

# Trauma: Effects on Brain and Behavior

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# Agenda

- Who is doing the trauma research?
  - Call for counselors to contribute!
- Brain Basics
  - Integration of brain, the nervous system, and body (behavior)
- Trauma basics
- Three theories of how trauma affects the brain
  - Polyvagal Theory
  - Neuroimmune Hypothesis
- So what?
  - Why is this important for counselors

# Learning Outcomes

- Introduce three proposed models for how trauma effects the brain
  - Polyvagal Theory
  - Neuroimmune Hypothesis
- Exposure to the integration of the brain, the nervous system, and our body
- Understand the neurological importance of safety and connection to facilitate healing

# Who is doing the trauma research?

*Not counselors....*

**Who is working with clients who have had extensive exposure to traumatic experience?**

Entry-level counselors

**What settings?**

Community mental health agencies

Residential treatment

In-Patient Hospitals

# Informed Consumers of Research

## Common reasons for misinformation/interpretation

- Push to publish
- Good intentions
- Fast paced movement of technology
- Consuming information produced by individuals outside of your field

## Takeaways

- Integration of information is key for a solid foundation
  - Monocrop
- Question sweeping generalizations or theories that explain it all

# Why is this important?

A client who has experienced a traumatic event (or has perceived an event as traumatic) presents with a variety of challenges to clinicians, including a dysregulated autonomic nervous system, compromised ability to self-soothe and diminished capacity for relatedness with others.

(Quillman, 2012)

# Brain & Trauma Basics

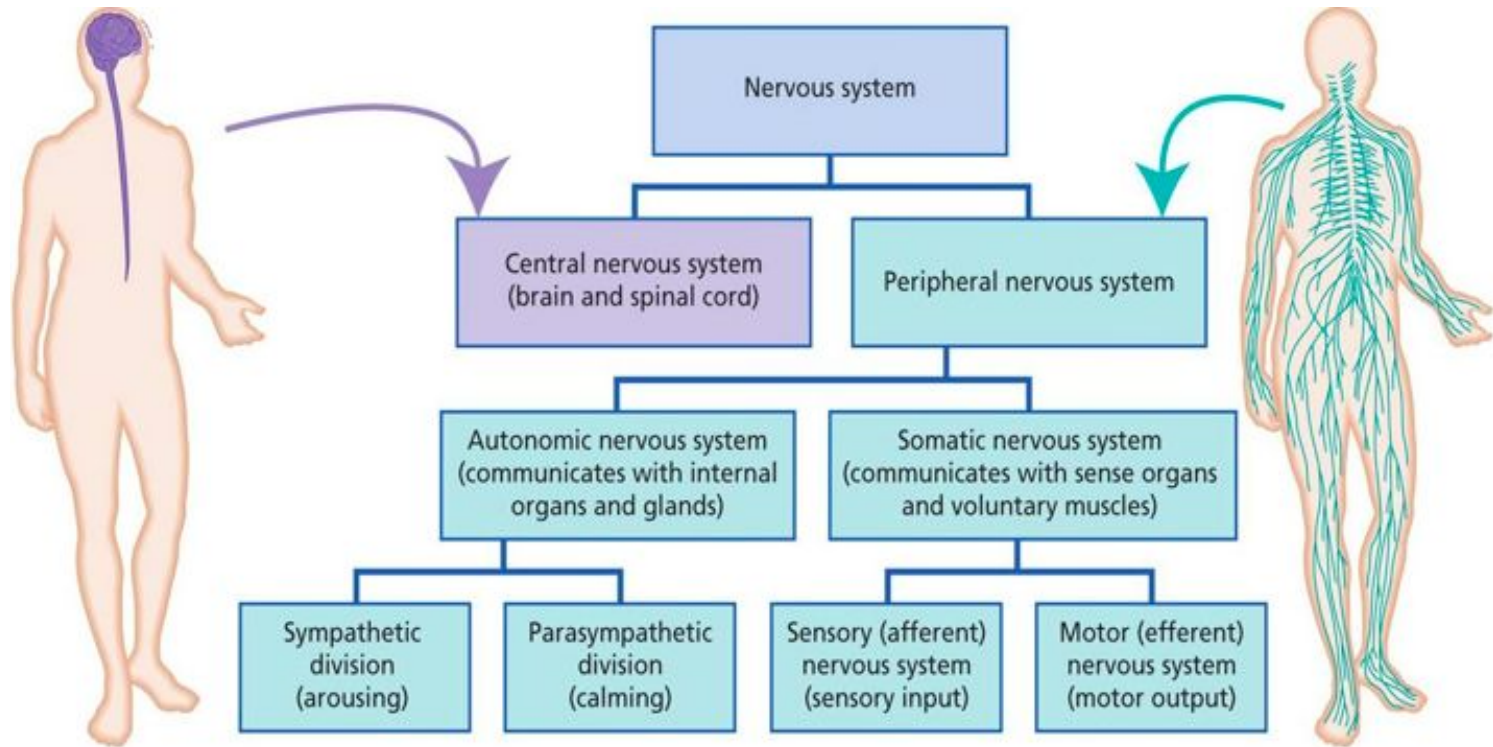
# The *Brain* as a system

- When speaking about the brain, we are actually referring to a complex system that is *interpreting and responding* to information from inside the body and outside the body
  - Brain
  - Neurotransmitters
  - Spinal Cord
  - Organs
  - Nerves
  - Hormones





# The Nervous System



# Neurobiological Assumptions

- The environment shapes neurobiological development and attachment formation
- Assumptions
  - The mammalian nervous system evolved
    - This system serves a purpose
    - There are inherited aspects that are part of the typical development of the human body
    - There are remnants of that system that can be activated by events that don't necessarily present the same form of danger as we perceive

# Trauma

It is not just the event itself that determines whether something is traumatic, but also the individual's experience of the event



Horowitz (1989)

“...a sudden and forceful event that overwhelms a person's ability to respond to it, recognizing that a trauma need not involve actual physical harm to oneself; an event can be traumatic if it contradicts one's worldview and overpowers one's ability to cope”

# Polyvagal Theory

# Foundations

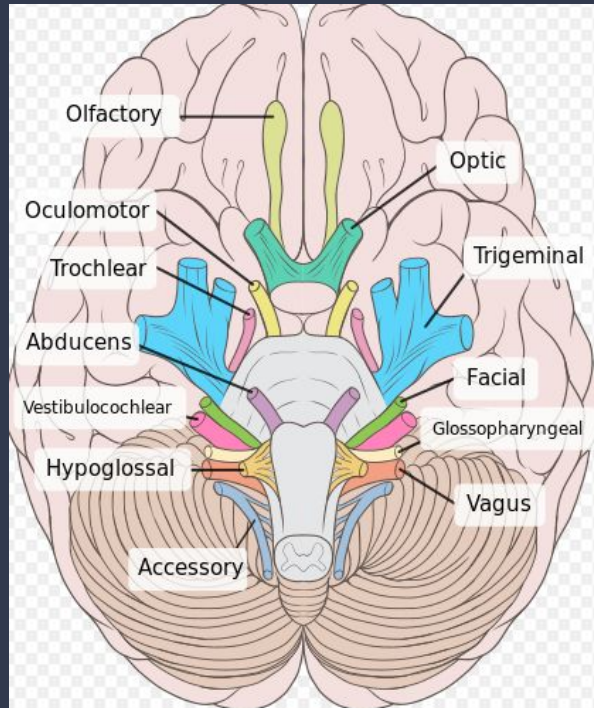
- Dr. Stephen Porges
- Contributions to the literature
  - Model of neural regulation connected to the autonomic nervous system
  - Provides several insights into the adaptive nature of physiological state
  - Introduces the system aspect of autonomic nervous system
  - Neuroception (Porges, 2004)

# Neuroception

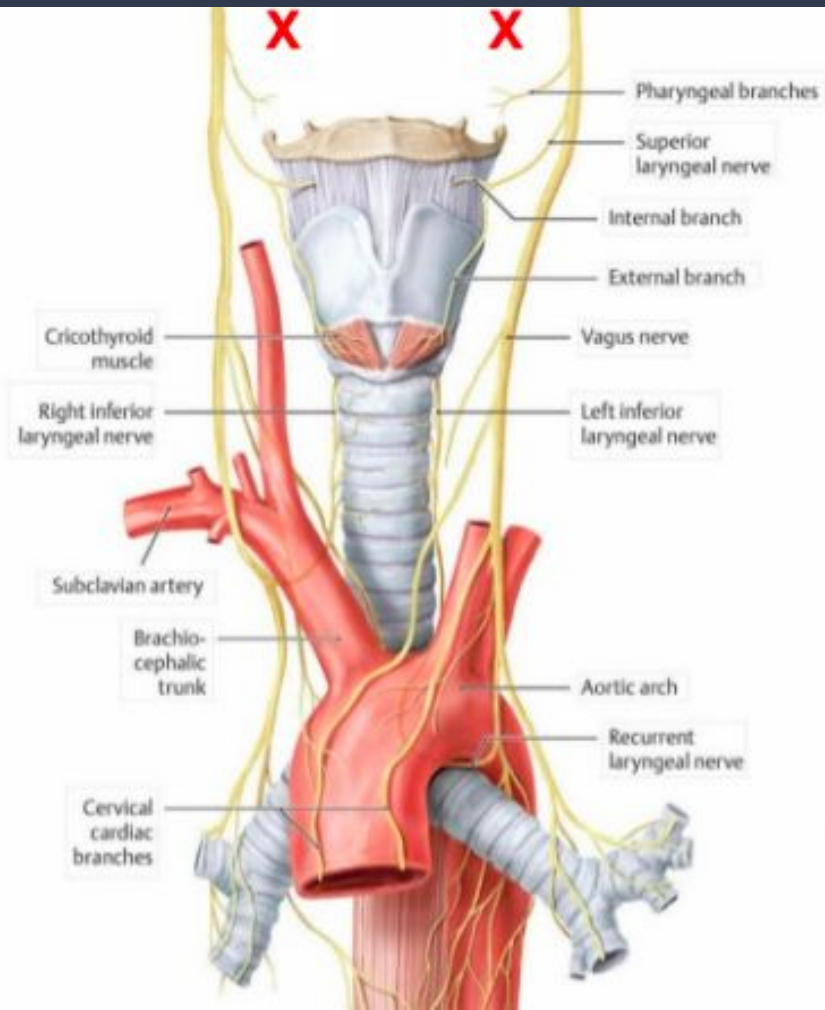
(Porges, 2004)

- The nervous system processes information from all our senses and unconsciously evaluates risk
- Relies on neural circuits and assists us in evaluating danger and responding appropriately
- Faulty neuroception is linked to *faulty reactivity and unnecessary changes in physiology and it results in maladaptive behavior* that are often seen in counseling
- If the environment is experienced as dangerous, social approaches may trigger a response of aggression or withdrawal which are damaging to social bonds

# Polyvagal



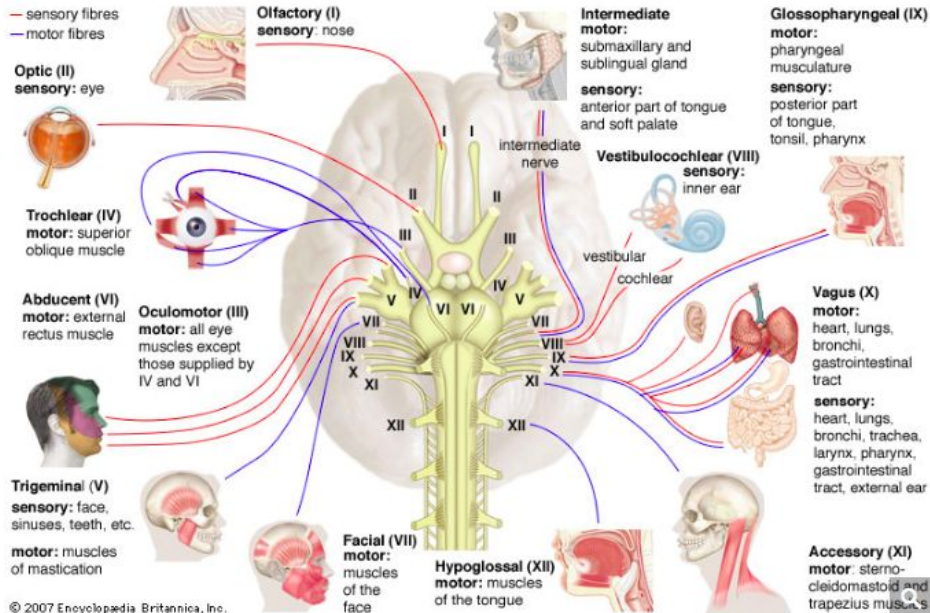
- Mammals have two vagal circuits that originated in two different parts of the brainstem (Porges & Buczynski, 2011)
- Implications for practice
  - People can get stuck in the “reptilian circuit” (Porges & Buczynski, 2011)
    - Voice lacks intonation and face shows little emotion
  - Some clients are in a physiological state of vigilance instead of one that allows for social engagement



So...what is the  
vagus nerve?



# What is the vagus nerve?



*The vagus nerve has the most extensive distribution of the cranial nerves.*

- Longest and most complex of the cranial nerves
- Runs from the brain, through the face, through the thorax, to the abdomen

# Social Engagement System

- Social engagement requires a sense of safety (Klotter, 2016)
- The vagal system plays a role in fostering behavioral and psychological interactions with the environment (Porges, 2011)

# What does this mean for clients?

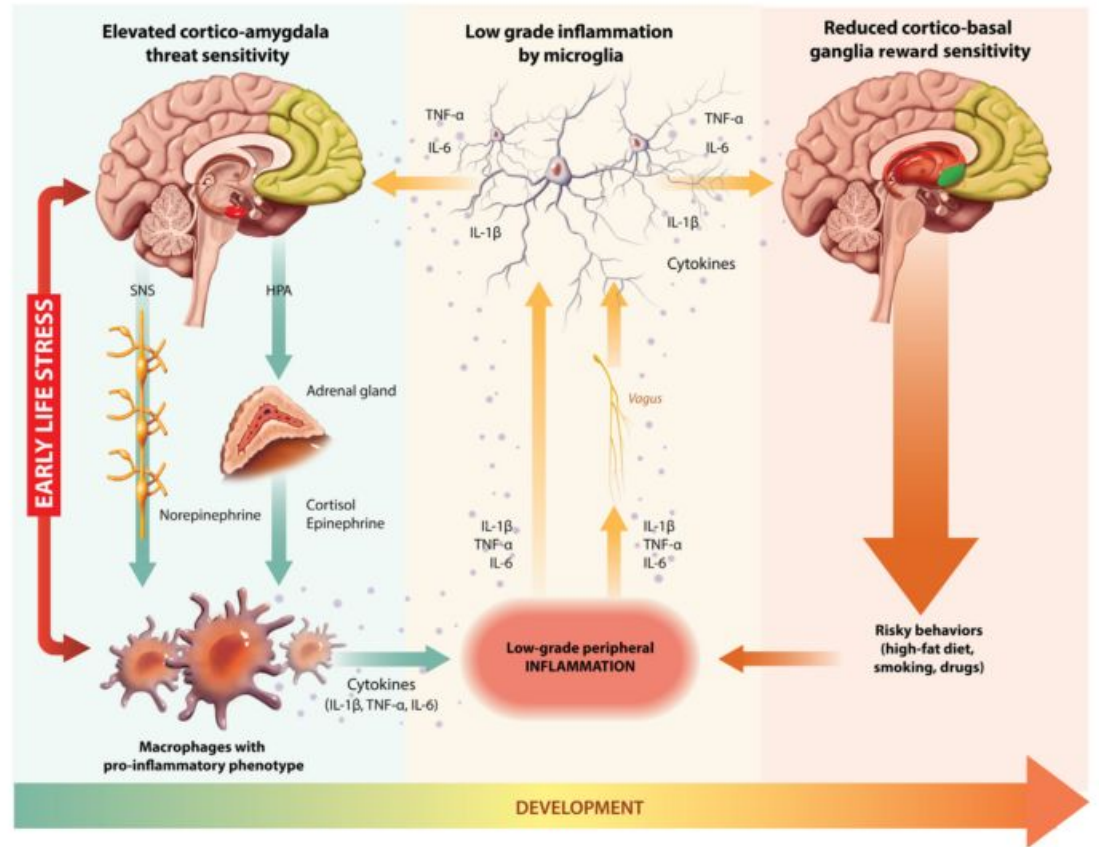
- Bidirectionality
- Co-regulation strategies in therapy when working with clients that have experienced a traumatic event(s)
- Provides rationale for early intervention and education to provide children with opportunities to develop[ skills in self-regulation
- The experience of safety is a prerequisite of the therapeutic relationship
  - *Regulation is the starting point for social engagement*

# Neuroimmune Hypothesis

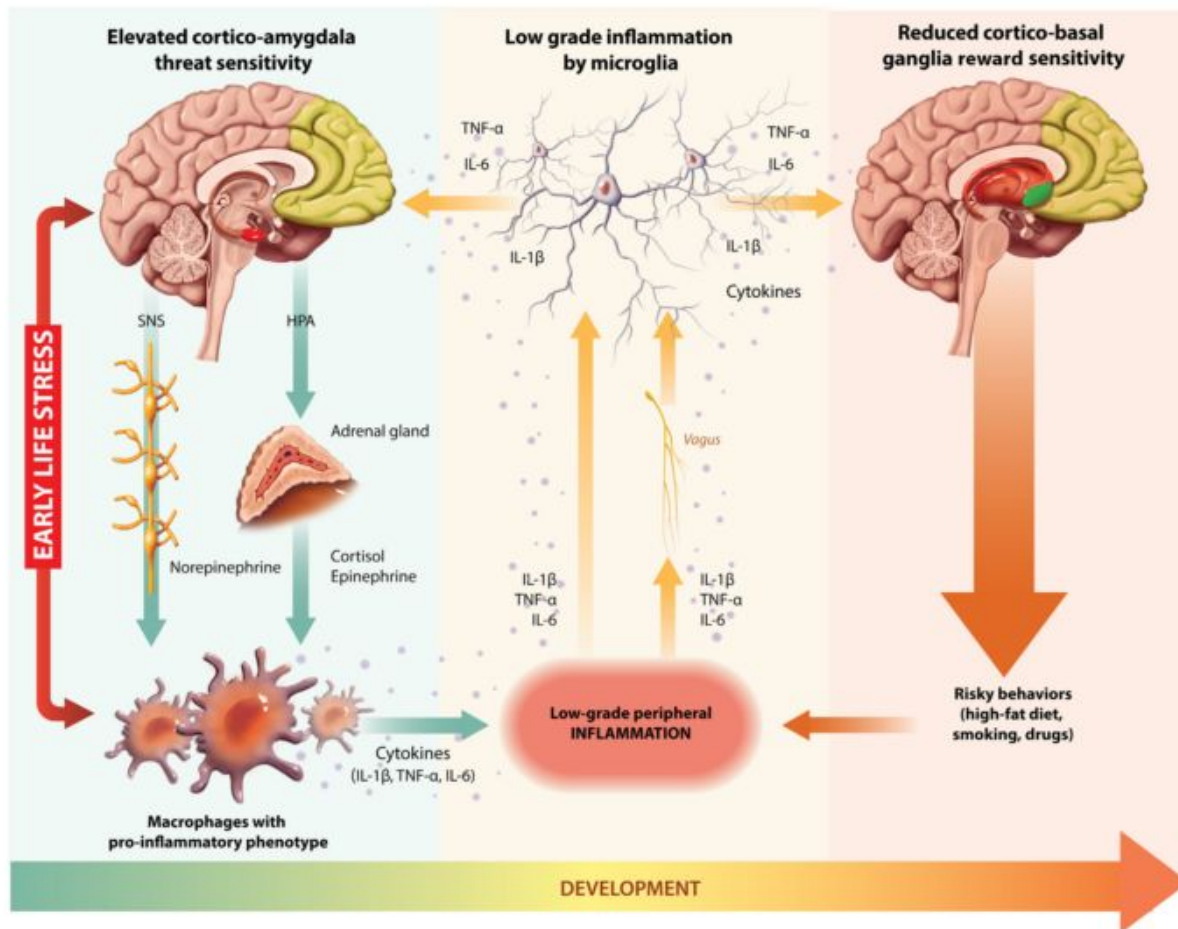
# Broad Strokes

- Early-life adversity amplifies crosstalk between peripheral inflammation and neural circuitries promote threat-related, reward-related, and executive control-related processes (Nusslock & Miller, 2016).
- This crosstalk results in chronic low-grade inflammation, thereby contributing to obesity, insulin resistance, and other pre-disease states (Nusslock & Miller, 2016).

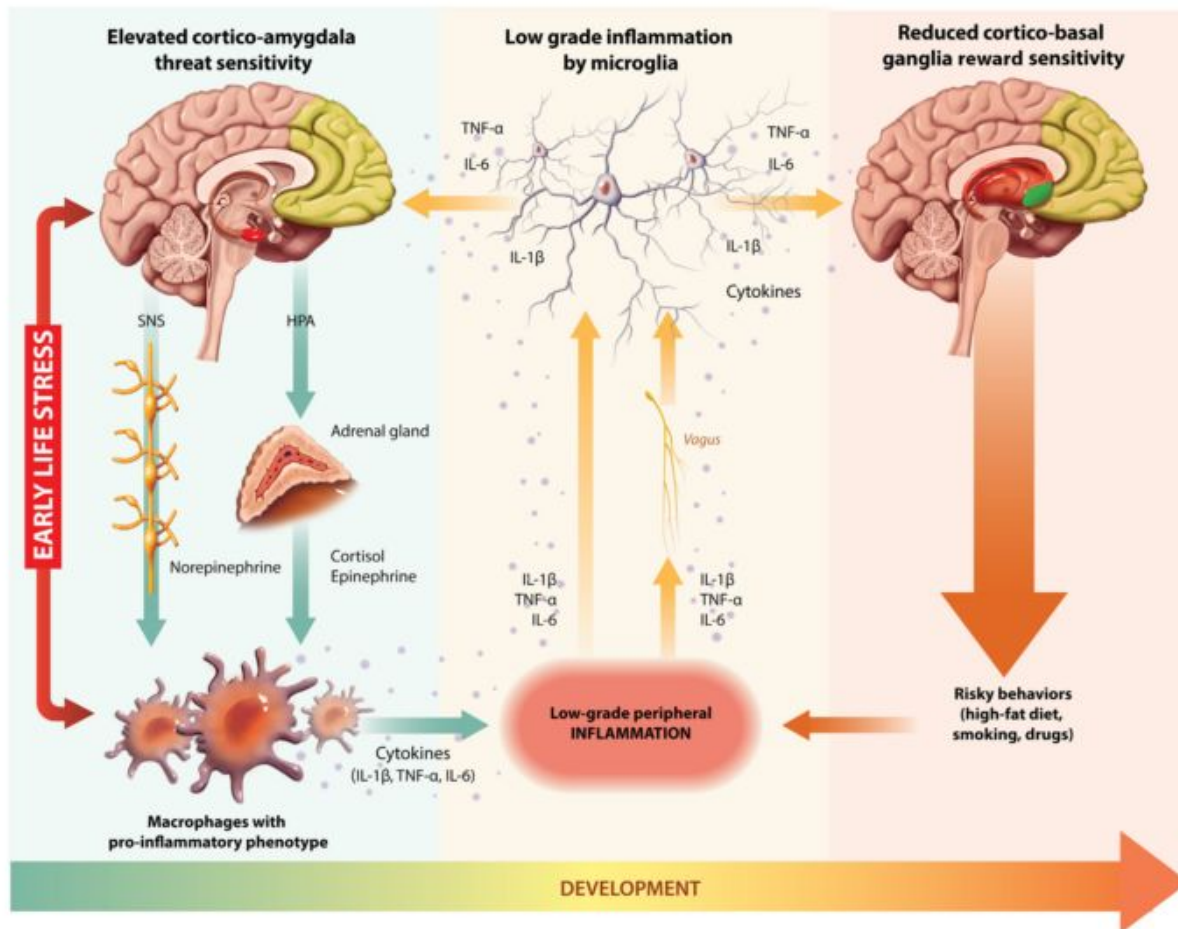
## Neuroimmune Circuit



**Figure 1.** Depiction of neuroimmune network hypothesis. HPA, hypothalamic-pituitary-adrenocortical; IL-1 $\beta$ , interleukin-1 $\beta$ ; IL-6, interleukin-6; SNS, sympathetic nervous system; TNF- $\alpha$ , tumor necrosis factor-alpha. (Illustration by Chi-Chun Liu and Qingyang Chen.)

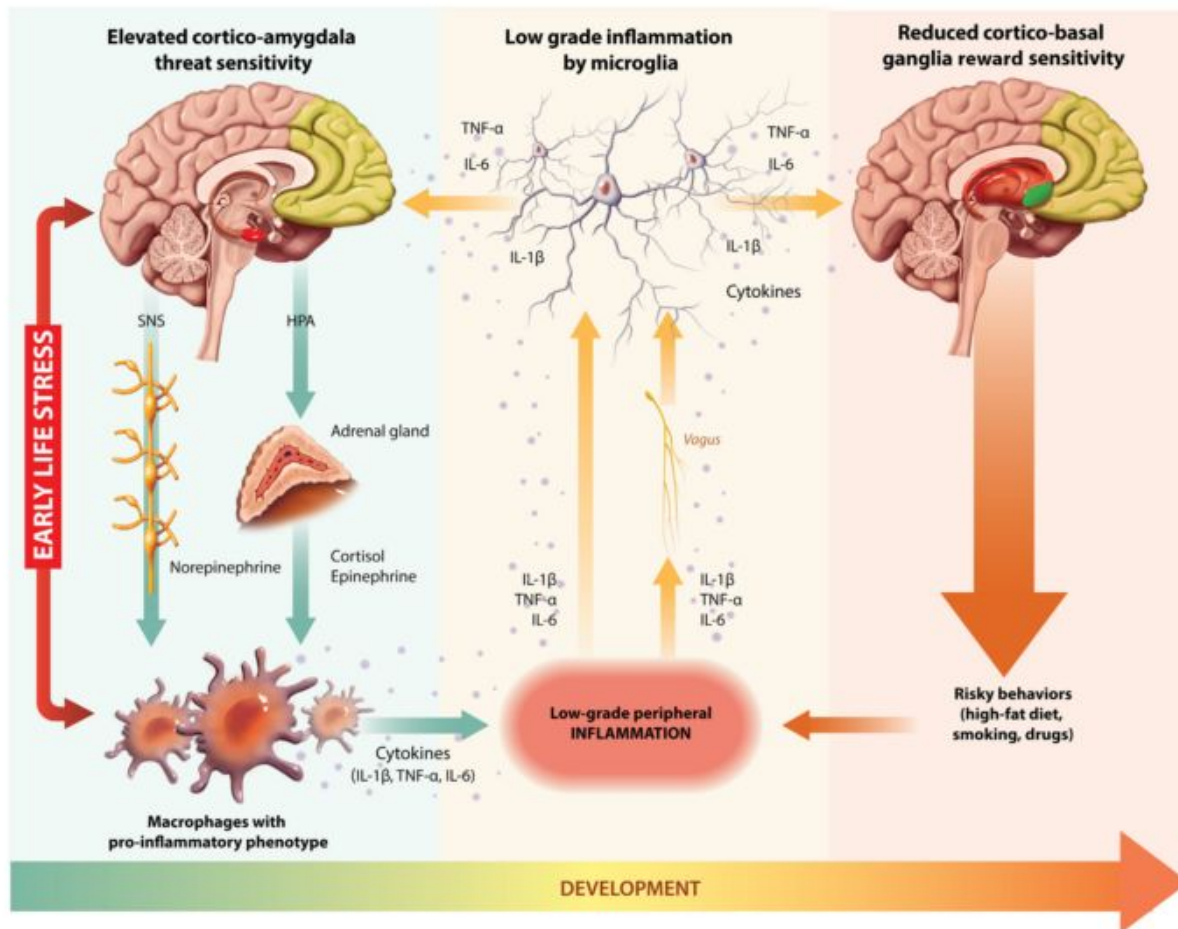


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# Contributions to the literature

- A model that recognizes the multidirectional transactions among these systems
- Bridging the gap between the work on early childhood adversity (post-ACE's Study) to the work on immune system compromise
  - Moving correlated work to casual work so we can better target interventions

So what...

*Why is this important for counselors?*

# Creating a sense of safety

*Traumatic experience erodes a sense of safety, removes control, and triggers a physiological (primal) sense of helplessness*

What are some ways that you create a sense of safety for your clients?

- Making and processing contract
- Agreeing and sticking to session times
- Predictable responses
- Rogers' core conditions (1957)

“Tell your clients who were traumatized that they should celebrate their body’s responses, even if the profound physiological and behavioral states that they have experienced currently limit their ability to function in a social world,” Porges advises. “Tell them to ‘celebrate’ how their body responded instead of making them feel guilty that their body is failing them when they want to be social and let’s see what happens” Dissolving that sense of being “bad” promotes feelings of safety that allows social engagement to occur”

(Porges, 2011)

# Perspective

When we are working with clients that have experienced a traumatic event ask yourself...

Am I being perceived as a helper or an adversary?

# What does this mean for our work?

- Work with the biological/psychological systems
- Need for physical and psychological safety (Prendiville, 2017)
- “Our capacity to regulate levels of arousal, together with our subsequent baseline state, is heavily influenced by our early experiences and emotional environment” (Prendiville, 2017)
- Reflecting on the personalized responses of individuals is important

# What does this mean for our work?

## The Arts

- Integration of the arts
  - Repetitive rhythmic activity (Jennings, 2001; Gaskill and Perry, 2014; Malchiodi, 2014)
    - Music, Movement, Sensorial Activities
- According to the polyvagal theory, the middle ear can be stimulated through higher-pitched vocal music (Porges, 2011)



# What does this mean for our work?

## Physical Health

- Neuroimmune Hypothesis
  - Diet
  - Exercise
  - Implementing health programs in our schools in communities
- Treatment goals
  - Food diaries
  - Support physical health

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