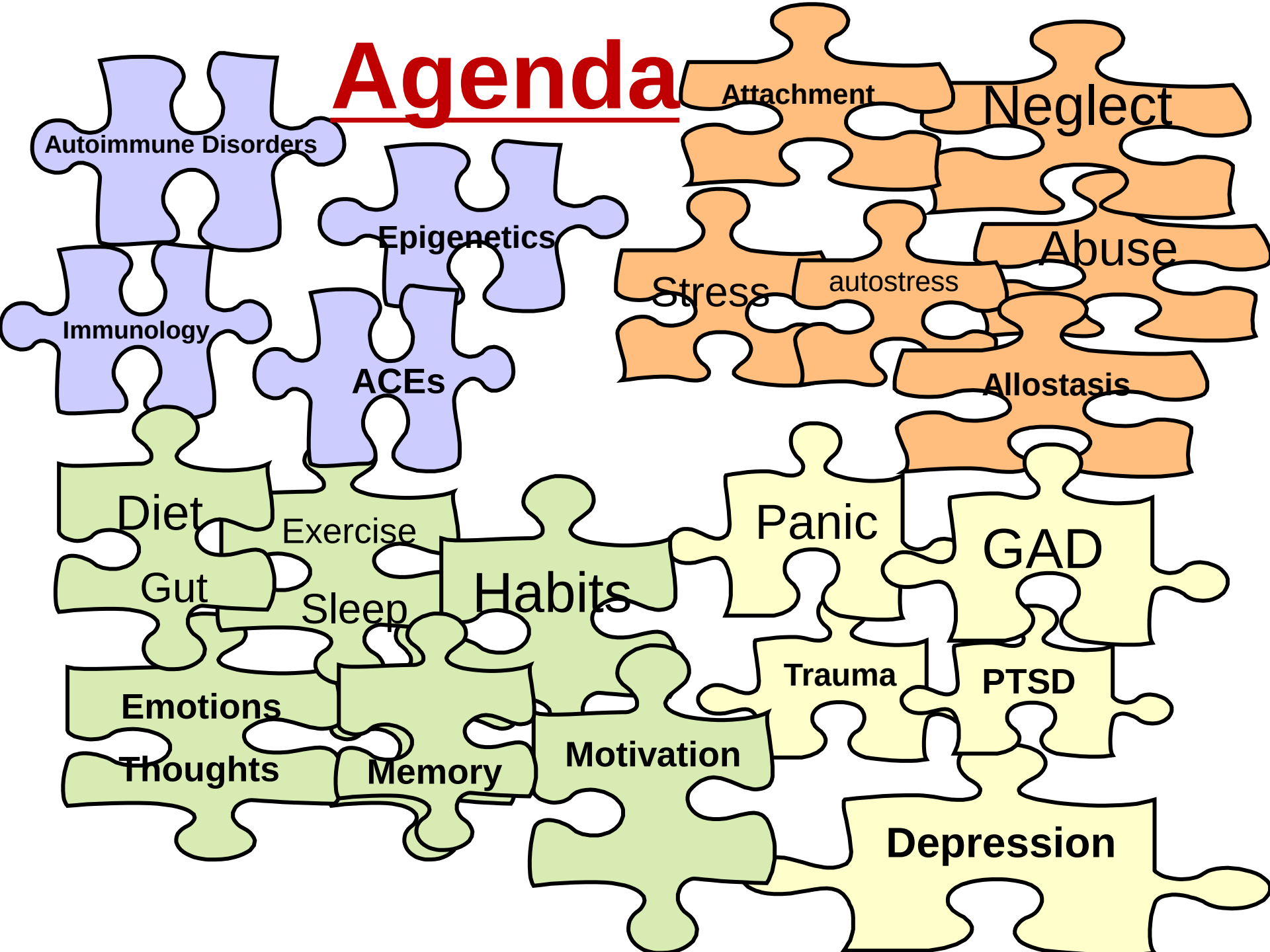
Brain-Based Therapy & PTSD:

Toward Psychotherapy Integration

John B. Arden, PhD, ABPP


Agenda
Autoimmune Disorders
Epigenetics
Immunology
ACEs
Attachment
Neglect
Abuse
Stress
autostress
Allostasis
Diet
Exercise
Gut
Sleep
Habits
Panic
GAD
Trauma
PTSD
Emotions
Thoughts
Memory
Motivation
Depression

Therapy might have been different

"We must recollect that all of our provisional ideas in psychology will presumably one day be based on an organic substructure."

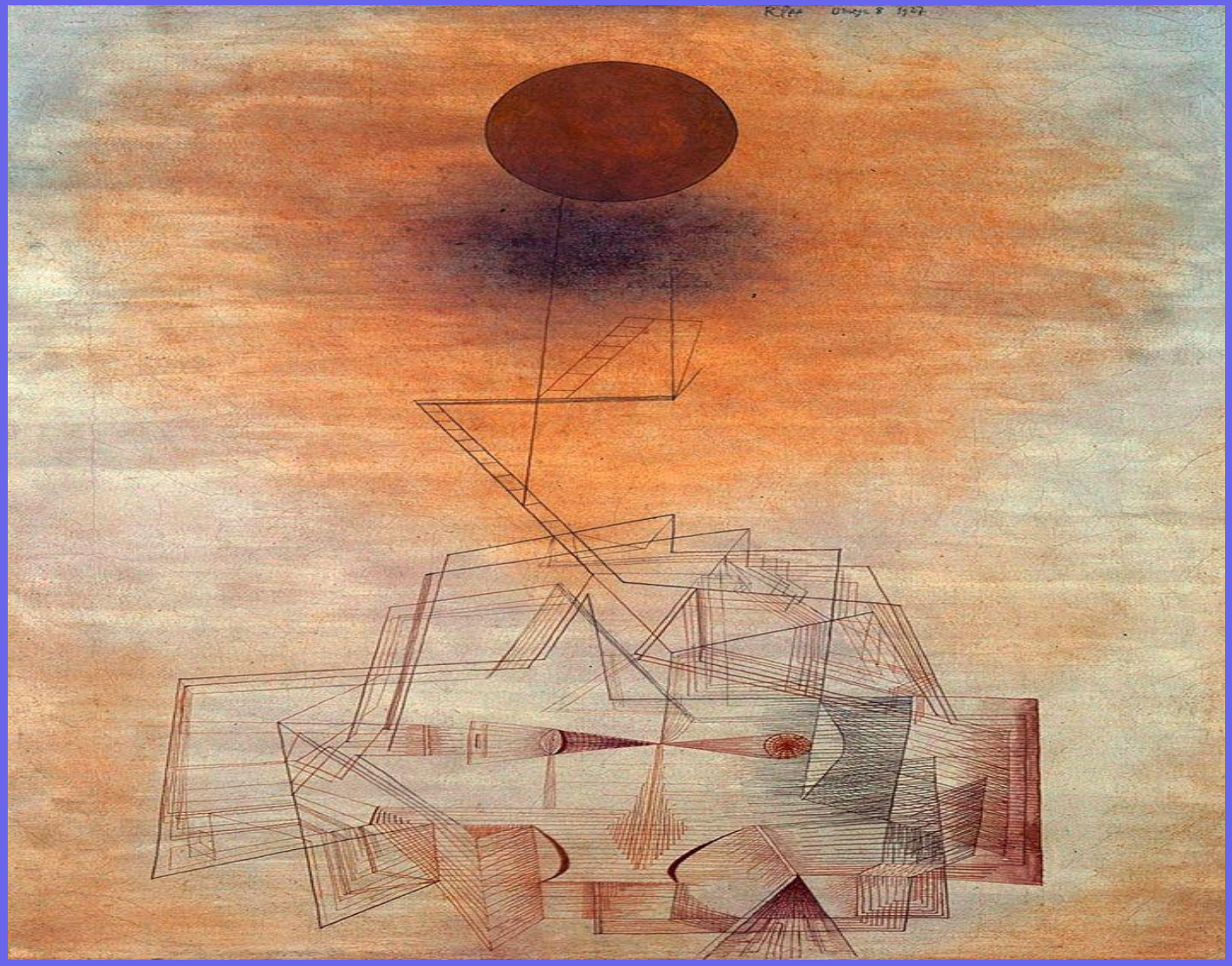
--Sigmund Freud

"The act of will activates neural circuits"

--William James

But……

Limits of Understanding (Klee)

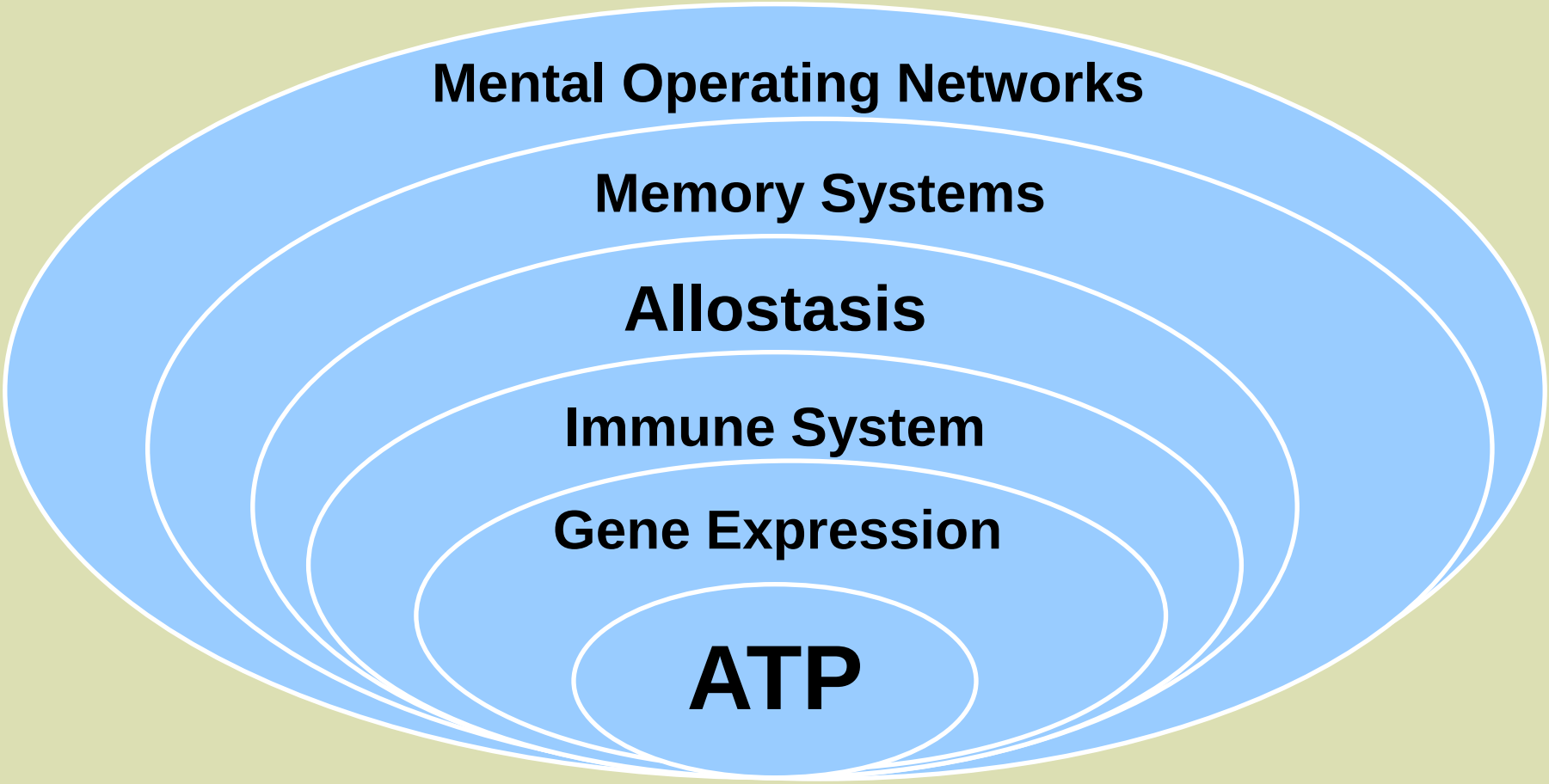


The Science has Changed

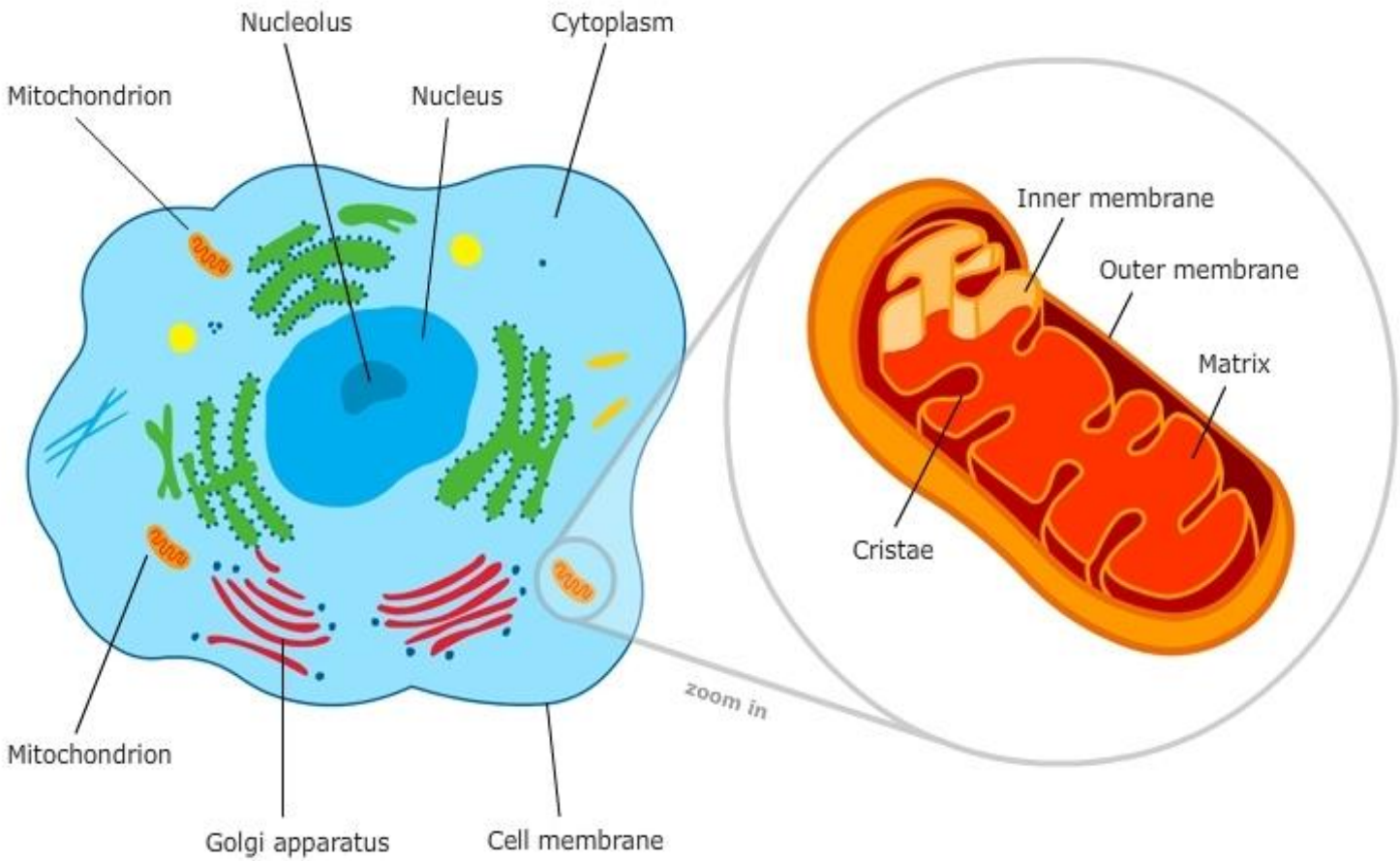
“Mental functions direct electrochemical traffic at the cellular level” Roger Sperry

“Psychotherapy works by producing changes in gene expression that alter the strength of synaptic connections…” Eric Kandel

“Self”-Organization



Cells and Their Energy Factories



Numbers of Mitochondria

- On average each of our cells host 500 mitos.
  - Roughly 10 percent of our total body weight.
- Energy needs: our heart and brain cells contain the greatest number of number of mitos.
  - There are approximately 10 million billion mitos in an adult human brain.

The Energy Generating Metaphor

Mitochondria, just like a dam, uses pressure in each step so that energy is released from electrons within the pump.

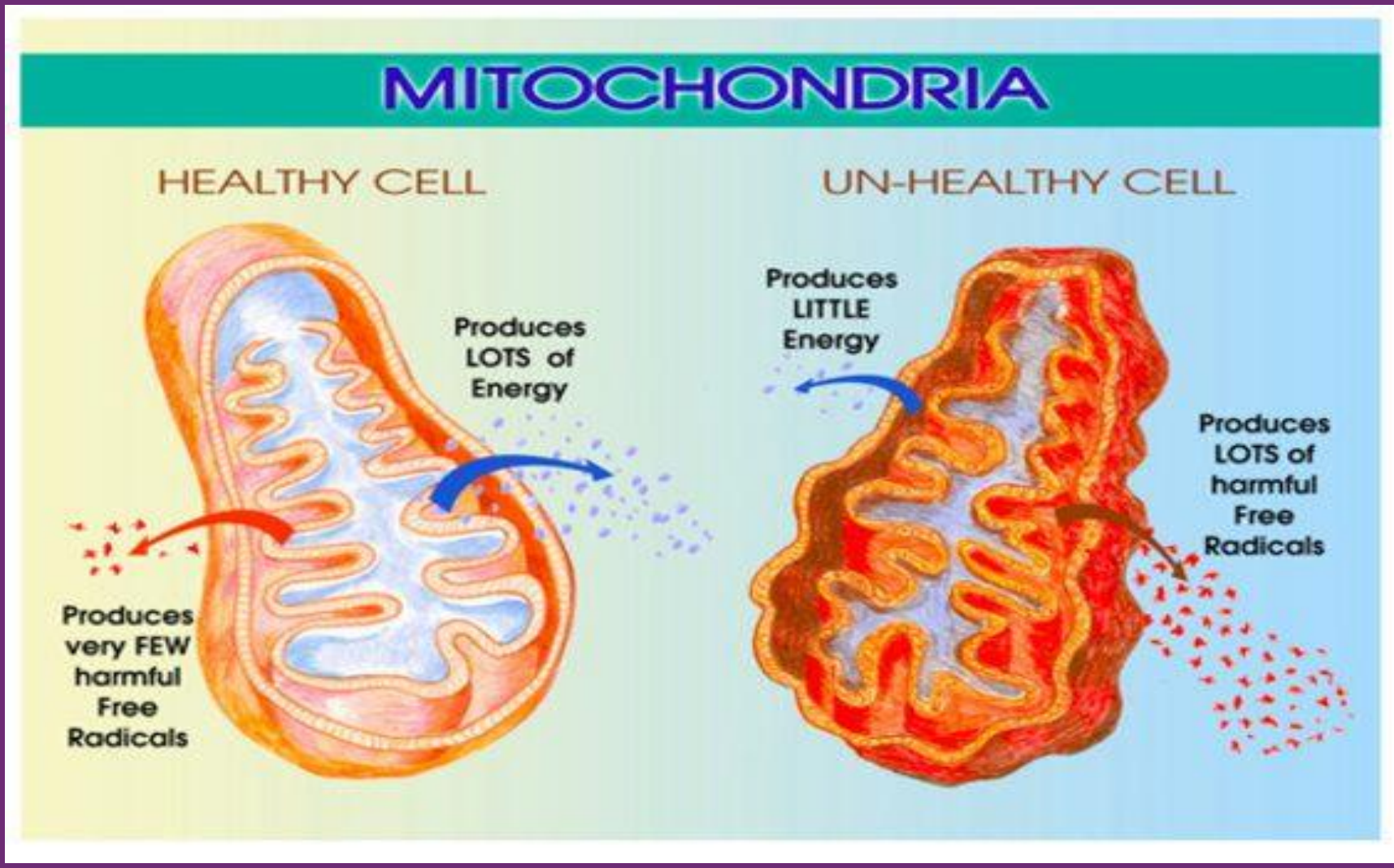
The biochemical reactions culminate with the final product, the synthesis of ***adenosine triphosphate*** *(ATP).*

Client Education

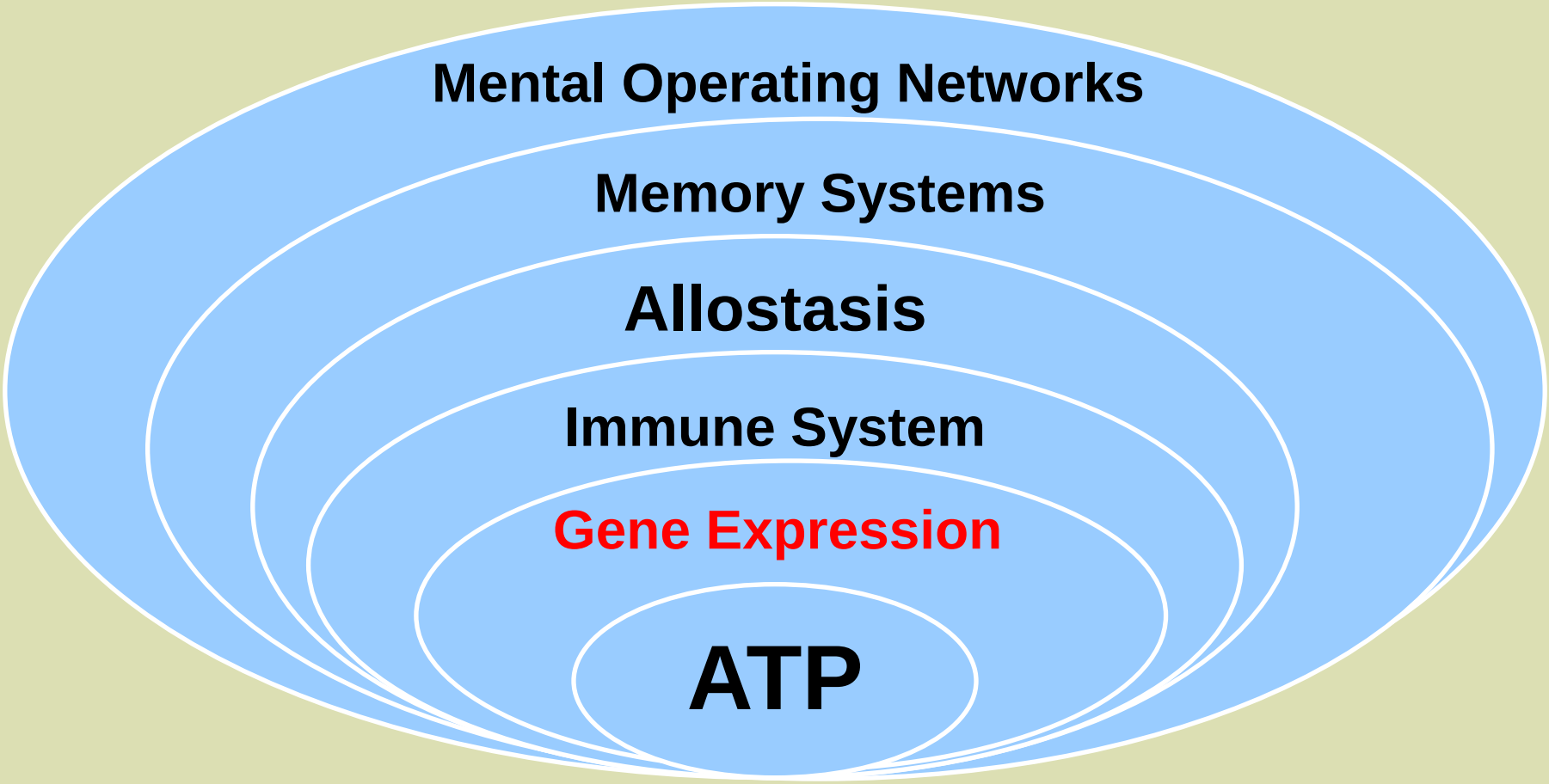
Because your energy generators are mighty: Call them ***Mitos***

They produce your principal energy: ATP for: ***All That Power***

Free Radical Damage

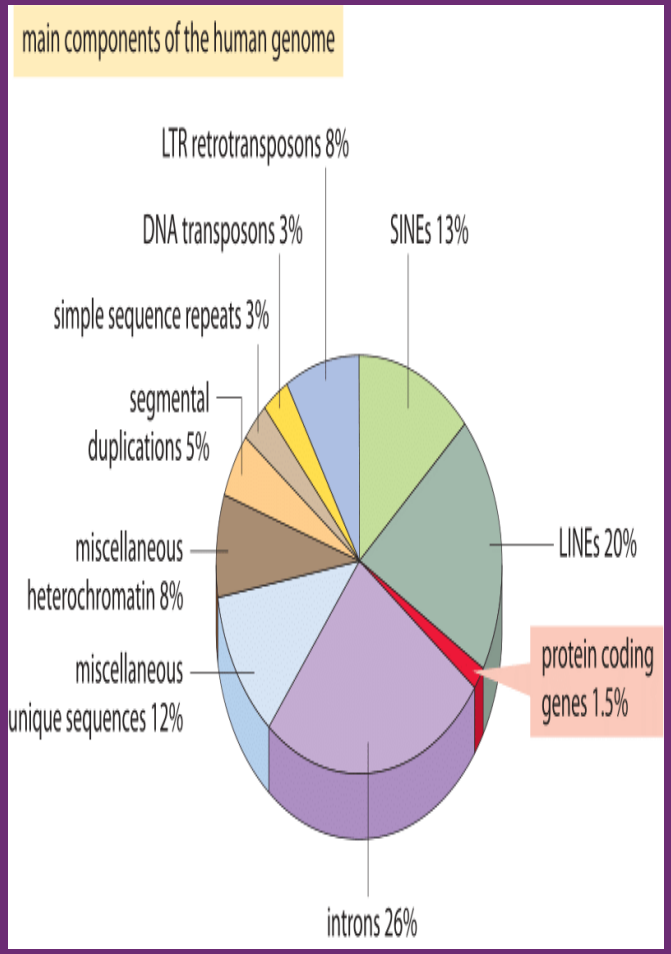


“Self”-Organization



Epigenetics

- 24,00 genes (that code for protein)
  - Worm and human
- 2% (the rest—”junk DNA”)
- As the complexity of the species increases so does the amount of “junk DNA”



Epigentics and parenting

- Good parenting produces kids with less methylation of the cortisol receptor gene
- The kids have a better thermostat for cortisol and can turn of the stress response system more easily

Cortisol level

Client Education

Genes are expressed or suppressed by the quality of our social support

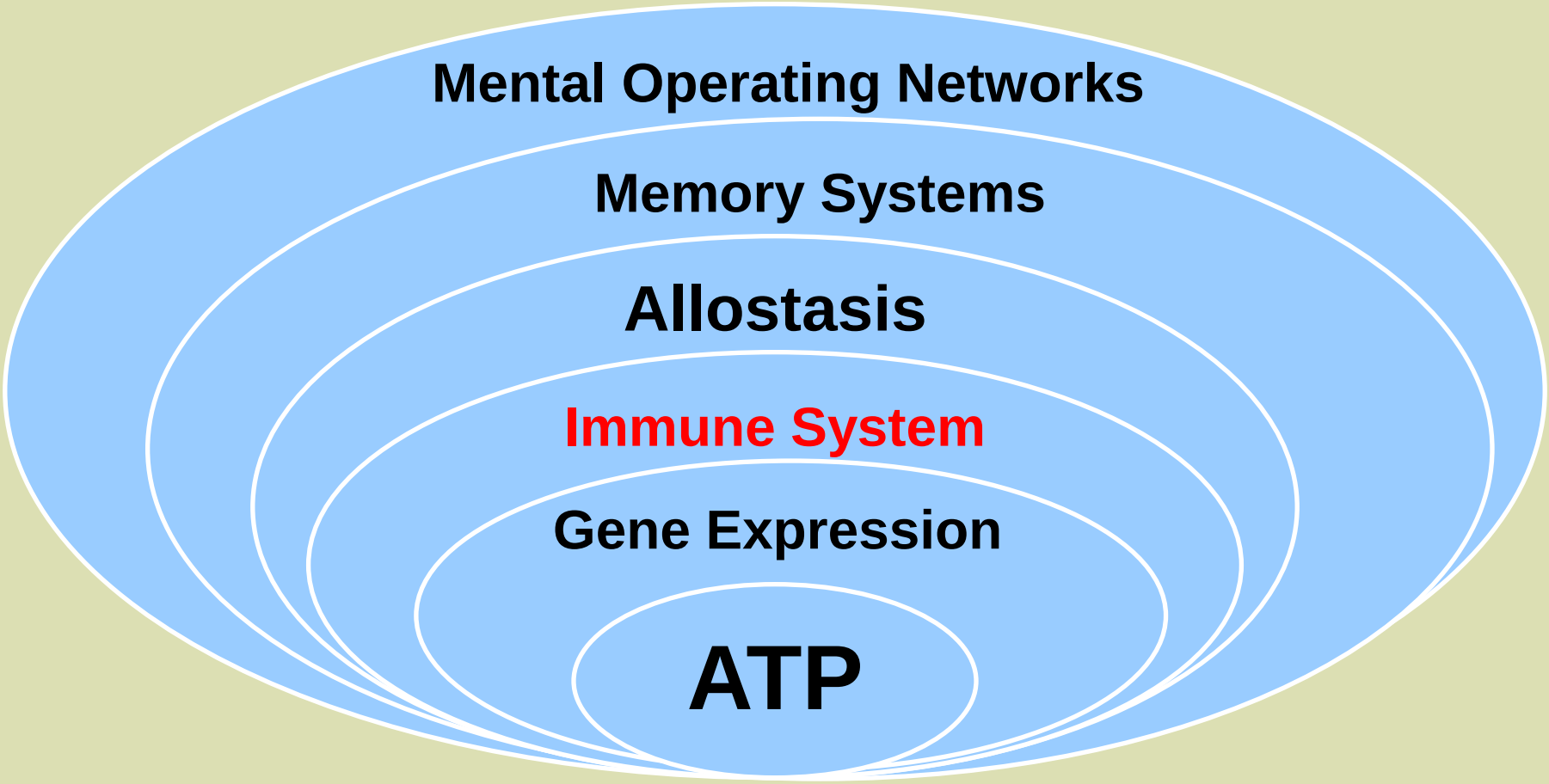
Factors that Shorten Telemeres

- Aging
- Cardiovascular disease
- Smoking
- Obesity (more than smoking!)
- Type 2 Diabetes
- Social isolation
- Poor diet
- No exercise
- Poor sleep
- Alcohol and other drugs
  - **All rendering DNA vulnerable to damage**

Client Education

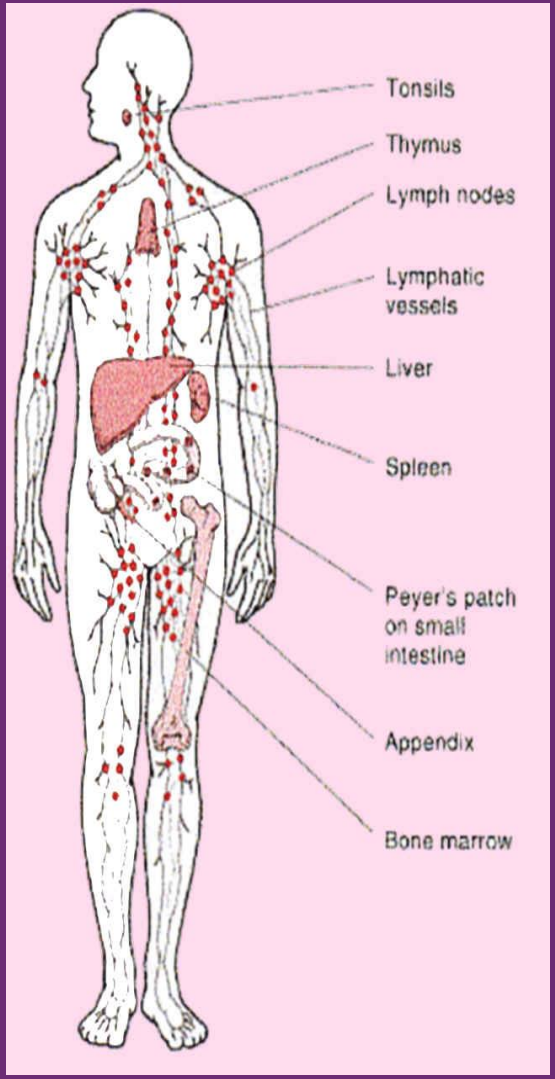
- ***You must protect your genes from harm***
- ***Your lifestyle behaviors are indispensable:***
  - ***SEEDS***

“Self”-Organization



Components of the Immune System

- Lymph vessels and lymph nodes — filtering system for the lymph. WBCs lie in wait for foreign substance to destroy
- Bone marrow — origin of WBCs
- Thymus — where T cells differentiate into functioning cells from precursors
- Spleen — filtering system for the blood
- Other organs — gastrointestinal tract has Peyer's patches with high density of WBCs, respiratory tract has tonsils, skin, etc.



Client Education

- ***You have an immune system in your brain***

- ***If you have inflammation anywhere in your body, chances are that you will in your brain too***

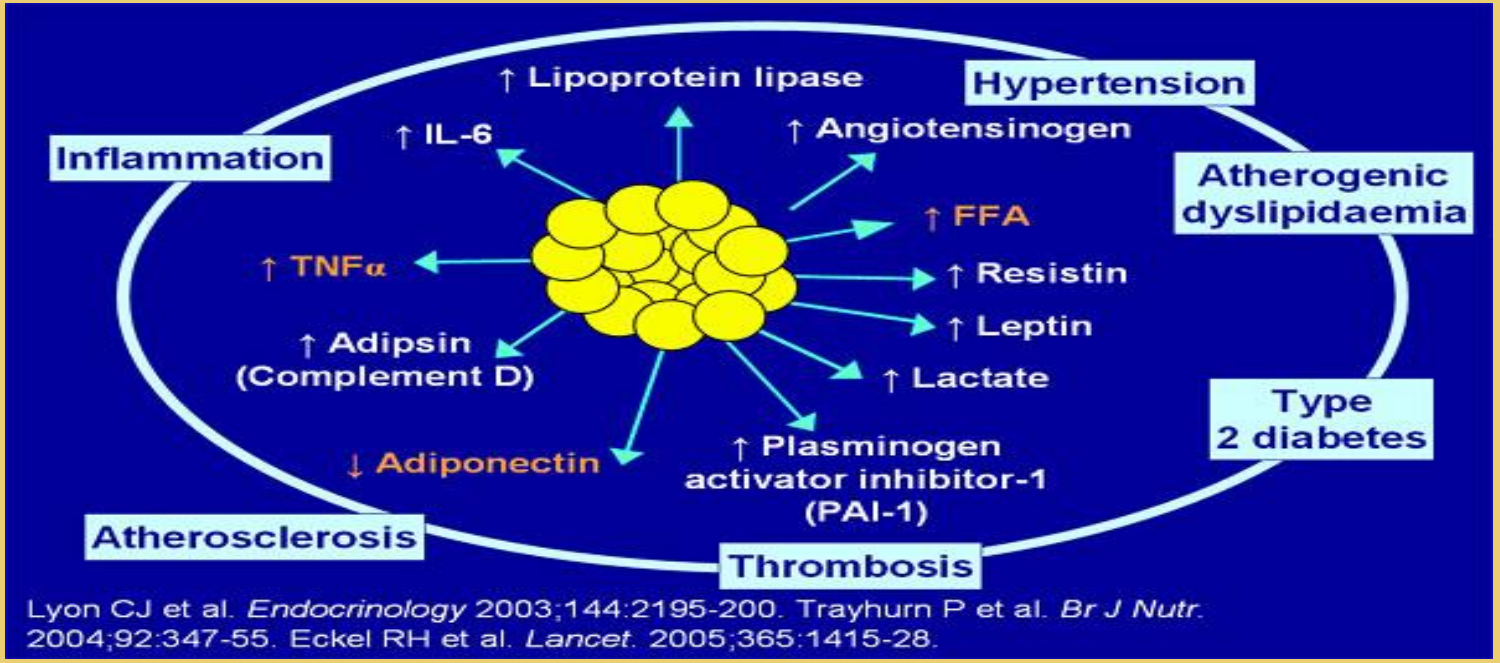
➢PICs cause a depression-like Sickness Behavior

- Stress can increase PICs levels
- High PICs can lower the concentration of serotonin and DA
  - –Cognitive dysfunction, anxiety, fearfulness, depression, thoughts about suicide
- "Sickness behavior"---fatigue, social withdrawal, and immobility--depression (Hickie and Lloyd 1995).

Obesity, Inflammation, and Diabetes

- Fat cells secrete IL-6
- IL-6 can induce insulin resistance

Higher IL-6 may predict diabetes type 2



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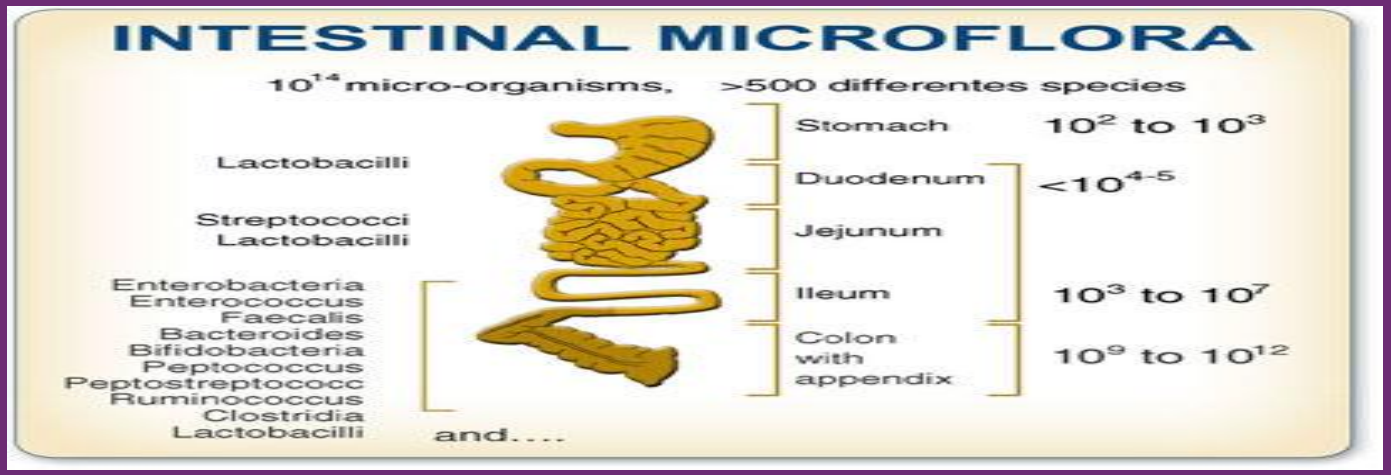
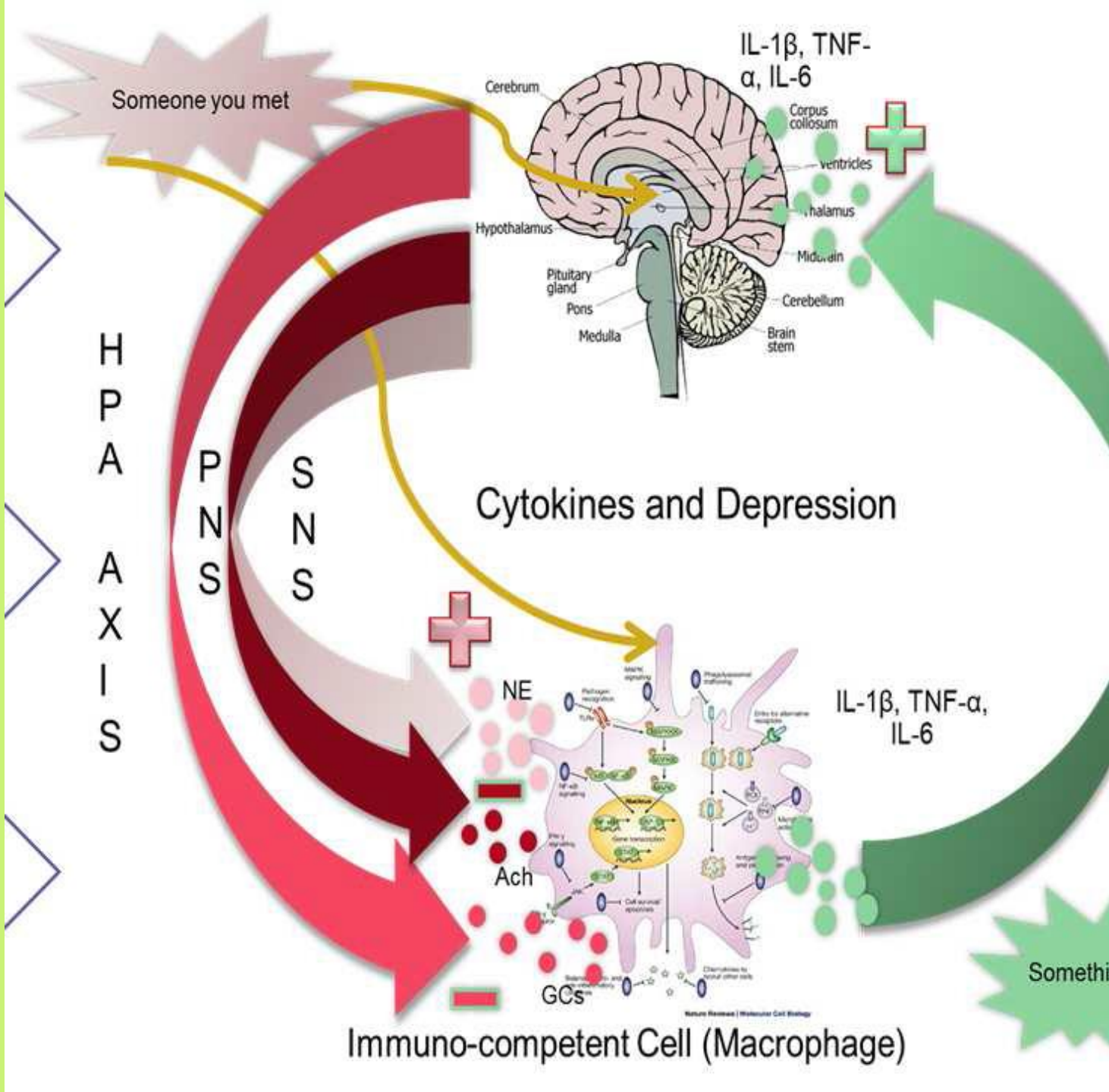
Microbiome



- **The GOOD: helps digest certain foods the stomach/small intestine doesn't, can combat invading microorganisms. Microbes generally do not cause disease unless they grow abnormally; they exist in harmony with us.**
- **The BAD: may have a role in auto-immune diseases (e.g., diabetes, rheumatoid arthritis, multiple sclerosis, fibromyalgia) and possibly some cancers. A poor mix of microbes in the gut may also aggravate obesity.**

- Bad Diet
  - Simple carbs
  - Transfatty acids
  - Saturated fats
  - Food allergies
  - Bad oils
  - High dairy
  - High gluten
- No exercise
- Chronic illnesses
- Autoimmune disorders
- Chronic pain
- Chronic stress
- Being overweight
  - Apple shape
- Leaky gut



Affect Asymmetry

Set points

Left Hemisphere

Positive emotions
Approach behaviors
Feeling engaged

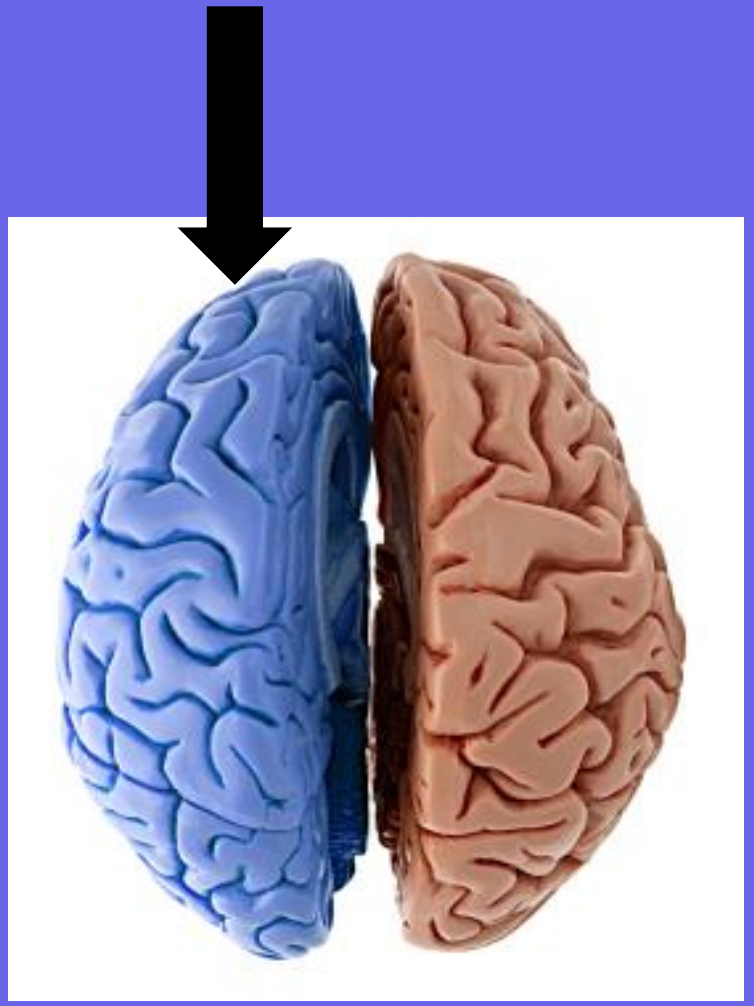
Right Hemisphere

Negative emotions
Withdrawal and Avoidance
Feeling overwhelmed

Left PFC:

Suppressing Sadness

Activating Positive Emotions



Client Education

- When you are overwhelmed with anxiety or depression it is best to shift from the big picture to the small, and do something that approaches a goal in a piecemeal and incremental manner.

Left PFC more DA:

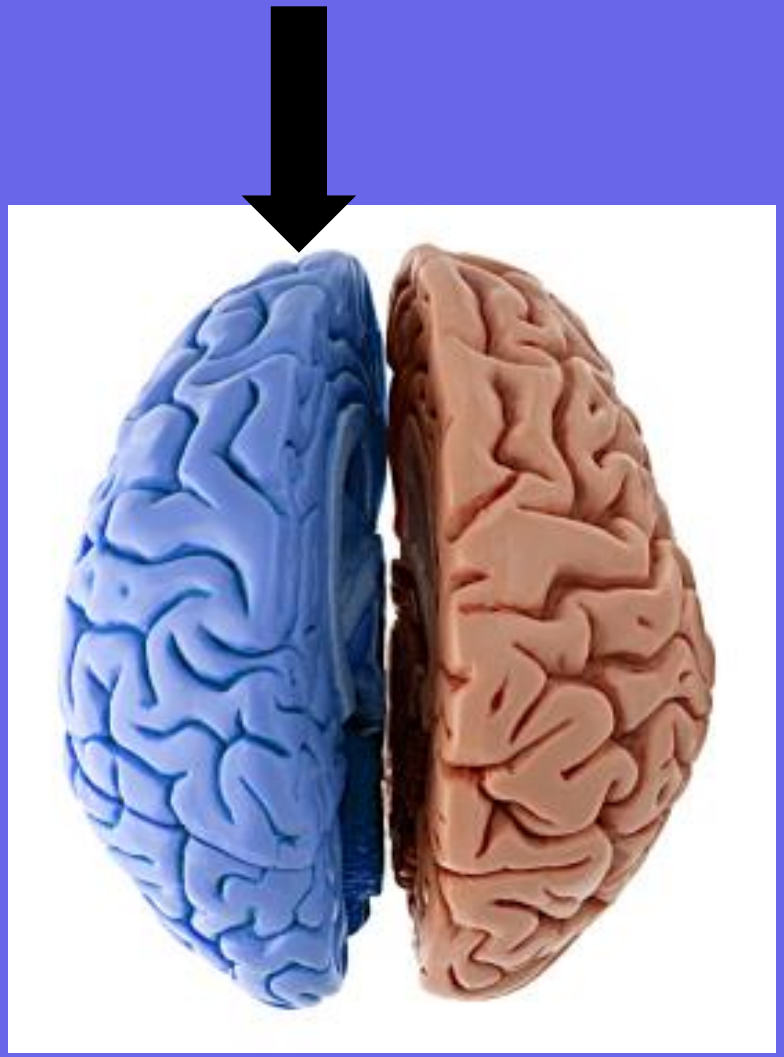
Activation

&

Approach

Behaviors

(curiosity; assertion)



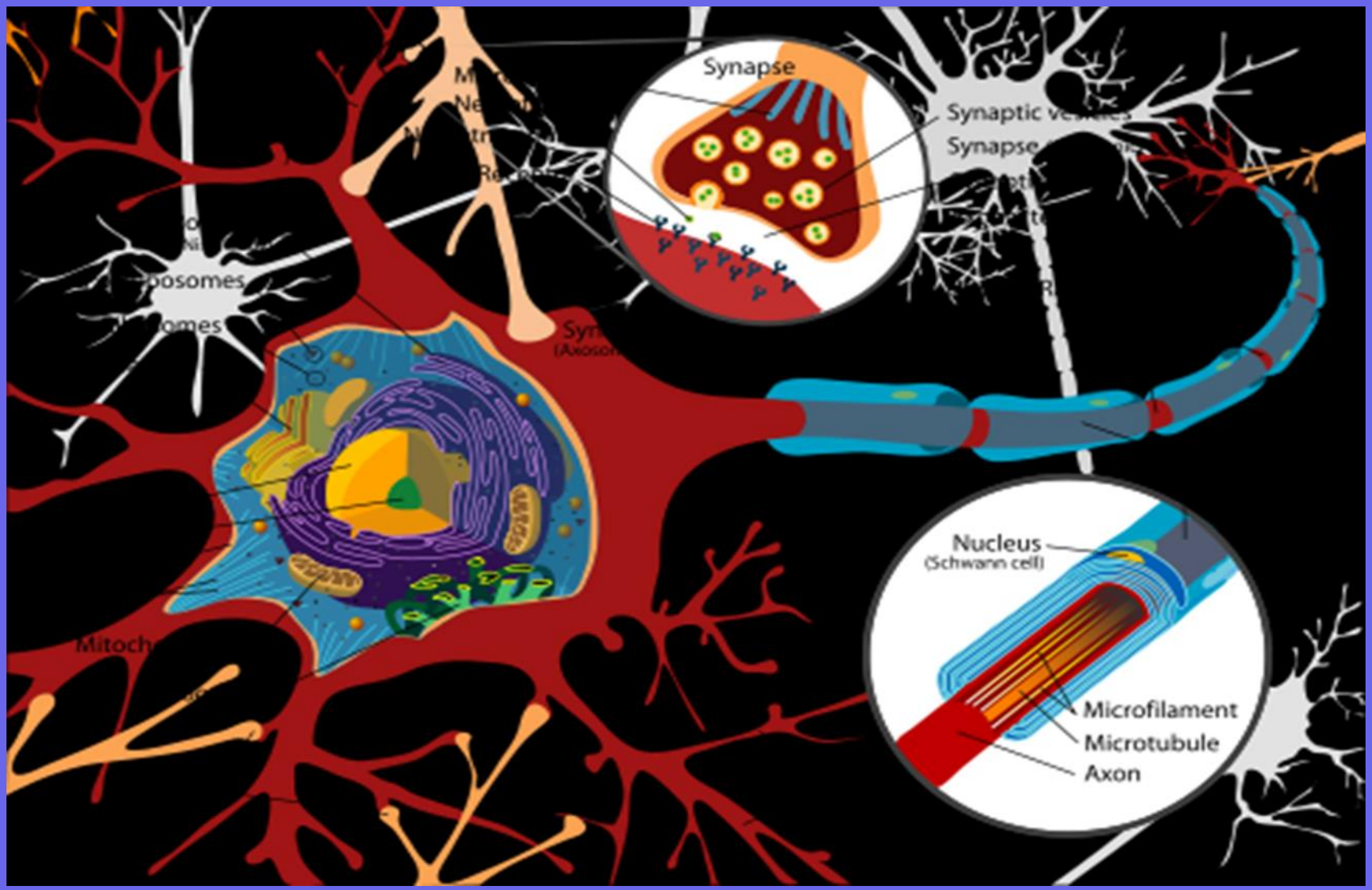
Right PFC more NE:

Activating
Behavioral
Inhibition

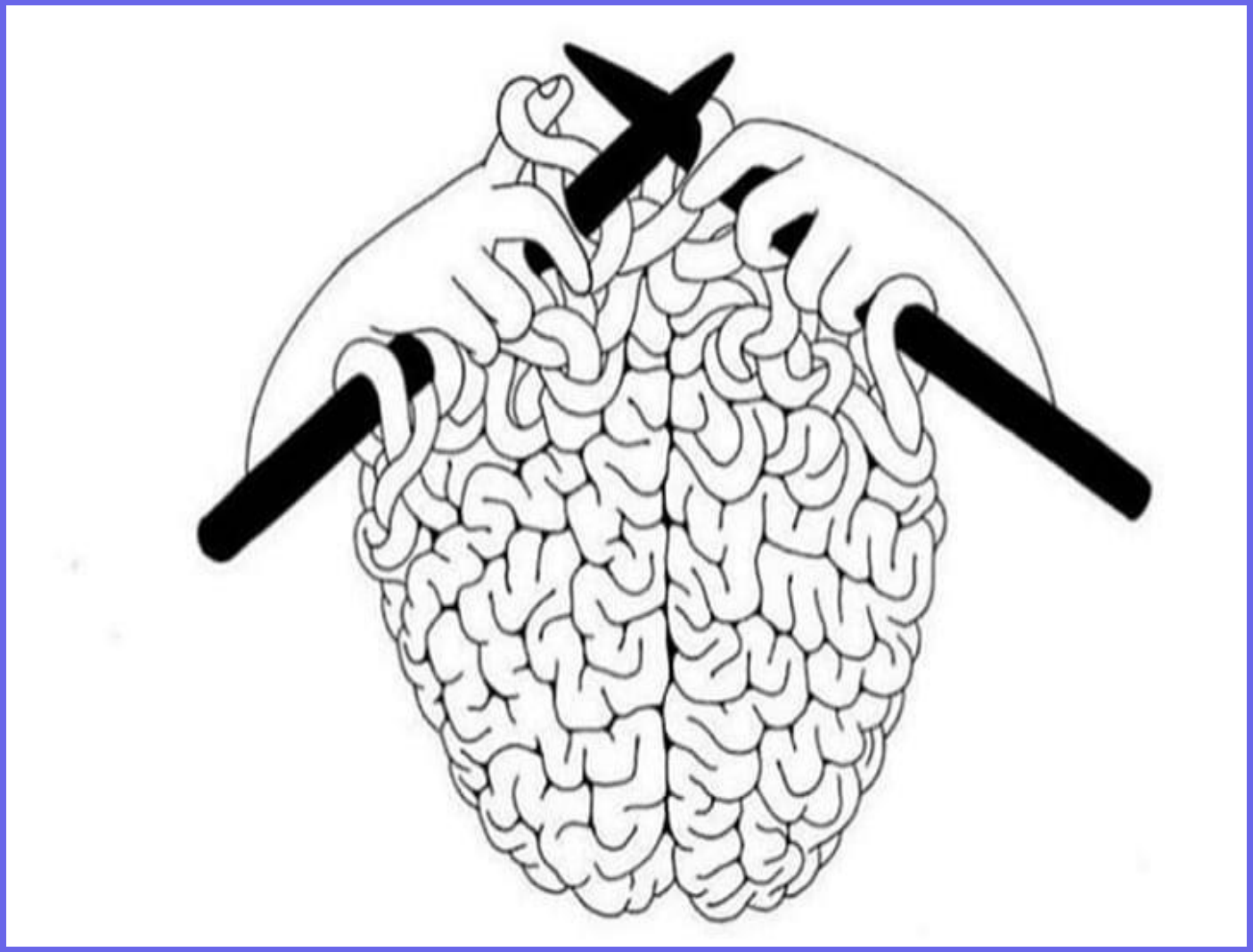
Associated
With negative
Emotions

87 Billion Neurons

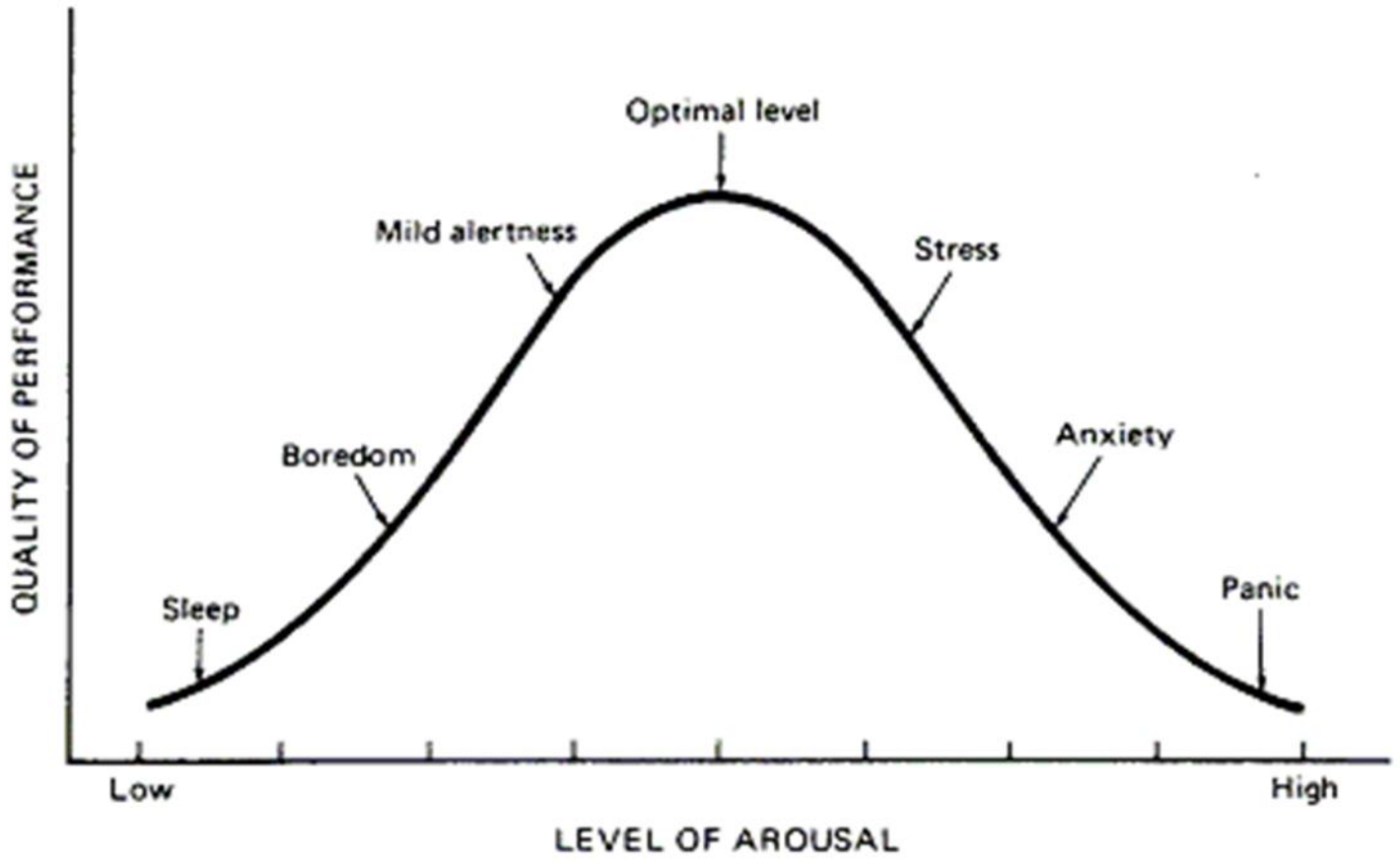
Each with 10,000 synaptic connections



Mind/Brain Causality



Yerkes Dodson arousal curve



Client Education

You have to do what you don’t feel like doing so that eventually you will feel like doing it.

Factors that Increase Neurogenesis

Exercise

- play induces BDNF gene expression

Fasting

Fewer calories consumed

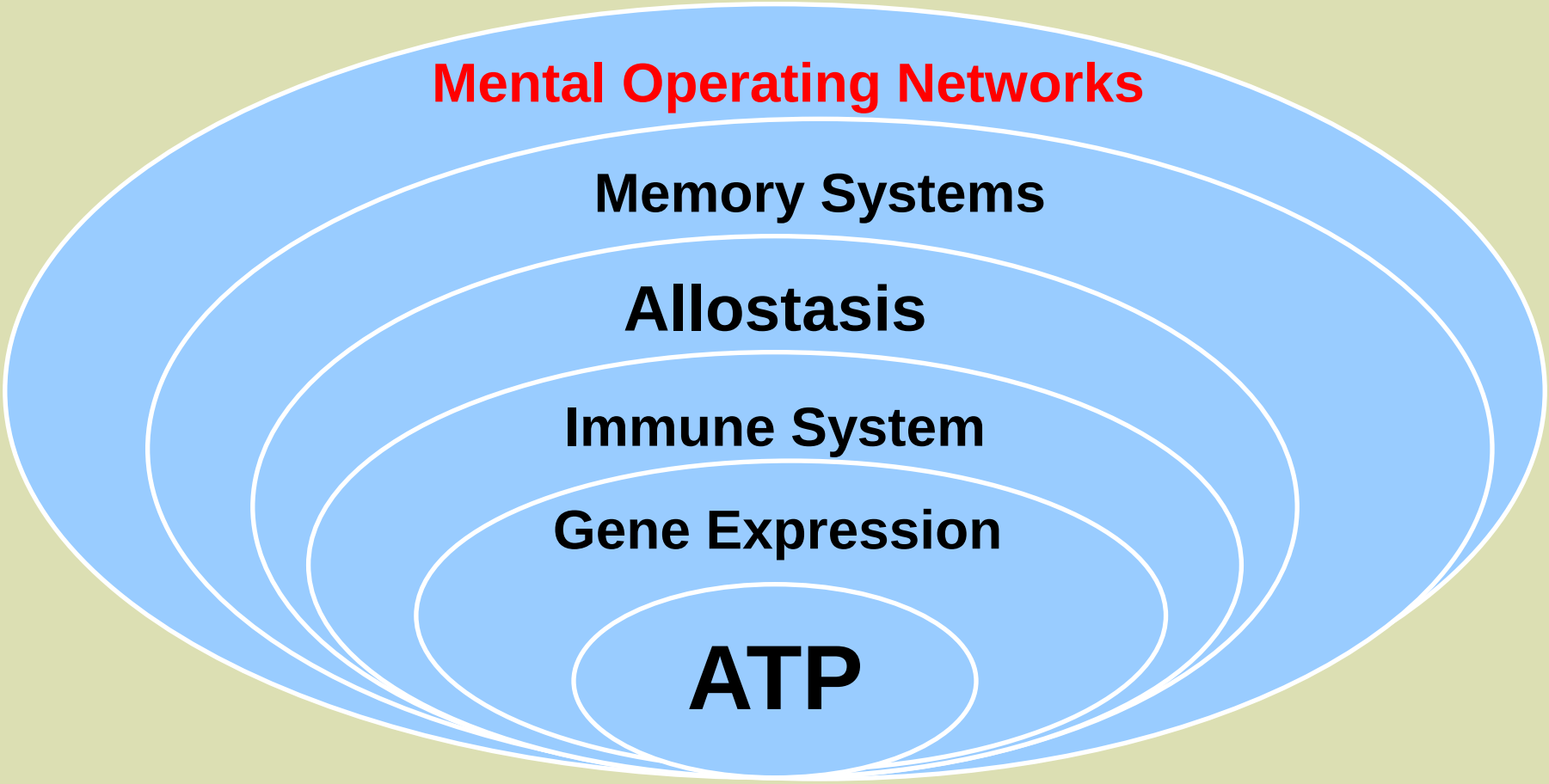
Food content --(Omega—3)

Profound new experience

Client Education

You can grow new neurons in the area of your brain that gives you the capacity for memory. The first steps include maintaining a healthy diet, aerobic and cognitive exercise.

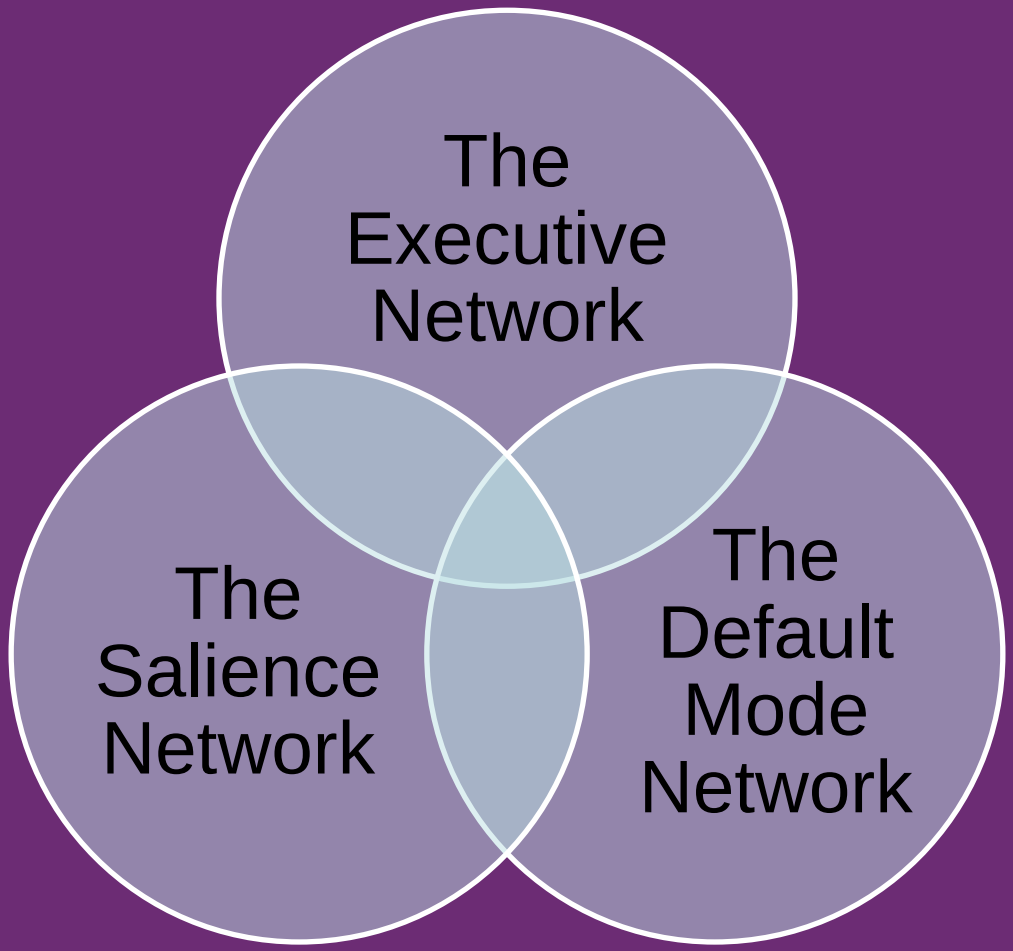
“Self”-Organization



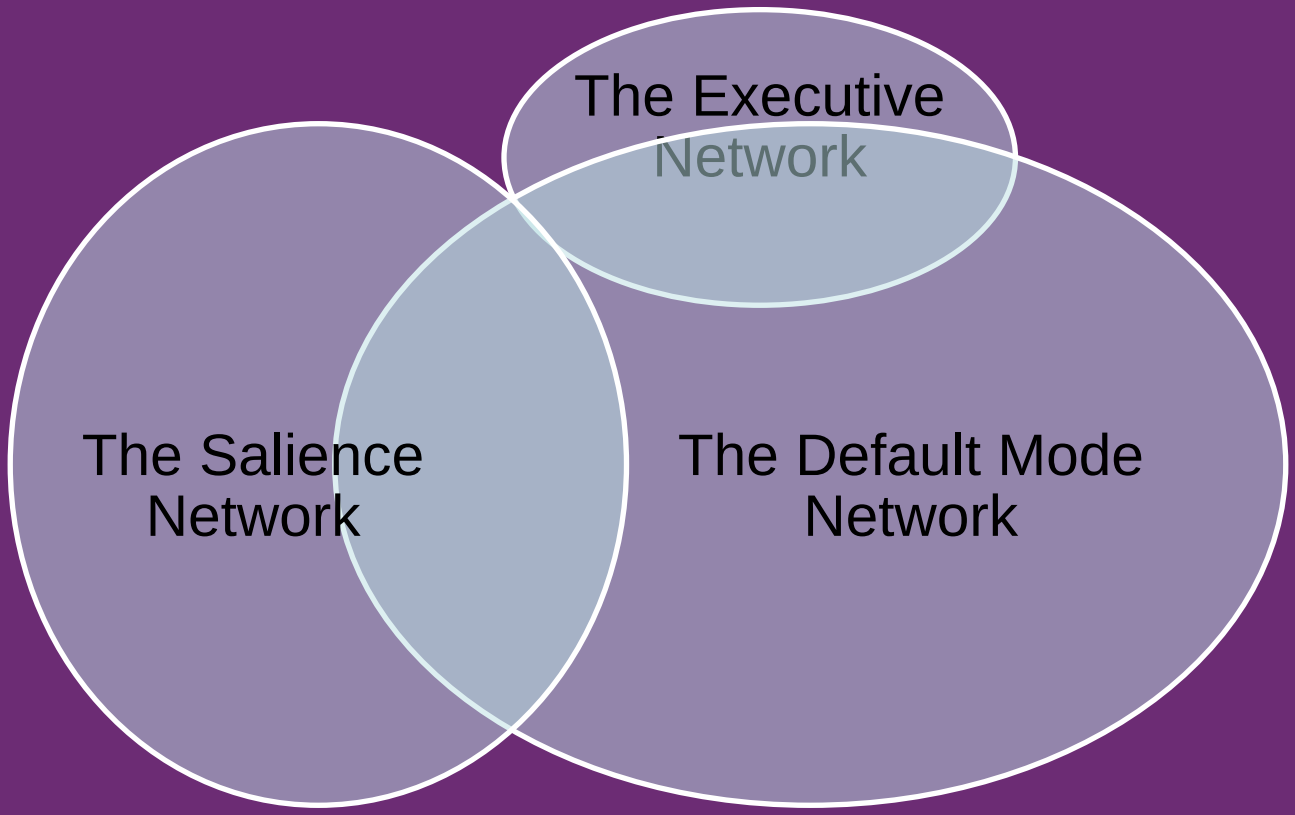
The Mind's Operating Networks:

- **Salience Network:**
- the material "me"
- emotional and reward saliency;
- **Default Mode Network:**
- mind-wandering; fantasying, ruminating
- mentalizing, projecting to the future or past;
- **Central Executive Network:**
- moment to moment monitoring of experience
- selection, planning, toward goals;

Balancing the Mental Networks



Imbalanced Mental Networks



Salience Network:

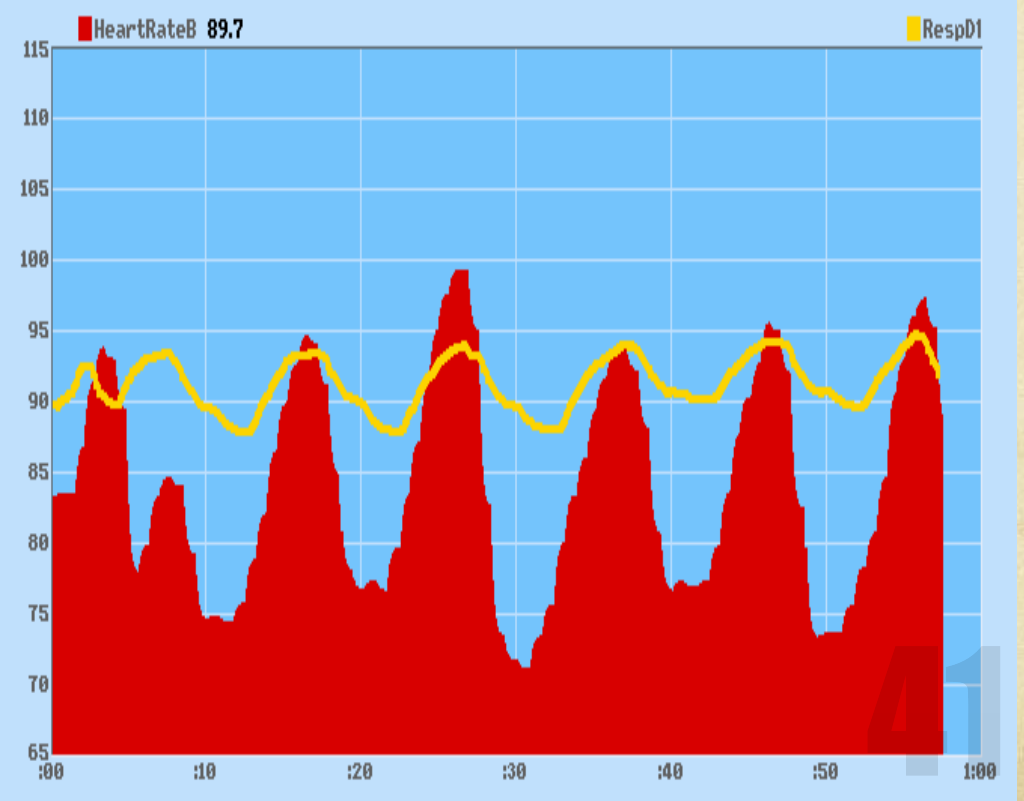
- referred to as the ‘sentient self’ (the material “me”)
- detecting emotional and reward saliency;
- detecting and orienting toward external events in bottom-up fashion;
- bilateral anterior insula, dorsal anterior cingulate, amygdala

Variability is good

Peak/valley differences
= vagal tone ***when resp is in normal range***

Heart rate increases with inhale.

Heart rate decreases with exhale. This pattern shows high vagal tone (high PSNS activity) and a high amount of heart rate variability.



Default Mode Network:

- reflecting, spontaneous thoughts or mind-wandering;
- activated during tasks of mentalizing, projecting oneself into the future or past;
- activation when reflecting on social relationships;
- anterior and posterior midline and cingulate cortex

DMN Variations

- Increases when DLPFC is not engaged:
  - Stressed, bored, no novelty, or tired
- Social and self-referential –needed for sense of self
- Malfunctions in the DMN:
  - Schizophrenia—impaired self reflection—not sure where thoughts come from
  - Depression—negative ruminations

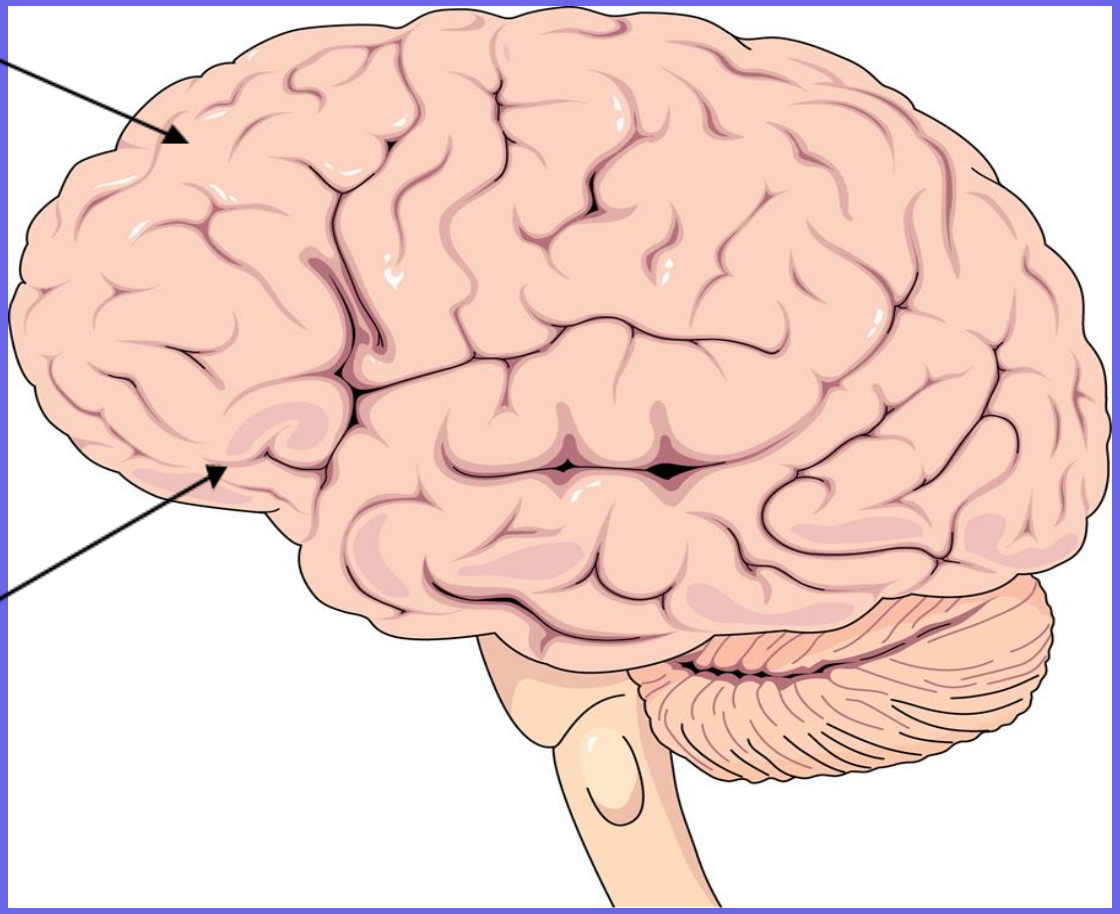
Central Executive Network:

- moment to moment monitoring of experience (meta-cognition)
- responsible for selection, planning, and decision-making toward goals;
- working memory that helps select, orient, and maintain an object in the mind;
- bilateral dorsolateral prefrontal cortex

DLPFC and the OFC

Dorsolateral Prefrontal Cortex

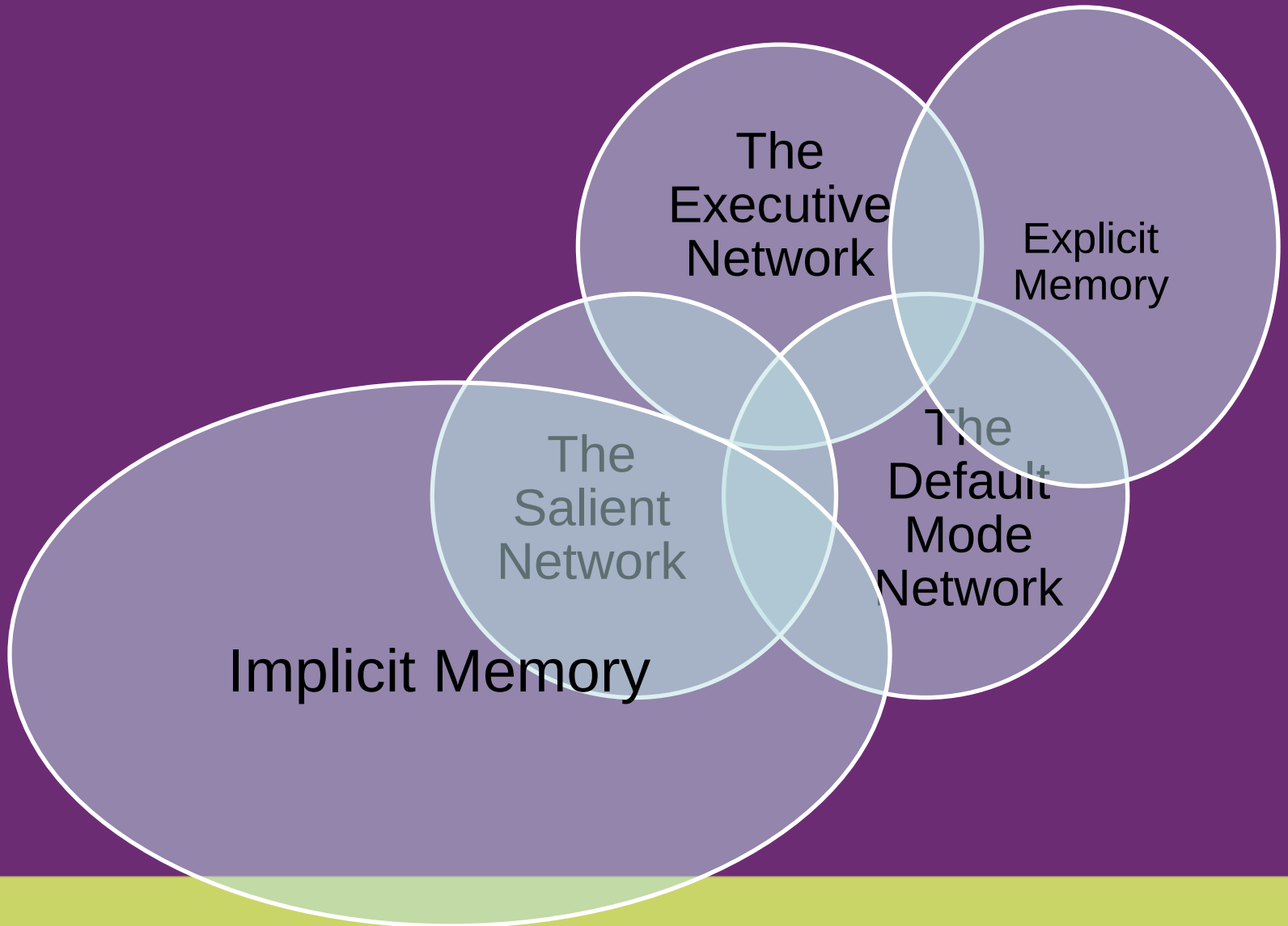
Orbital Prefrontal Cortex



Pre-Frontal Cortex

- Dorsolateral pre-frontal cortex (DLPFC)---working memory: 7, plus or minus 2, …….or 20-30 seconds of information
- Orbital frontal cortex (OFC)
  - Social brain
  - Affect regulator
  - Empathy
  - Attachment, warmth, and love
  - Connections with limbic area, i.e., amygdala
  - Phineas Gage

The Mental Neworks & the Long-Term Memory Systems



The Effects of Social Medicine

- ↓ Cardiovascular reactivity (Lepore, et al, 1993)
- ↓ Blood pressure (Spitzer, et al, 1992)
- ↓ Cortisol levels (Kiecolt-Glaser, et al, 1984)
- ↓ Serum cholesterol (Thomes, et al, 1985)
- ↓ Vulnerability to catching a cold (Cohen, et al, 2003)
- Depression (Russell & Cutrona, 1991)
- ↓ Anxiety (Cohen, 2004)
- ↓ Natural killer cells (Kiecolt-Glaser, et al, 1984)
- ↑ Slows cognitive decline (Bassuk, et al 1999)
- Improves sleep (Cohen, 2004)

Vagal Brake (Porges)

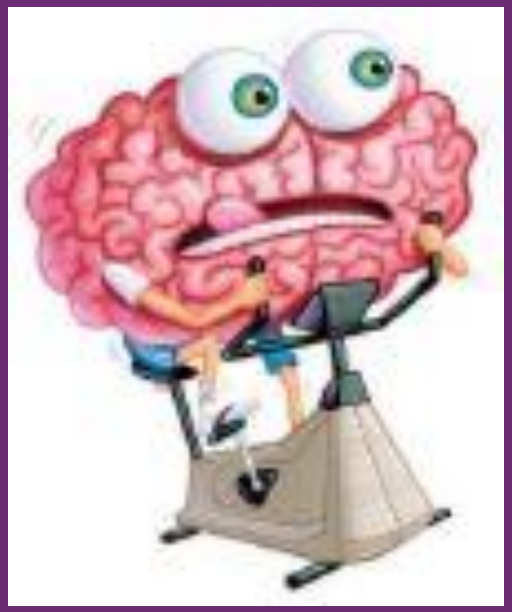
- *Higher vagal tone* correlates with:
  - Self-Soothing capacity
  - Quality of caretaking and attachment
  - More reliable autonomic responses
  - The range and control of emotional states
- *Lower vagal tone* correlates with:
  - -- Anxiety
  - Impulse Control problems
  - Hyperactivity, Attention deficit and distractibility
  - Avoidant & Disorganized Attachment
  - Irritability

Self-Regulation Factors

- **Social**
- **Exercise**
- **Education**
- **Diet**
- **Sleep**

Exercise Optimizes

- Mood
  - –↑ neurotransmitters
    - »Serotonin
    - »Dopamine
    - »norepinephrine
  - –physical health

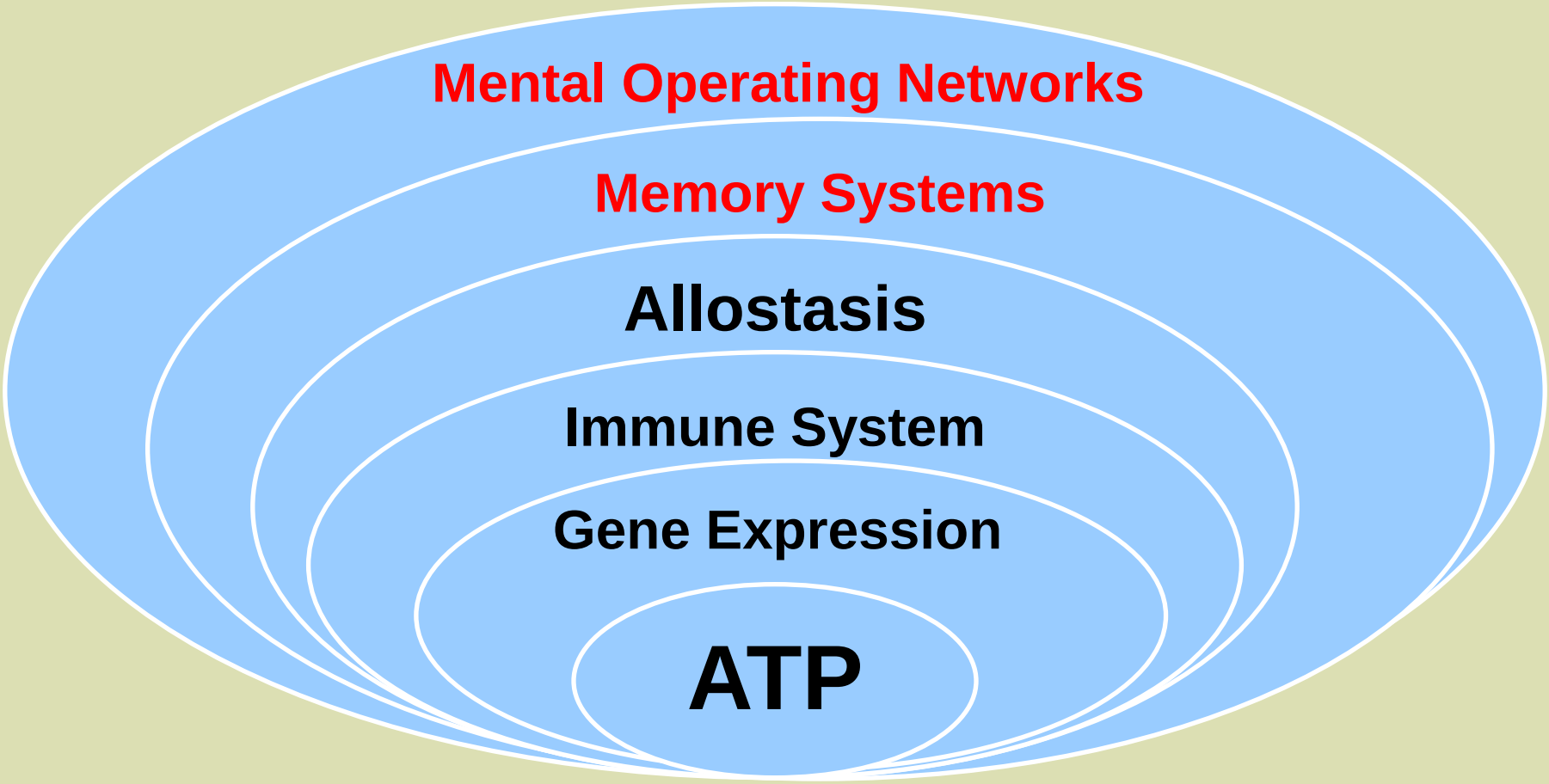


Exercise Optimizes

- Cognition
  - alertness
  - attention
  - motivation
  - cognitive flexibility

SEEDS
Education
Memory Improvement

“Self”-Organization



Two LT Memory Systems

Implicit

Non-declarative

- Procedural
- Emotional
- Generalized
- Classical conditioning

Amygdala and BG-driven

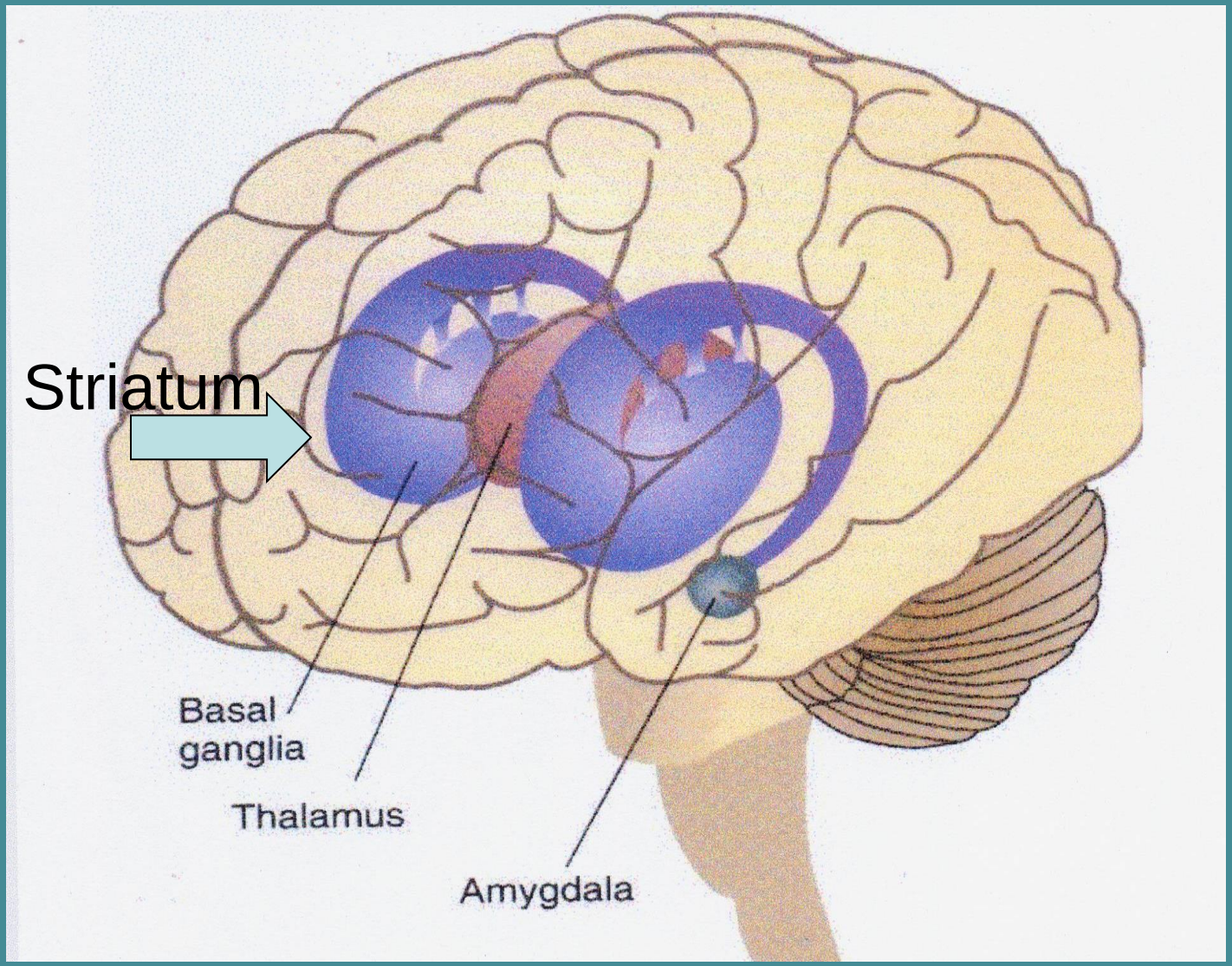
Explicit

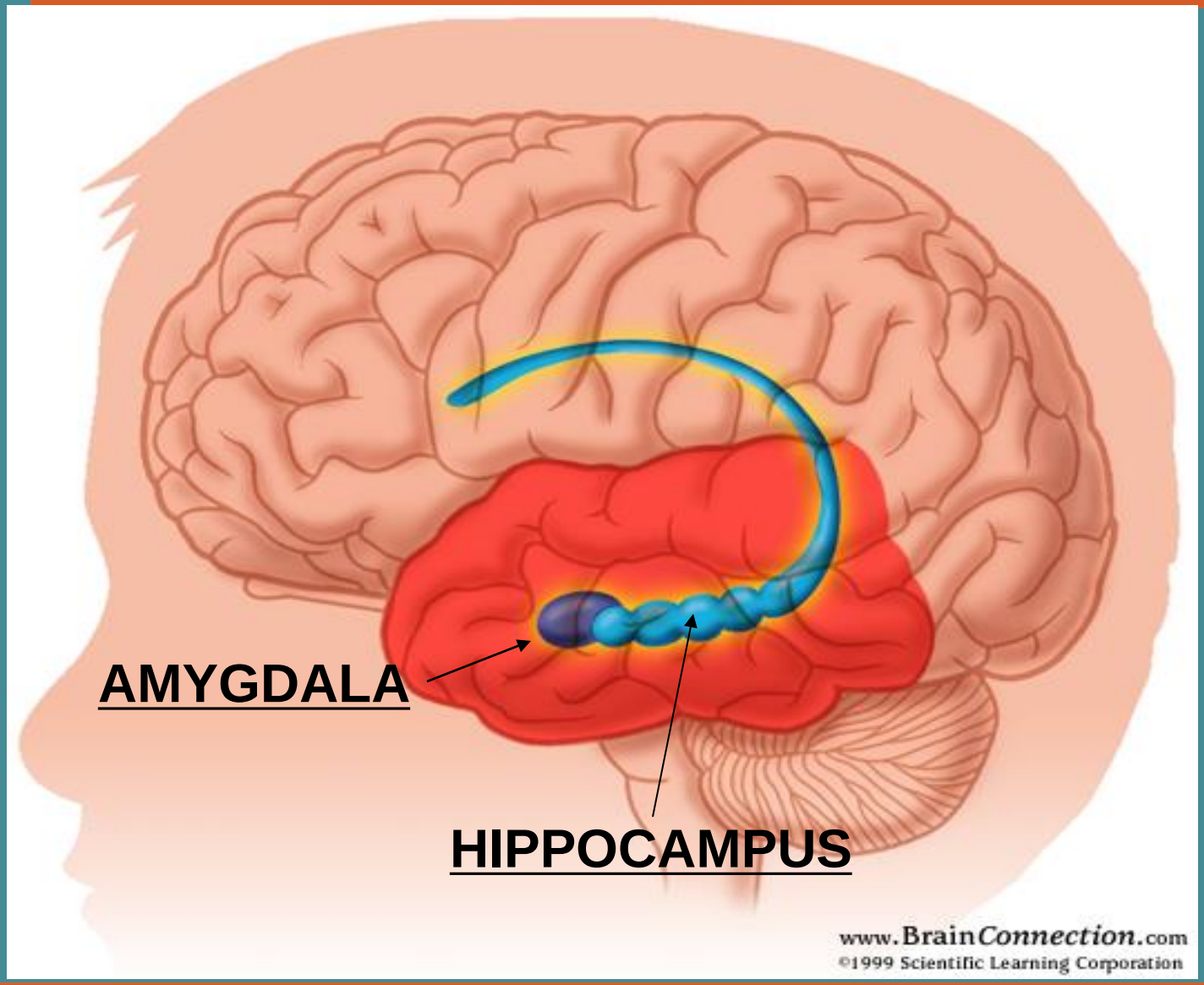
Declarative

- Episodic
- Autobiographical
- Semantic
- Context Specific

Hippocampus-driven

The Habit Circuits




AMYGDALA
HIPPOCAMPUS
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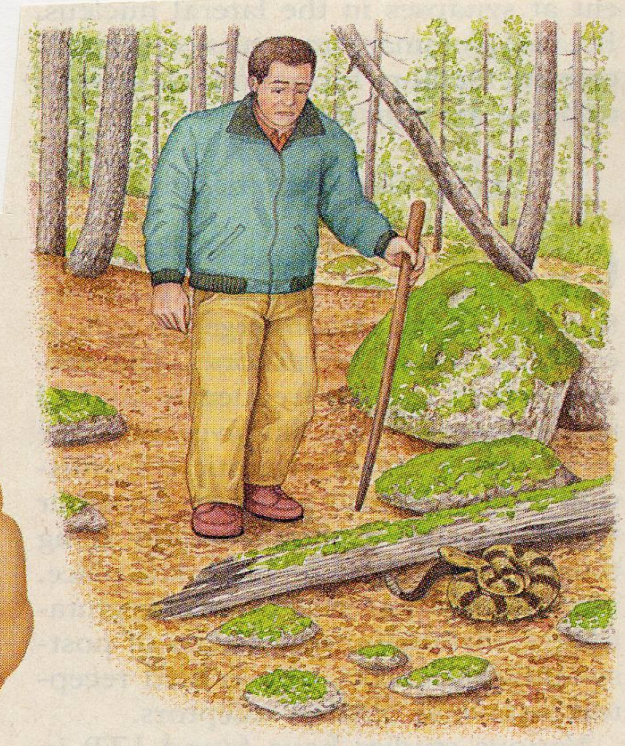
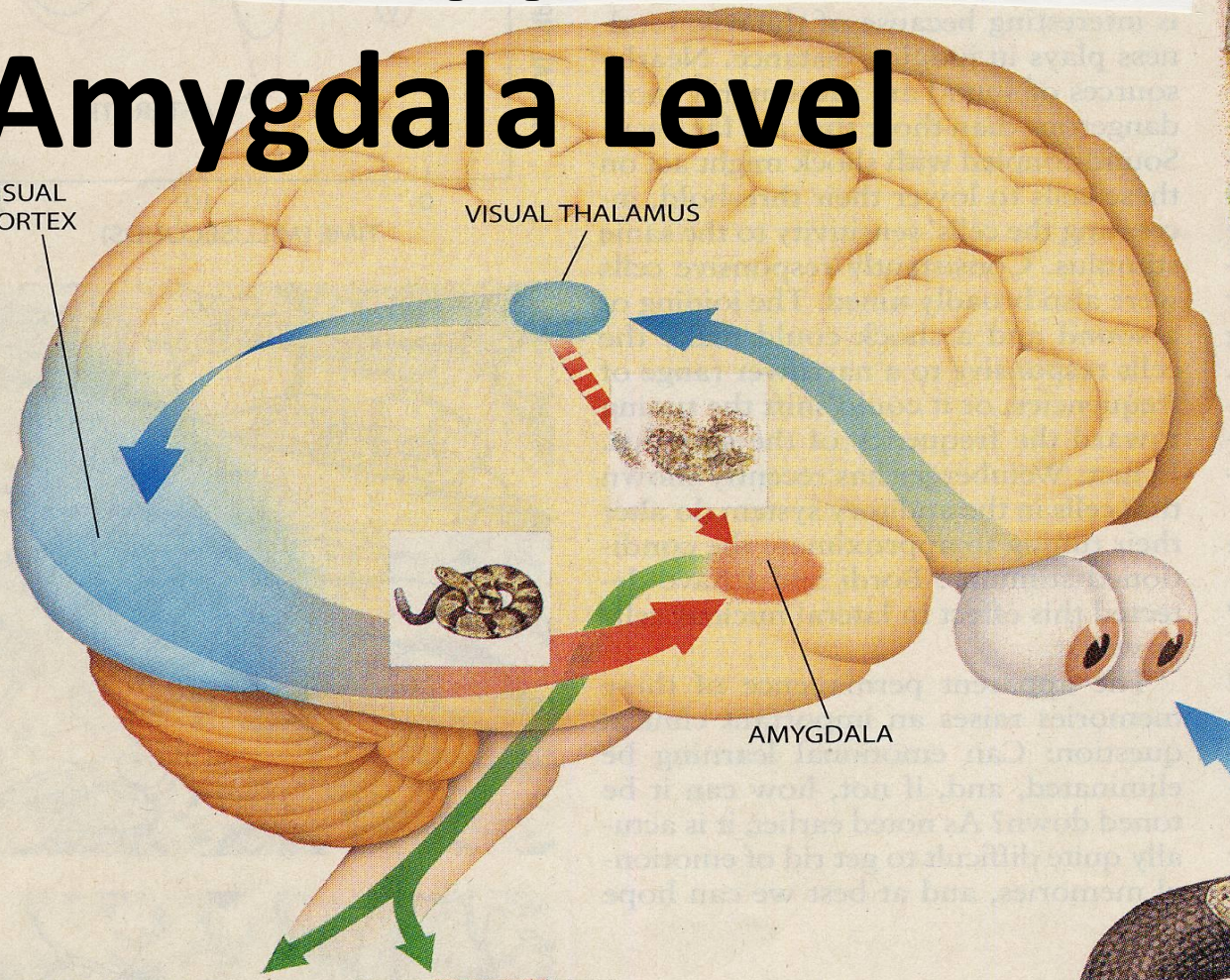
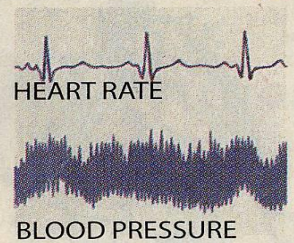
Amygdala and Hippocampus

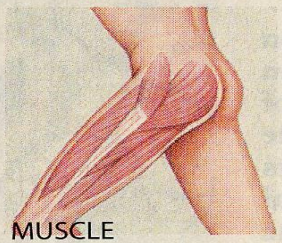
- Amygdala contributes to emotional amplification of explicit memories
- Explicit memories can be state-based (e.g., when we are depressed, we remember depressing events)
- When the amygdala and hippocampus are activated together memories are more robust and durable
  - Make what you want the client to remember emotionally relevant

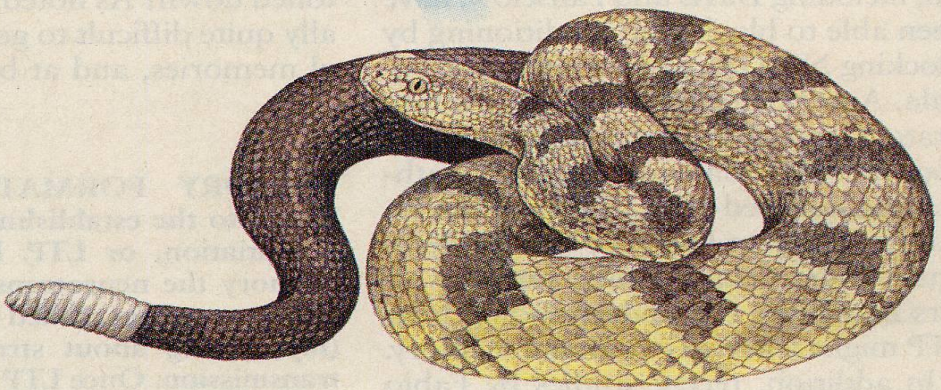
Threat Appraisal: Amygdala Level







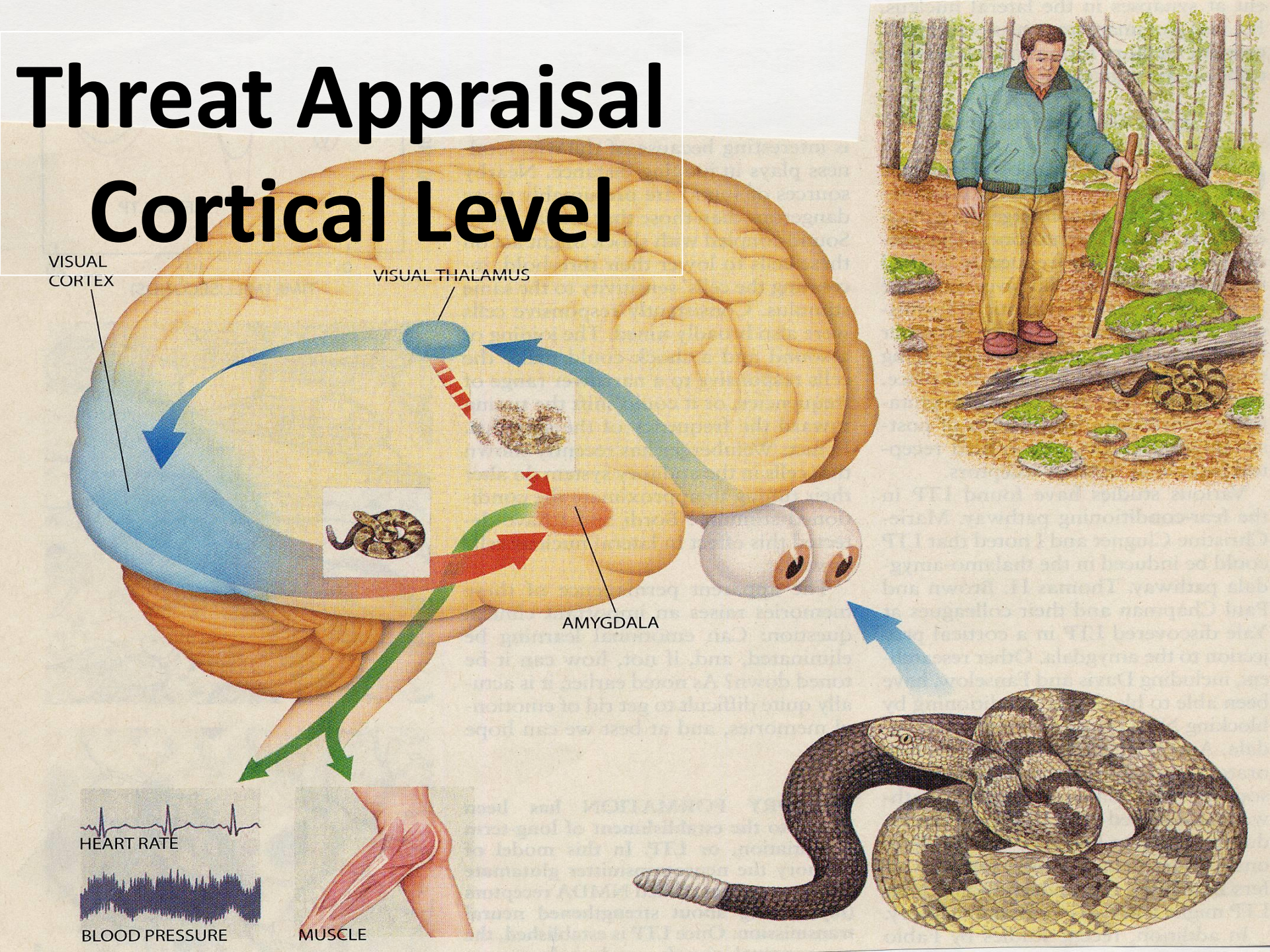




The Fast Circuit to the Amygdala

- Sensory info goes to the Thalamus then directly to the Amygdala:
- Fight or Flight: SNS and HPA activation
- Emotional Learning
- Fear Conditioning
- PTSD, panic, etc.
- Flashbacks
- “Bottom up”

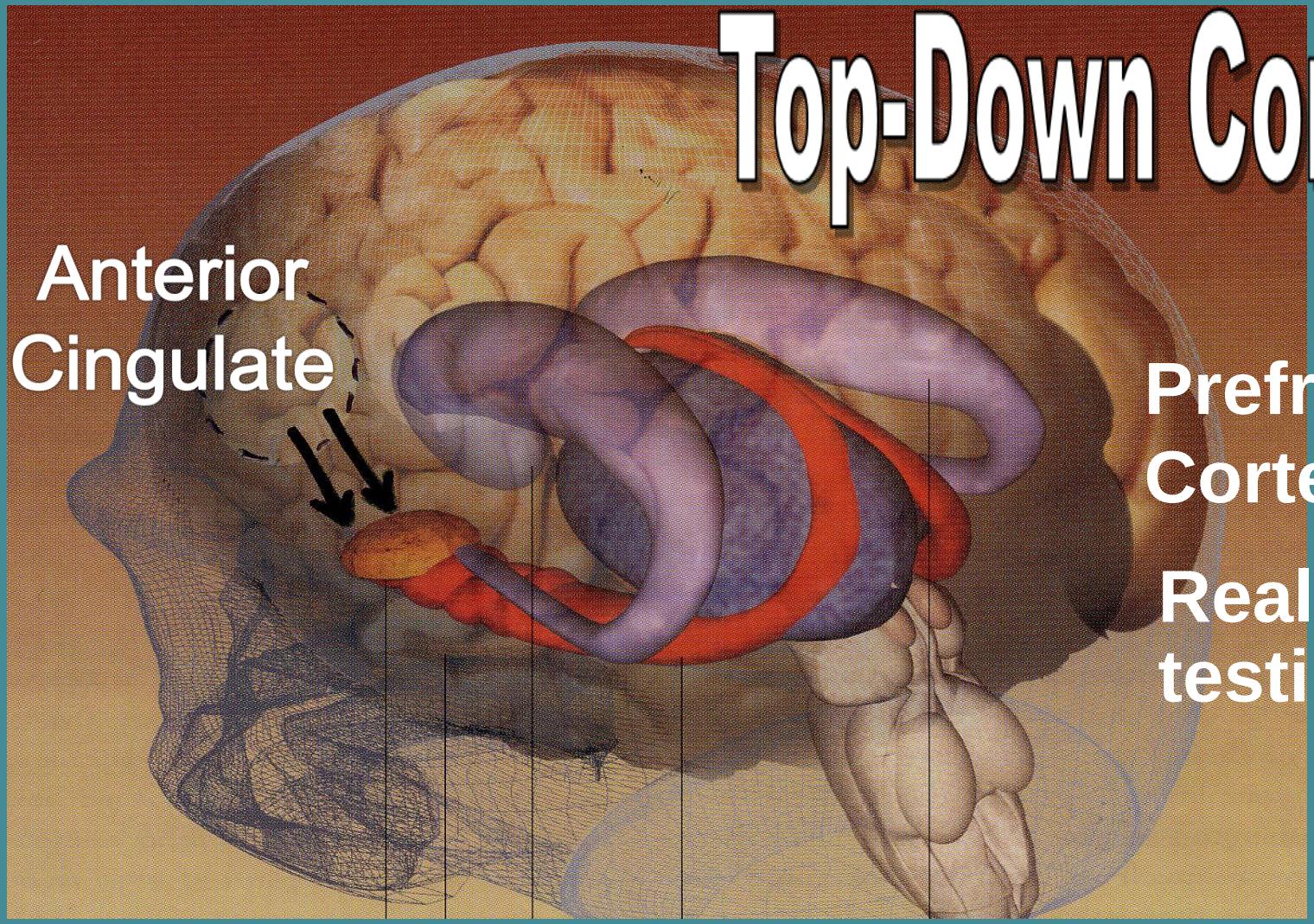
Threat Appraisal Cortical Level



The Slow Circuit to the Amygdala

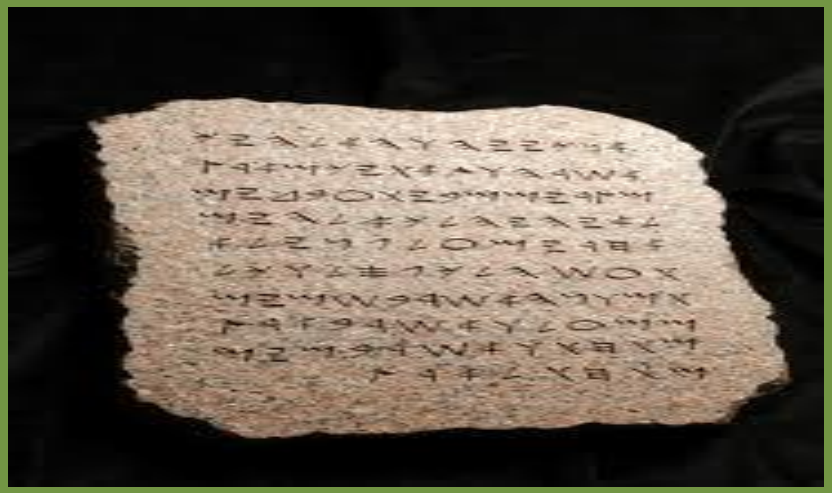
- Sensory info goes to the Thalamus through the Cortex and Hippocampus to the Amygdala
- Complications:
  - Worries and GAD
  - Fears and Phobias
- Benefits:
  - Tames the Amygdala
  - With exposure, New Thinking (cortex)
- "Top down"

Cortical-level Appraisal



The Dynamics of Fear

- Amygdala memories are hard to forget ("Stone tablet")



- Hippocampal circuits tell us what to fear and in what context ("Etch-a-Sketch")

Client Education

- Your brain is not like a computer, coding every program used or website visited.
- Your memories change in response to new experiences. That's what therapy does.

Memory (summary)

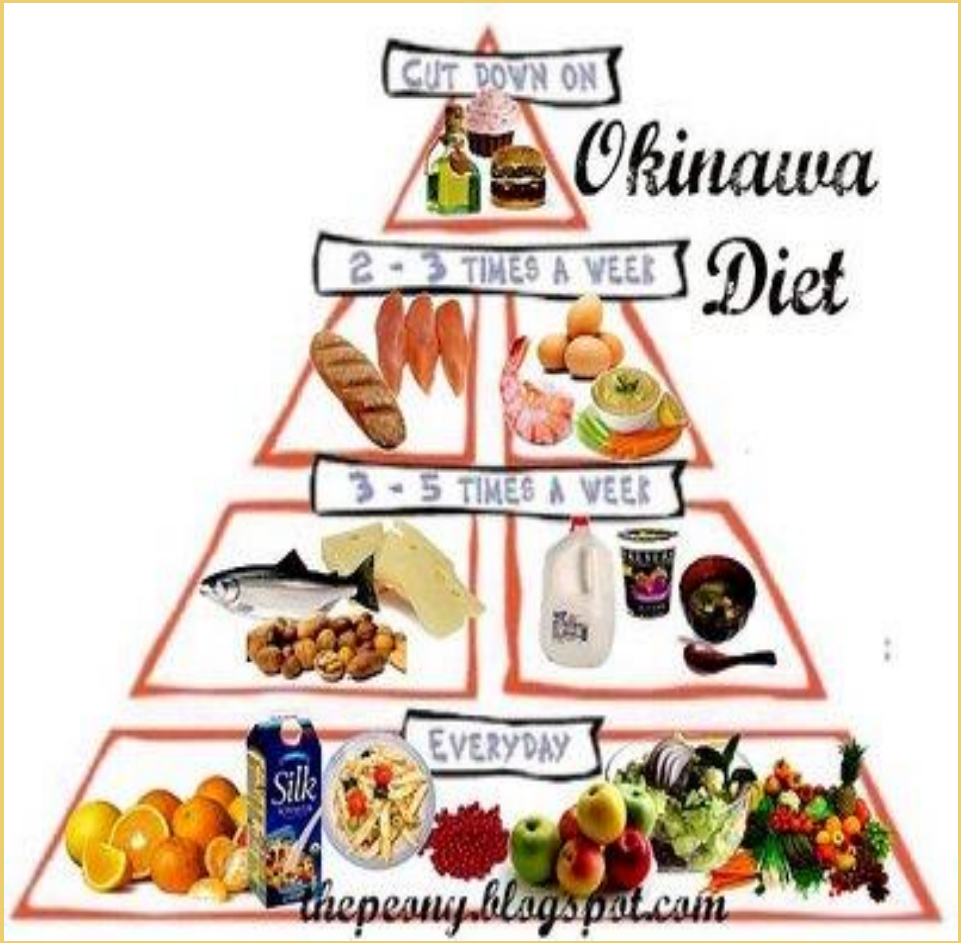
- Attention is critical to the coding of new memory
- The power of mnemonics
- The “Inverted U”: too little stimulation (e.g., boredom) or too much stimulation (e.g., trauma) conflict with the coding of new memory
- A moderate degree of anxiety works best to facilitate neuroplasticity and new memory

Client Education

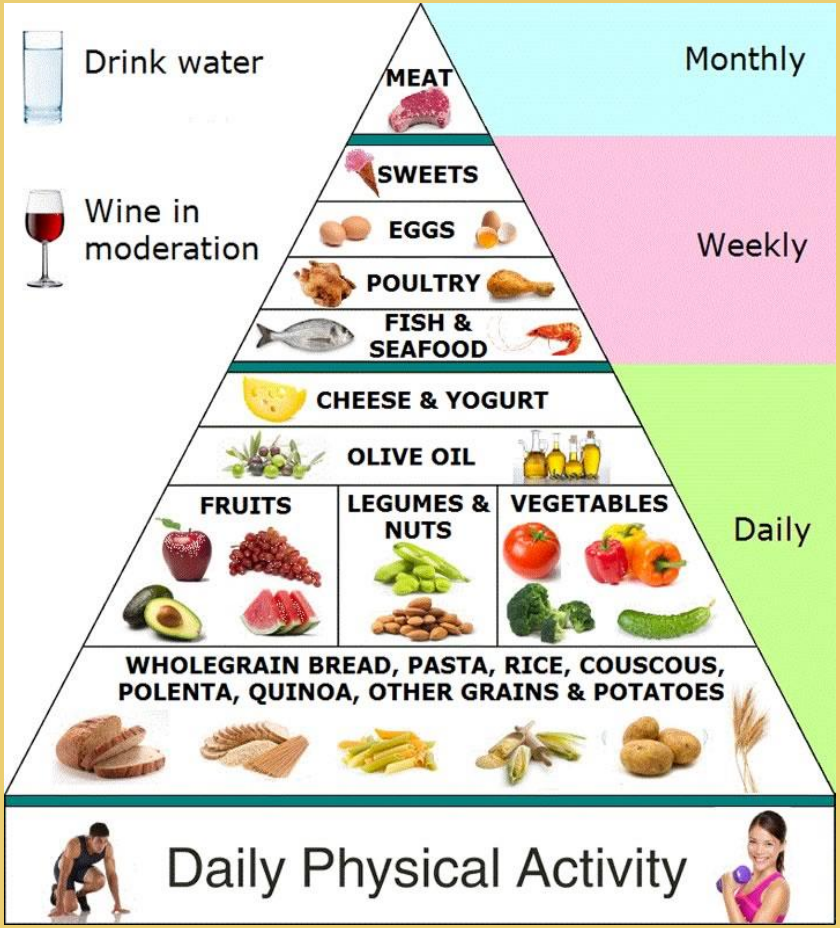
- A bad diet will deplete your brain chemistry, making your alarm system unnecessarily overactive.
- Just skipping breakfast will cause you to be depressed and have less energy and ability to deal with stress and anxiety.

Diets styles for longevity:

Okinawan



Mediterranean

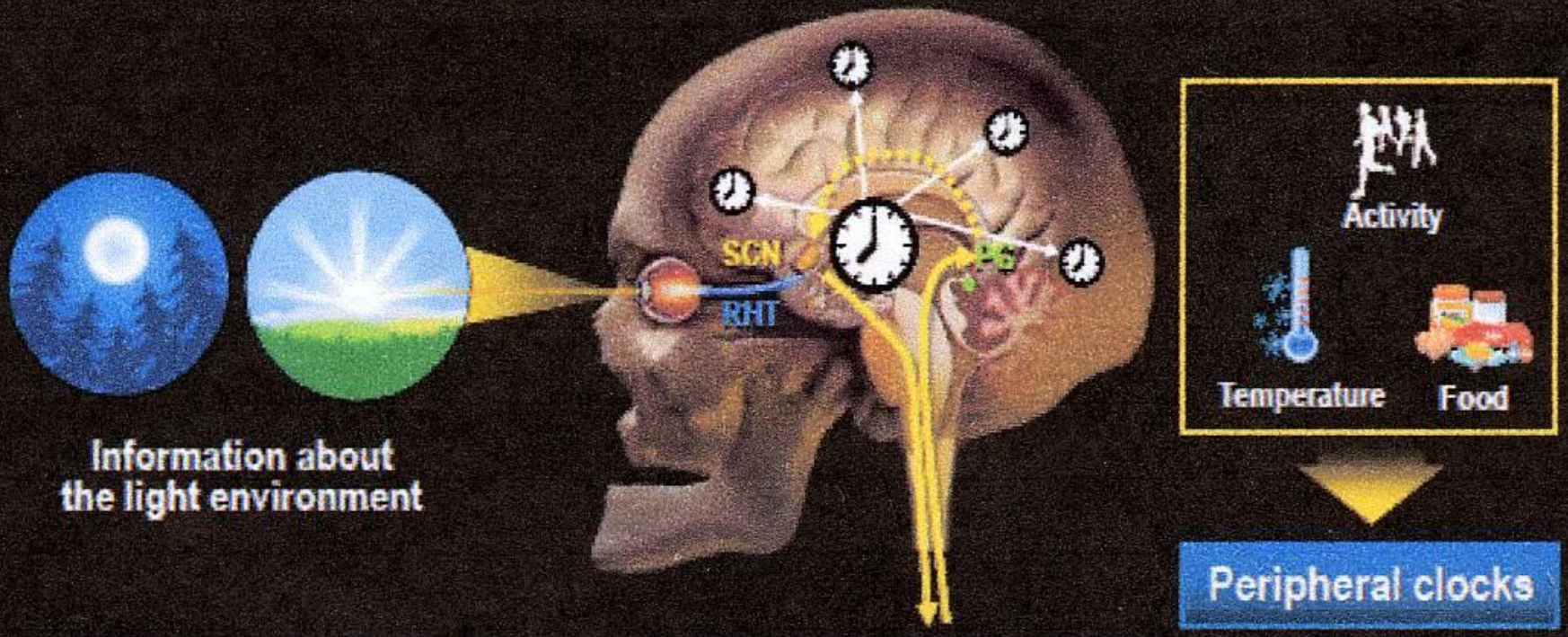


Diet Summary

- –The importance of breakfast
- –The perils of simple carbohydrates--↑ depression
- –Transfatty acids -↑ depression
- –Essential fatty acids
- –3-4 balanced meals
- –Vegetables 3xs per day
  - »↓ depression risk by 30%
    (Nurse's Health Study)

Synchronizing Circadian Rhythms

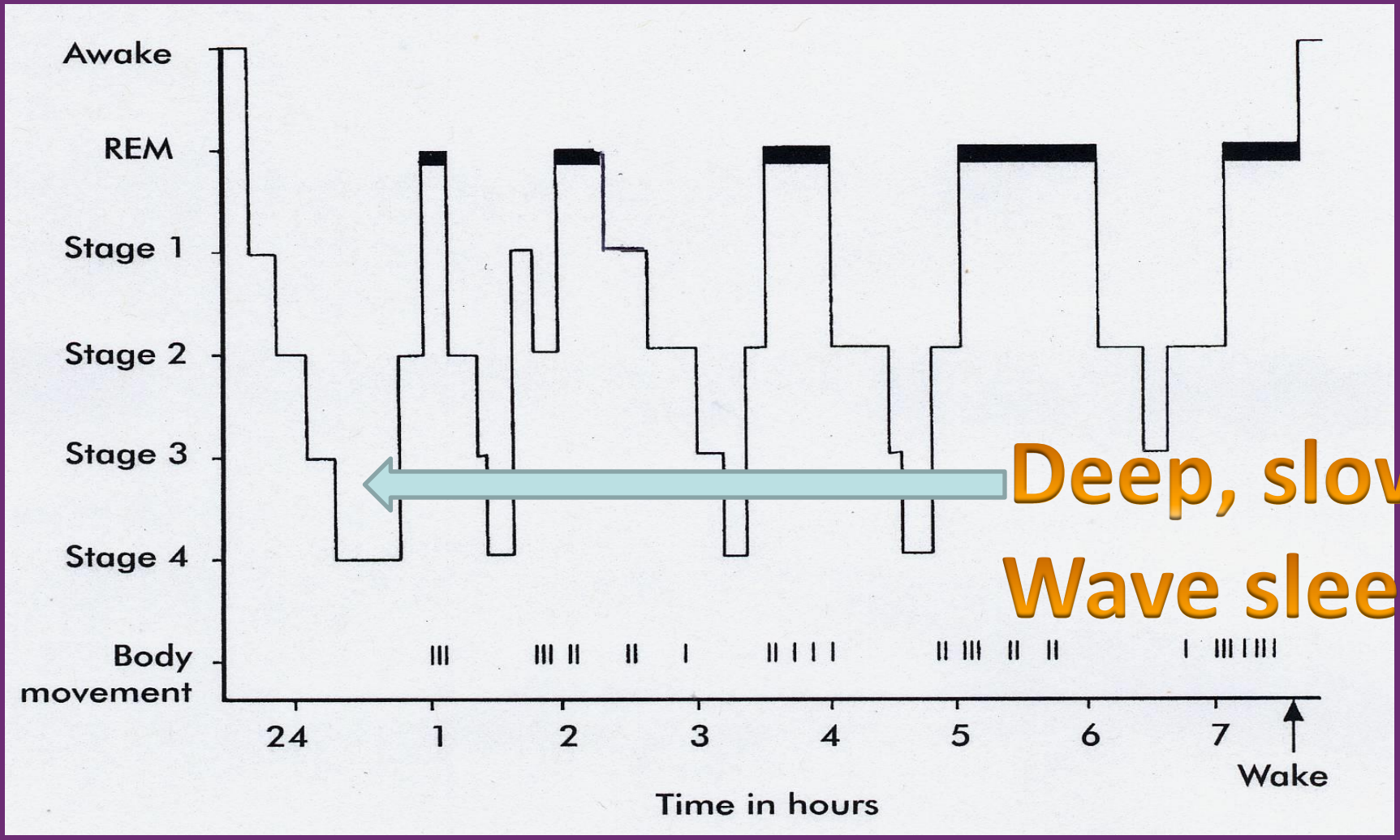
Entrainment of the SCN and Peripheral Clocks

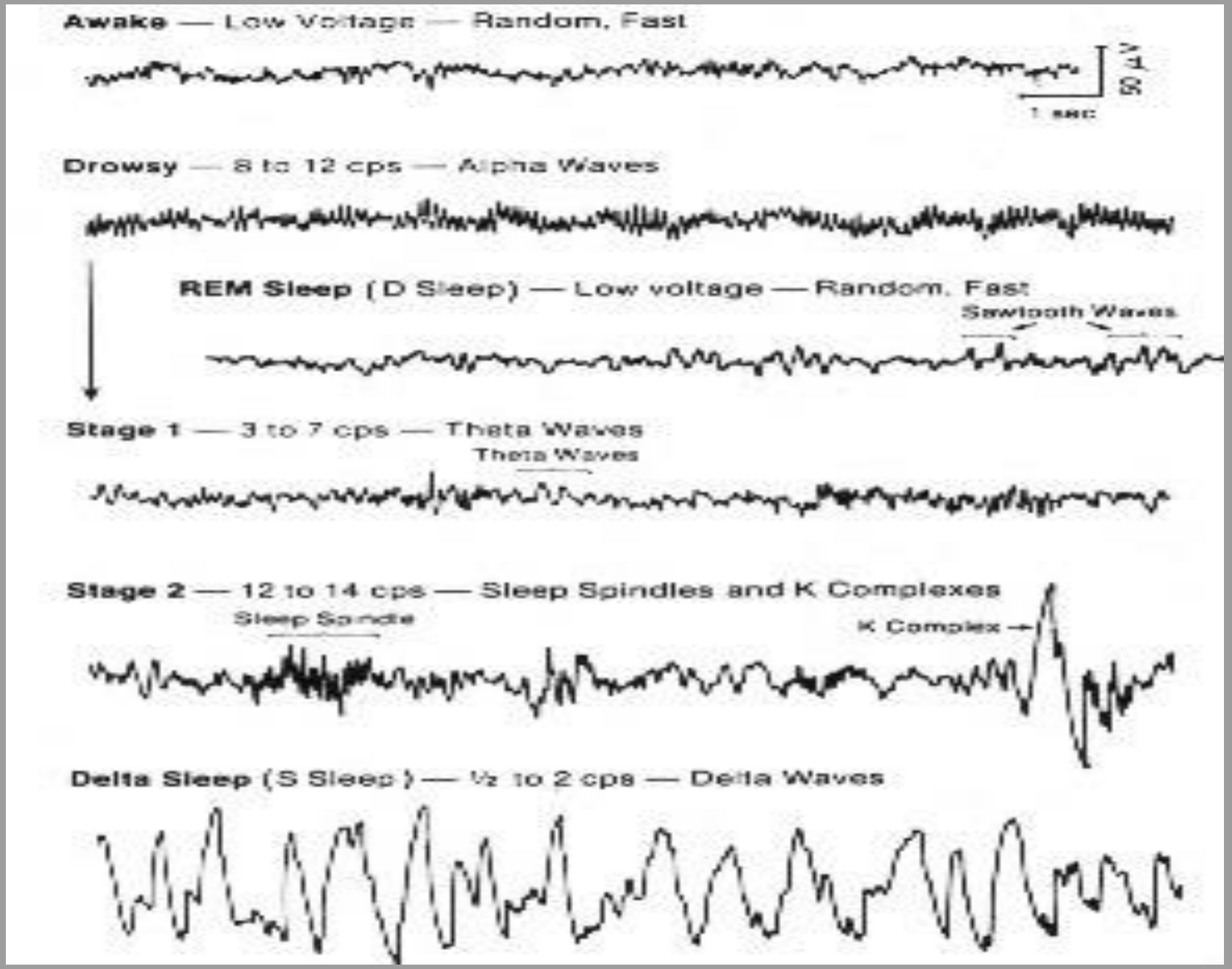


GI, gastrointestinal; PG, pineal gland; RHT, retinohypothalamic tract; SCN, suprachiasmatic nucleus; WBC, white blood cell.

Beckett M, Roden LC. *S Afr J Sci*. 2009;105(11-12):415-420; Dibner C, et al. *Annu Rev Physiol*. 2010;72:517-549; Young M, et al. *Sleep Med*. 2007;8(6):656-667.

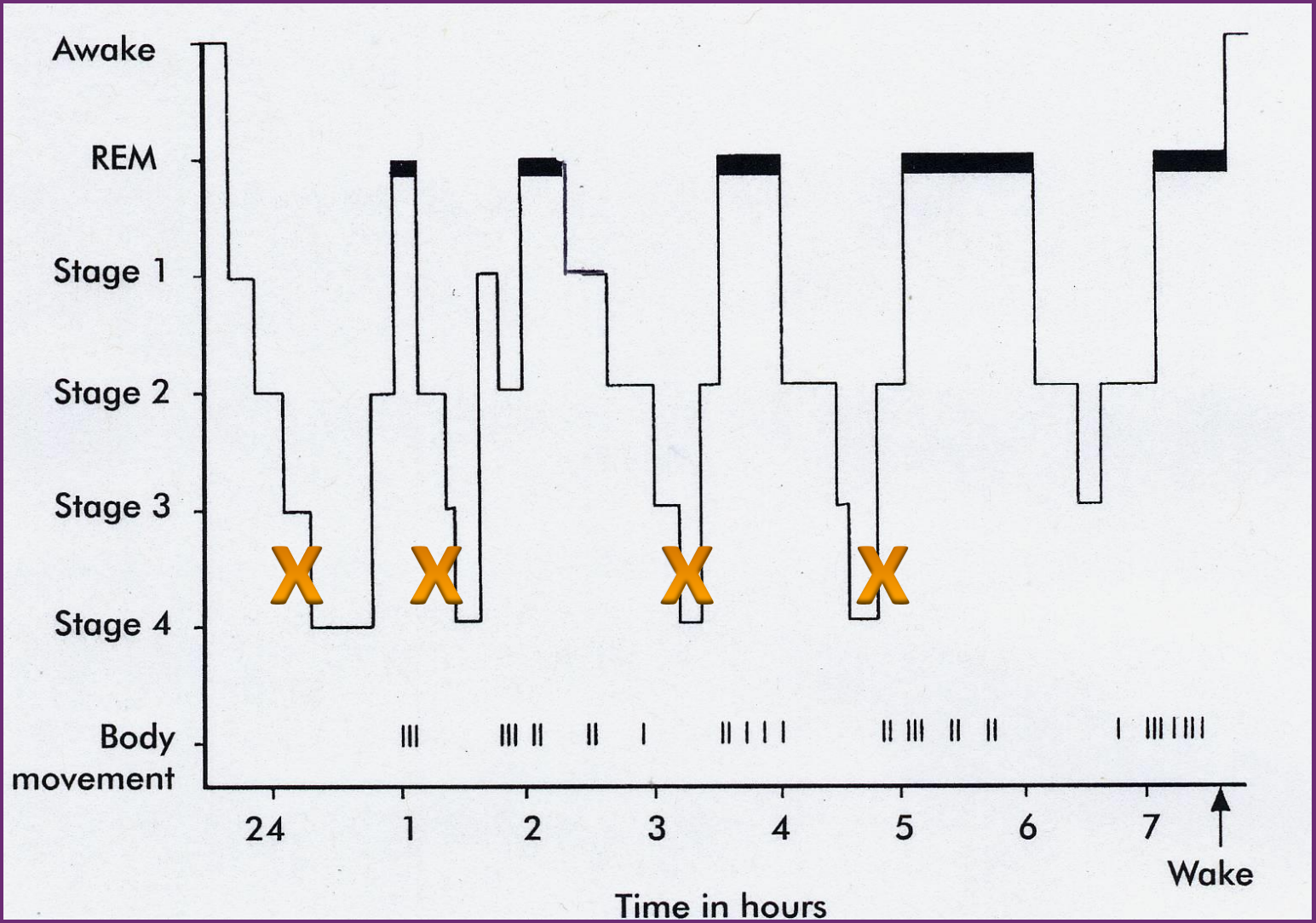
Normal Sleep Architecture




Awake — Low Voltage — Random, Fast
50 μV
1 sec
Drowsy — 8 to 12 cps — Alpha Waves
REM Sleep (D Sleep) — Low voltage — Random, Fast
Sawtooth Waves
Stage 1 — 3 to 7 cps — Theta Waves
Theta Waves
Stage 2 — 12 to 14 cps — Sleep Spindles and K Complexes
Sleep Spindle
K Complex
Delta Sleep (S Sleep) — ½ to 2 cps — Delta Waves

Pathologic Changes in Slow wave sleep

dep, anx, pain, apne, substance abuse



Slow wave sleep deprivation

- **> Fatigue**
- > Increases in cortisol
- **> Inflammation**
  - **> Trouble concentrating**
  - **> Impaired emotion regulation**

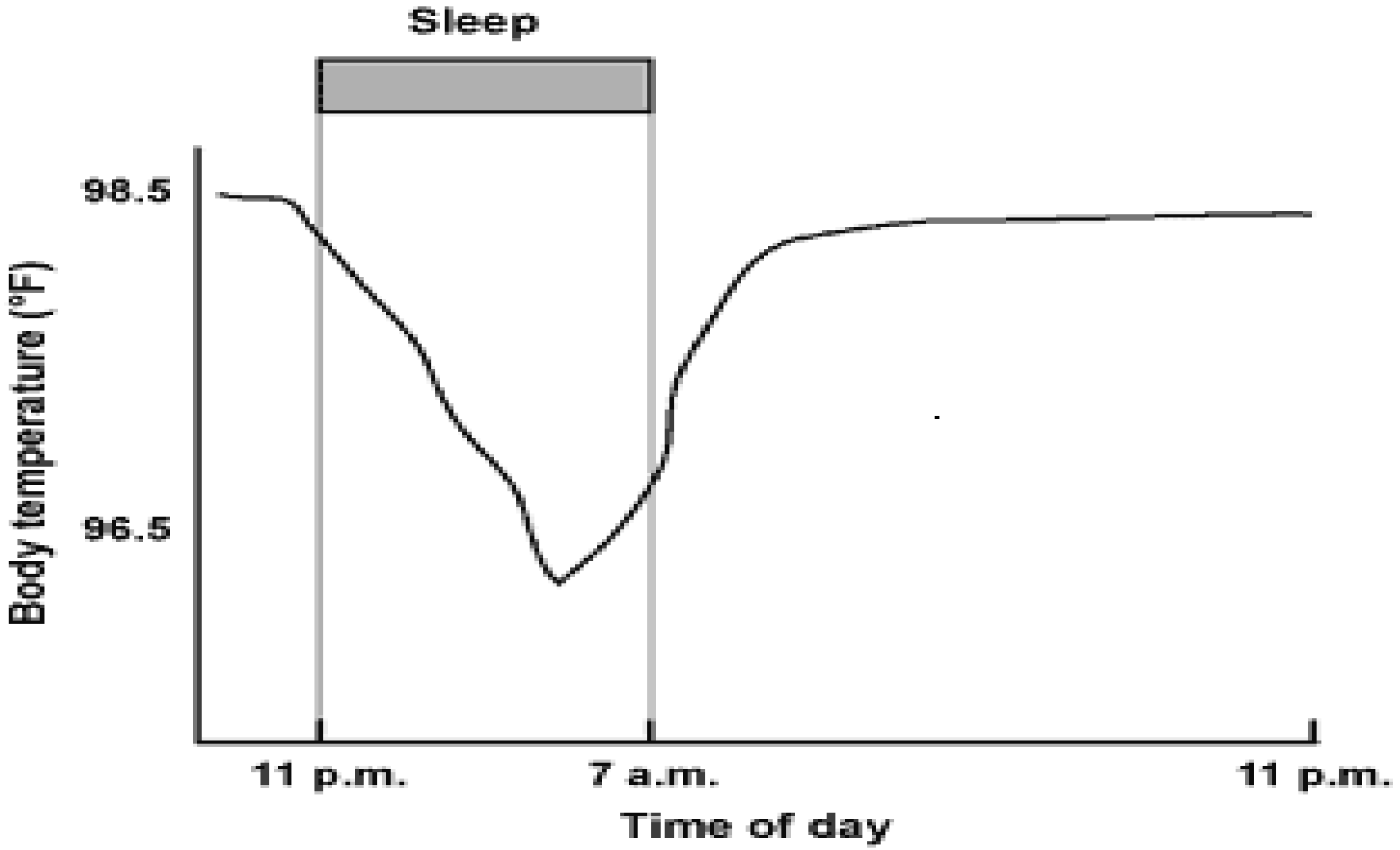
Increase in negative memories

–Increase in depression

Brain Clearing

- “Glymphatic" system, a nod to both glial cells and its functional similarity to the lymphatic system
  - –Sleep as a dishwasher for your brain
- Sleep clears B-amyloid in the brain via increased CSF flow in interstitial space

Body Temp and Sleep



Sleep Summary

- Under 6 hours impairment
- Avoiding sleep depressors
- Negative sleep thoughts
- Body temperature
- Diet
- Exercise

Allostasis

- Allostatic adjustments are adaptive over the short term with moderate and fluctuating levels of cortisol to help orchestrate adjustments by:
  - enhancing or inhibiting gene transcription
  - regulation of BDNF
  - up regulates amygdala activity
  - targets prefrontal systems involved in stress and the emotion (Sullivan & Gratton, 2002).
  - maintaining stability through a change (McEwen, 1998).
- *Allostatic load* --When demands exceed the balance of energy and regulatory gains from rest and recuperation. (McEwen and Wingfield, 2003).

Client Education

- Just as your car needs shock absorbers for bumpy roads, so too can you develop the durability to adapt to daily challenges.

CBT vs. Metacognitive Models

(ACT, DBT, MBCBT, etc.)

CBT

Rationale=control

Cognitive restructuring

Breathing retraining

Interoceptive exposure to lessen fear & avoidance

Situational exposure to lessen fear fear and avoidance

MC Models

Rationale=relinquish control

Thought Diffusion

Observe & accept

Interoceptive exposure with acceptance of internal cues

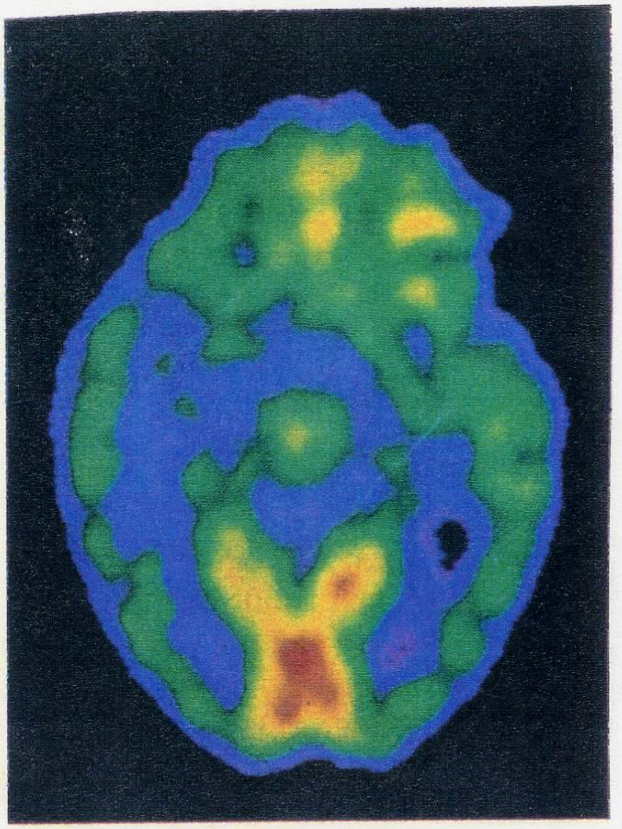
Situational exposure to achieve life values and goals

Client Education

- The next time a well-meaning person tries to reassure you that there is certainty in life, say:
- "Thanks, but I'm learning how to appreciate uncertainty and the shades of grey."

Neurodynamics of Anxiety

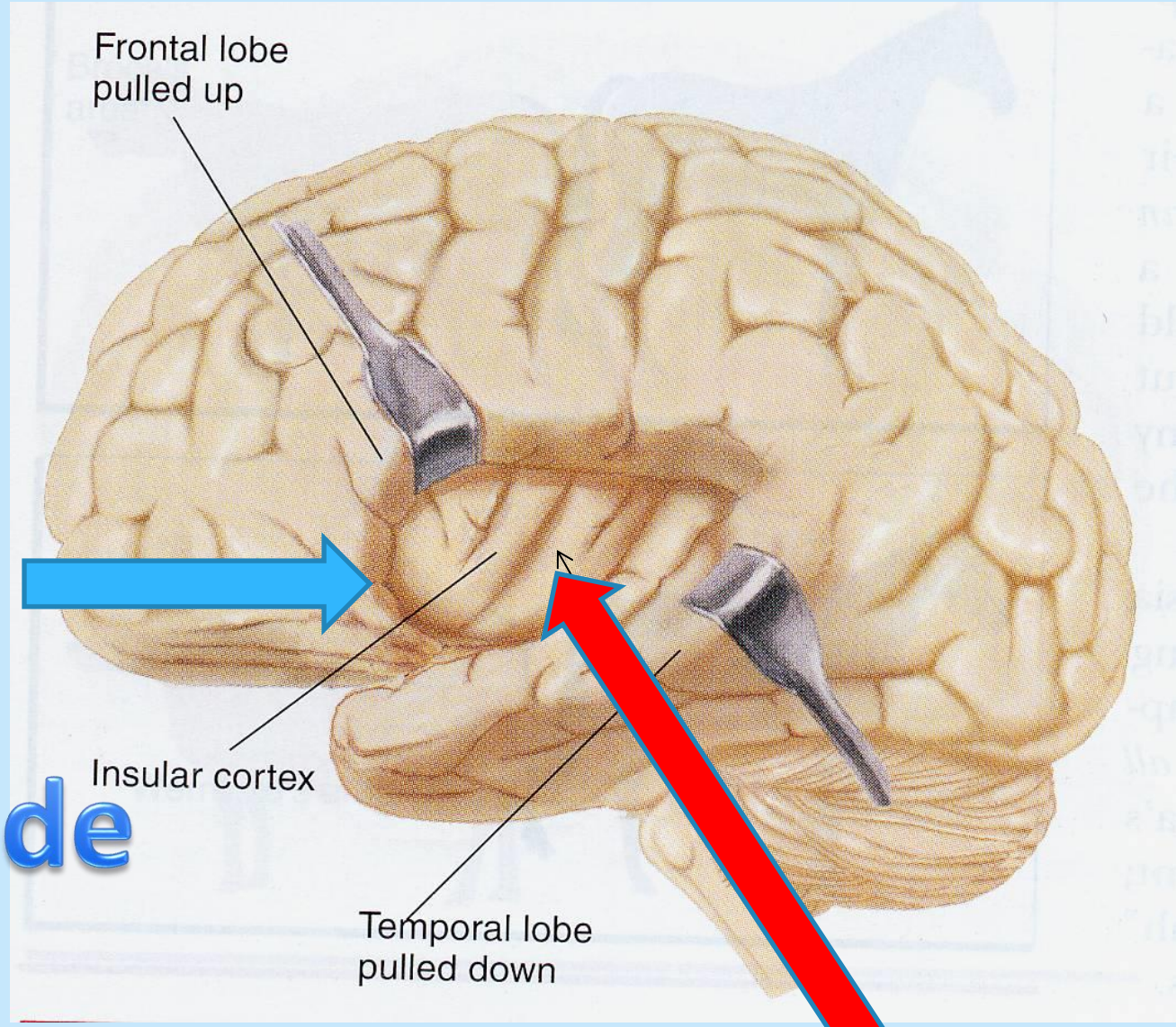
- Two routes to the amygdala, the fast and slow
- Right frontal bias in general for anxiety disorders
- Under-activation of the left frontal lobes and in Broca's area explains why some people feel "speechless" when they're scared (Rauch et al., 1997).



Client Education

- Sensations from your own body should not be the cause for alarm.
- Don’t let your body be the boy who cried wolf.

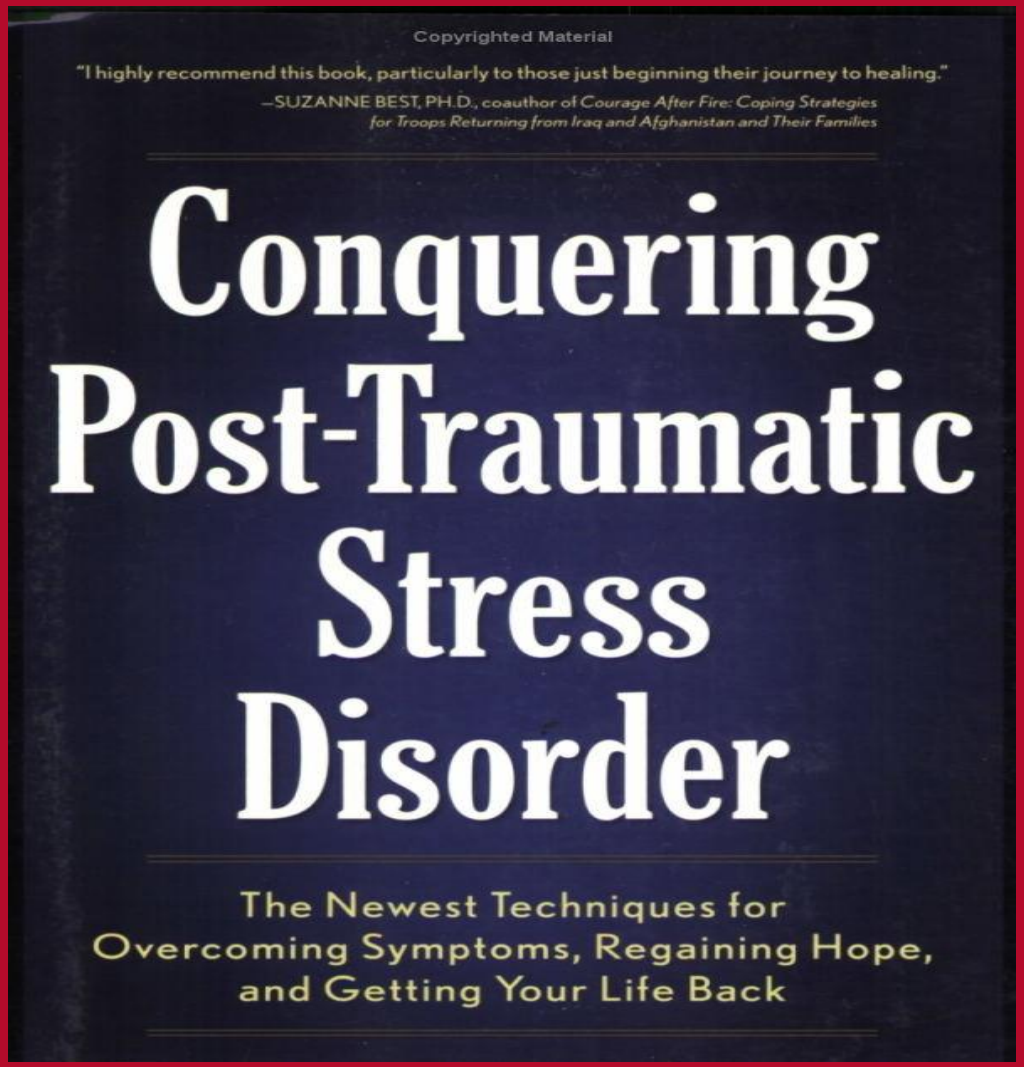
Interoceptive Feedback



Insula

Left side

Post Traumatic Stress Disorder

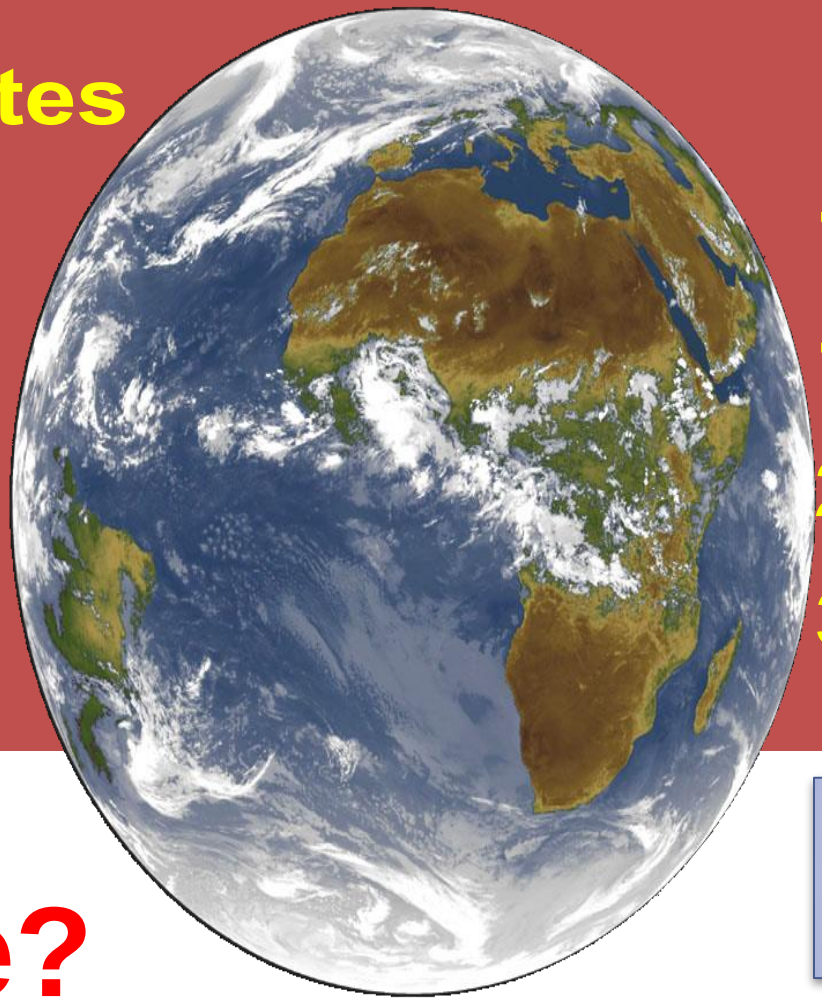


Chronic, severe, inescapable

- War Zones
- Rape
- Child abuse
- Elder abuse
- Domestic violence
- POWs and refugees

PTSD as a Worldwide Problem

Germany	2.2%*
United States	7.8%
Ethiopia	15.8%
Gaza	17.8%
Cambodia	28.4%
Algeria	37.4%



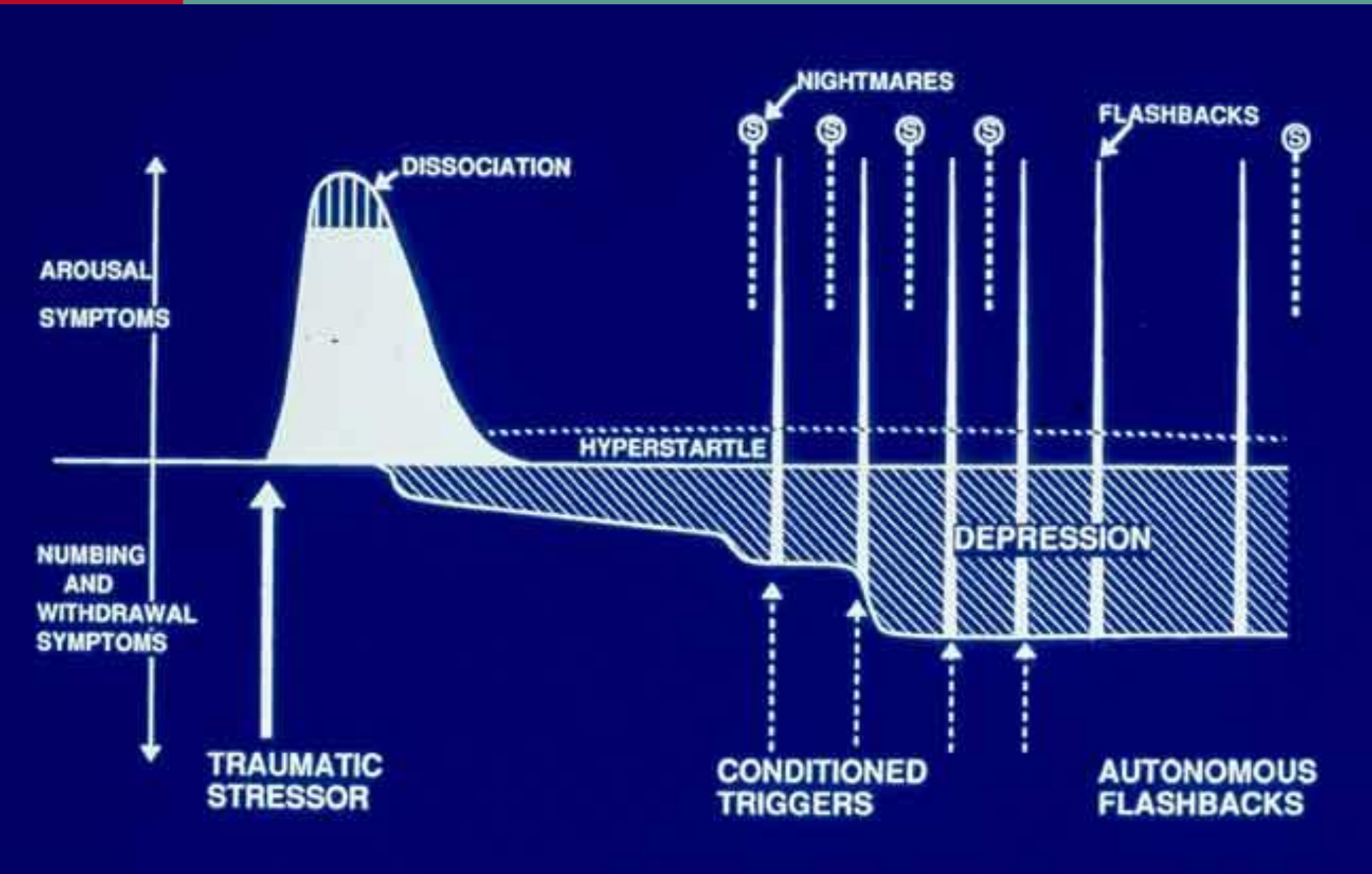
Ukraine?

Gaza, Afghanistan?

Risk Factors for PTSD

- Greater distress before/after the trauma
- Poverty and low socioeconomic status
- Previous or current psychological disorder and poor affect regulation
- Family discord and/or insecure attachment
- Cognitive disengagement at the time of the trauma and dissociation involving depersonalization and de-realization
  - Especially with early and repeated trauma

Time Sequence



Phylogenetic Responses to Stress

- 1) Trigger the social engagement system—the myelinated vagus
- 2) Fight or flight—SNS and HPA axis arousal
- 3) Immobilization—freeze, collapse, and feigned death:
  - 2 stages
    - Freezing in terror
    - Paralyzed—shut down—total submission, trancelike, dissociation

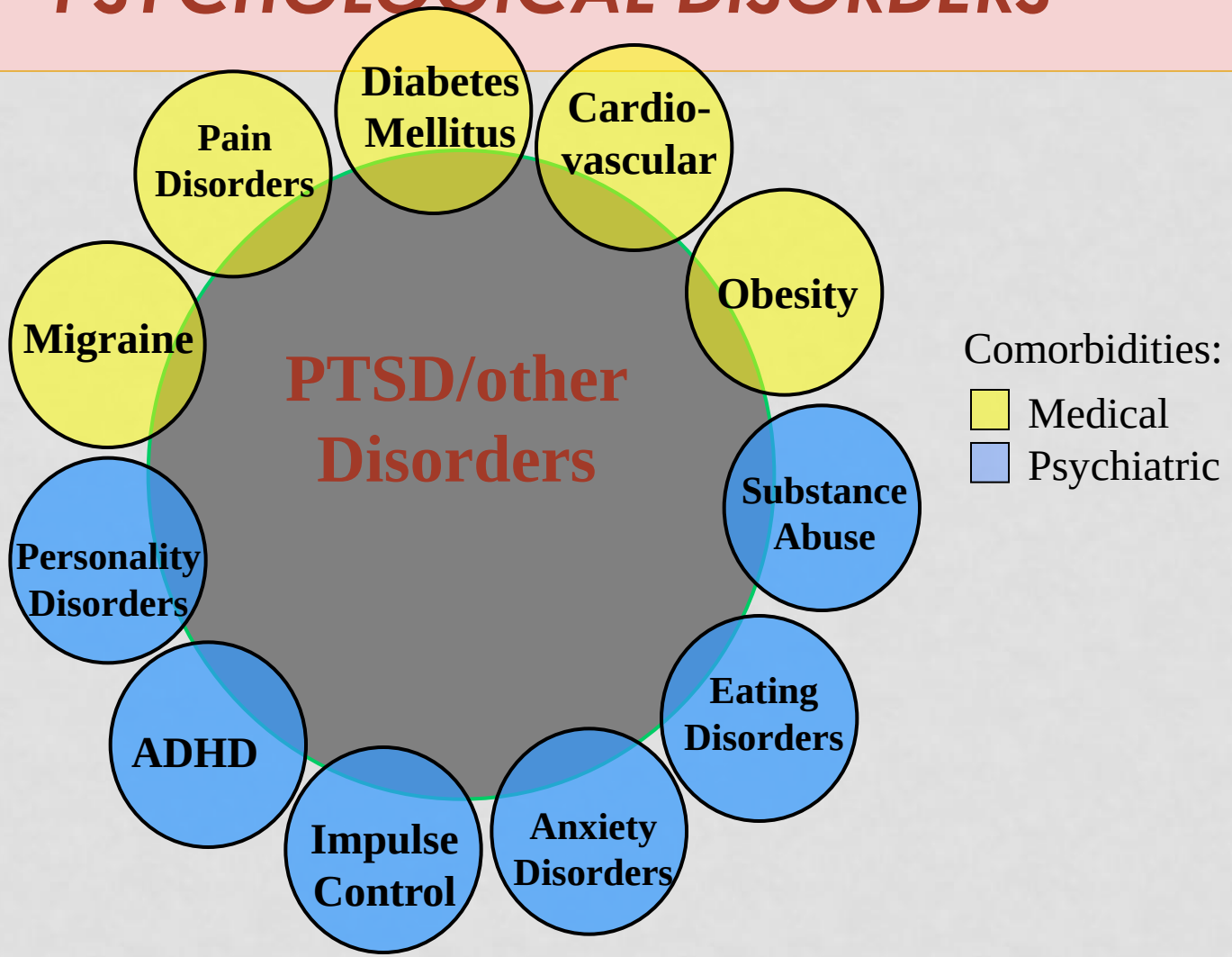
PTSD Neurodynamic Aspects

- ↑ amygdala—general false positives for threat
- ↓ mPFC especially the ACC (reduced neurointegration and cortical volumes) (De Bellis, et. al., 2000) (inadequate top down inhibition of the amygdala)
- ↓ hippocampus (cortisol, excitotoxity, blocking of neurogenesis)

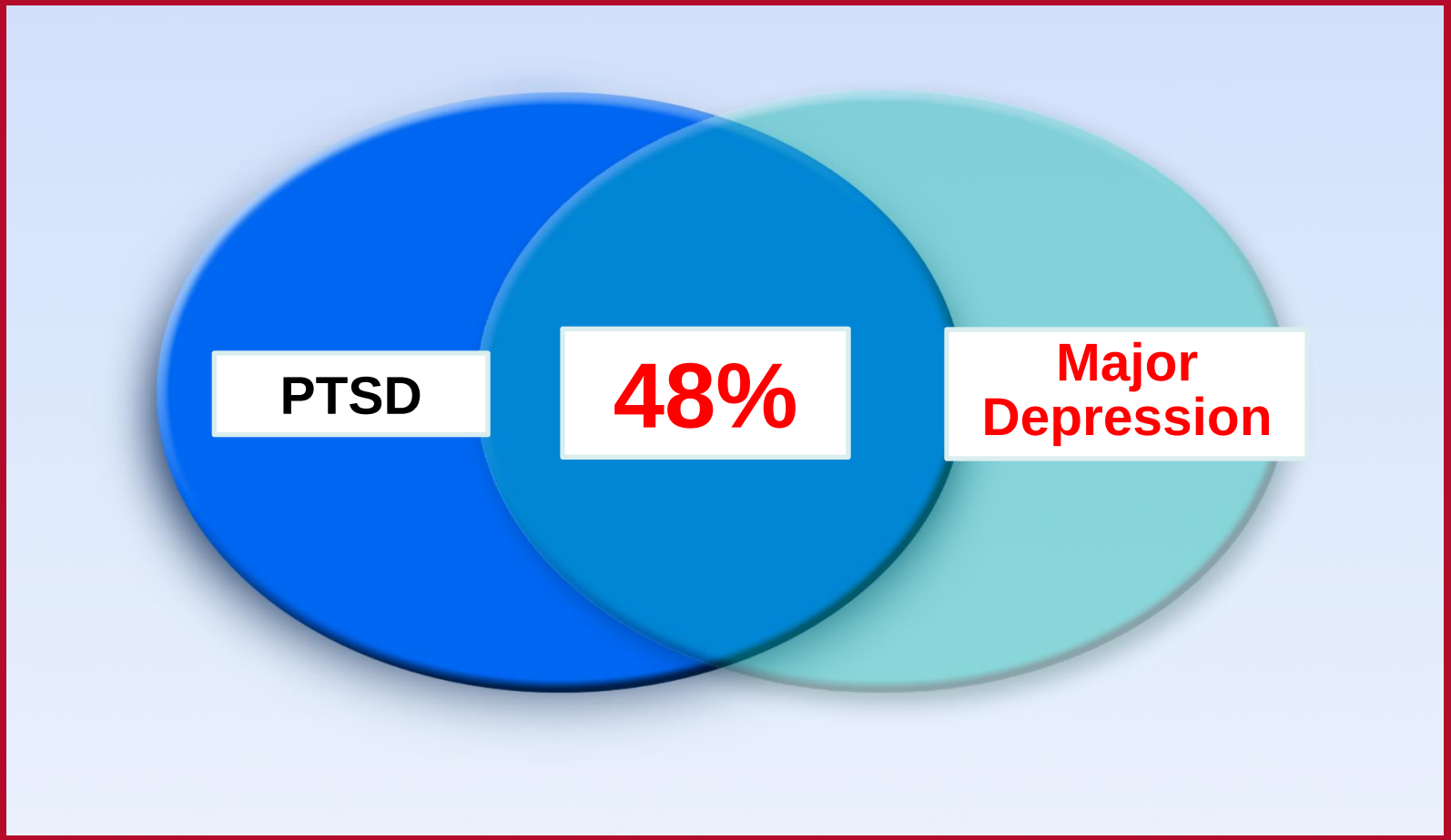
Most Common Acute Post-Traumatic Stress Response

- Depression
- Anxiety Disorders
- Substance use / abuse
- Acute Stress (ASD) only later PTSD
- Adjustment disorders
- Persistent complex bereavement

THE RULE NOT THE EXCEPTION
THE MULTIDIMENSIONALITY OF NEURO-PSYCHOLOGICAL DISORDERS



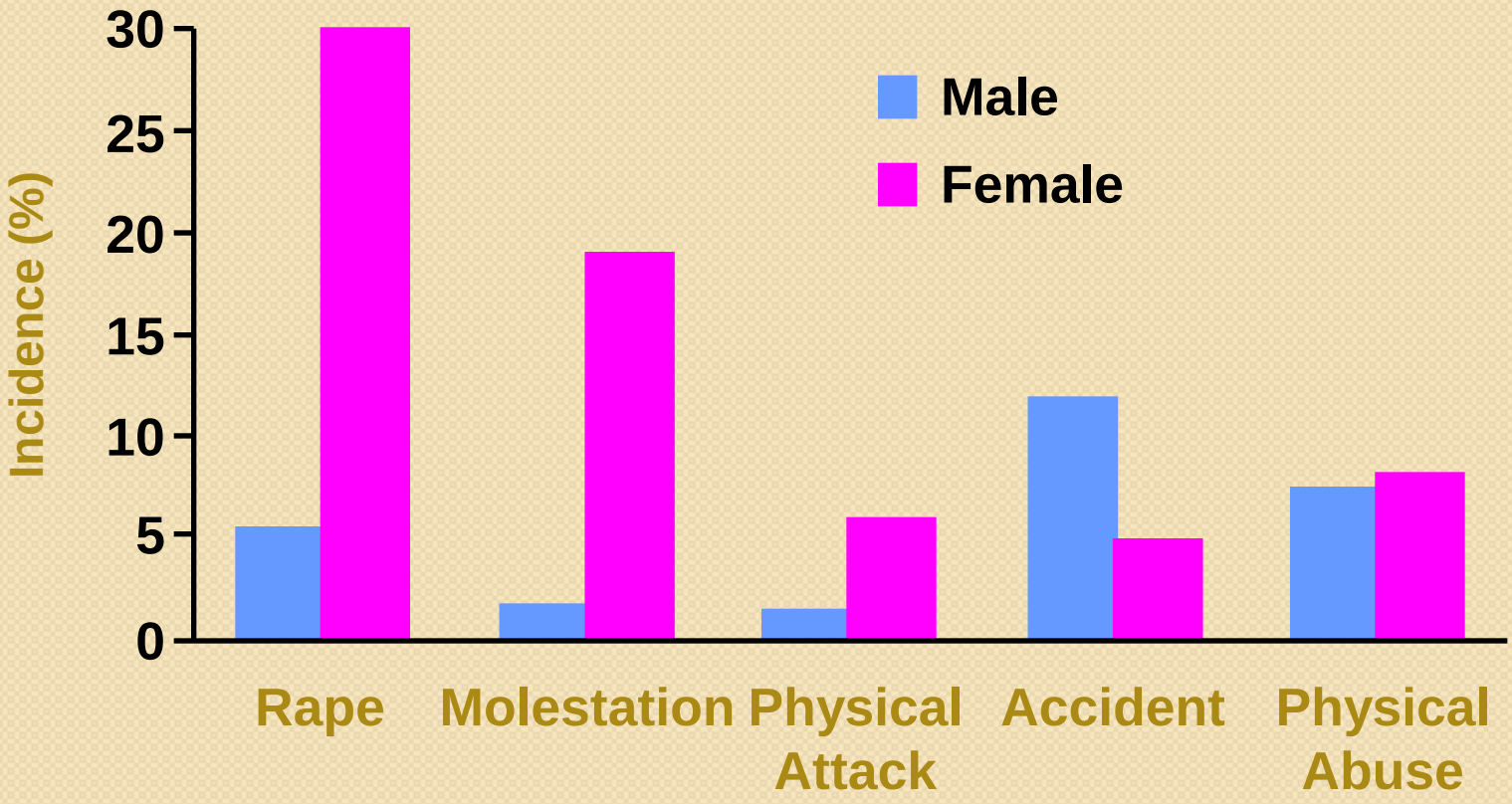
Common Occurrence of PTSD and Depression



A Big Problem:
Reluctance to tell or seek out help

- **Sexual assaults**
- **Bullying** (kids and adults)
- **Work-place violence**
- **Domestic violence**

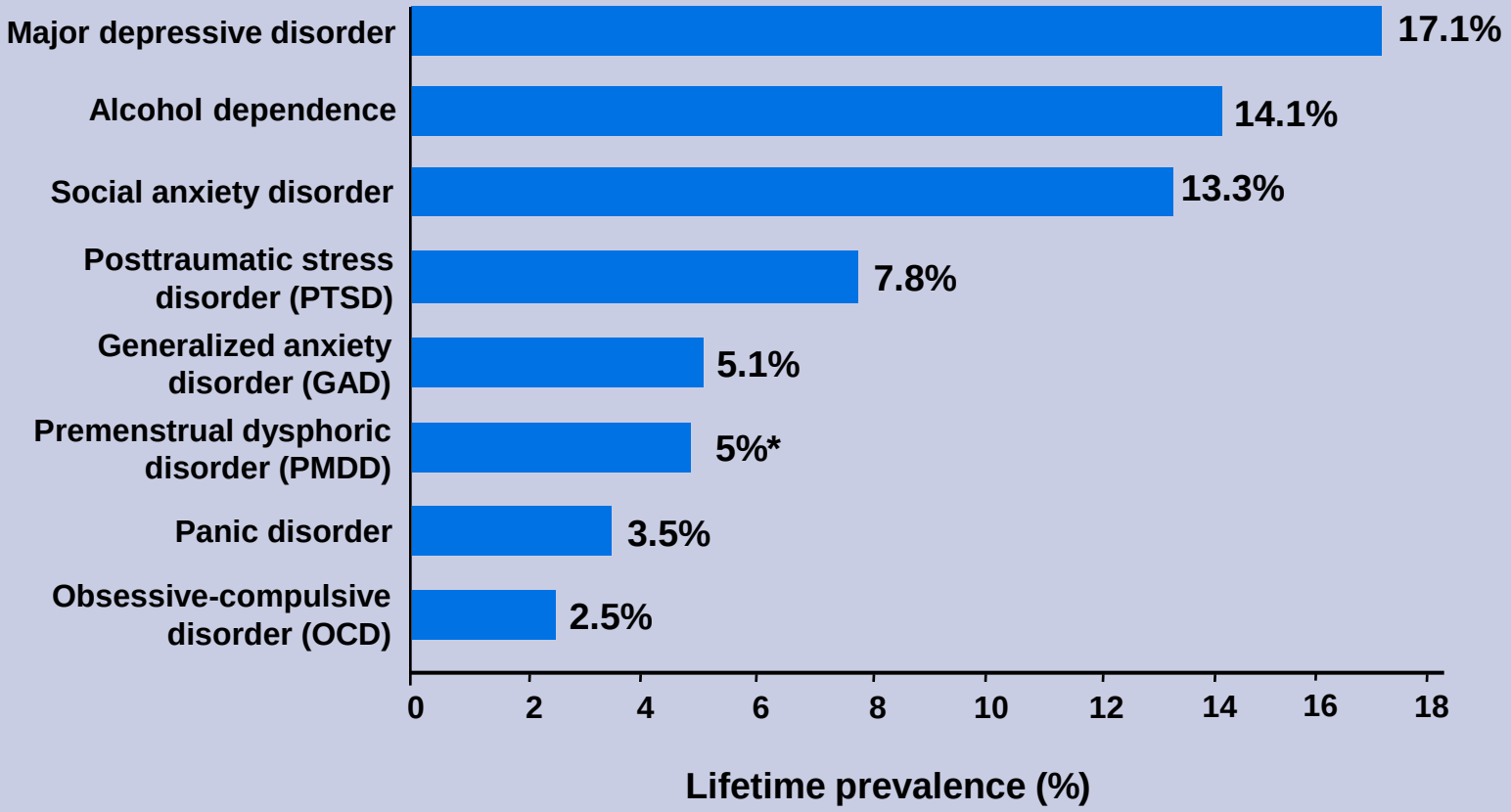
Non-Combat-Related Trauma Associated with PTSD



Kessler et al. Arch Gen Psychiatry. 1995;52:1048

Courtesy of: David V. Sheehan, M.D., M.B.A.

Lifetime Prevalence of Common Psychological Disorders



Predicting PTSD

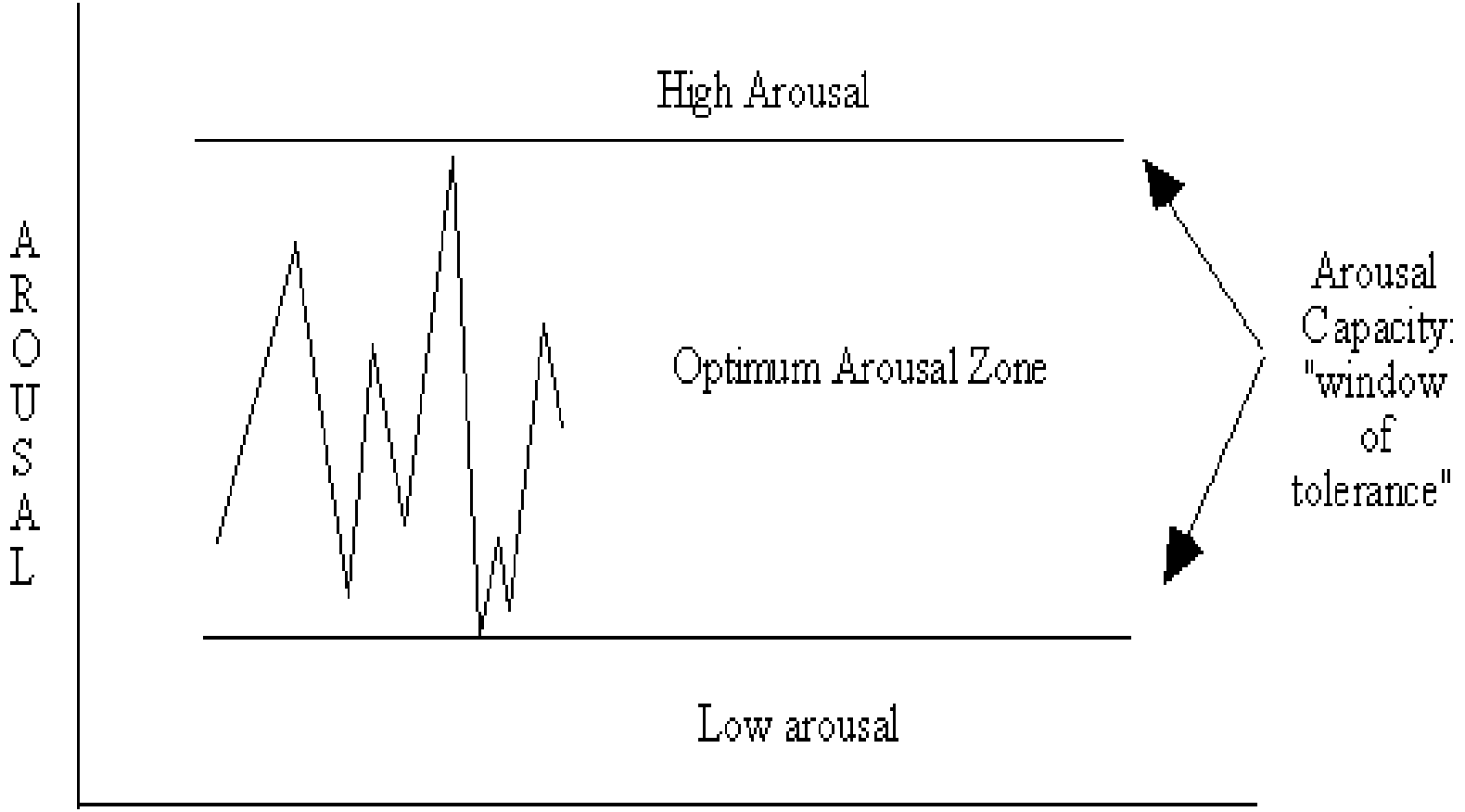
Dissociation or amnesia at the time of traumatic event

Panic attack: first 24 hours

70% greater risk

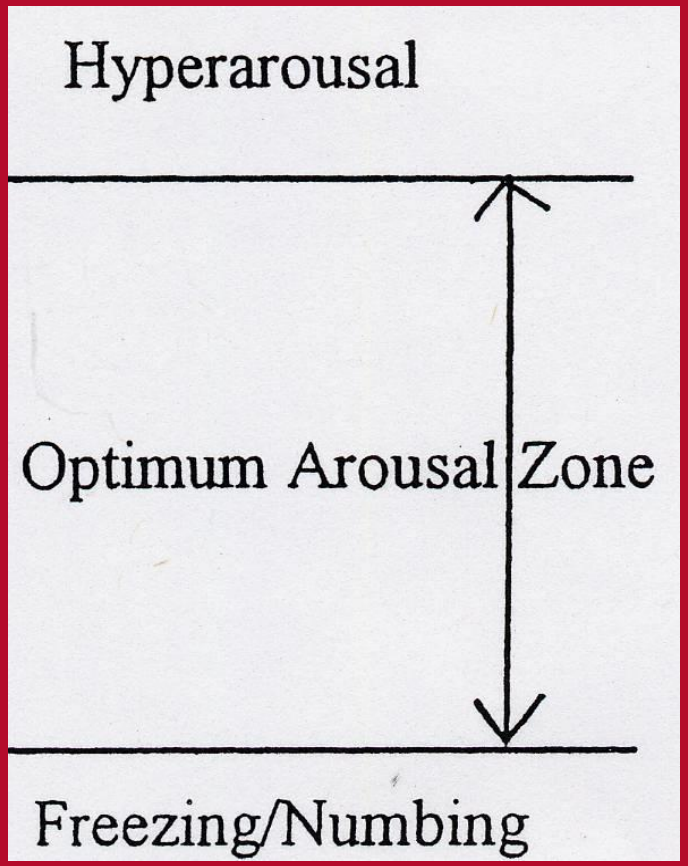
The Severity of the Traumatic Event is not predictive of outcome

Window of Tolerance



Working the "Therapeutic Window"

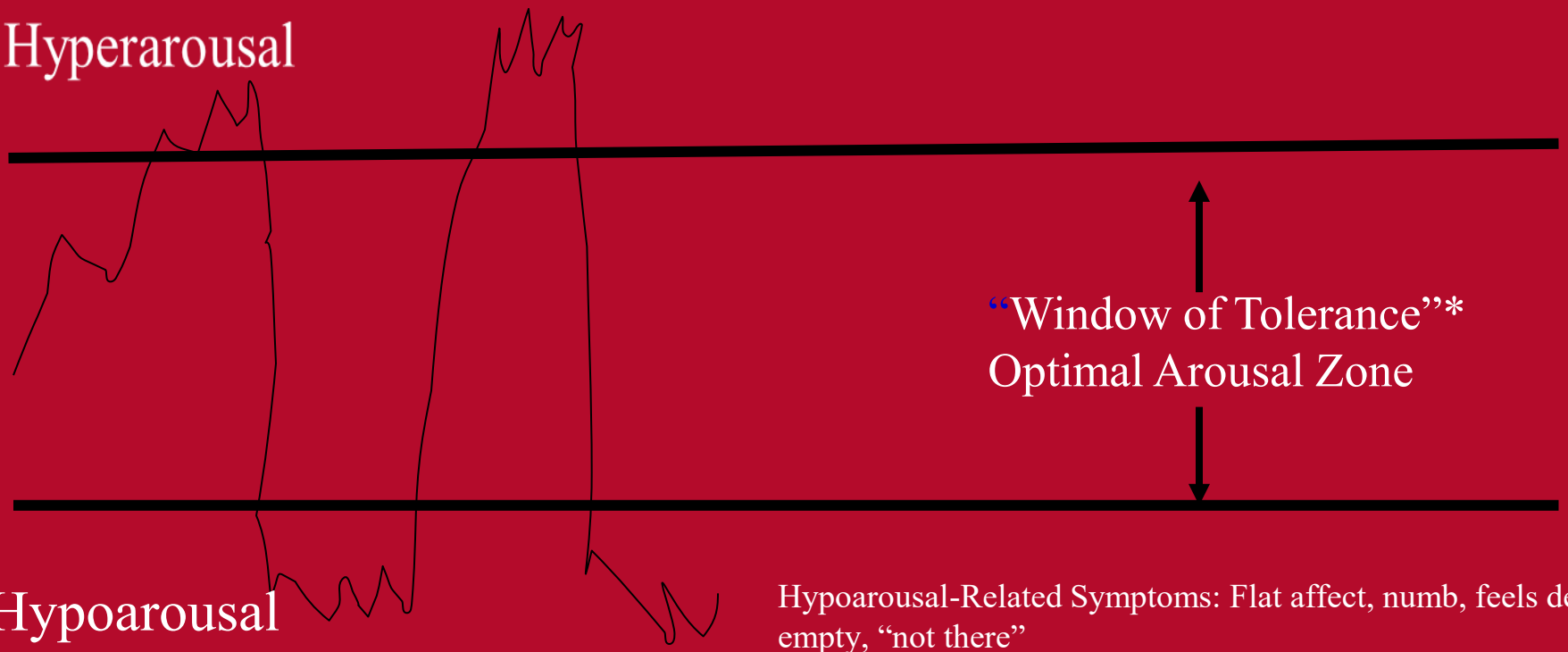
Over-Shoot



Under-Shoot

Trauma Responses are Autonomically Driven

Hyperarousal-Related Symptoms:
High activation resulting in impulsivity, risk-taking, poor judgment
Chronic hypervigilance, post-traumatic paranoia, chronic dread
Intrusive emotions and images, flashbacks, nightmares, racing thoughts
Obsessive thoughts and behavior, cognitive schemas focused on worthlessness and dread



Hypoarousal-Related Symptoms: Flat affect, numb, feels dead or empty, "not there"
Cognitively dissociated, slowed thinking process
Cognitive schemas focused on hopelessness

Hippocampal atrophy

Client Education

- Though your memory may be temporarily impaired, you can revitalize these areas of your brain by aerobic exercise followed by learning and goal oriented behaviors.

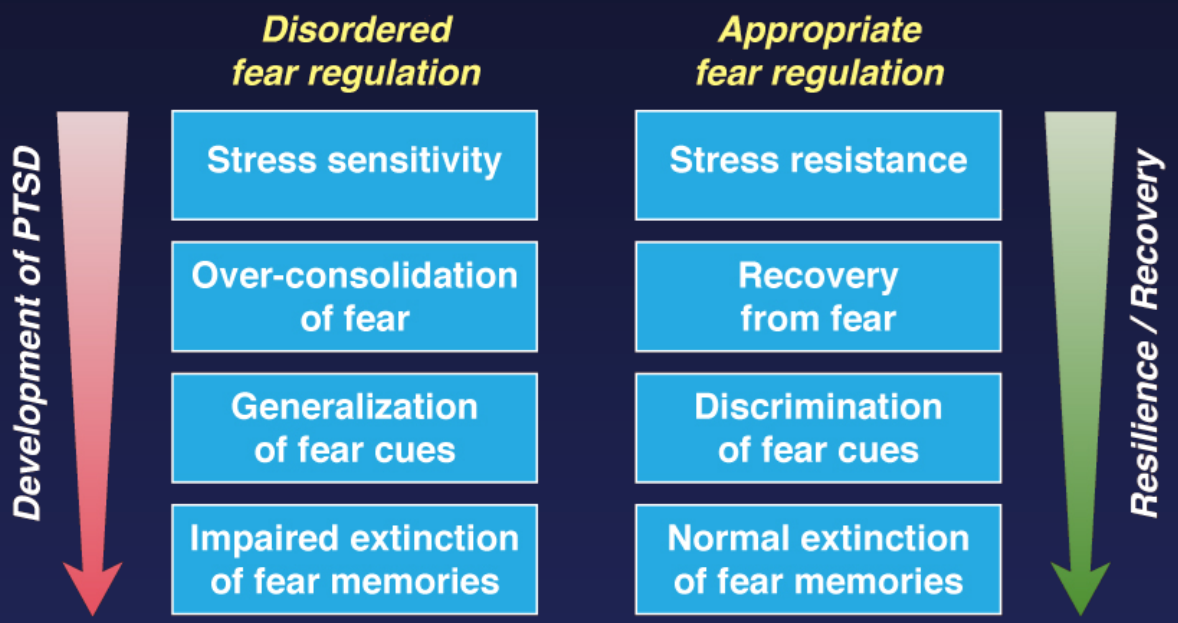
Possible Neurochemical Vulnerability of PTSD

- ↑ NE post trauma may predict PTSD (Yehuda, et. al., 1998)
- ↑ cortisol in the evening not in the morning
- ↑ proinflammatory cytokines post trauma
  - The secretion of IL-6 inflammatory cytokines can be triggered by B-adrenergic receptors with ↑ NE
  - Inflammation can occur post trauma via CRH/substance P-histamine axis with ↑ cortisol and IL-6 (Elenkov, et. al., 2005)

Client Education

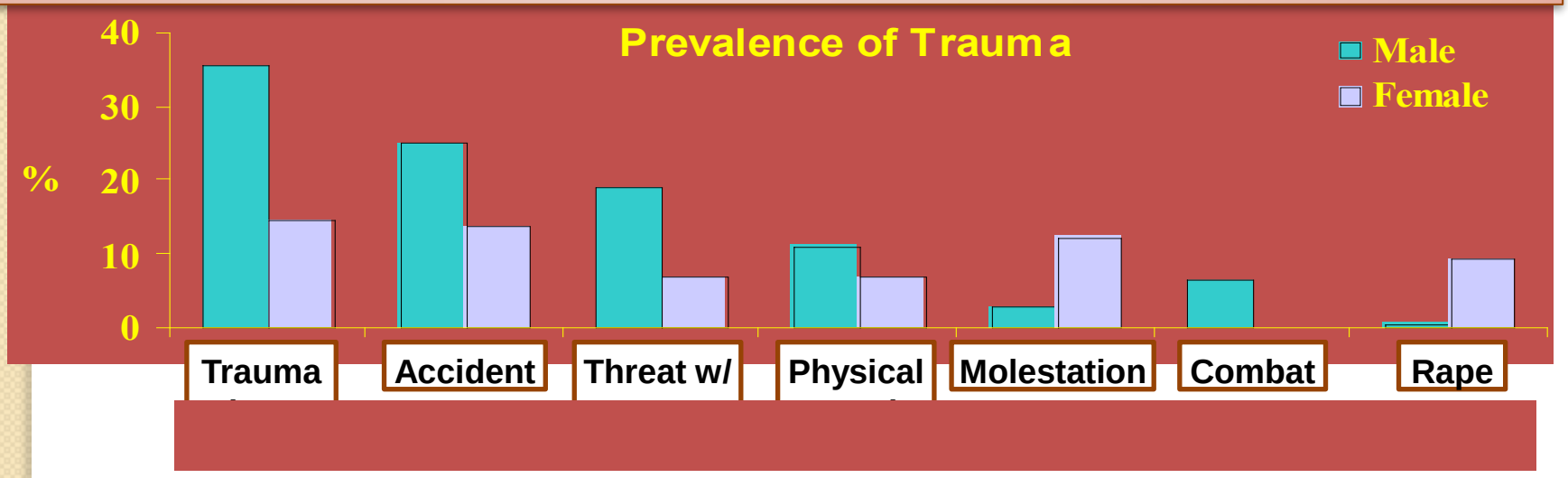
- It’s common to feel like being alone after a traumatic event. But, isolating now will make you worse and feel even more alone.
- Parts of your brain activate when you are with people which helps you buffer anxiety and lift depression.

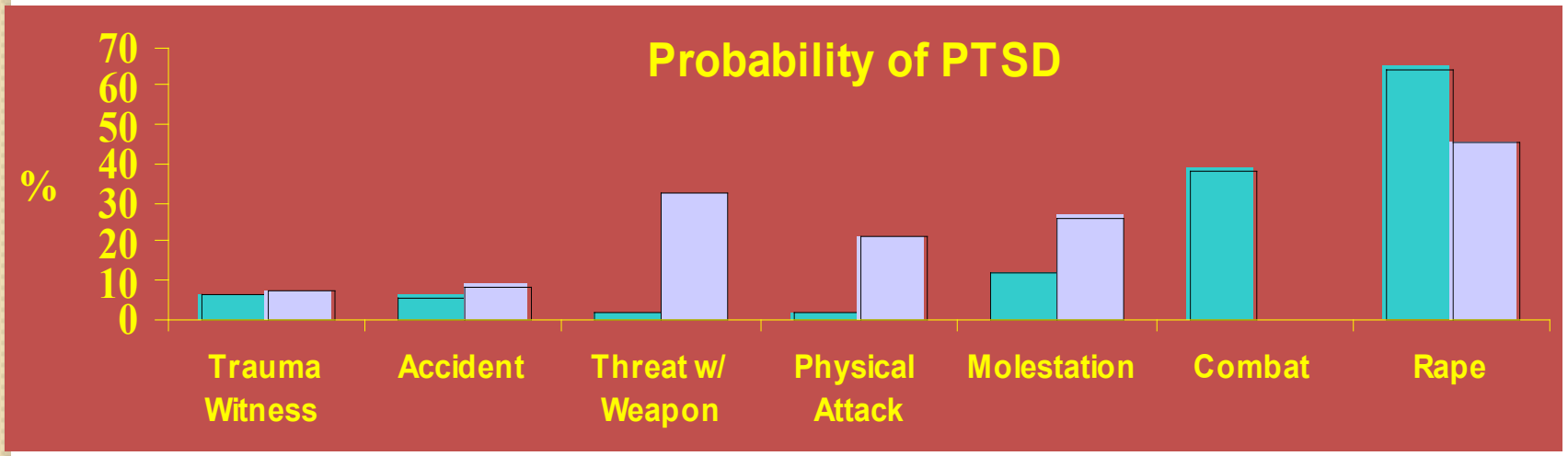
Disordered Fear Regulation in PTSD



From: Mahan AL, Ressler KJ. Trends Neurosci, 2012, 35:24-35.

Prevalence of Trauma and Probability of PTSD





Kessler. *J Clin Psychiatry*. 2000;61(suppl 5):4.
Kessler et al. *Arch Gen Psychiatry*. 1995;52:1048.

Avoidance

The major factor in perpetuating PTSD and contributing to a more chronic course

Avoiding specific trauma triggers; Reminders:

- **People**
- **Situations**
- **Conversations**
- **Media**
- **Medical Treatment**

Suicidality and PTSD

- *PTSD patients are 6 times more likely to attempt suicide than the general population*
- *PTSD has higher risk of increased number of suicide attempts than all other anxiety disorders*

Amygdala-Level Processing

Rapid, Crude, Generalized
Many false alarms
Non-Responsive to
new "Data"
Outside awareness & Automatic
Beneath the radar of consciousness

Watch for Implicit Memory of Trauma

- Notice that….
- Wow! What just happened
- Did you feel the change in….
- Noting somatic communication
  - “The body knows the score”
- Gentle exposure to changing somatic
  - sensory motor experience

Research on PTSD Treatments

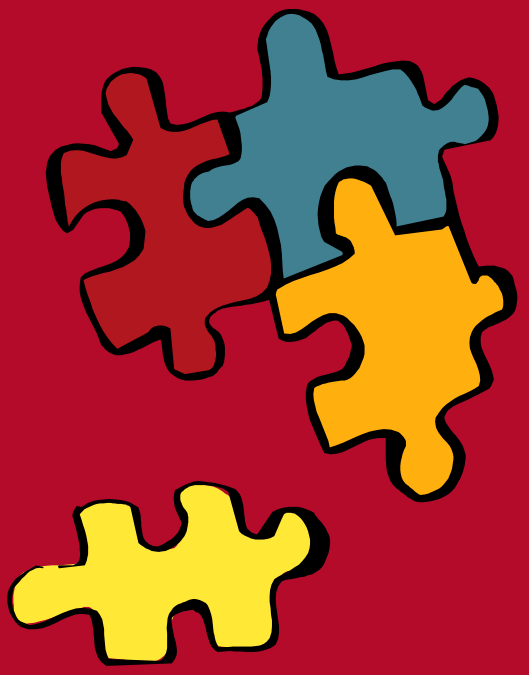
- Institute of Medicine (IOM) 2007 Review
  - Thorough review of psychotherapy research for PTSD (requested by the VA)
- Treatments not found to have clear empirical support:
  - EMDR, group therapy, hypnotherapy, eclectic, CBT alone….
- Exceptions: review found strong efficacy of exposure:
  - Prolonged Exposure (PE)
  - Cognitive Processing Therapy (CPT)

Exposure

- Imaginal exposure (trauma memory)
  - Exposes client to memory of the trauma in structured, controlled way
  - Trauma exposure helps client in two ways:
    - Helps reduce anxiety associated with trauma memory (via extinction of conditioned fear)
    - Helps client organize memory into coherent narrative (calms overactive amygdala)
  - Generally need minimum of 12 sessions (CBT, PE, CPT)
    - CBT approach starts with psychoeducation, anxiety management, and coping skills
    - Minimum 4-6 imaginal exposure sessions (temp. increase of anxiety and re-experiencing symptoms)
    - Cognitive processing of trauma memory & associated meaning (beliefs)
- Situational exposure (CBT & PE)
  - targets avoidance of trauma-related situations (and agoraphobic avoidance)
- Interoceptive exposure
  - Targets “fear of fear” or somatic phobia (treatment for panic disorder)

Impaired Information Processing in Post-Traumatic Stress Disorder

Dissociation at time of trauma (encoding)
Fragmented, "jigsaw" memories
images, emotions, bodily sensations, cognitions……..
dis-integrated



Watch for Implicit Memory of Trauma

- Muscle tension
- Motor impulses
- Heart rate
- Facial expression
- Trembling
- Breathing rate
- Mood changes

Dual Processing Theory

- **Limitations of the "fear network" theory – doesn't account for implicit memory:**
  - **Verbally accessible memories (VAMs) on the conscious memory level. VAMs can be accessed in therapy through deliberate recall.**
  - **Situationally accessible memories (SAMs) non-conscious. SAMs are only accessible through exposure cues that activate the non-conscious network** (Brewin, Dalgleish, and Joseph, 1996).

The Explicit system

- Verbally accessible memory (VAM) system—the narrative—autobiographic
  - Can be deliberately retrieved (Brewin, 2005)
  - Cortex and hippocampus
  - Past, present, and future
  - Available to verbally communicate
  - Restricted by attention and arousal
- Traumatized people use the VAM system to evaluate the trauma
  - They ask themselves “could it have been prevented?”
  - “What are the consequences….the meaning?”

The Explicit system

- VAM system memories are accompanied by “secondary emotions” (not experienced at the time of the trauma)
  - Directed at the past—i.e. regret or anger about the risks taken
  - Often involves guilt or shame over perceived failure or not preventing the event
  - Thoughts about the future—i.e. sadness at the loss of cherished plans or hopeless at the thought of not finding fulfillment

The Implicit System

- Lower level perceptual processing—too briefly apprehended to be bounded together in consciousness memory required for VAMs
  - Sights
  - Sounds
  - Physiological sensations including changes in heart rates, temp, or pain

The Implicit System

- Primary emotions—fear, horror, helplessness
- Accounts for flashbacks that can be triggered involuntary by cues related to the trauma (sight/sounds etc.)
- Not structured by verbally coded memories—therefore more extensive
- The more drawn out the trauma, the greater the tendency to experience a range of sensations and emotion
- Difficult to access in therapy

Client Education

- Every time you go through this exposure exercise it will get easier.
- The higher parts of your brain, will rewire to put the brakes on the alarm button in the lower part of your brain.

Converting traumatic memories into meaning

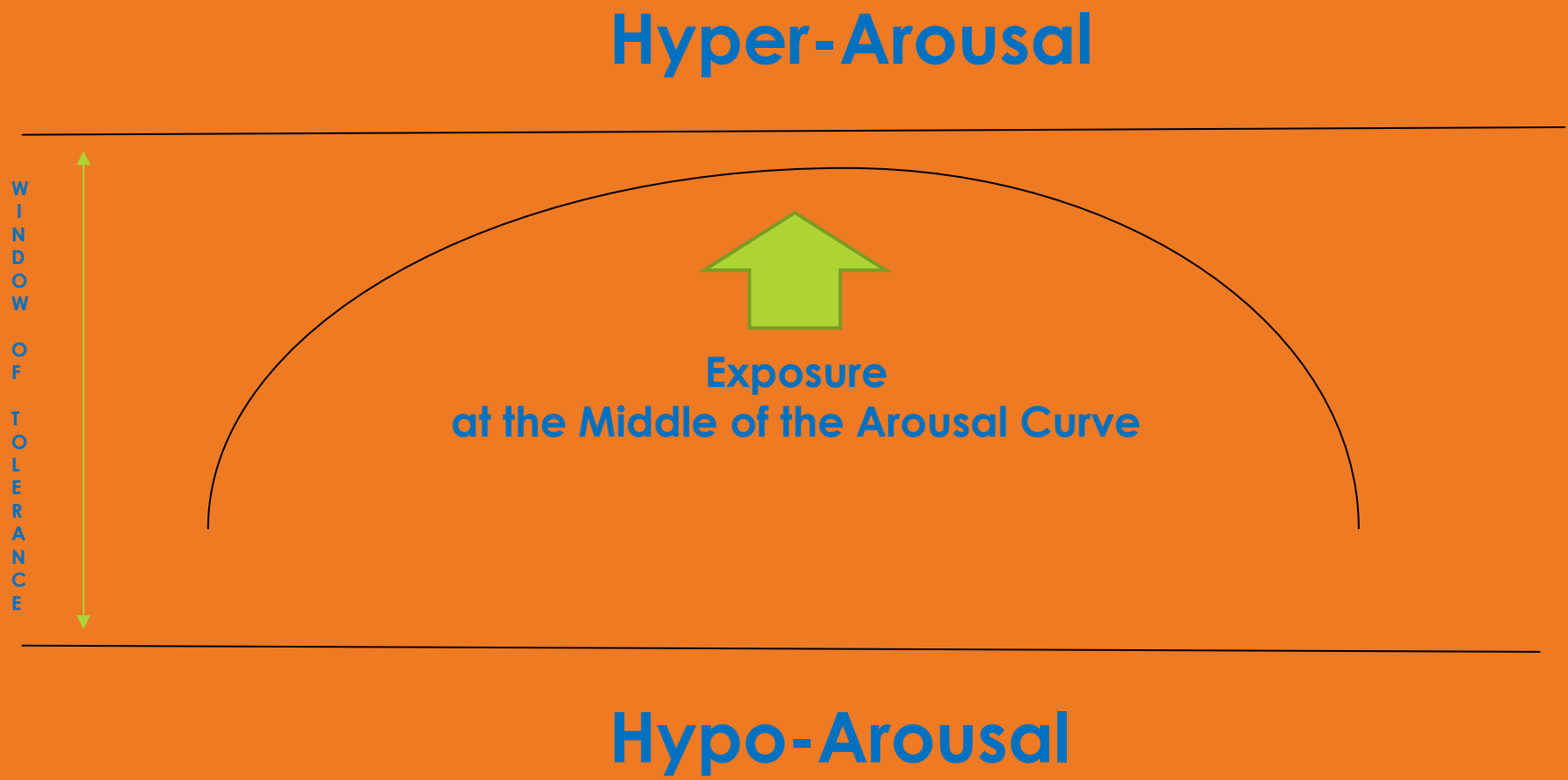
- Traumatic memories are fragmented and disorganized into “hotspots” which can spur flashbacks
- Hotspots occur where there is maximal functioning separation between SAMs and VAMs (i.e. less integration) (Brewin, 2005)
- They need to be integrated and converted into a coherent and an organized form to reduce the risk intrusions into flashbacks (Ehlers & Clark, 2000; Conway & Playdell-Pearch, 2000)

Client Education

- Step-by-step. I am going to help you expose yourself to the cues that trigger the flashbacks so that you can bring them under control.

Explicit and Implicit Integration

- The process needs to be repeated for:
  - Neuroplasticity—the inverted “U”
  - To neutralize the traumatizing quality of the SAM system
  - So that VAMs can compete with SAMs and integrate them
    - The new VAM system puts the SAM system in perspective


Hyper-Arousal
WINDOW OF TOLERANCE
Exposure
at the Middle of the Arousal Curve
Hypo-Arousal

Client Education

- By getting your memory systems in sync, what had triggered flashbacks will fade away.
- Those flashbacks will lose their ever presence and be placed where they belong, in the past as you develop a meaningful future.

Continuum of Detachment

- **Traumatized people can experience:**
  - **Mild detachment or absorption: involving a breakdown in the ability to notice outside events and extending to an altered sense of self.**
  - **Moderate detachment: involving feelings of depersonalization and derealization. The person sees himself as if from afar as an observer.**
  - **Extreme detachment: involving a state of unresponsiveness. The person can act catatonic and have no sense of self or time.** (Allen, 2001)

Affective Regulation of Condition Emotional Response (CERS)

- The skill of perceiving, labeling, and accepting emotion
- Identifying and modifying thoughts that exacerbate emotions
- Practical action—act in concert with values
- Insight into why/how the emotions are coming up
- Titrate the exposure within the window of tolerance in the middle of the inverse "U"
  - Highest affect in the middle of the session then calm at the intensity curve at the end

Exposure

- An activity that provokes or triggers memories of the traumatic event:
  - Repeated or extended (prolonged) to objectively harmless but feared stimulus
  - For at least 20 minutes allows enough time to habituate and enough time to recoup with sufficient support
  - Also allows for the release of BE release
  - Start low—go slow

Exposure

Goal—for traumatic memories to lose their power

- a disparity between what a client is feeling (i.e. fear) and the objective reality that there is nothing to fear in the current environment
- Counterconditioning—the presence of positive phenomena that are antithetical to physical or psychological danger. "Cells that fire out of link lose their link." LTD

Client Education

- Delay tension reduction behaviors
  - "Urge surfing"-ride it out, they are only temporary
  - Hold off long enough to defuse the power
  - The upsetting feeling will eventually become tolerable
  - Don't try to change the feeling but change your relationship to it.

Activation

- Conditioned Emotional Responses (CERs e.g. fear, sadness, or horror)
- CERs are critical to trauma processing to extinguish emotional-cognitive associations to a given trauma memory must be:
  - Activated
  - Not reinforced
  - Counter-conditioned

Dissociative Disorders

- Depersonalization/Derealization disorders + persistent or reoccurring experiences of unreality from mind, self, body, and/or surroundings
- Dissociative amnesia – psychogenic inability to recall autobiographical info. Specifier—dissociative
- Dissociative identity disorder (DID)—2 or more personalities with reoccurring memory "gaps" (episodes of amnesia can include possession)

Dissociative Dynamics

- Because the development of a coherent and durable sense of self thrives on safety and positive attachment:
  - When interpersonal environment is dangerous hypervigilance and attention is drawn outward away from the development of a coherent self-system
  - Attention inward could be punished
  - Internal representations could be fragmented

"Identity Training" from Dissociation

- Therapy entails helping the client build a coherent and positive model of the self by facilitating self-exploration and self-reference
  - Helping the client identify, label, accept feelings, and needs
  - Development of a coherent internal life (DMN) and self-determination (EN)

“Identity training” from Dissociation

- Because relational schemas (internal working model—attachment styles) are framed before explicit memory, their implicit nature are “triggered” by situations & feelings states that need reconditioning—activation—reconsolidation
  - Emergent “relational feedback” do not contain the contextual representation of the past (i.e. abuse)
  - “corrective emotional experience” (psychodynamic)

PTSD Treatment

- Increased size and activity of DLPFC
- Increased size and activity of the hippocampus
- Decreased activity of the amygdala
- SNS activity within the window of tolerence
- Decreased PICs
- Recalibrated HPA

Orienting Response, REM, and Memory

- Somatic stimulation of the orienting response (i.e. via EMDR, EFT, acupressure etc.) involve:
  - *Shto takoe?* (Что такое? or *What is it?)*
  - Reorienting of attention -- triggered automatically when a sudden movement grabs attention or intentionally when you chose to look at an object
  - The reorienting of attention requires you to release your focus on one location so that it can shift to a new location
- The shift in attention involves:
  - The orienting response (Sokolov, 1990)
  - Induces REM like state
- Both facilitate cortical integration of memories (Stickgold, 2002)

Orienting and Recoding

- A stimulus that prompts a person to notice what happens next primes PFC activity.
- Coding in novelty, an unexpected somatic sensation, integrates PFC, anterior cingular cortex, hippocampus, and basal ganglia circuits by moderate bursts of dopamine,
  - orienting serves as a sort of a kickstart to the connectivity between the executive and the salience networks

Shifts in attention and asymmetry

- **Why activate the RH when it is already overactive? How about tapping the right hand and/or foot?**
- **The right limb tapping method still includes:**
  - **reorientation response**
  - **attentional shift**
  - **grounding**
- **This method is portable—the client can practice on his own (neuroplasticity)**

Client Education

- I’m going to ask you to direct your attention to the specific movement while at the same time you describe the traumatic event.
- This will help you reset your brain so that it will no longer be stuck in the past and you can move ahead to a positive future.

BBT and PTSD

- Phase 1: Psychological first aid—stabilizing ASD and preventing PTSD
- Phase 2: Integration of implicit and explicit memory systems:
  - Explicit memories (VAMs) –The conscious memory level, which can be accessed in therapy through deliberate recall.
  - Implicit memories (SAMs) –The nonconscious, which are only accessible through cues that activate the network.
  - Aided by somatic reorienting method
  - Phase 3: Posttraumatic growth—developing meaning and direction (Constructivism)

SAFE from PTSD

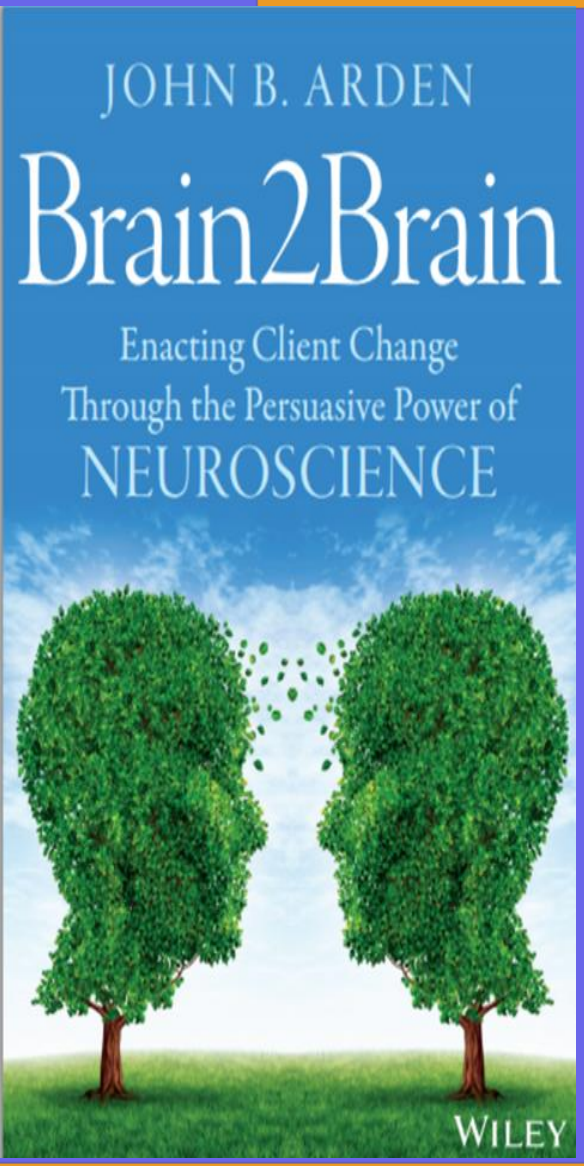
"S" is for stabilizing. To establish a healthy foundation for recovery.

"A" is for acceptance of what happened.

"F" is for future. To visualize a hopeful future--posttraumatic growth.

"E" is for exposure. To confront the feelings and sensations that trigger flashbacks.

References


JOHN B. ARDEN
Brain2Brain
Enacting Client Change
Through the Persuasive Power of
NEUROSCIENCE
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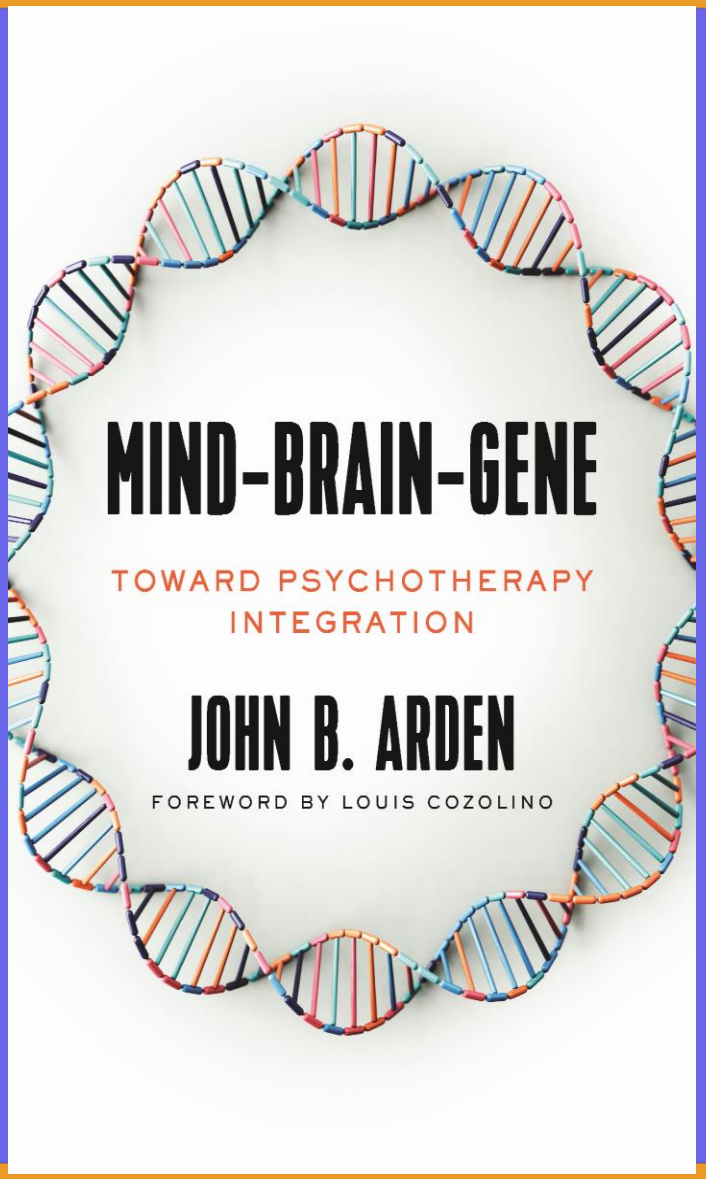
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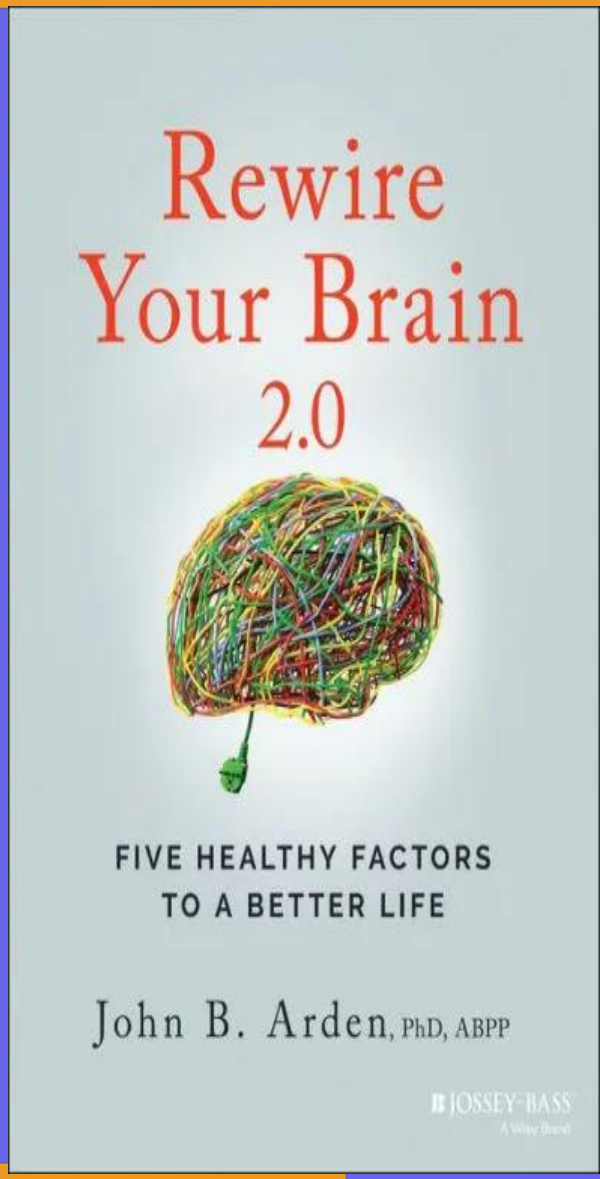
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