Understanding Traumatic Memories

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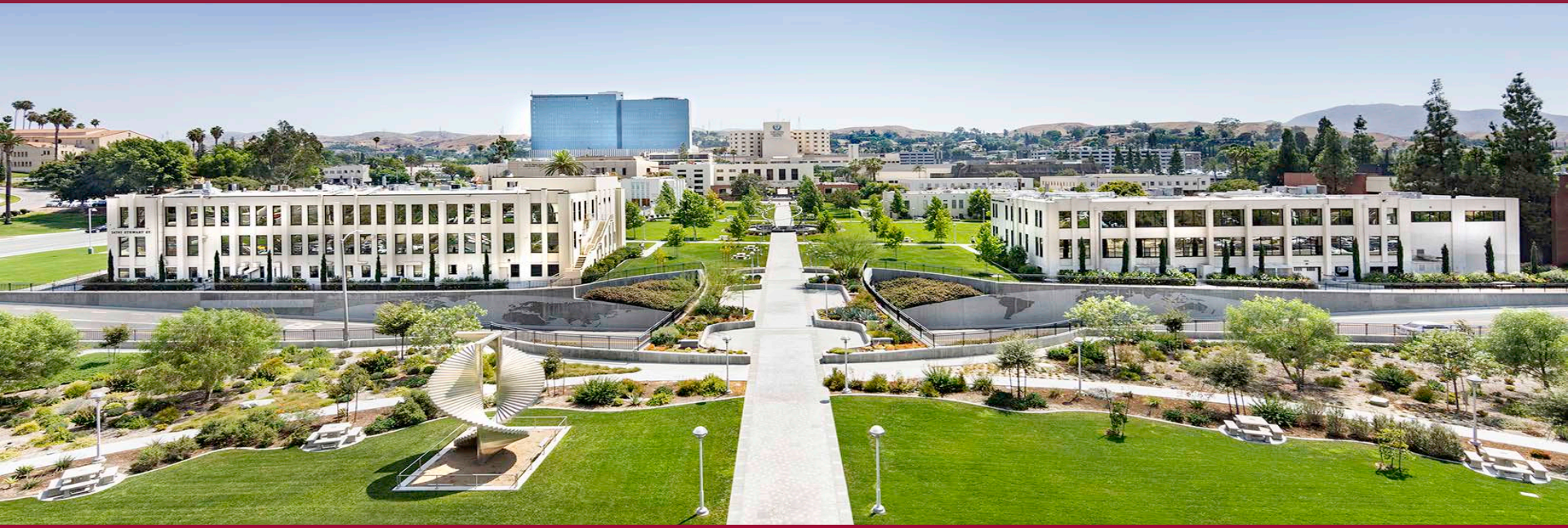
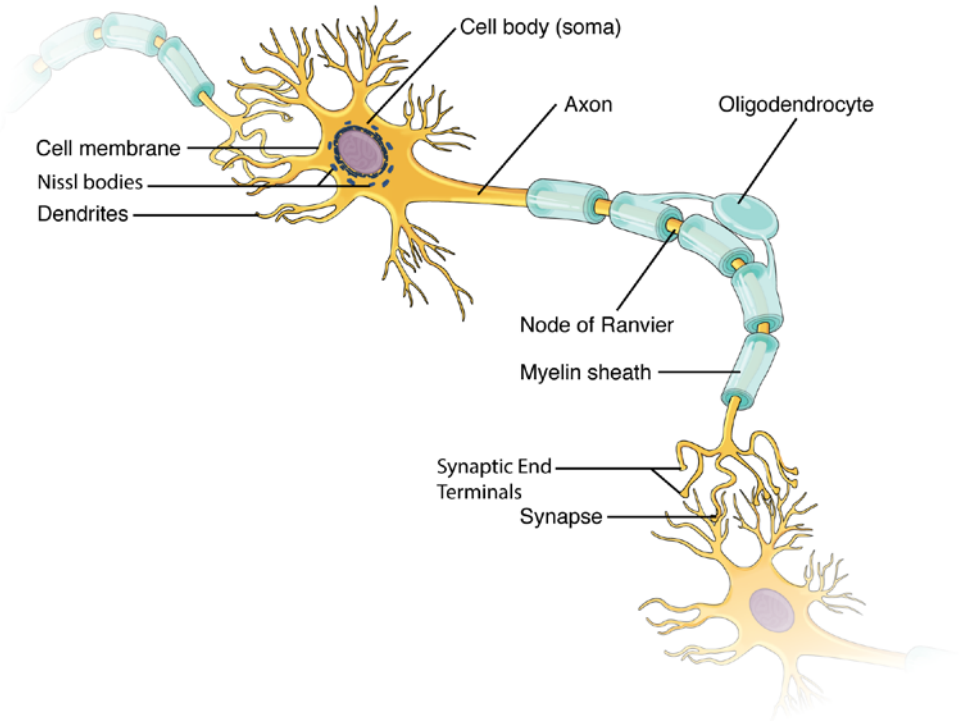


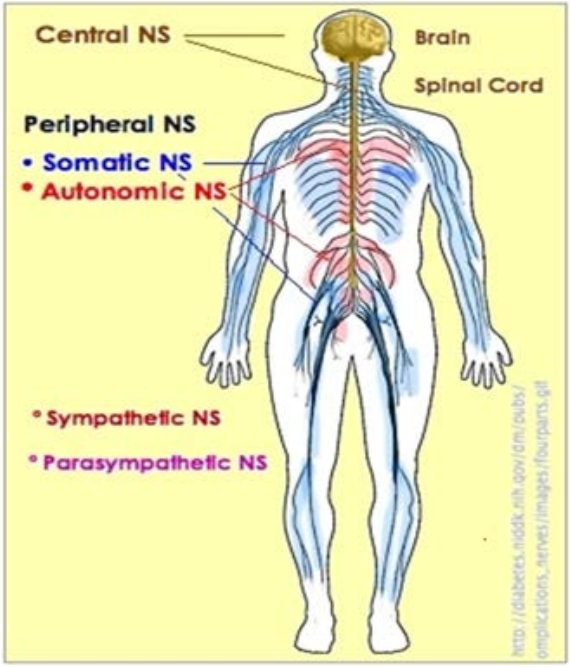
Brian Cells

- Neurons
  - Uses electrical impulses
  - Communicates via neurotransmitters
  - Has axon/dendrites
- Glial Cells
  - Supports cells
  - Macro/Microglia
  - Ependymal
  - Astrocytes
  - Oligodentrocytes



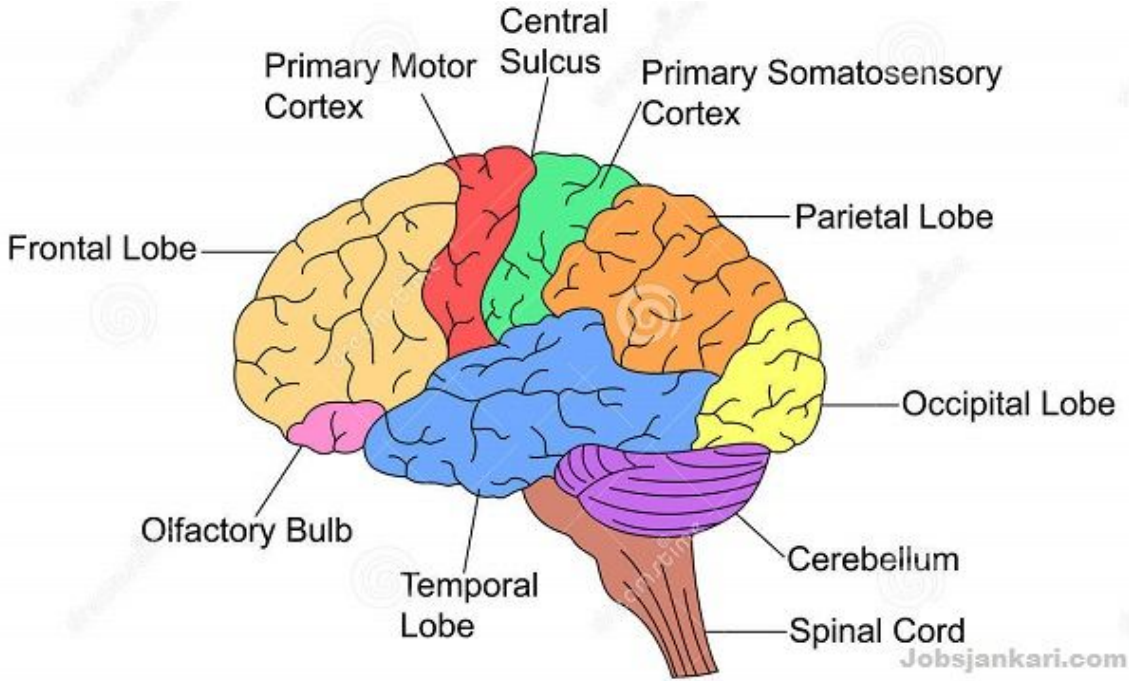
The Human Nervous System

- Central Nervous System (CNS)
  - ~ Brain
  - ~ Spinal Column
- Peripheral Nervous System (PNS)
  - ~ Somatic Nervous System
    - Sensory nervous system (afferent) – *Sensory input*
    - Motor nervous system (efferent) – *Motor output*
  - ~ Autonomic Nervous System (ANS)
    - Sympathetic Nervous System (SNS) - Alert
    - Parasympathetic Nervous System (PSNS) - Calm

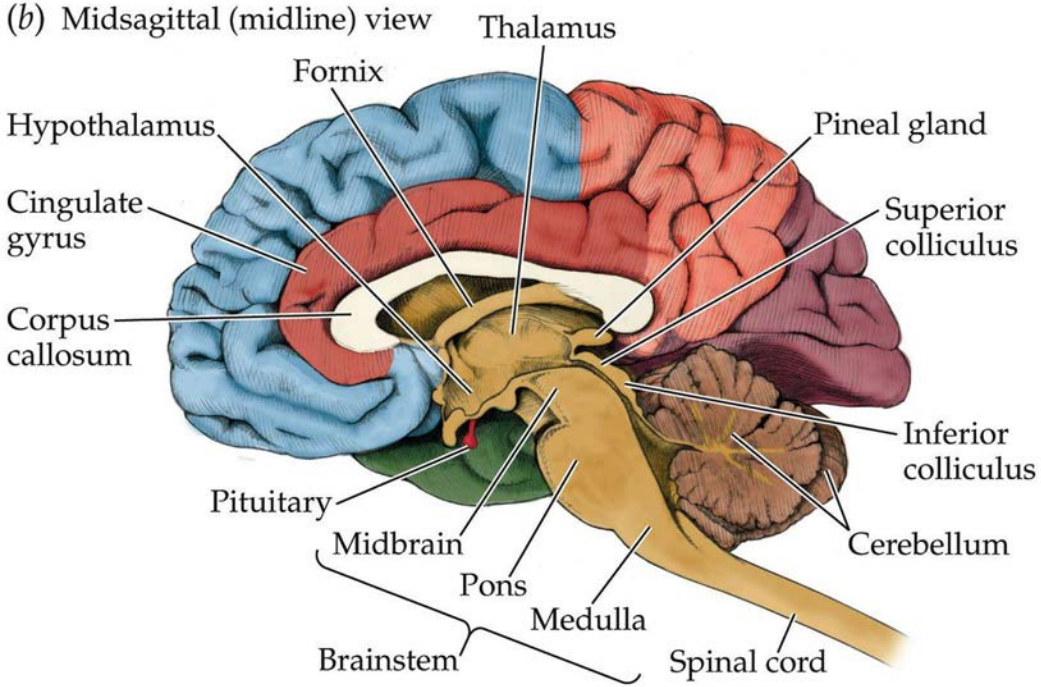


The Human Brain

- » Frontal Lobe
  - ~ Executive planning/Inhibition
- » Primary Motor Cortex
  - ~ Initiation of motor activity
- » Primary Somatosensory Cortex
  - ~ Sensory input
- » Parietal Lobe
  - ~ Coordination of sensory input
- » Occipital Lobe
  - ~ Vision
- » Cerebellum
  - ~ Coordination of movement
- » Temporal Lobe
  - ~ Memory storage/speech
- » Olfactory Bulb
  - ~ Smell



Mid Brain



Biological Psychology 6e, Figure 2.12 (Part 2)

Organizing Principle: Three Parts of The Brain

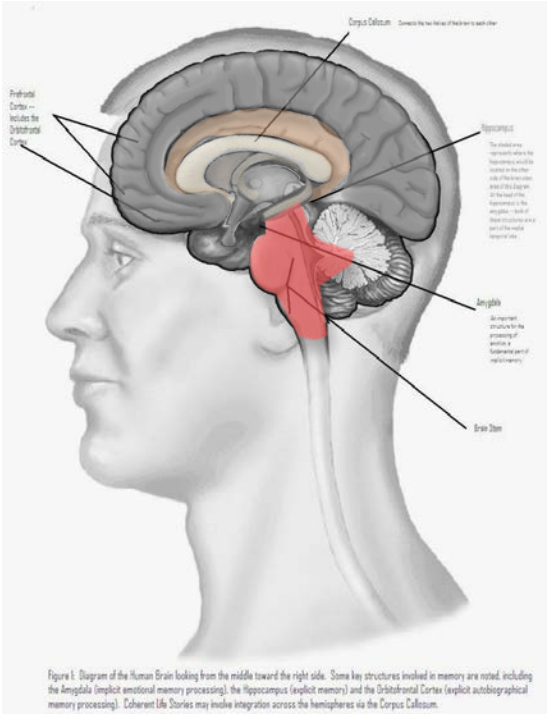
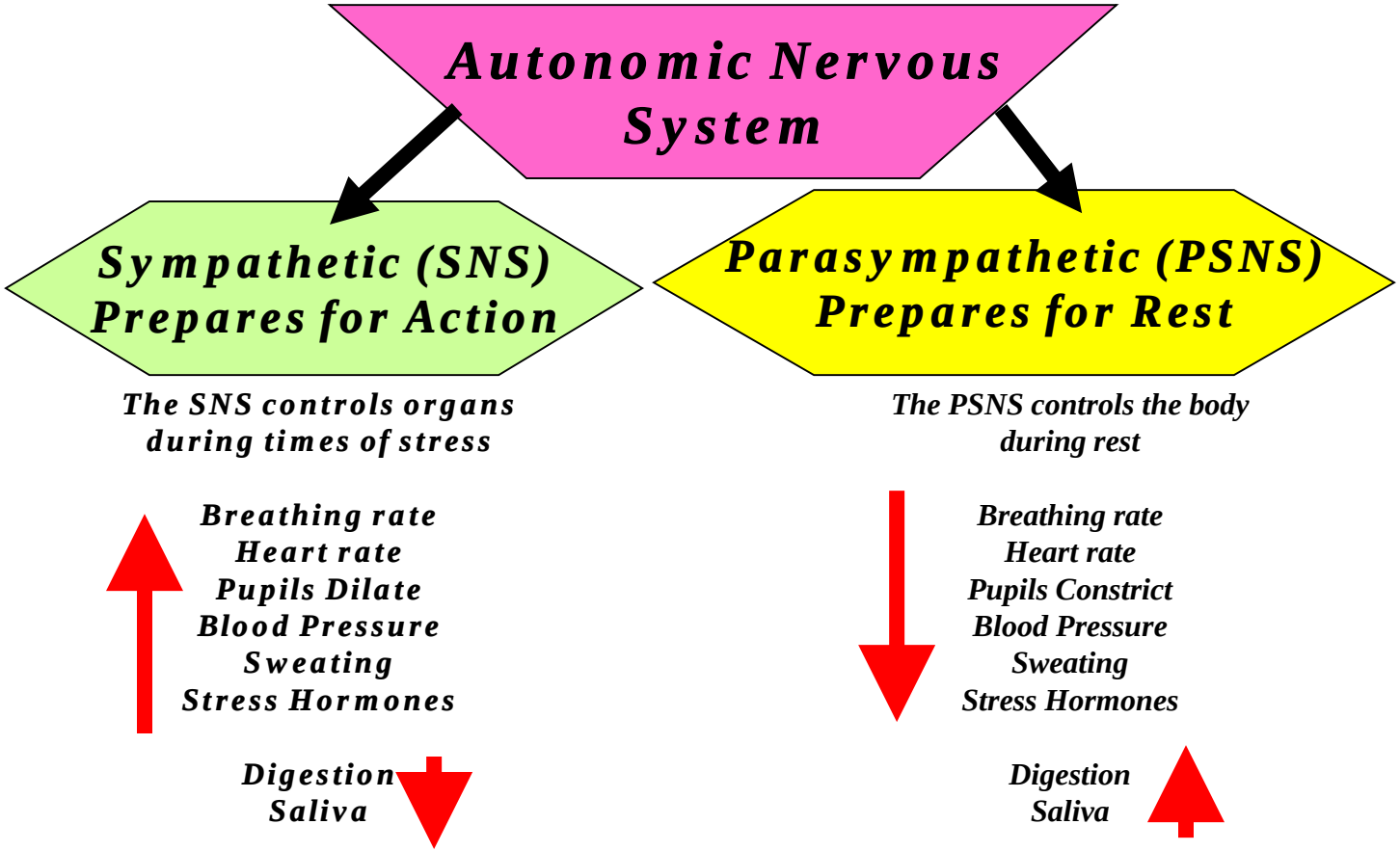


Figure 1: Diagram of the Human Brain looking from the middle toward the right side. Some key structures involved in memory are noted, including the Amygdala (implicit emotional memory processing), the Hippocampus (explicit memory) and the Orbitofrontal Cortex (explicit autobiographical memory processing). Coherent life Stories may involve integration across the hemispheres via the Corpus Callosum.

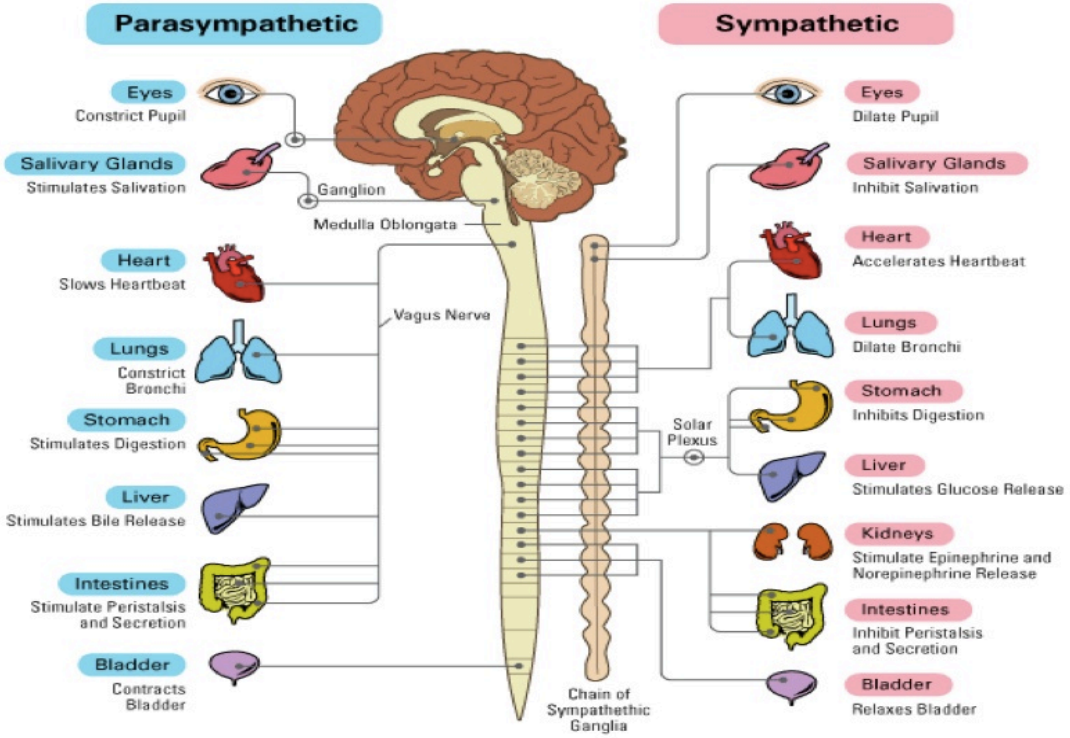
Cortex: Thinking
Integrates input from all 3 parts. Cognition, beliefs, language, thought, speech.

Limbic Area: Emotional
Assesses risk.
Expression and mediation of emotions and feelings, including emotions linked to attachment.

Survival Brain: Instinctual
Carries out "fight, flight, & freeze."
Unconscious.
Digestion, reproduction, circulation, breathing - responds to sensation.


Autonomic Nervous System
Sympathetic (SNS) Prepares for Action
Parasympathetic (PSNS) Prepares for Rest
The SNS controls organs during times of stress
The PSNS controls the body during rest
Breathing rate
Heart rate
Pupils Dilate
Blood Pressure
Sweating
Stress Hormones
Digestion
Saliva
Breathing rate
Heart rate
Pupils Constrict
Blood Pressure
Sweating
Stress Hormones
Digestion
Saliva

Schema Explaining How Parasympathetic and Sympathetic Nervous Systems Regulate Functioning Organs



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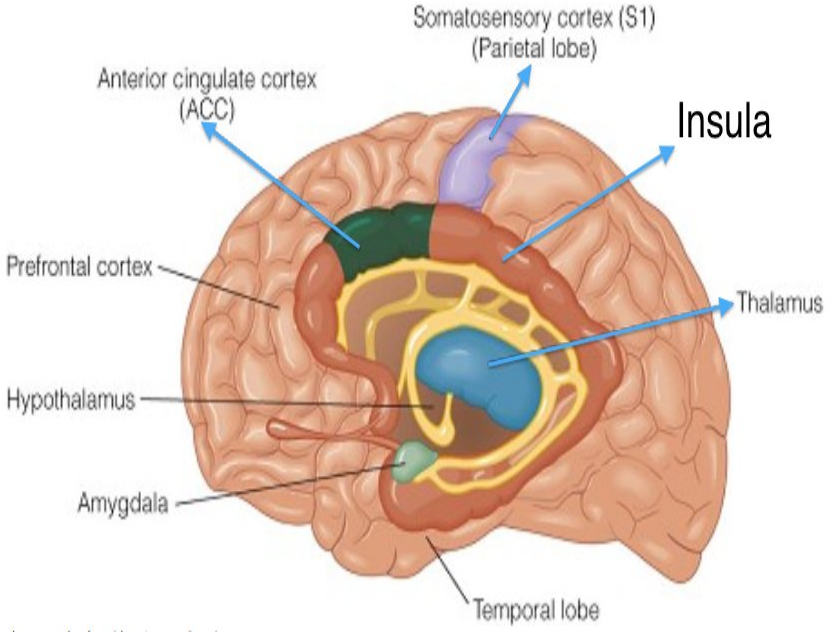
Interoception & the Insula

Our ability to observe body sensations
in response to how we think, feel and move

- The insula is a part of the brain that helps body and mind communicate to one another.
- It reads physical states of the body (sensations) like pain, an itch, temperature
- It communicates to the Medial Prefrontal cortex (thinking brain) to take action to keep the body in a state of internal balance
- Body awareness can reduce impulsivity and promote emotion regulation and clearer thinking. Paulus, et al (2010)



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Interoception & the Insula

- Through *Tracking* - the intentional awareness of internal sensations – a person may begin to notice subtle sensations throughout their bodies and use this awareness to experience a richer sense of self, increase in social skills, and better control of emotions (Miller-Karas, 2015).

- Sensory awareness skills that **focus on pleasant or neutral sensations** may establish new neural networks, and result in positive neural pathways that compete with or replace existing negative neural pathways. (Grabbe, et al 2019)

What is Stress?

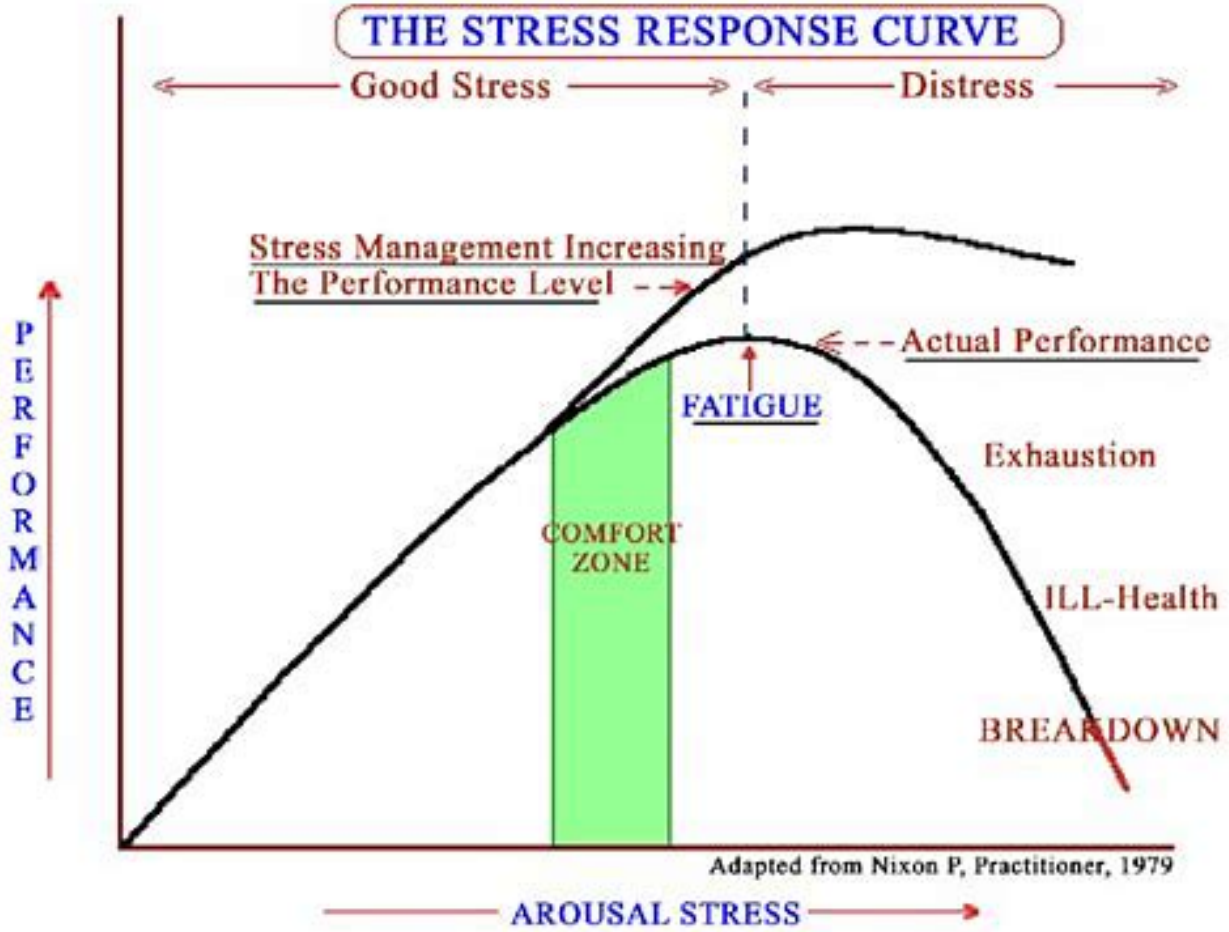
- Stress is the combined mental and physical response of the person to some perceived challenge or threat
  - ~***Perception is Key***
- "Flight or Fight Response" – activation of the autonomic nervous system
- Individual reaction to stress can either be ***positive and motivating*** (**Eustress**) or ***negative and overwhelming*** (**Distress**)

Models of Stress

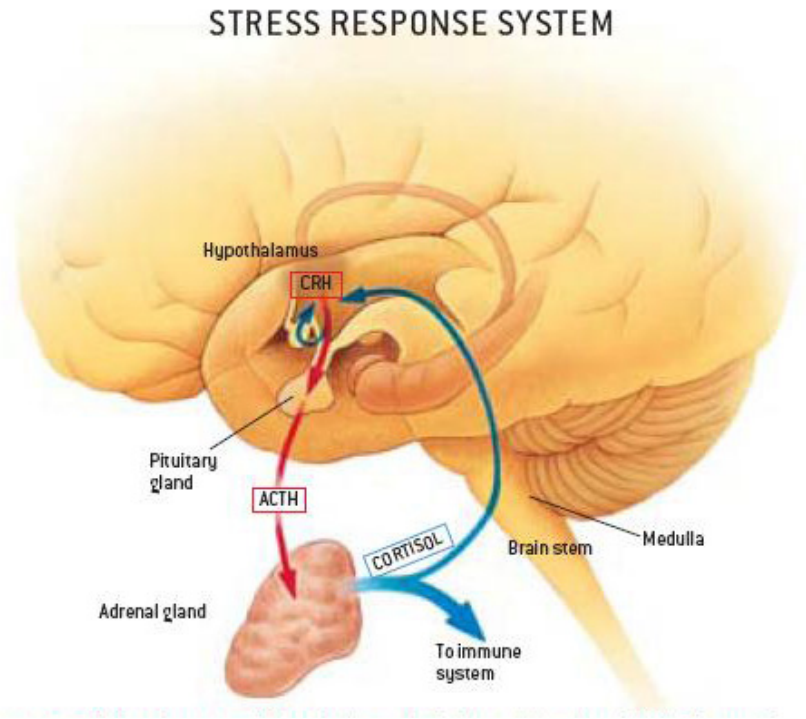
- **Walter Cannon**
  - ~ Proposed "*Fighting or flight"* response – 1915
  - ~ Coined the term *homeostasis* (being in a state of equilibrium)
- **Hans Selye**
  - ~ Proposed "*General Adaptation Syndrome"* – 1936
    - 1) Alarm phase (acute symptoms)
    - 2) Resistance phase (acute symptoms are gone)
    - 3) Exhaustion phase (when 1st stage reaction may be present again or organism failure)
  - ~ Defined stress as *"a nonspecific response of the body to any demand made upon it"*
- **Allostasis** – how the body maintains stability in the face of change (more dynamic)
  - ~ The *set point* to maintain physiological quilibrium
  - ~ *Allostatic load* refers to the cumulative effects of stressors on the body

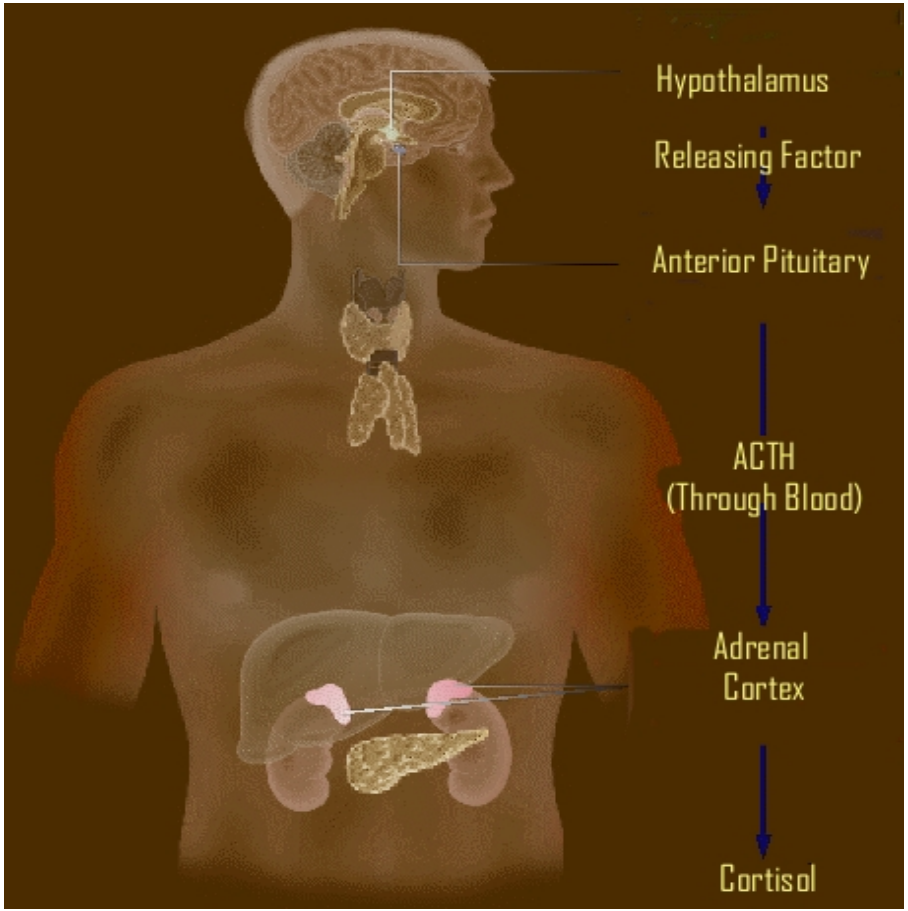
Stages of Stress Response

1. Perceive threat through any senses or thoughts (6th sense or gut feeling)
2. SAM – Sympathetic adrenomedullar system
   - ~ Rapid short lasting responses such as alertness, vigilance, and appraisal
   - ~ Quick release of epinephrine/nor-epinephrine
   - ~ Activates SNS → Activates HPA-axis
3. HPA-axis
   - ~ Slower response leading to release of cortisol
4. Once threat is past PSNS is activated (brings system back into regulation)
5. Adaptation
   - ~ Behavioral/emotional responses to stress
   - ~ Coping mechanisms devlop


THE STRESS RESPONSE CURVE
Good Stress
Distress
Stress Management Increasing
The Performance Level
Actual Performance
FATIGUE
Exhaustion
COMFORT
ZONE
ILL-Health
BREAKDOWN
PERFORMANCE
Adapted from Nixon P, Practitioner, 1979
AROUSAL STRESS

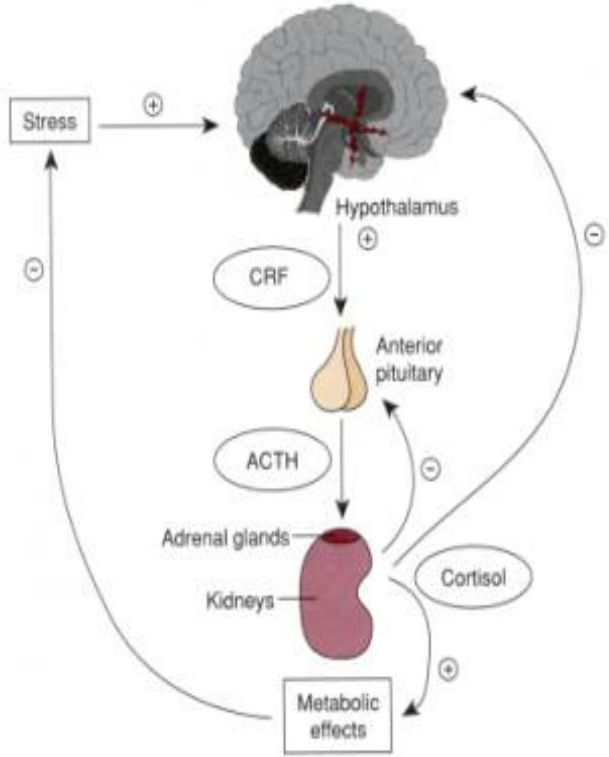
Hyptothalamic-Pituitary Adrenal- Axis

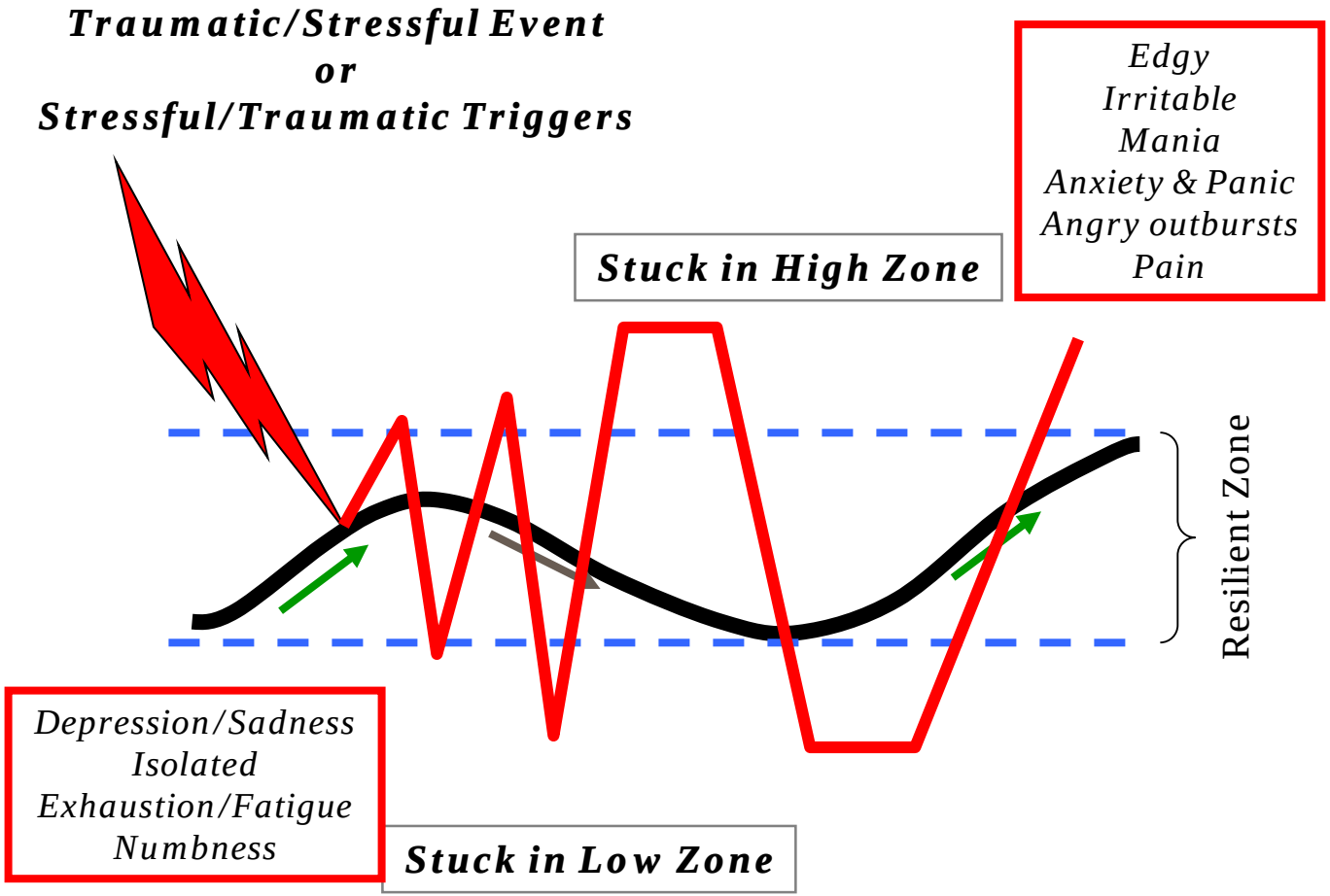



Hypothalamus
Releasing Factor
Anterior Pituitary
ACTH
(Through Blood)
Adrenal
Cortex
Cortisol

Hypothalamic-Pituitary-Adrenal Axis

- The hypothalamic-pituitary-adrenal axis (HPA or HTPA axis), also known as the limbic-hypothalamic-pituitary-adrenal axis (LHPA axis)
- complex set of direct influences and feedback interactions among the hypothalamus (a hollow, funnel-shaped part of the brain), the pituitary gland (a pea-shaped structure located belo the hypothalamus), and the adrenal glands (small, conical organs on top of the kidneys).
- The interactions among these organs constitute the HPA axis, major part of the neuroendocrine system that controls reaction to stress and regulates many body processes, including digestion, the immune system, mood and emotions, sexuality, and energy storage and expenditure.





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Explicit Memory

The process of conscious learning and storing of information like facts and events

Accessed by our <u>intention</u>

- Facts
- Life history on a timeline
  - There is a sense of self & time
  - Develops between 18-24 months of age

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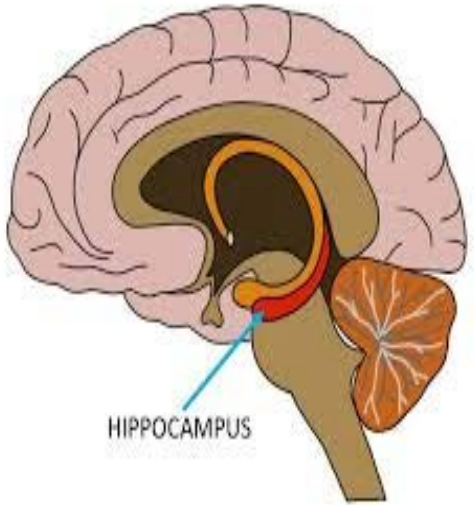
Explicit Memory

The hippocampus processes explicit memory in the cortex

- Stores memories in their proper perspective and place in our life's timeline.
- When the amygdala is highly stimulated:
  - Stress hormones are released which interfere with functioning of the hippocampus.
  - May result in a traumatic experience not being explicitly remembered or remembered in fragments. (van der Kolk, 1994, 1996, 2001)



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Implicit Memories

Includes body memories like sensations associated with traumatic memories

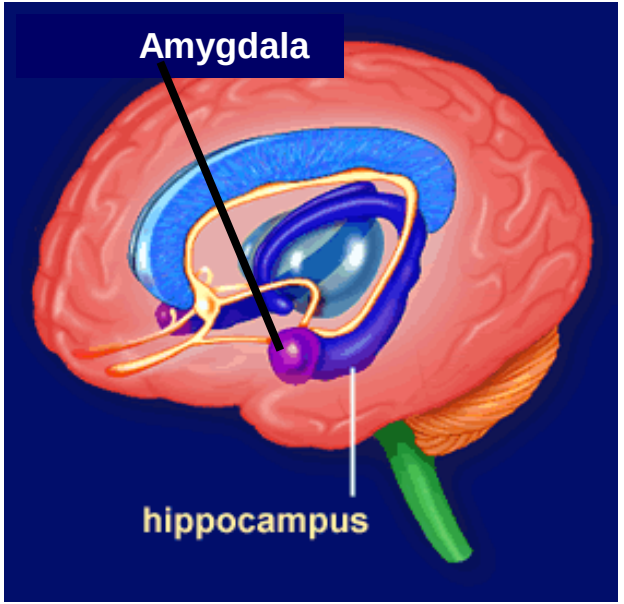
Cues set off implicit memories

- Does not have a sense of self & time
- Develops before birth
- Can be triggered out of the blue

COZOLINO (2002) THE NEUROSCIENCE OF PSYCHOTHERAPY

The Limbic Area: Amygdala

- The amygdala is the appraisal system of the brain.
  - Signals rest of nervous system when there is a threat
  - It creates templates from highly charged emotional memories
    - Positive memories
    - Negative memories



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MEMORY CAPSULE

A Compartment of Memory:

- Holds the implicit memories of an emotionally charged experience.
- The multisensory reminders of a traumatic event can set off an experience in the present moment perceived as occurring in the present moment.

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External Reminder

Visuals (people, places & things)

Sounds

Smells

Internal Reminder

Internal body sensation

Muscle tension

headache

Stomachache

Implicit capsule of traumatic memory

pain, numbness, dizziness, trembling, paralysis, nausea, palpitations, anxiety, terror, shame, anger, rage, flashbacks, nightmares or intrusive thoughts

Scaer, R,(2007) *The Body Bears the Burden*

Managing Distressing Memories

- Exercise
- Get enough quality sleep
- Drink enough water
- Eat healthy foods
- Engage in healthy social connections
- Do not use foods/drugs/alcohol to cope with difficulties
- Seek to engage in more activities that are fun and healthy
- For more information: **On YouTube: "*Arechiga and CRM*"**

The End!