

# Understanding the Psychology of Trauma:

Psychological implications of climate  
change impacts

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# Interdisciplinary Collaboration



# Presentation Outline

- **Neurophysiology of the Human Stress Response**
- **Psychological Impacts of Climate Change: Acute, Gradual, Longterm**
- **Future Directions**

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- **Neurophysiology of the Human Stress Response**
- **Psychology of Climate Change Impacts: Acute, Gradual, Longterm**
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**NEUROCEPTION**

# NEUROCEPTION

*Neuroception, “a neural process, distinct from perception, that is capable of distinguishing environmental (and visceral) features that are safe, dangerous, or life threatening...Neuroception represents a neural process that enables mammals to engage in social behaviors by distinguishing safe from dangerous contexts.”*

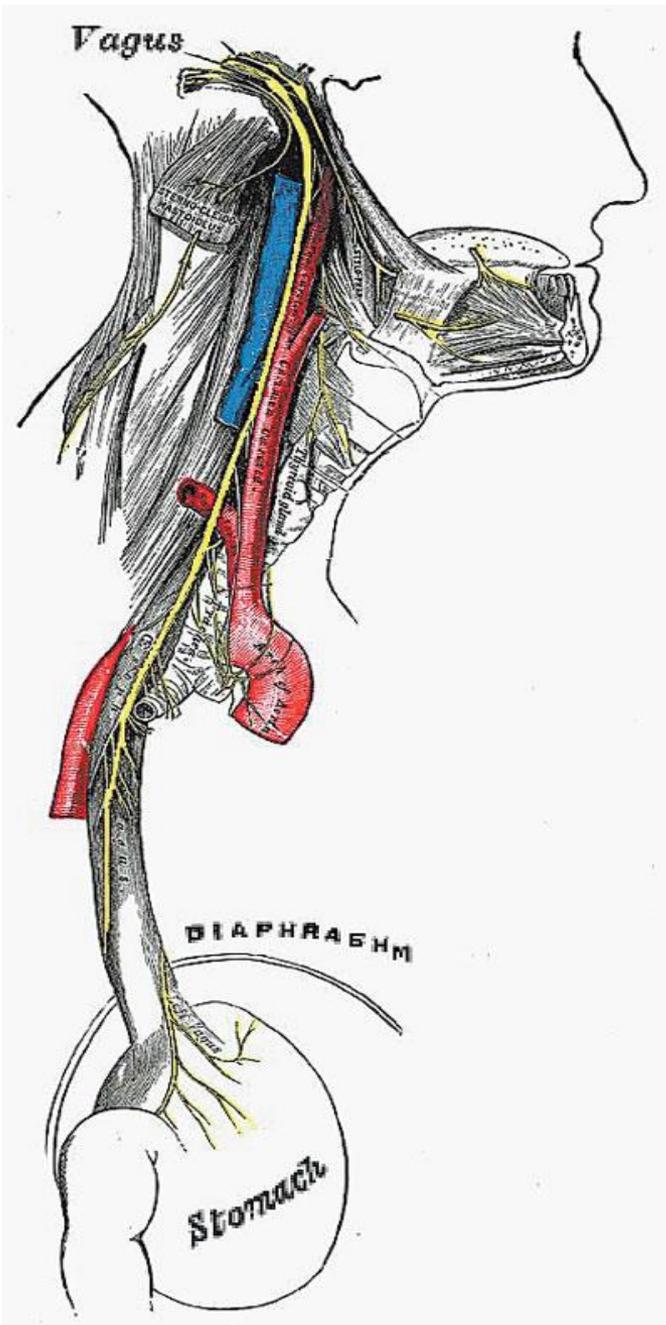
*(Stephen Porges)*

# SURVIVAL

We are biologically primed to seek and respond to survival data.

Where / What is Safe

Where / What is Dangerous



## **The Polyvagal Theory**

Stephen Porges

The Vagus Nerve in three parts, all working simultaneously:

### **Ventral Vagal System:**

Social Engagement/frontal cortex

### **Sympathetic Nervous System:**

Fight/Flight, Freeze - Limbic Brain

### **Dorsal Vagal System:**

Freeze/Immobility/Brainstem

# Human Stress Response 101



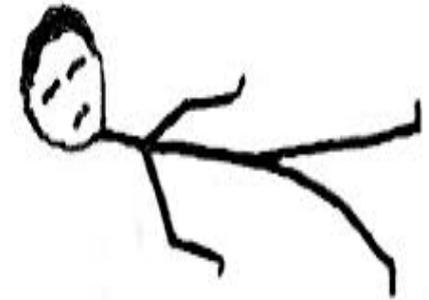
## **SAFETY**

Spontaneously  
engage others:  
Eye contact, facial  
expression, voice  
tone & prosody



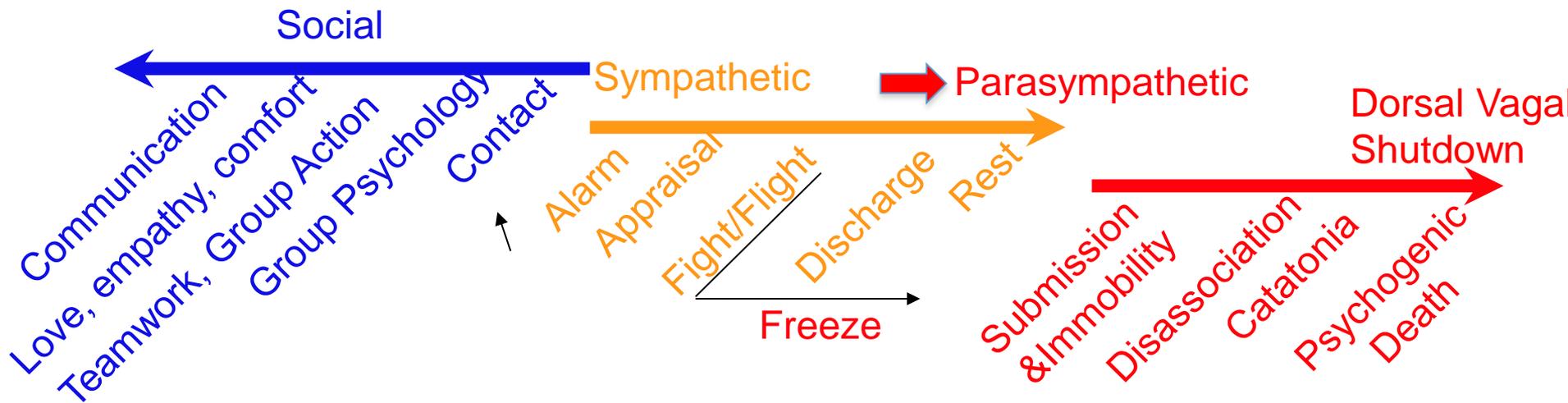
## **DANGER**

Defensive Strategies  
Fight / Flight,  
Mobilization



## **LIFE THREAT / OVERWHELMED DEFENSE SYSTEM**

Shutdown /  
Immobilization



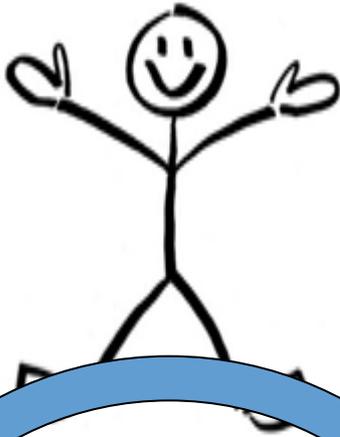
We play our **newest, best card [Social Engagement]** first.

When faced with a threat, if social engagement doesn't work (or has not worked in the past), we try **our older, second card [Fight / Flight]**.

If we are not able to Fight the threat or Flee from the threat, we play our **oldest, last card [Dorsal Vagal Shutdown]**.

If that doesn't work we are in extreme danger of death.

# Human Stress Response



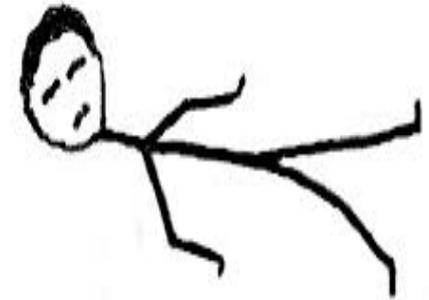
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# Innate capacity for social engagement



.....in the presence of safety

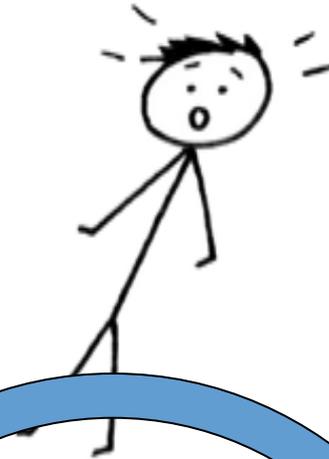


# Human Stress Response



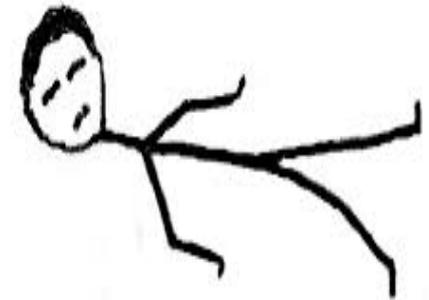
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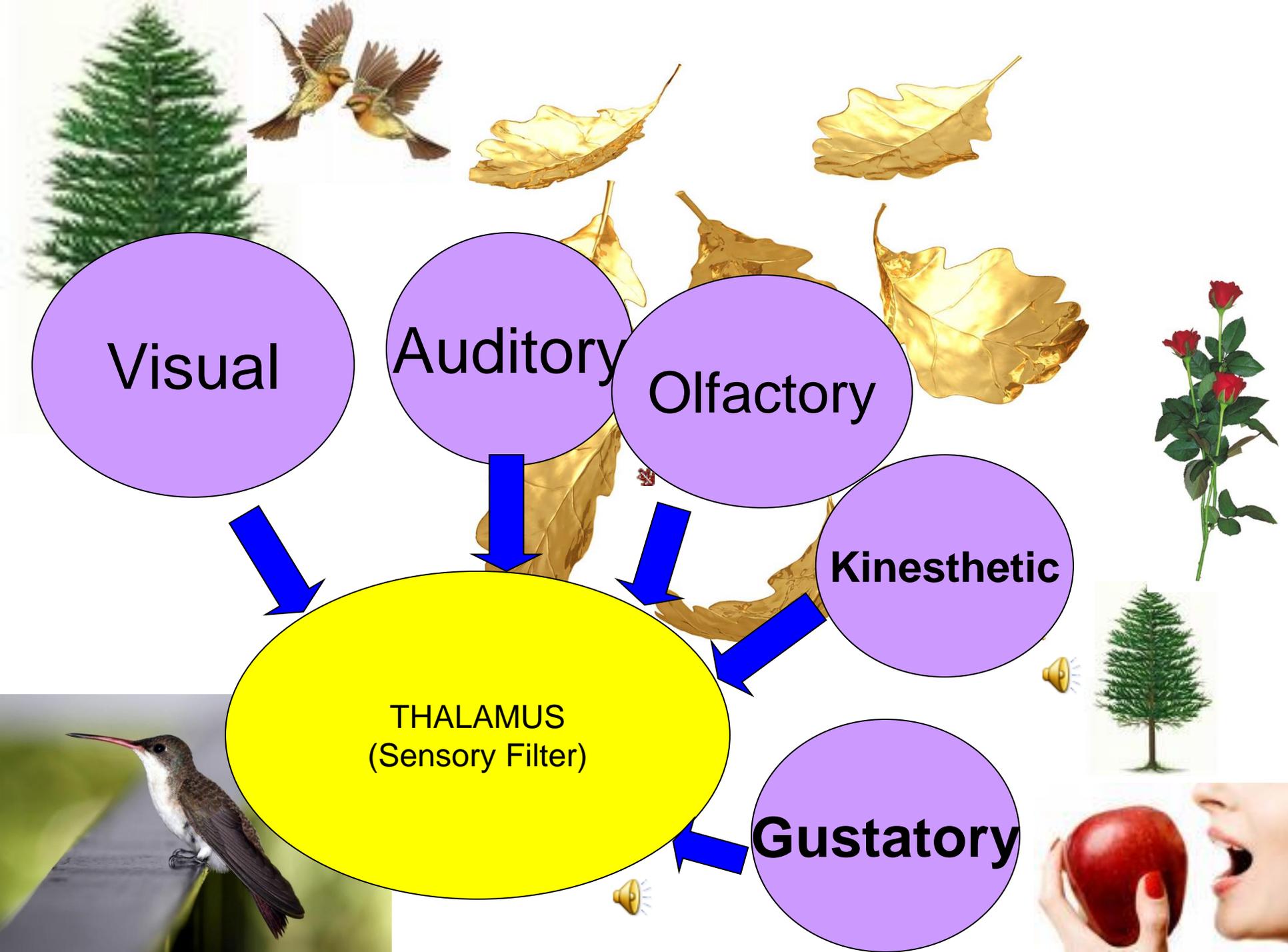


**LIFE THREAT /  
OVERWHELMED  
DEFENSE SYSTEM**

**Shutdown /  
Immobilization**

# Human Stress Response: Fight or Flight





Visual

Auditory

Olfactory

Kinesthetic

THALAMUS  
(Sensory Filter)

Gustatory



**THREAT !!!**

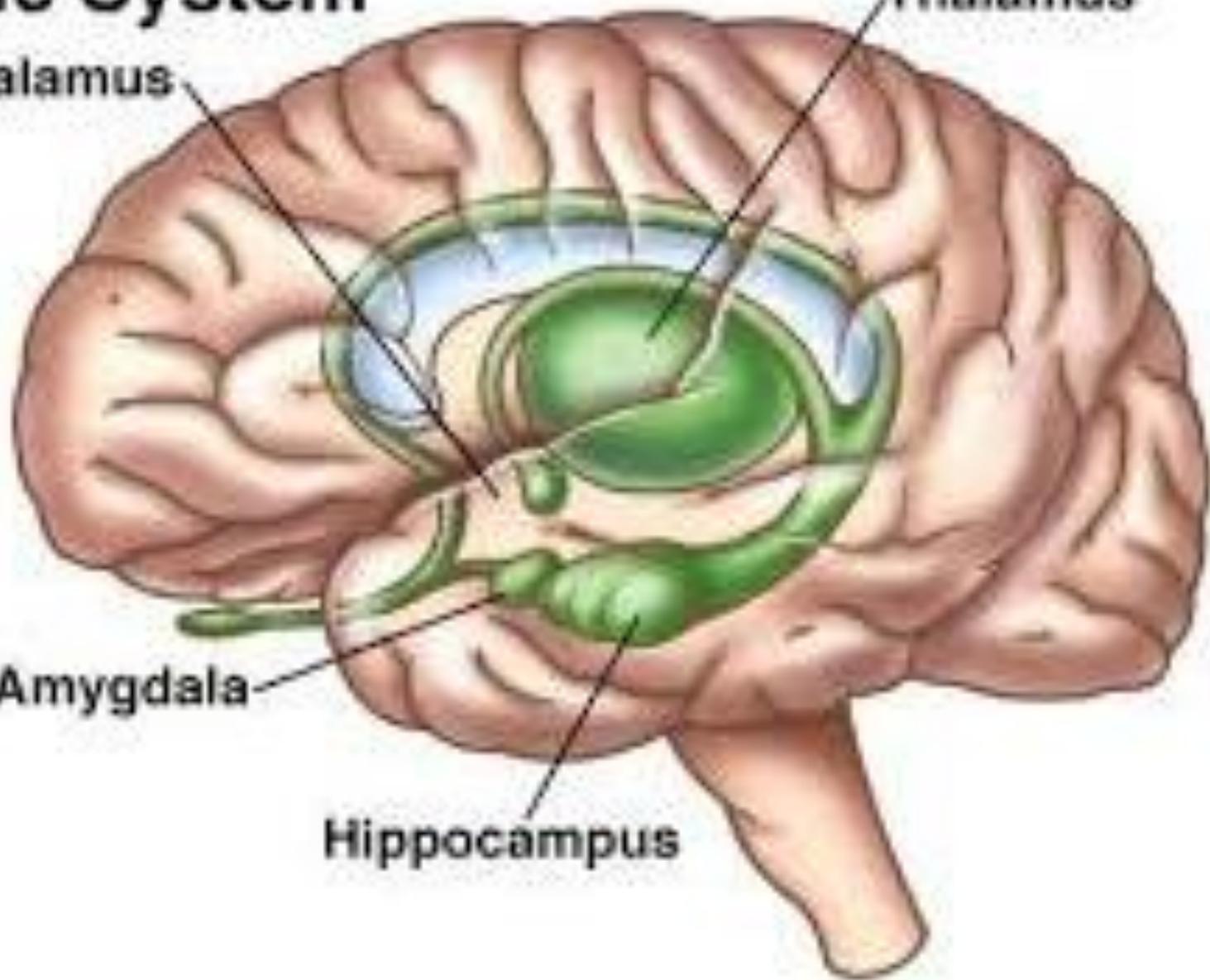
# Limbic System

Hypothalamus

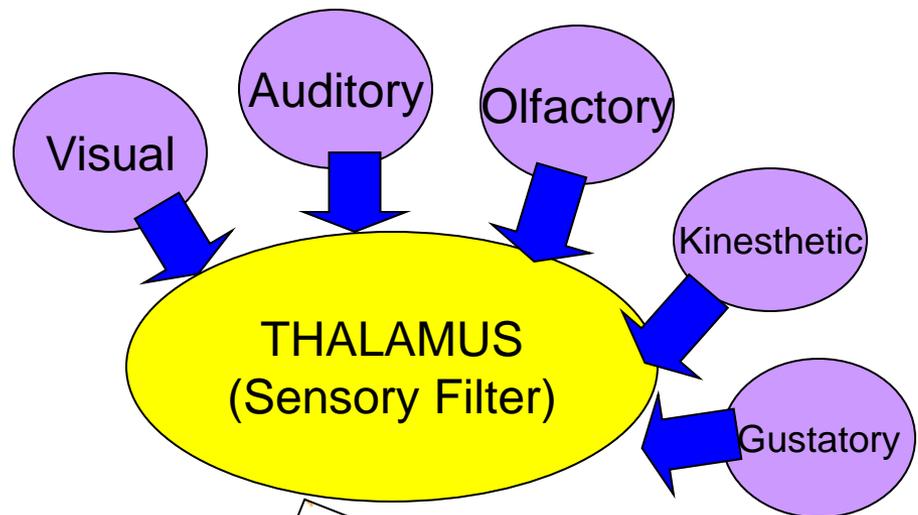
Thalamus

Amygdala

Hippocampus



**PREFRONTAL  
CORTEX:**  
  
Integration and  
Planning



**HIPPOCAMPUS:**  
(organization and  
Integration)



ALERT!! What is  
It? Get ready!

The Amygdala activates the Autonomic Nervous System: Parasympathetic and Sympathetic Nervous Systems

# system

Release of stress hormones: adrenaline, cortisol

Skin blood vessels constrict, causing chills and sweat

Blood vessels constrict in stomach and gastrointestinal tract

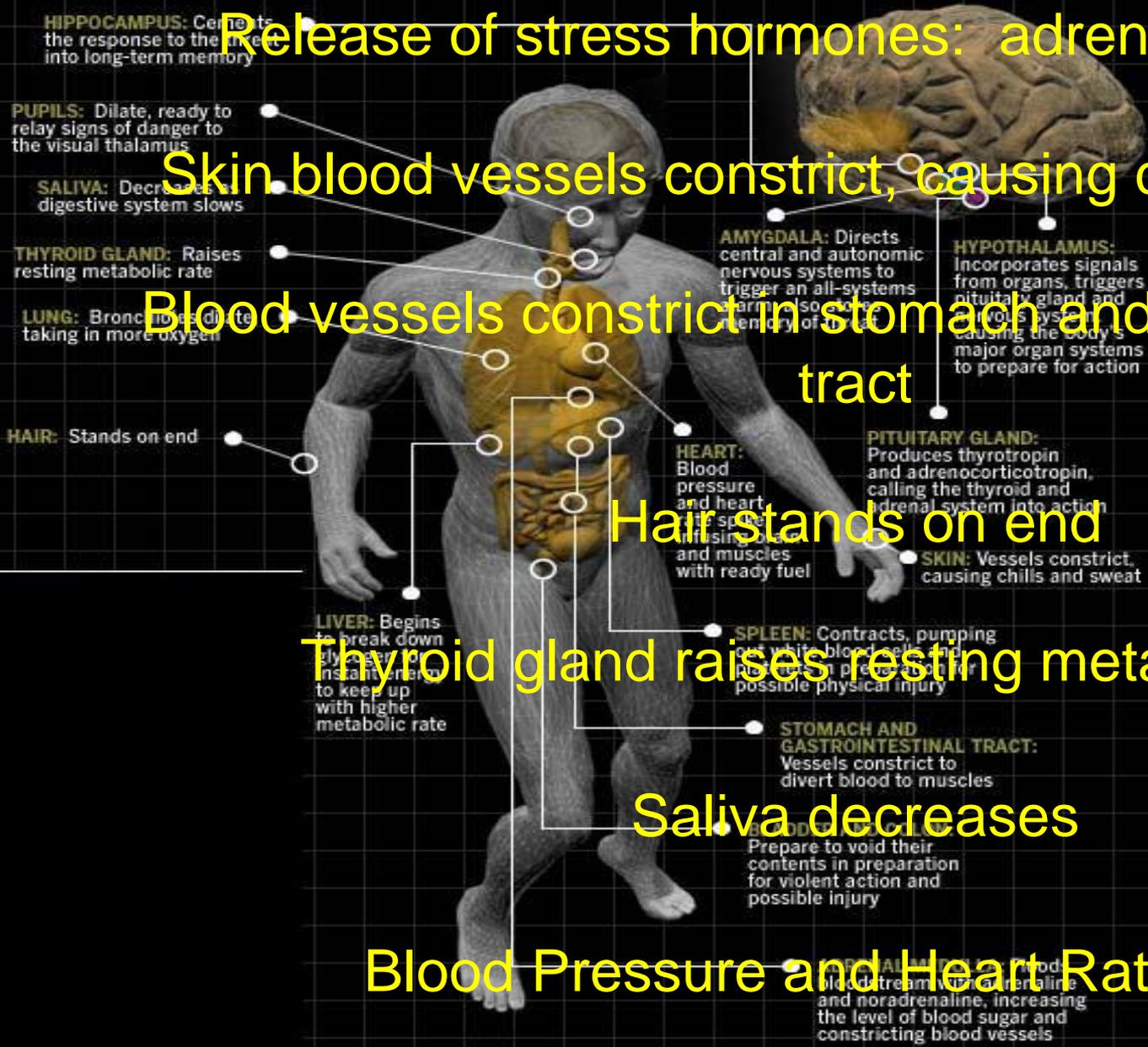
Hair stands on end

Thyroid gland raises resting metabolic rate

Saliva decreases

Blood Pressure and Heart Rate Spike

Digestion Stops



**HIPPOCAMPUS:** Centers the response to the threat into long-term memory

**PUPILS:** Dilate, ready to relay signs of danger to the visual thalamus

**SALIVA:** Decreases as digestive system slows

**THYROID GLAND:** Raises resting metabolic rate

**LUNG:** Bronchioles dilate taking in more oxygen

**HAIR:** Stands on end

**LIVER:** Begins to break down glycogen to instantly energy to keep up with higher metabolic rate

**HEART:** Blood pressure and heart rate spike infusing blood and muscles with ready fuel

**SPLEEN:** Contracts, pumping out white blood cells and antibodies in preparation for possible physical injury

**STOMACH AND GASTROINTESTINAL TRACT:** Vessels constrict to divert blood to muscles

**BLOOD IN THE BOWEL:** Prepare to void their contents in preparation for violent action and possible injury

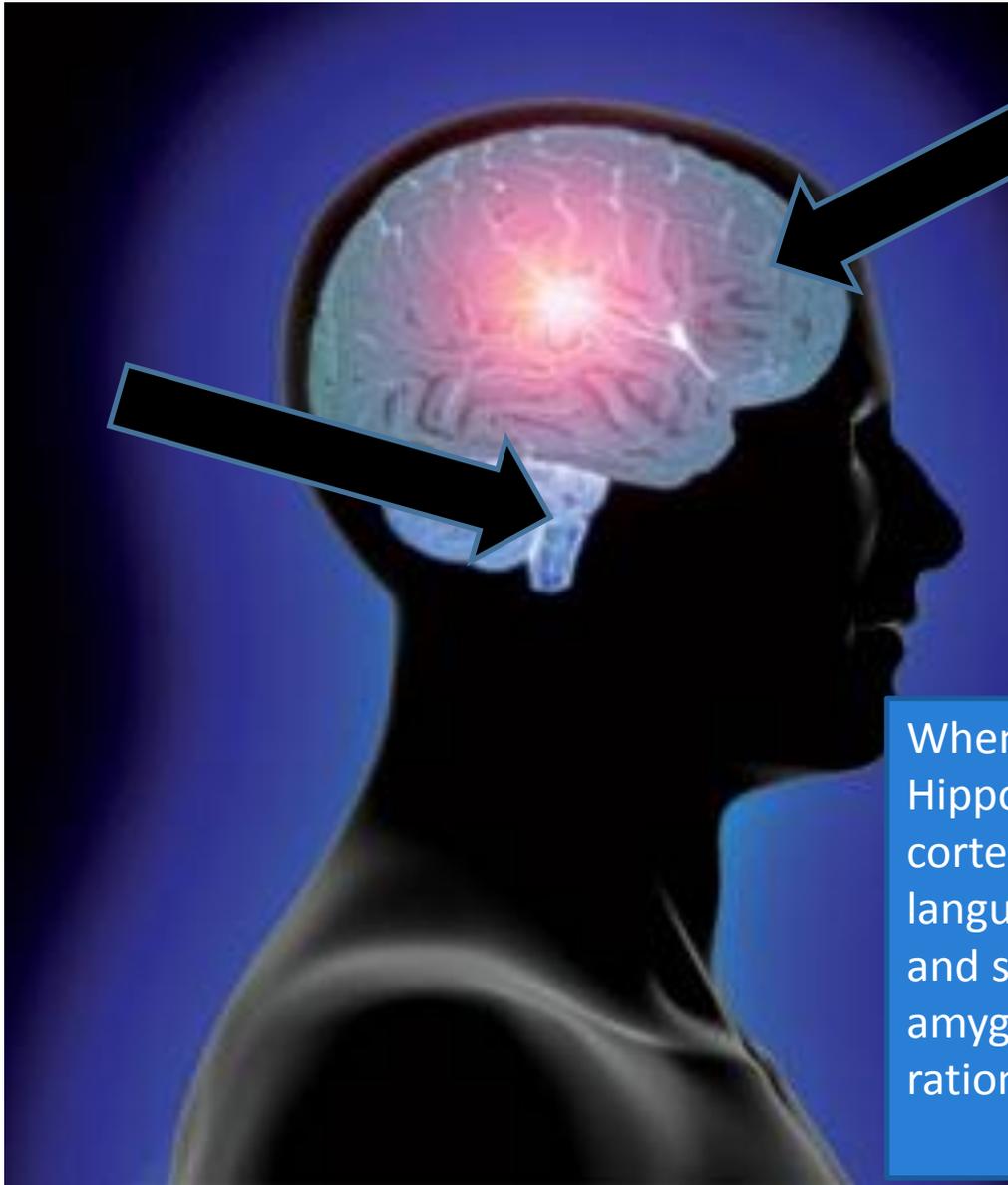
**ADRENAL GLANDS:** Flood blood stream with adrenaline and noradrenaline, increasing the level of blood sugar and constricting blood vessels

**AMYGDALA:** Directs central and autonomic nervous systems to trigger an all-systems alarm, also codes memory of the event

**HYPOTHALAMUS:** Incorporates signals from organs, triggers pituitary gland and autonomic system, causing the body's major organ systems to prepare for action

**PITUITARY GLAND:** Produces thyrotropin and adrenocorticotropin, calling the thyroid and adrenal system into action

**SKIN:** Vessels constrict, causing chills and sweat



When the amygdala is activated, it inhibits the Hippocampus and areas of the prefrontal cortex. These areas govern thinking, analyzing, language, and organizing memory into time and space. This is a survival response. The amygdala response is designed to override our rational thinking.

# Successful Resolution of Threat [Fight or Flight]



**Energy Release following resolution; unresolved trauma stays in body**

# Parasympathetic Response

There is no danger. Turn off the alert!



Parasympathetic Response: “Rest and Digest”

# Human Stress Response



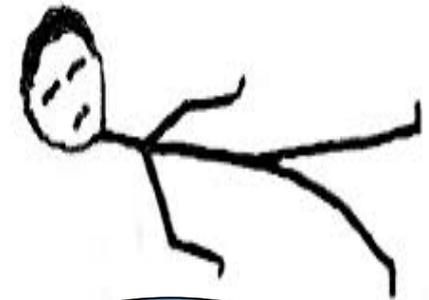
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## **DANGER**

Defensive Strategies  
Fight / Flight,  
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**LIFE THREAT /  
OVERWHELMED  
DEFENSE SYSTEM**

Shutdown /  
Immobilization

# Dorsal Vagal Shutdown



# Dorsal Vagal Shutdown- FREEZE

If fight/flight is NOT possible or successful, the sympathetic arousal can get so extreme that it is too much for the body to handle.

At this point, we have a failsafe survival mechanism. The Parasympathetic system spikes, overwhelms the Sympathic arousal and sends the person into a state of Freeze: full collapse, dissociation, or a partial freeze (e.g., inability to access words or emotions, or movement)

“A breakdown in the adaptation to stress occurs whereby the system fixates on threat-related survival data, then critical recognition of and attachment to safety-related survival data diminishes over time.” (Macy, 2003)



# Somatic and Body Experiences

- **Resilient Nervous System**
  - Arousal- discharge- rest rhythm
  - Successful mobilization in face of threat
  - Recovery after threat has been successfully overcome

- Persistent trauma has a physiological impact on the brain and nervous system
- The brain's natural alarm system malfunctions. Either stuck in "on position" or off altogether.
- Minor triggers can lead the brain's alarm to go on a rollercoaster from being stuck on "on" to being shut down completely.



# *Normal Assumptions*

When Threat is Minimal

**I Am Safe**

**I Am In Control**

**The World is Predictable**

**The World Is Meaningful**

**I am VALUED**

# ***SHATTERED Assumptions***

**Following Traumatic Event**

**I Am NOT Safe**

**I Am NOT In Control**

**The World Is NOT Predictable**

**The World Is NOT Meaningful**

**I am NOT Valued**

# Human Stress Response 101



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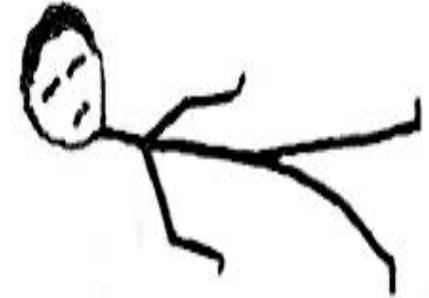
Eye contact  
expressive  
tone & volume



## **DANGER**

**Defensive Strategies**

Fight / Flight



**LIFE THREAT /  
OVERWHELMED  
DEFENSE SYSTEM**

**Intervention: SAFETY, CONNECTION,  
CONTROL, MEANING, MOBILIZATION,  
AND RESOLUTION**

# STRATEGIES TO MITIGATE EFFECTS OF TRAUMA STRESS

- Safety
- Connection (Social Support)
  - Mastery / Feeling of accomplishment

# Presentation Outline

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- **Psychological Impacts of Climate Change: Acute, Gradual, Longterm**

- **Future Directions**

# THE PSYCHOLOGY IMPACTS OF CLIMATE CHANGE

While specific climate impacts may be different, psychological impacts may be very similar.

<b>ACUTE OR EXTREME WEATHER EVENTS</b> (e.g., hurricanes, floods)	<b>SUBACUTE WEATHER EVENTS / GRADUAL CHANGES</b> (e.g., droughts, heat waves)	<b>LONG-TERM ENVIRONMENTAL CHANGES</b> (loss of “place”, change sea ice and wildlife patterns)
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Gathering of both quantitative and qualitative research on three areas of impact;  
Necessity to infuse science of psychological trauma: Critical to understand the human stress response in relation to three impacts, all threats to survival

# WHO??

Everyone is affected but not affected equally

**MOST VULNERABLE:**

Older adults, children, infants, pregnant women, disabled

People with: limited resources (social / financial, reduced mobility, pre-existing conditions, historical trauma

Social inequality, low levels of trust

Those who rely upon land for livelihood/life

Reframing and Renaming:

ADAPTIVE RESPONSE

TO THREAT

can become

MALADAPTIVE IN

CURRENT SITUATION

RESPONDING THROUGH A DANGER LENS

# Acute or extreme weather events



**Fight/  
Flight**



# Social Engagement after successful Fight/Flight

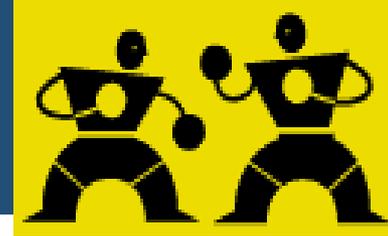


# Unsuccessful Mobilization /Resolution?

The brain's natural alarm system malfunctions.  
Either stuck in "on position" or off altogether.



# FIGHT



- Hyper arousal

Aggression, irritability, difficulty concentrating, irritability, quick to lose temper, “hyper” behavior, difficulty falling asleep or staying asleep

# FLIGHT



- Avoidance

Withdrawal from others, isolating, hiding, decreased sympathy/empathy for others, escape behaviors (e.g. alcohol, drugs), lack of connection, excessive daydreaming, difficulty getting out of bed, sick days

# FREEZE

- Shutting down

Shutting down of emotional expression, overwhelmed (“I can’t”), ignoring or tuning out, looking dazed or “spacey”, over compliance, giving up, death



# Hurricane Katrina

- Loss, Grief, Relocation, disrupted supports, inequitable distribution of resources, cumulative stress, separation from family, loss of sense of safety
- **I Am NOT Safe\*\*I Am NOT In Control \*\*The World Is NOT Predictable\*\*The World Is NOT Meaningful\*\***

# Following Hurricane Katrina

- Acute stress and post-traumatic stress disorders,
- Increased domestic violence, and
- Higher rates of depression and anxiety
- Higher rates of suicide (attempted and completed) in affected communities
- Drastic disruption of care for people with pre-existing mental health needs

# Human Stress Response 101



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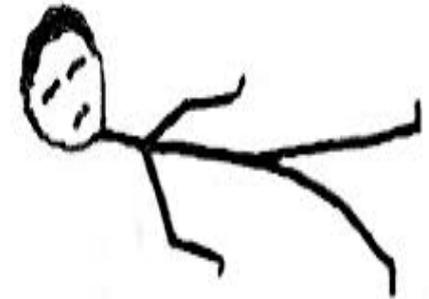
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## **DANGER**

**Defensive Strategies**

**Fight / Flight,**



**LIFE THREAT /  
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DEFENSE SYSTEM**

Shutdown /

**SAFETY, CONTROL, PREDICTABILITY,  
MEANING AND CONNECTION**

# Gradual Climate Impacts



# Sub-acute Climate Events

- Exacerbation of pre-existing disorders
- Chronic stress = health conditions
- Weakening of social fabric of community
- Increased meaninglessness / loss of identity
- Increased depression and anxiety
- Increased Substance Abuse
- Increased risk of suicide

# Long term / Permanent Changes



# SAOLASTALGIA

Coined by Albrecht (2011). the term  
'SOLASTALGIA': Solace + Nostalgia

A form of melancholia experienced by people distant from their home and longing to return, solastalgia describes a similar sense of dislocation and homesickness experienced while one is still 'at home'.

\*\*particularly salient among people with stronger attachment to their land

# Circumpolar North

Land is essential for survival, foundation for culture, ancestry, connecting with family and friends, health & wellness



Northern Canada: rising temperatures, decline in sea ice thickness and extent, warming permafrost, increased frequency and intensity of storms, and disruptions to wildlife and vegetation patterns

- precarious living conditions (housing shortages, overcrowding),
- pre-existing health
- disparities rooted in historical trauma with profound social and cultural impacts, and inadequate access to health-sustaining resources in the Inuit populations in Canada experience
- Inuit communities experiencing suicide rates up to 11 times higher than the Canadian average

- Feelings of insecurity, “stuckness”
- Longterm effects on children, relationships
- Traditions with younger generations
- Feeling unsafe...increase in alcoholism, violence, suicide
- Loss of major source of wellness as land can no longer provide venue for enjoyable activities
- Profound loss of identity, loss of control, loss of meaning

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**Strategies for working  
with those impacted  
(Understanding  
Psychological Trauma)**

# Psychological Resilience

In the presence of significant **ADVERSITY**, **RESILIENCE** is understood to be both the capacity of individuals to **NAVIGATE** their way to the psychological social, cultural, and physical resources that sustain their well-being **AND** their capacity to individually and collectively **NEGOTIATE** for these resources to be provided and experienced in culturally meaningful ways.

# Risk Factors vs. Protective Factors

- “Intervention may thus be conceived as an attempt to shift the balance from vulnerability to resilience, either by decreasing exposure to risk factors and stressful life events or by increasing the number of available protective factors.”



Werner, 1994

# Basic Strategies to Support Resilience

Remember SAFETY, CONTROL, WORTHINESS, and MEANING

- Acknowledge coping efforts and strength; look for resilience
- Empower those affected by impacts to re-establish safety and connections
- Encourage those affected to take active role
- Acknowledge the people for the important things that they have done so far

# ACUTE IMPACTS

Hobfoll (2007) offers five evidence-based principles to guide intervention in the aftermath of a disaster to move responders towards compassion.

1. Promoting a sense of safety
2. Promoting calm
3. Promoting a sense of self and a sense of collective efficacy
4. Promoting connectedness
5. Promoting hope

# SUB-ACUTE & LONGTERM IMPACTS

- Increase Bonding and Social Support:  
Enhance Family & extended social support networks (e.g., Peer-to-peer support )
- Strengthening community networks (work across groups)
- Create Opportunities for Meaningful Involvement
- Infuse Mental Health considerations into existing plans

# Interdisciplinary Collaboration



**Responsibility of mental health professionals to collaborate in developing knowledge on climate-related mental health outcomes and on potential interventions**

For more information: contact  
or Cathy Lounsbury ([clounsbury@antioch.edu](mailto:clounsbury@antioch.edu))

