Stress Management on the Go

Lee Lipsenthal, MD

Definitions of Stress

- Stress is the automatic non-specific response of the human organism to any change or demand.
- Stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being.
- The response is mediated by the autonomic nervous system.

Definitions of Acute & Chronic Stress

Acute Stress: the threat is immediate and the need to respond is instantaneous. Adrenaline and noradrenaline of the adrenal gland are called into play.

Chronic Stress: the threat is prolonged and unabated, and it usually involves the presence in the blood of cortisol.

Autonomic Nervous System

Sympathetic Pathway—Accelerator

High Effort

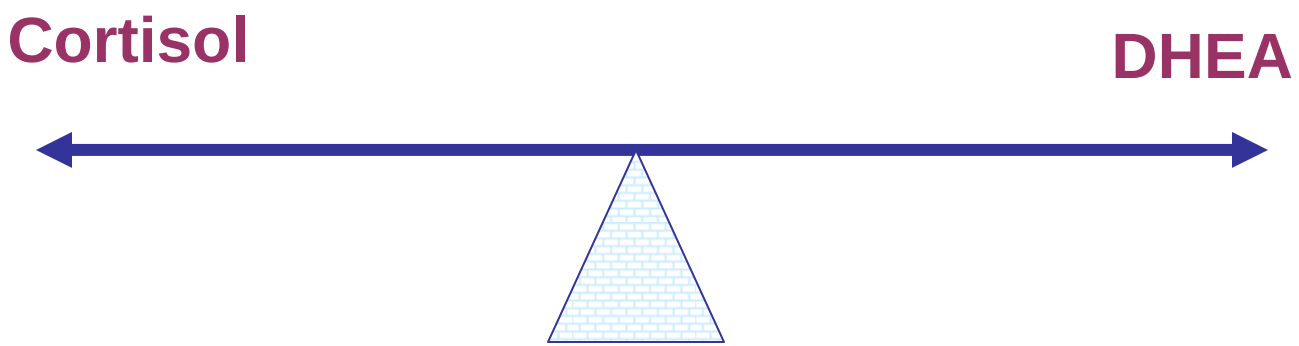
Adrenaline

Parasympathetic Pathway—Brake

Low Effort/relaxation

Acetylcholine

Hormonal System

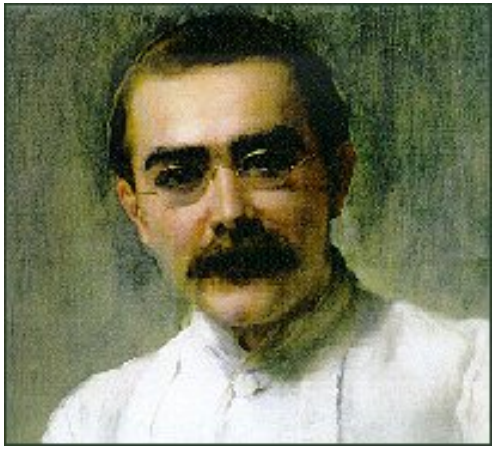


Physiological consequences of stress driven by catecholamines and cortisol

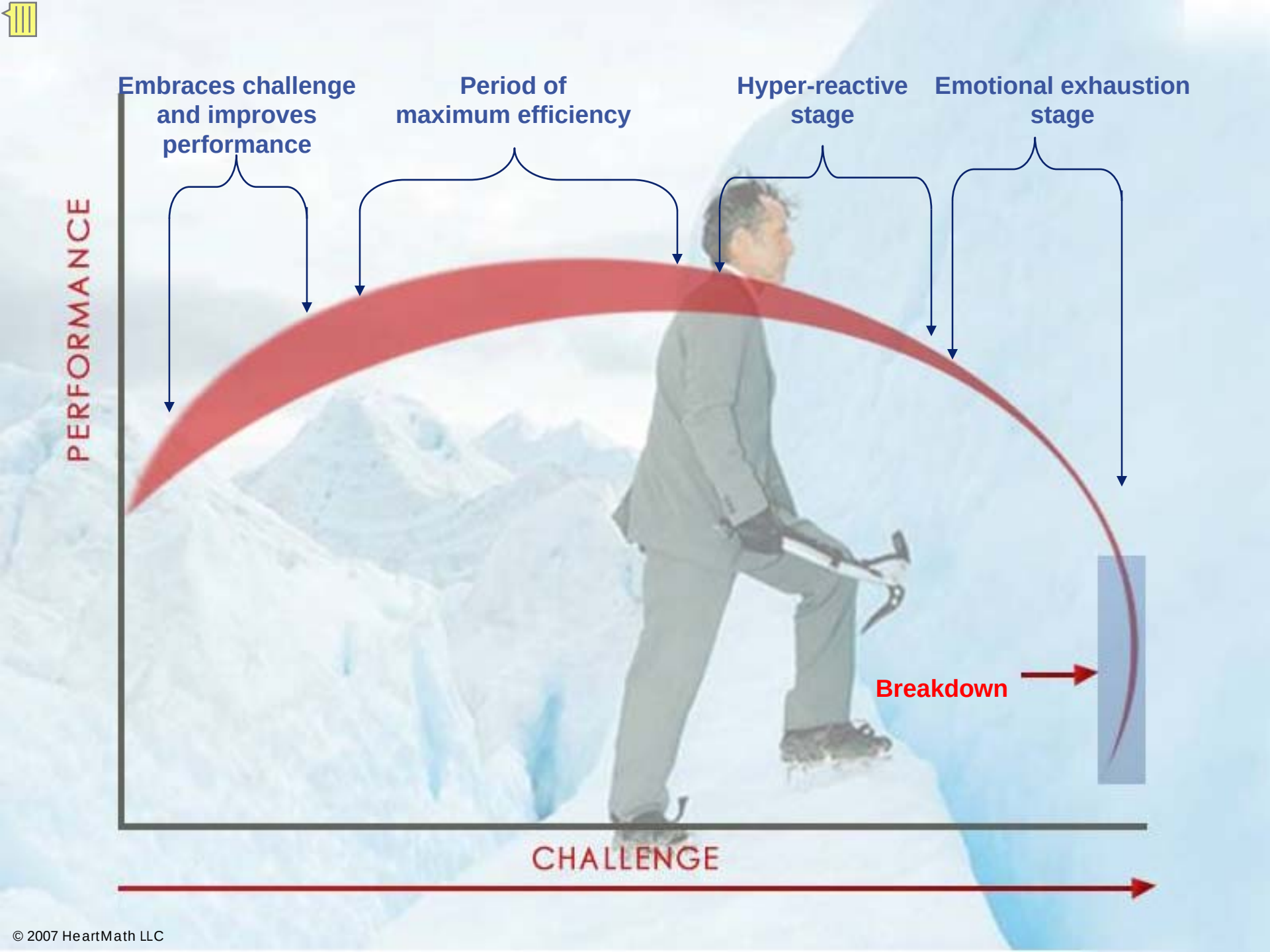
- ↑ heart rate
- ↑ blood pressure
- ↑ blood flow to muscles
- ↓ blood flow to skin
- ↑ metabolic rate
- ↓ digestion
- ↑ blood clotting and thickness
- ↑ blood sugar
- ↑ respiratory rate
- ↑ fluid retention
- ↑ alertness
- ↑ breakdown of fats
- ↑ triglycerides and LDL cholesterol

Work Stress & Heart Disease

- The INTERHEART study - With 11,119 workers, in 52 countries, case-controlled, heart disease was directly related to work stress independent of region, ethnic background or sex.
    - Rosengren A, Hawken S, Ounpuu S, et al. Lancet. 2004;364:953-962.



“More men are killed by overwork than the importance of the work justifies”
- Rudyard Kipling



Men’s response to stress; “Fight or Flight”

- With stress hormones testosterone is released
  - Increases aggressiveness
  - Increases the need to isolate oneself

Women's response to stress; "Tend and befriend"

- Relationships soothe women's stress
- Stress triggers a need for bonding with others
- Oxytocin is released, this creates nurturing behaviors in response to stress;
  - The need to care for others
  - The need to clean the 'nest'
  - Diminishes the fight or flight response

Women's response to stress

- When working women become stressed with over busy-ness, they tend to let go of relationships
- This is counter to their inherent need
  - **Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-flight.** Taylor, Shelley E.; Klein, Laura Cousino; Lewis, Brian P.; Gruenewald, Tara L.; Gurung, Regan A. R.; Updegraff, John A., Psychological Review. 107(3), Jul 2000, 411-429.

How Did We Get This Way?

- We Are:
  - Intelligent
  - Caring
  - Sensitive
  - Inquisitive

We Are Also:

- Type A
- Perfectionistic

Perfectionism

- Whose expectations are you trying to live up to?
  - Your parent's
  - Your mentor's
  - Your spouse's
  - Your own

Perfectionism leads to:

- Judgementalism
- Fear of making errors
- Reluctance to admit mistakes
- Isolation
- Never being satisfied!

Type A

- Opinionated
- Judgmental of others
- Pressured to succeed
- Clipped pattern of speaking, forced smiles
- “Hurry sickness” – rushing against time
- Multi-tasking
- Aggressive beyond the need of the situation
- Not trusting others to do the job right
- Perfectionism
- Competitiveness
- The desire to be recognized for you accomplishments
- The need to prove self worth with performance

Who gets more work done,
a type A or a type B?

Manage Stress

Eliminate the causes

Change perception of the stress

Stress Management tools:

Meditation

Yoga

HeartMath Techniques

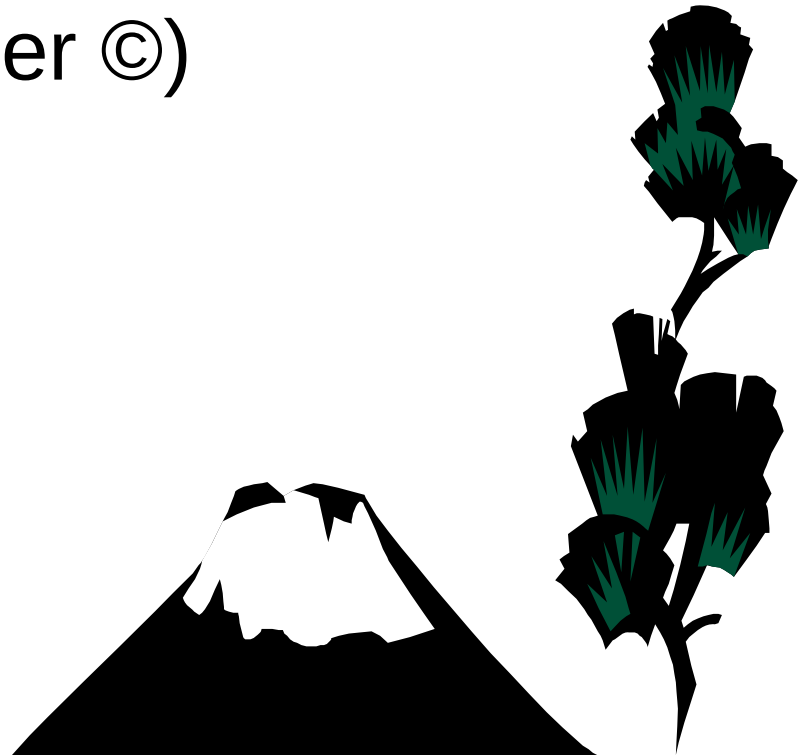
(Freeze-Framer ©)

Ti Chi

Prayer

Exercise

Hobbies



Stop The BMW!

Bitching, Moaning & Whining

Managing Stress: Your Core Values

Using emotions

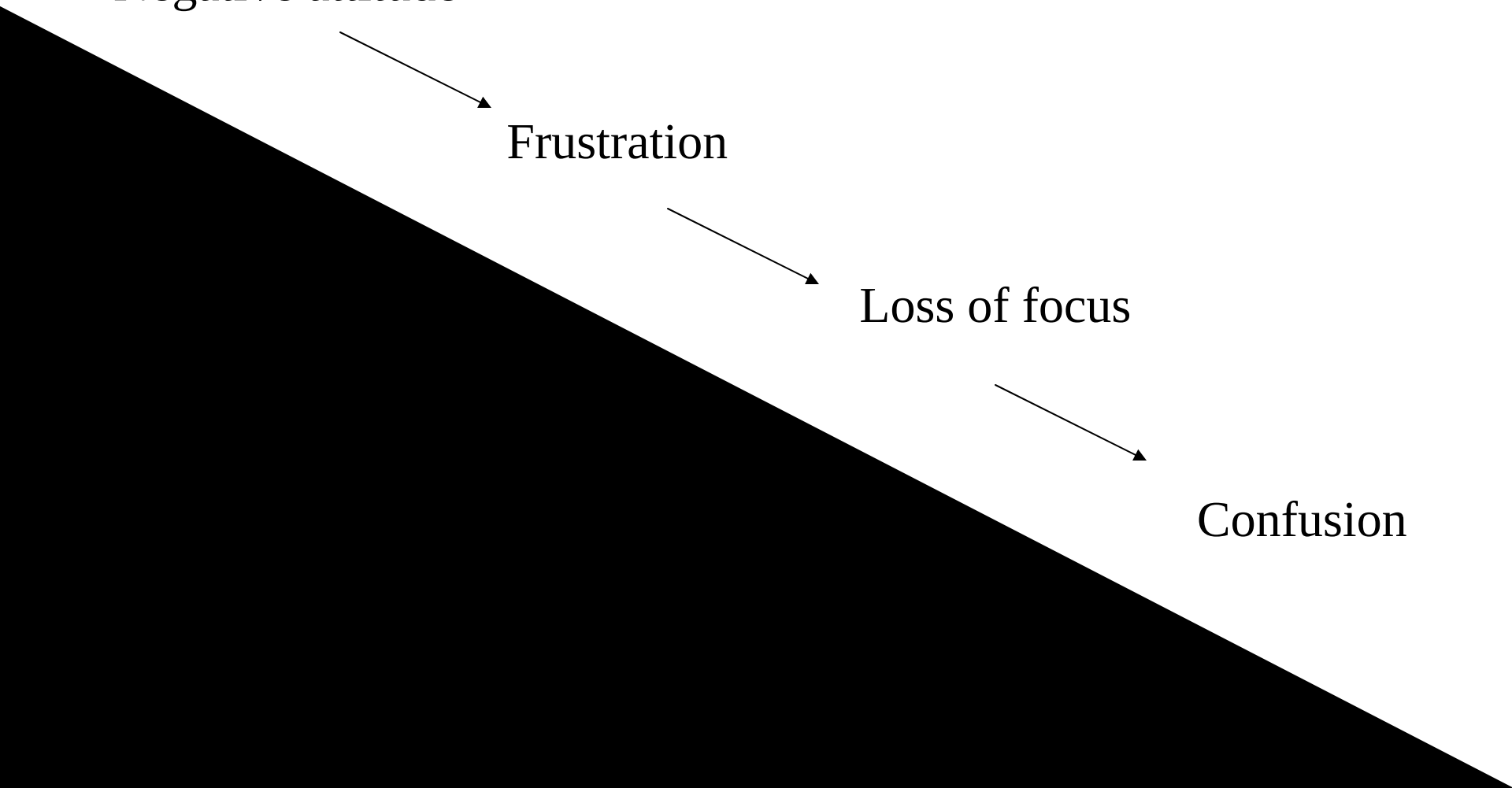
To minimize stress

Enhance clarity and management

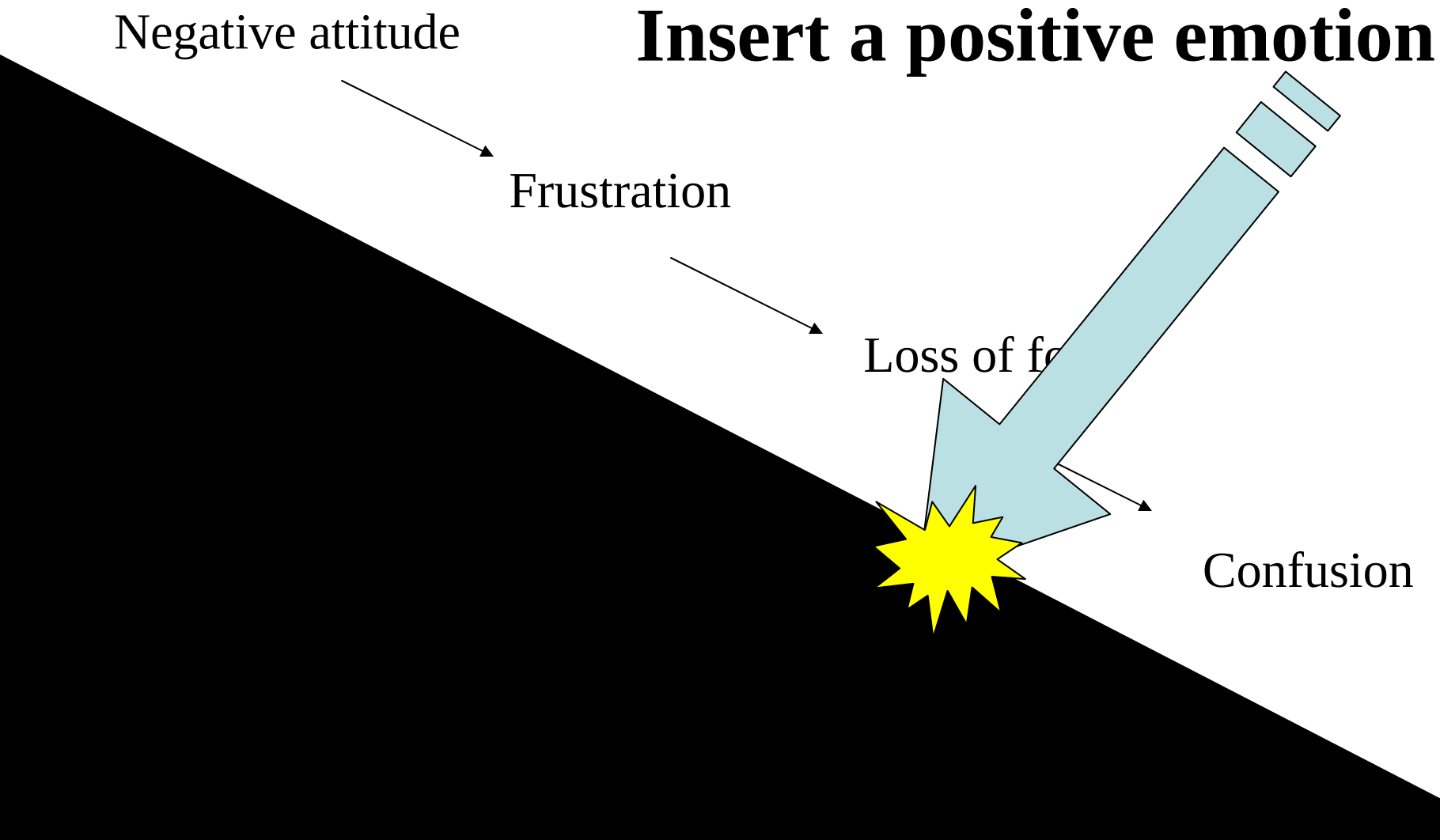
Make fewer mistakes

Stop the downward spiral

The slippery slope

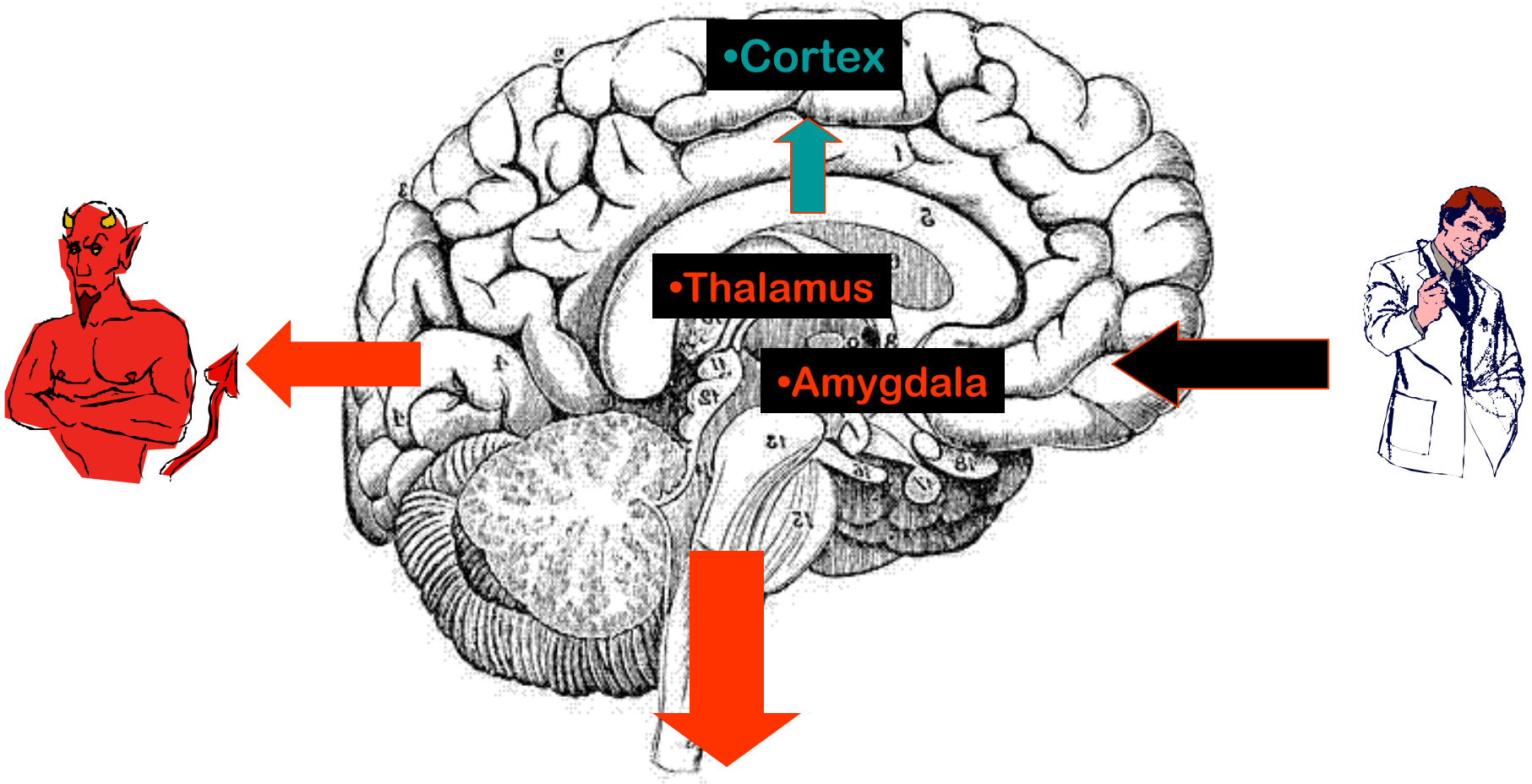


Stop the slide!



Exercises:
Your Balance Sheet

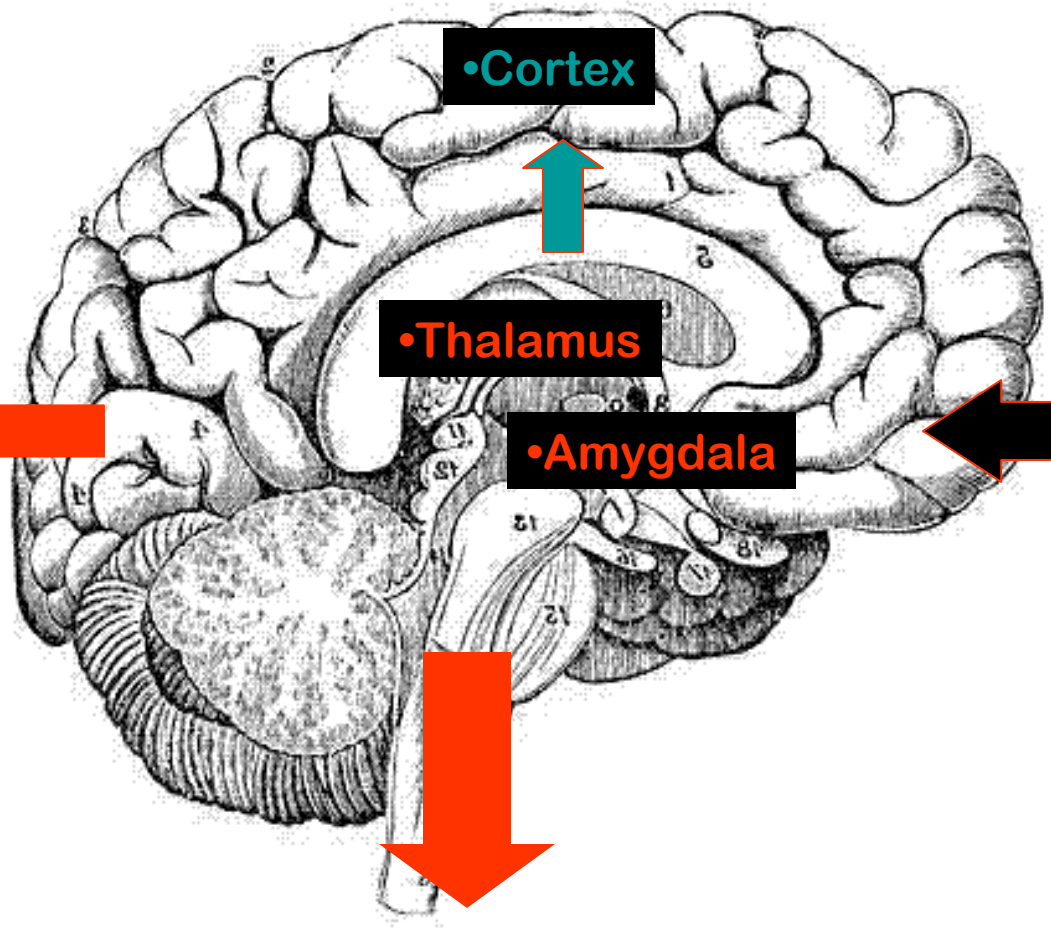
Stop thinking with your mid-brain



Anger!

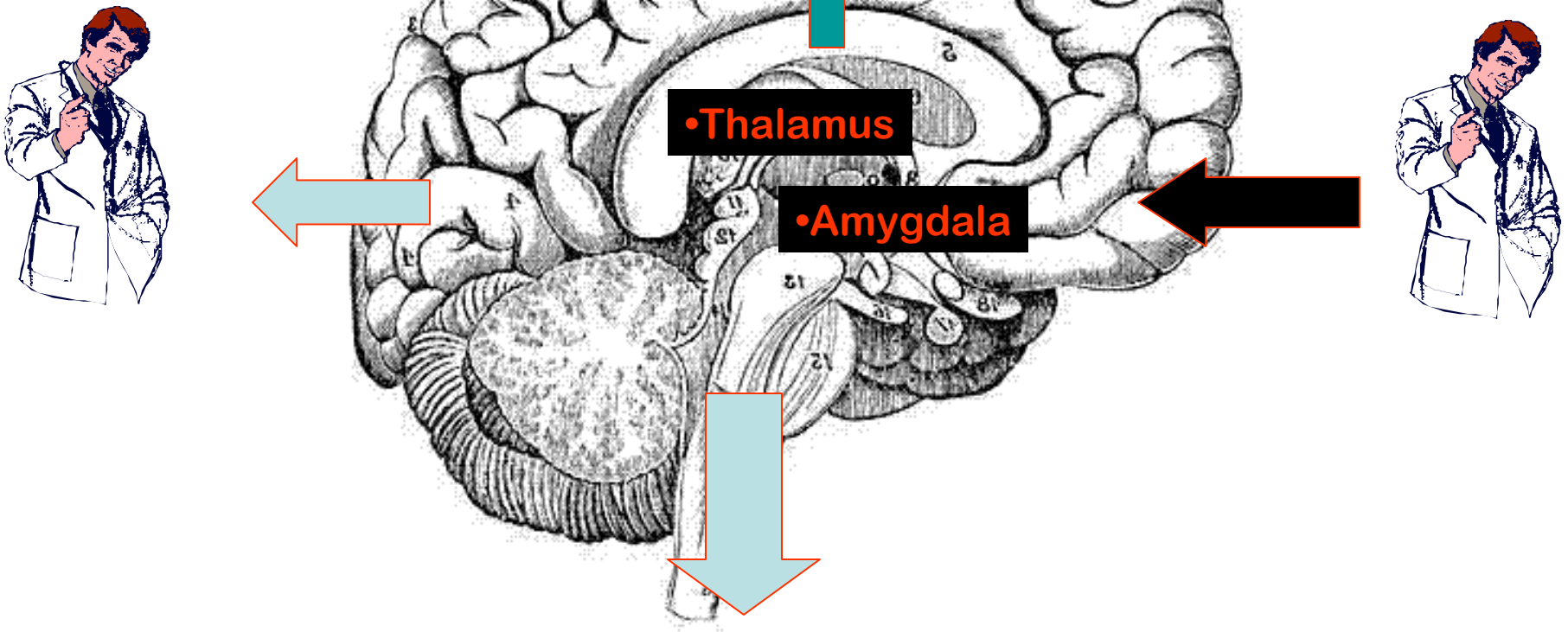
- Increased catecholamines and cortisol

Insert “appreciation” here



Anger!

The Output shifts



Clarity!

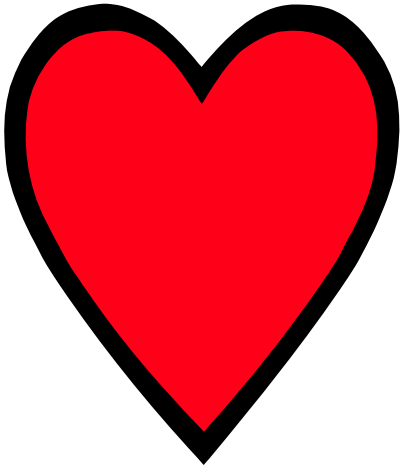
Exercises:
Protect yourself from Dr. Bob

The Physiologic Role Of The Heart In Emotions

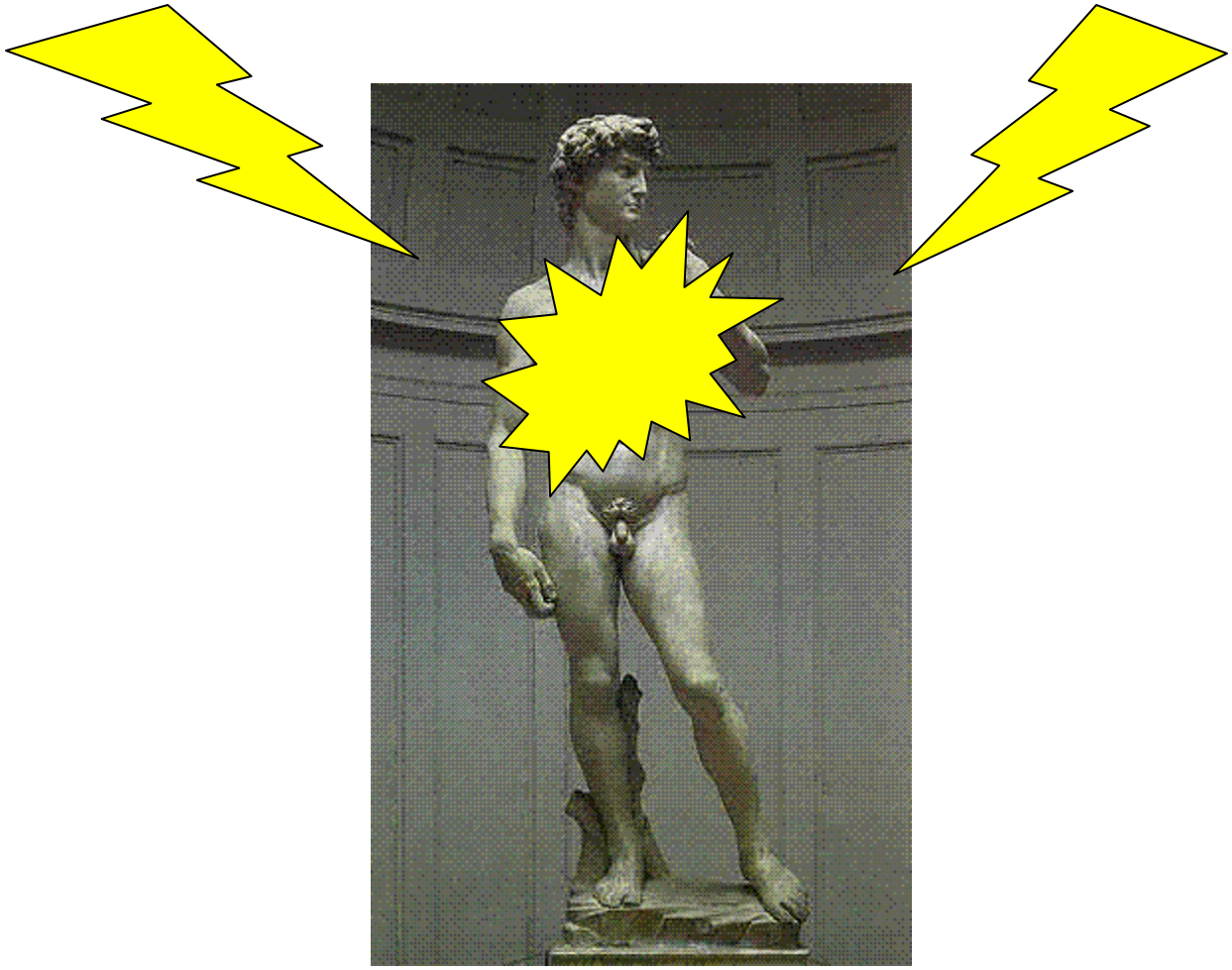
Brain - Heart Communication

Sympathetic

Parasympathetic



Is the heart just a passive recipient of information?



Cardiac Endocrine Function

- Atrial Natriuretic Peptide
  - Diuretic
  - Vascular smooth muscle relaxing
  - Other hormonal and neurologic receptors
- Brain Natriuretic Peptide
- Intrinsic Cardiac Adrenergic Cells
  - Release catecholamines and dopamine
- Opiods
- Nitrous Oxide

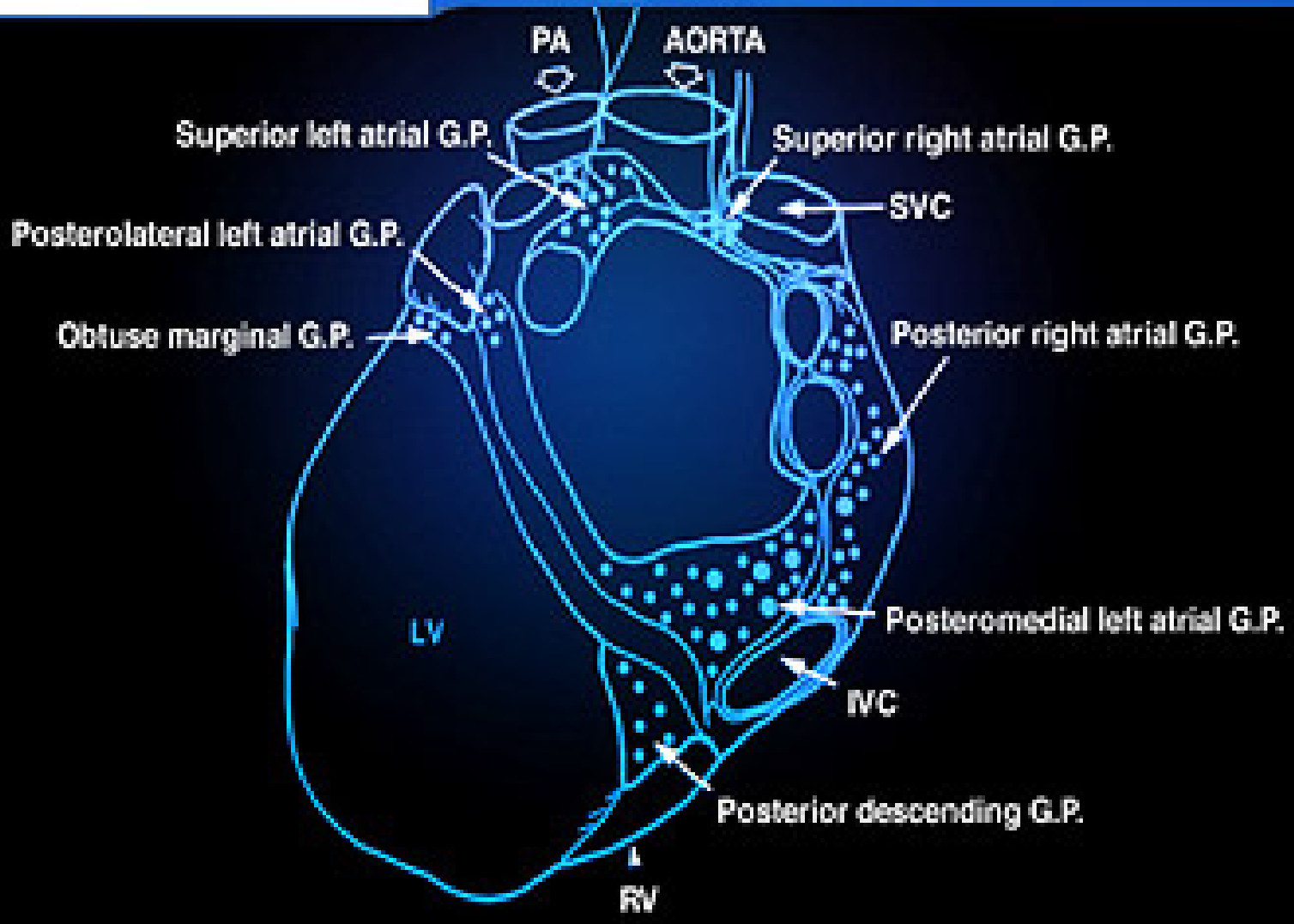
The Neural Heart

- The heart has a nervous system:
  - Afferent and efferent neurons
  - Ganglia
  - Local Circuit Neurons

    - Neurocardiology, Armour, JA and J. Ardell Eds.. - NY,NY, Oxford University Press

Institute of HeartMath

Intrinsic Cardiac Afferent Neurons

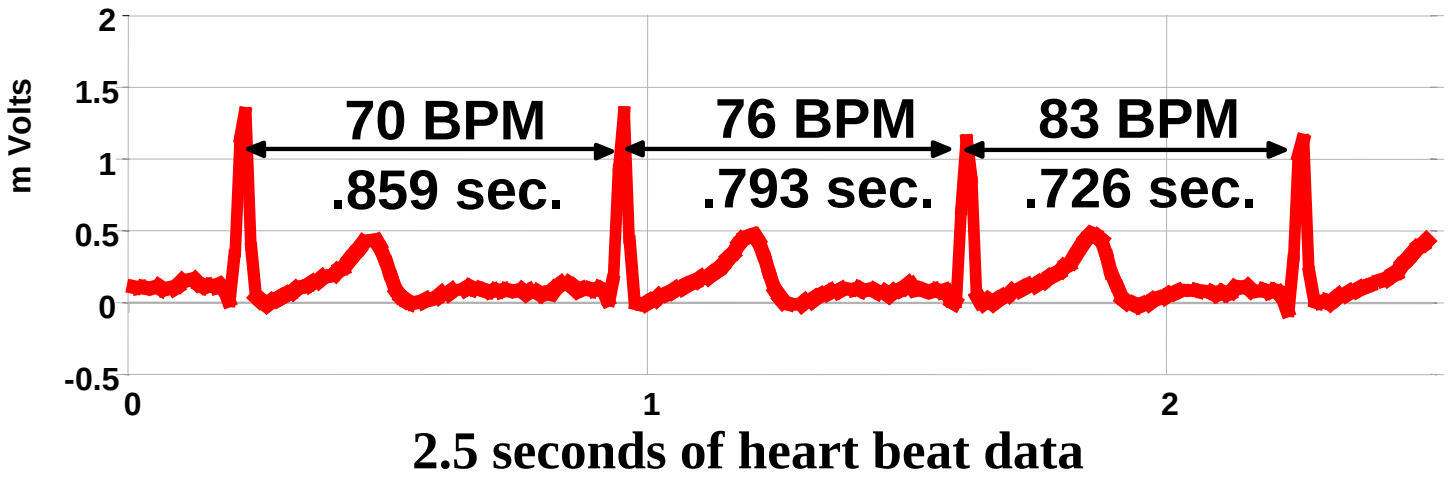


Location and Distribution of Intrinsic Cardiac Ganglia

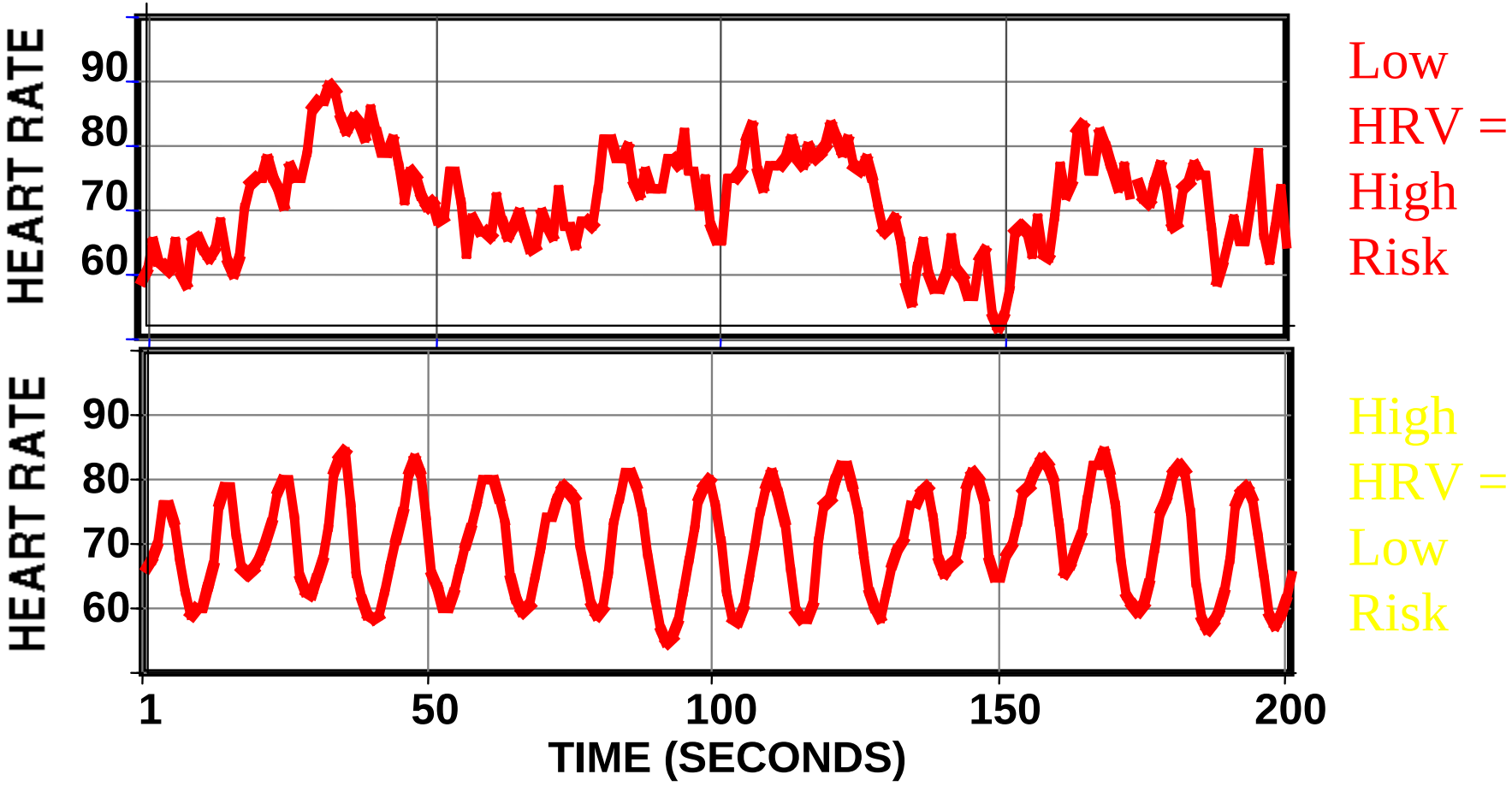
How can the heart's response effect brain function?

Heart Rate Variability

Heart Rate Variability (HRV)



Low and High HRV



Heart Rate Variability

- Key indicator of autonomic function
- Low HRV indicates high sympathetic and parasympathetic tone = high cardiac risk
- High HRV indicates low sympathetic and parasympathetic tone = low cardiac risk
- Decreases with age
- Low HRV is predictive of MI and sudden death
  - Circulation, 1996;93: 1043-1065

Low HRV Predicts CHD & All Cause Mortality

- 14,672 men and women
- HRV measured between 1987 and 1989
- Low HRV increased risk of CHD formation and death by 40%

    - Dekker et al, Circulation 2000:102:1239

Depression and HRV

- Depressed patients with CAD
- compared to non-depressed patients with CAD
- HRV was much lower in the depressed population as an independent variable

  – Carney et al, Am J of Cardiology 1995, Sept 15;76(8)

HRV In Surgery

- Problem: Surgeons in Sweden have higher death rate from CAD than general practitioners
- Laparoscopic procedures are increasing and seem to be fatiguing to the surgeons
- HRV study of surgeons and assistants during open v. laparoscopic colo-rectal surgeries
- Sympathovagal balance was worse, by HRV, during laparoscopic procedures

  – Bohm, B et al; Arch Surg, vol 36 March 2001

HRV patterning will effect cortical function and emotions

A Laboratory example (animal studies):

Low HRV pattern produced by stimulation of vagal afferents, to the cortex, causes and:

- Decreased muscle tone
- Altered pain perception
- Changes in CNS hormonal output
- Decreased cortical activity - “cortical inhibition”
- Decrease speed of evoked potentials

An In Vivo example: Arrhythmias lead to emotional changes

- 55% of panic attacks were preceded, on Holter, by a paroxysmal SVT
- When the arrhythmia was treated, the panic attacks went away

Lessmeier, TJ et al; Archives of Internal Medicine; 1997; 157; 537-543

Heart Rate Variability Can Be Intentionally Modified

HRV, Mantras & Rosary Prayer

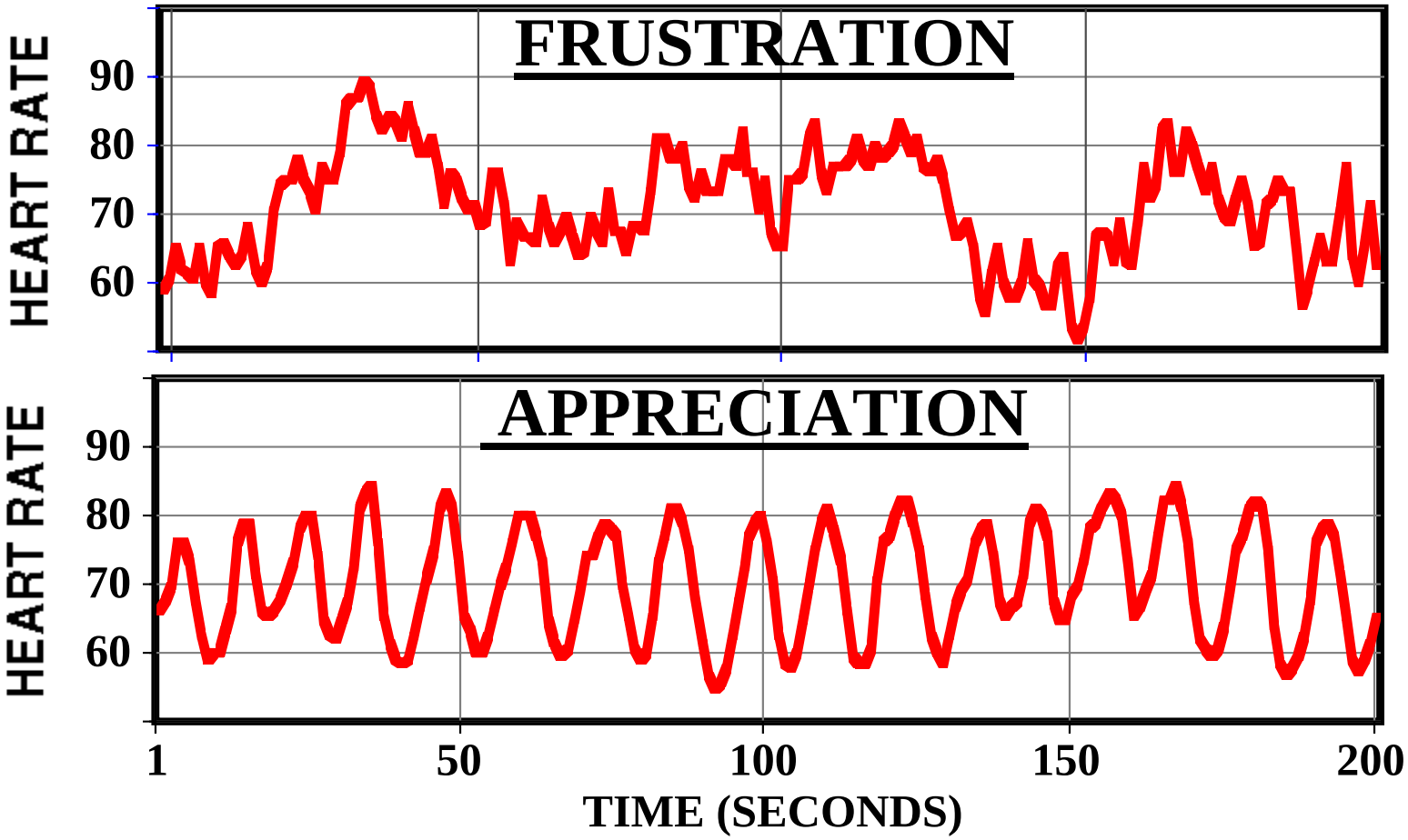
- Both practices:
  - Decreased sympathetic tone
  - Synchronized respiratory and c-v cycles
  - Improved HRV

Luciano Bernardi *et al BMJ* 2001;323:1446-1449 (22-29 December)

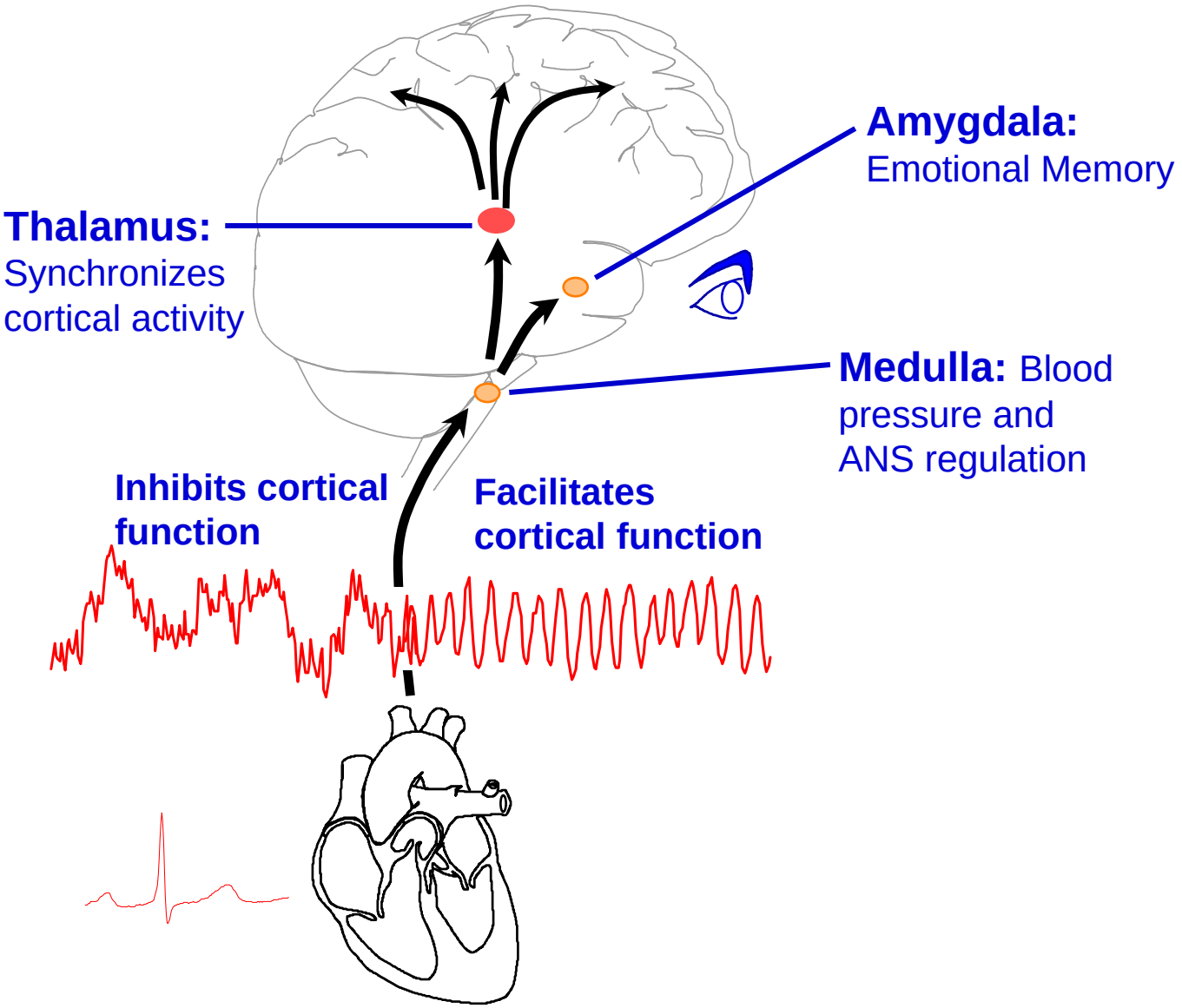
Heart Rate Variability Can Be Altered By Shifting Emotional States

McCraty et al; The American J of Cardiology; Nov. 15 1995; vol.. 76;14: 1089-1093

Perceptions & Emotions profoundly affect Autonomic Nervous System Balance and Heart Rhythms.



Ascending Heart Signals



Afferent input from the heart to the brain effects perception.

J. Lacey in “Psychophysiologic approaches to the evaluation of psychotherapeutic process and outcome” in: Rubenstien and Parloff, *Research in Psychotherapy*

Exhaustion will limit perception and decreases the big picture view

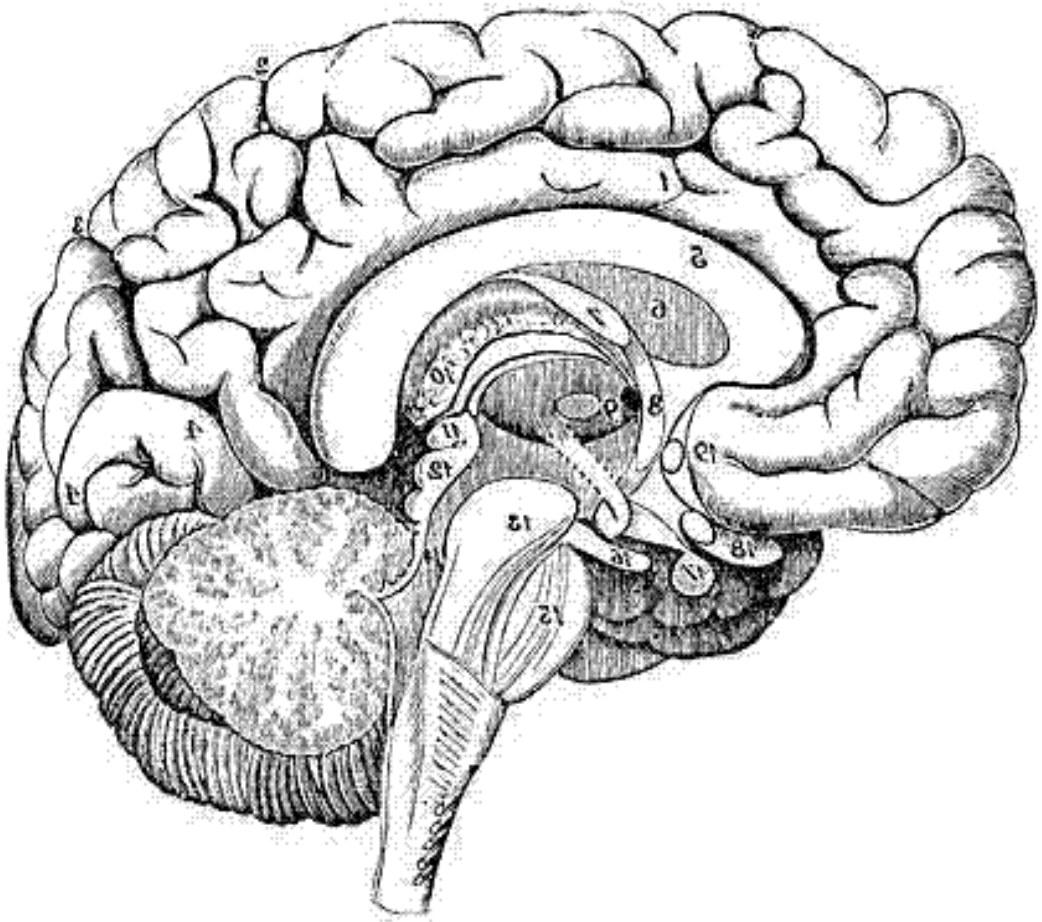
The Mental

Shift HRV & catecholamines to enhance learning and emotional intelligence

Increased Catecholamines
Increased cortisol
Low HRV

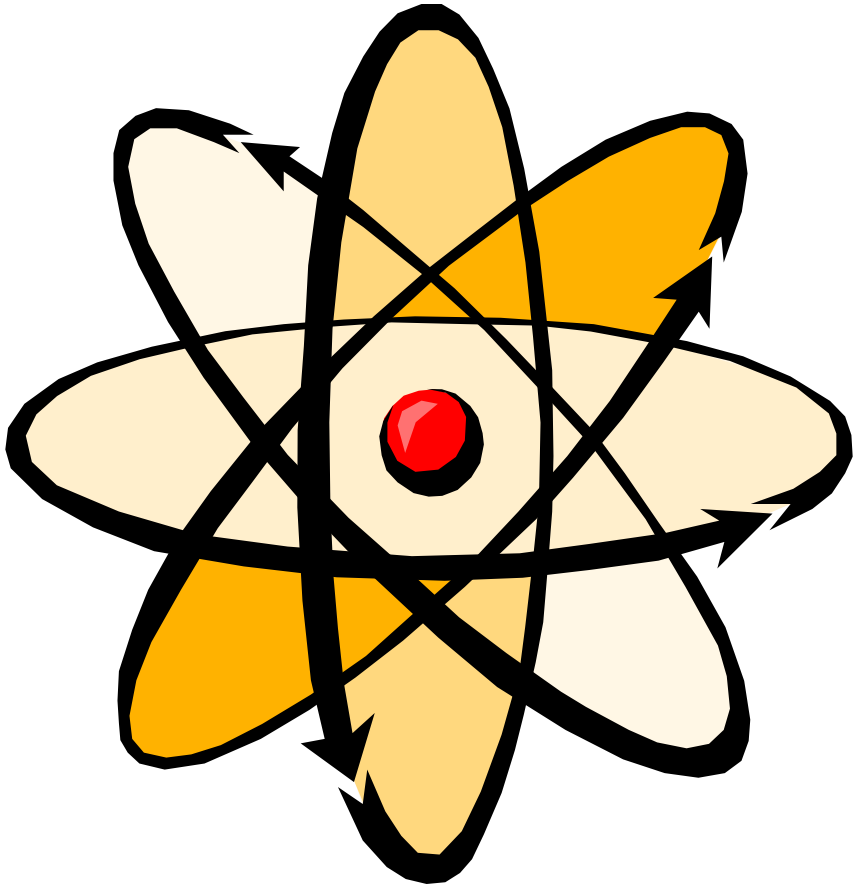
Cortical inhibition!

Decreased Catecholamines
Decreased cortisol
High HRV



Cortical facilitation!

Reclaim the fun of learning!



When are you the most creative?

People are most creative…

- **18% on vacation**
- **14% driving a car**
- **12% walk in the woods**
- **11% in the shower**
- **9% working in the yard**
- **8% with friends**

- **Work was a distant 9th, just behind sitting someplace quiet (with or without a favorite beverage)**
- **70% said in the AM**

It’s only when we have the courage to face things as they are, without any self-deception or illusion, that a light will develop out of events, by which the path to success may be recognized.

The I Ching

Emotionally Driven Shifts In Heart Rate Variability, Towards Coherence, Correlate With:

- Improved blood pressure
  - Barrios-Choplin, McCraty, Cryer, Stress Medicine; 1997, v13: 193-201
- Increased DHEA
- Decreased Cortisol
  - McCraty, Barrios-Choplin, Rozman, Atkinson and Watkins; Integrative Physiological and Behavioral Science; April 98; v33 #2, 151-170
- Improve diabetic control
  - Atkinson, McCraty, Lipsenthal – submitted for publication

Changes in heart rate variability to a more coherent pattern are associated with:

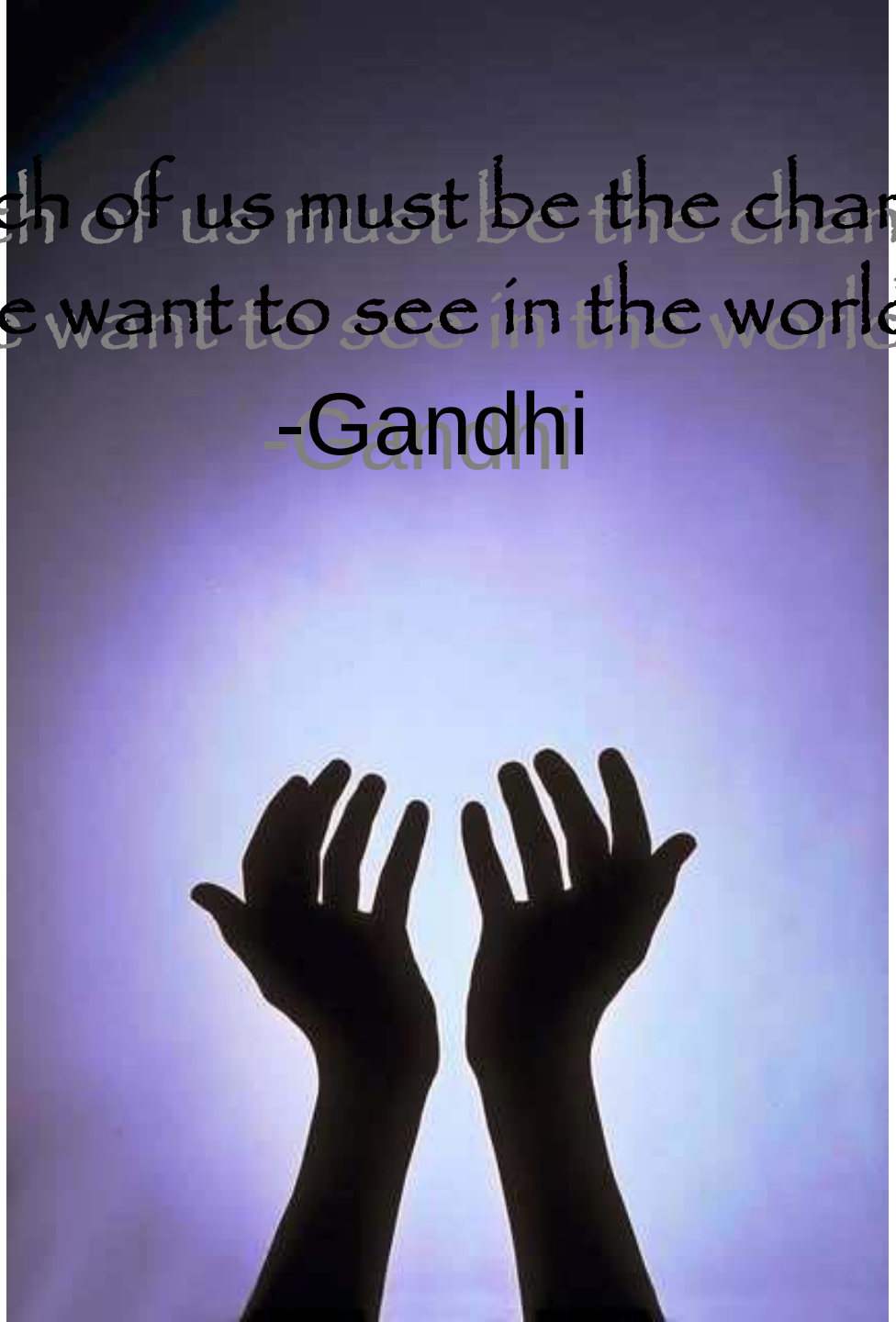
- Decreased depression
- Decreased anxiety
- Decreased hostility
- Improved communication
- Improved cortical reactivity

Find Clarity

- You have head knowledge
  - Academic information
  - Experience
- You have heart knowledge
  - Intuition
  - Empathy

Each of us must be the change we want to see in the world

-Gandhi



Exercises:
Appreciation Meditation