the treasure chest of the heart
  - Sensation – Warm soothing balm
- Giving over to the experience; letting it change you
- Letting go of resisting, grasping, clinging: “craving”



Link Positive and Negative Material

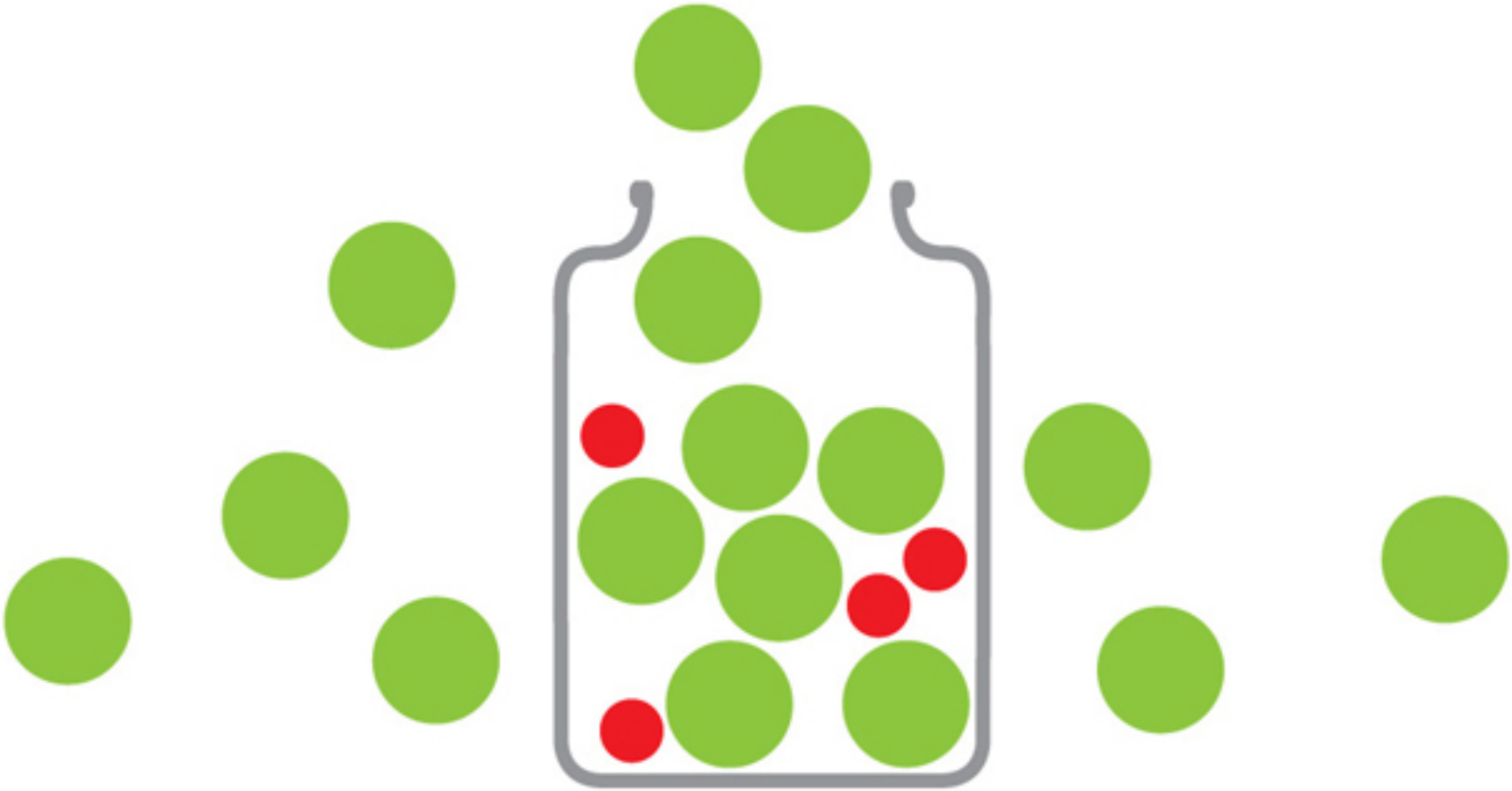
HEAL by Taking in the Good

1. **H**ave a positive experience. Notice it or create it.

2. **E**nrich the experience through duration, intensity, multimodality, novelty, personal relevance

3. **A**bsorb the experience by intending and sensing that it is sinking into you as you sink into it.

4. **L**ink positive and negative material. [optional]



Have It, Enjoy It

It's Good to Take in the Good

- Development of specific inner strengths
  - General - resilience, positive mood, feeling loved
  - Key resources – For challenges, deficits, wounds
- 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

Synergies of TG and Mindfulness

- Improved mindfulness enhances TG.
- TG increases factors of mindfulness (e.g., self-acceptance, self-compassion, distress tolerance).
- TG heightens learning from mindfulness:
  - Regulating attention
  - Body awareness
  - Disidentifying from reactions
  - Deepening centeredness
  - Peace of realizing that experiences come and go

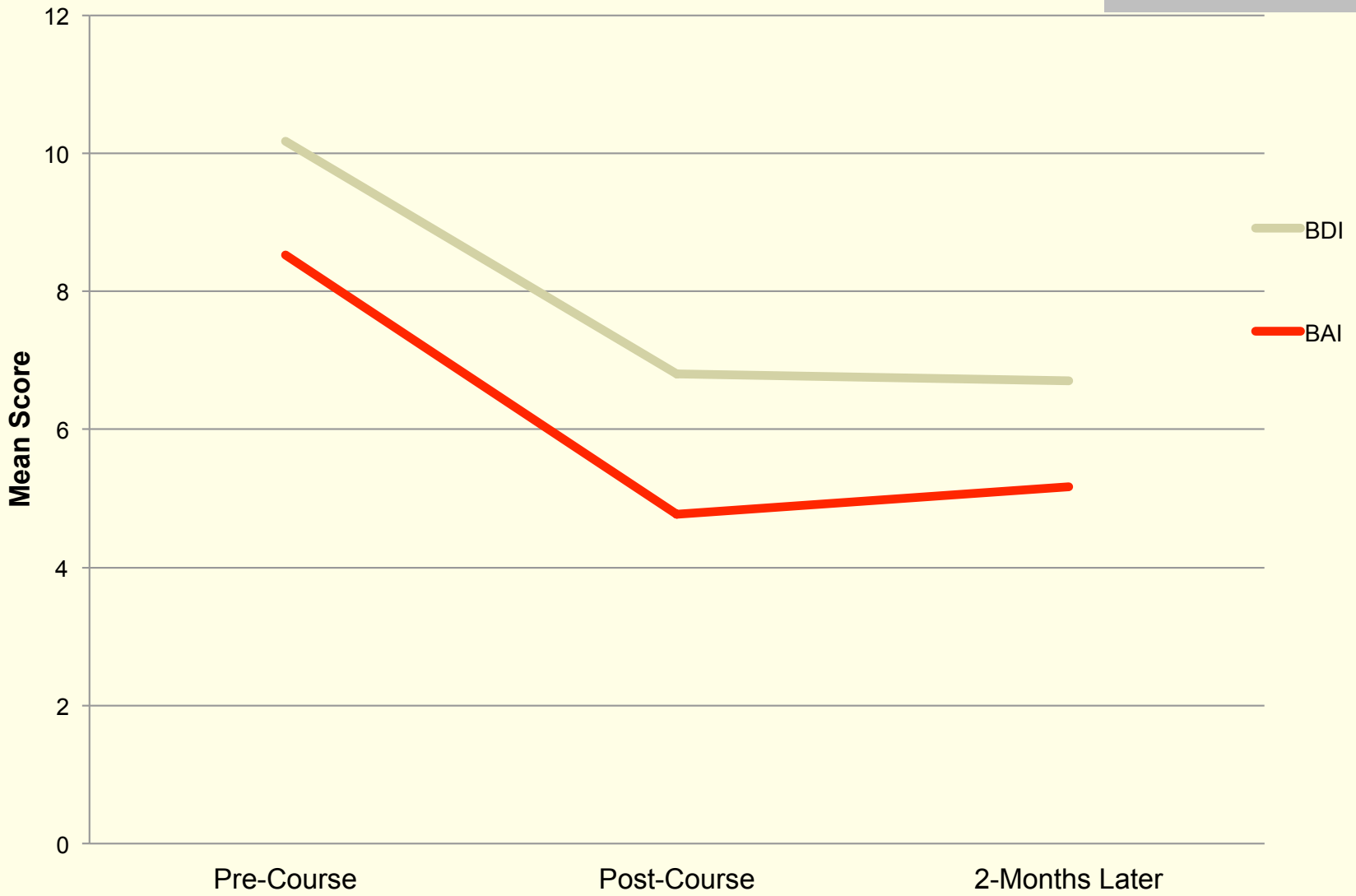
Study on the HEAL Process

- With collaborators from the University of California, a 2013 study on the HEAL course, using a randomized waitlist control group design (46 subjects).

- Course participants, compared to the control group, reported more Contentment, Self-Esteem, Satisfaction with Life, Savoring, and Gratitude.

- After the course and at two month follow-up, pooled participants also reported more Love, Compassion, Self-Compassion, Mindfulness, Self-Control, Positive Rumination, Joy, Amusement, Awe, and Happiness, and less Anxiety and Depression.

Combined Sample: Depression (BDI) & Anxiety (BAI)



Growing Gratitude

- **Create** the experience of gladness or gratitude.
  - Have the experience.
  - Enrich it.
  - Absorb it.

Using Positive Neuroplasticity with Children

Adaptations for Children

- All kids benefit from TG. Particular benefits for mistreated, anxious, spirited/ ADHD, or LD children.

- Style:
  - Be matter of fact: this is mental/neural literacy.
  - A little brain talk goes a long way.
  - Be motivating: benefits, “be the boss of your own mind.”
  - Down to earth, naturalistic
  - Scaffold based on executive functions, motivation, and need for autonomy.
  - Brief, concrete

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

Occasions for Taking in the Good

- Explicit training in positive neuroplasticity
- Natural rhythms in the day (e.g., start of class, after a lesson or recess, end of day)
- When working with an individual child
- When dealing with classroom issues

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 blocks

Obstructions to Taking in the Good

- General:
  - Distractibility
  - Blocks to self-awareness in general

- Specific:
  - Fears of 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

Uses for Children

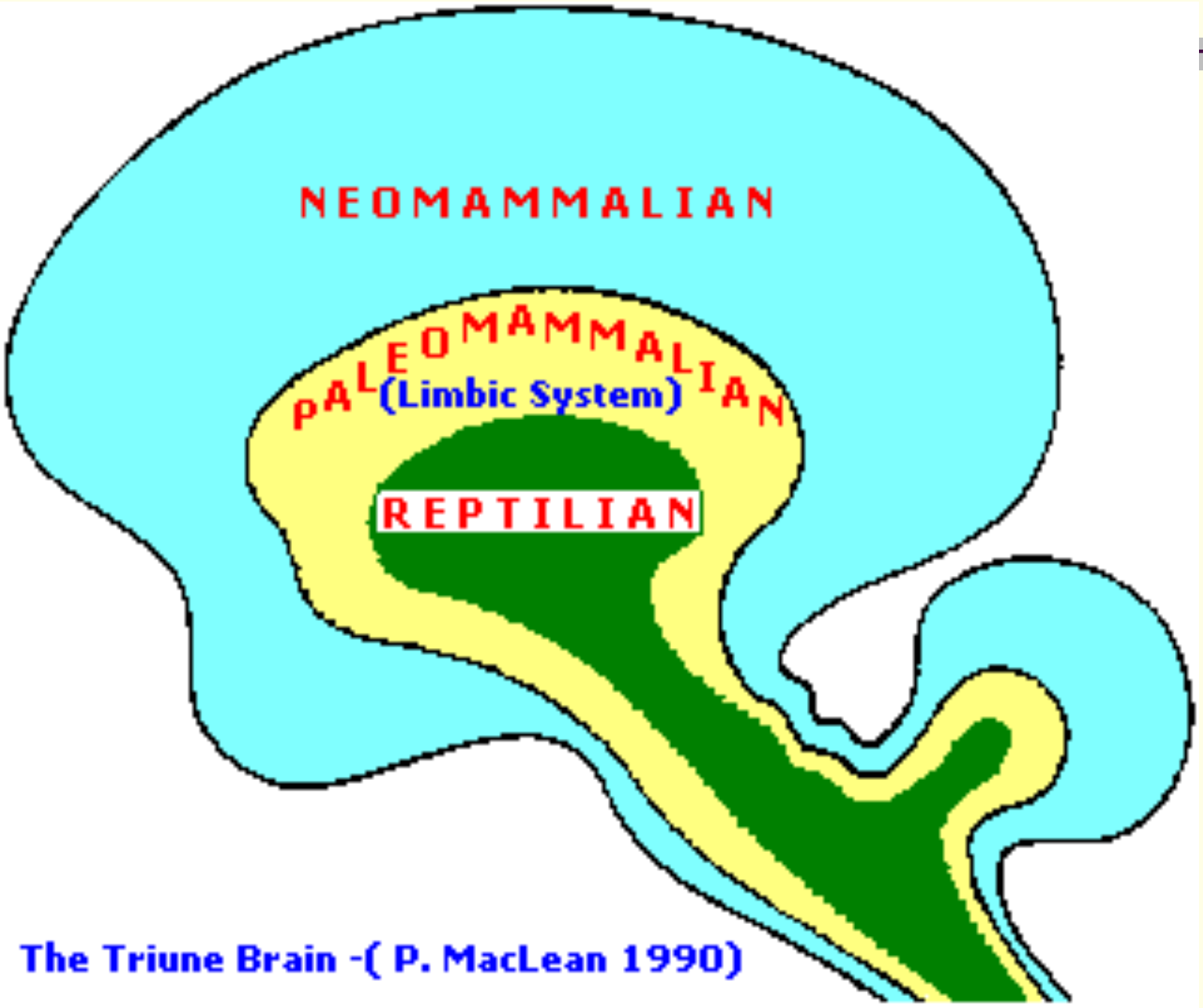
- Registering curricular skills and other resources
- Motivation for learning; associating rewards
- Seeing the good in the world, others, and oneself – and in the past, present, and future
- Seeing life as opportunity
- Strengthening the sense of being an active learner
- Developing child-specific resources

Pick a partner and choose an A and a B (A's go first). Then you'll take turns, with one partner mainly speaking while the other person listens, exploring this question:

What are some of the ways you could use positive neuroplasticity with your students?

Key Resource Experiences

Evolutionary History



Our Three Fundamental Needs

Safety

Satisfaction

Connection

Needs Met by Three Systems

Safety – Avoiding harms

Satisfaction – Approaching rewards

Connection – Attaching to others

Pet the Lizard

Feed the Mouse

Hug the Monkey

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 pleasured, 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

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

Pick a partner and choose an A and a B (A's go first). Then you'll take turns, with one partner mainly speaking while the other person listens, exploring this question:

What are some of the ways you could use key resource experiences with one or more of your students?

Coming Home

The Homeostatic Home Base

When not invaded by threat, loss, or rejection [no felt deficit or disturbance 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.

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

When invaded by threat, loss, or rejection [felt deficit or disturbance 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)

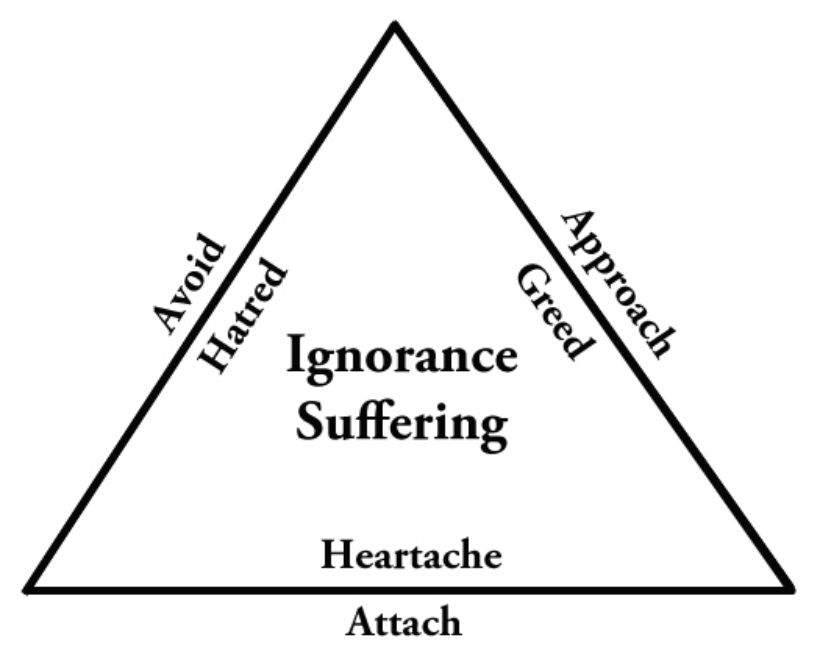
This is the brain in allostatic, ***Reactive,*** *craving* mode.

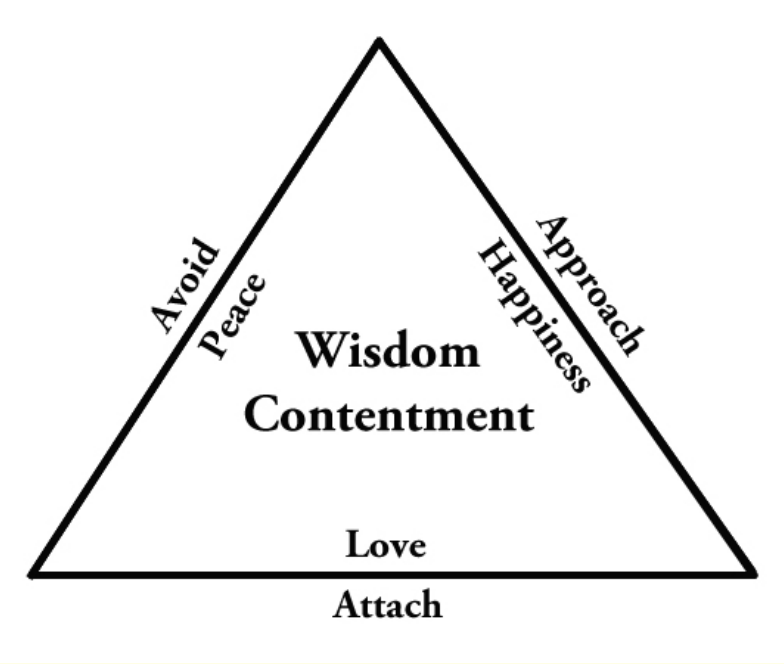
Reactive Dysfunctions in Each System

- **Avoid -** Anxiety disorders; PTSD; panic, terror; rage; violence
- **Approach** - Addiction; over-drinking, -eating, -gambling; compulsion; hoarding; driving for goals at great cost; spiritual materialism
- **Attach** - Borderline, narcissistic, antisocial PD; symbiosis; *folie a deux*; "looking for love in all the wrong places"

Choices . . .

Or?





Reactive Mode

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.

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.

Dhammapada 9.122

Suggested 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.
- 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.
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Key Papers - 1

See www.RickHanson.net for other scientific papers.

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Key Papers - 2

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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.

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- Lieberman, M.D. & Eisenberger, N.I. 2009. Pains and pleasures of social life. *Science*, 323:890-891.

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Key Papers - 4

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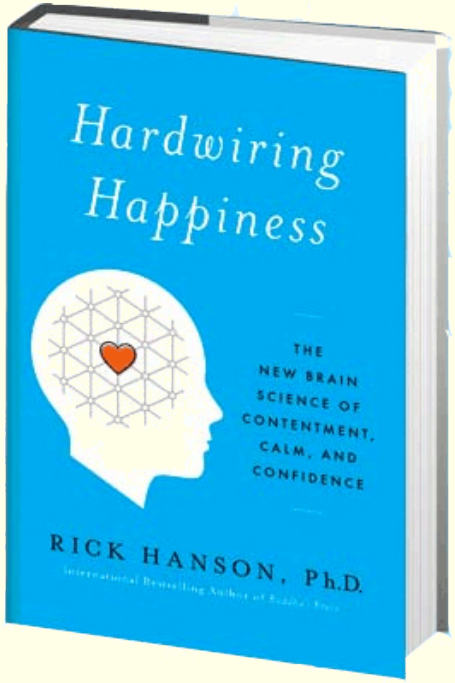
Where to Find Rick Hanson Online



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

youtube.com/drrhanson

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