

The Nervous System

The Brain Body Connection



The Vagus Nerve aka “the wandering nerve”

The autonomic nervous system regulates essential body functions like heart rate, blood pressure, breathing, and digestion. Central to this system is the vagus nerve, the longest cranial nerve, which connects the brain to various organs, including the heart, lungs, and stomach. Often called the "mind-body connection," the vagus nerve sends and receives signals between the brain and body, helping us respond to changes in both internal and external environments, which is key to maintaining overall well-being.

The Nervous System



In babies and toddlers, the vagus nerve, part of the parasympathetic nervous system, is developing rapidly and helps regulate vital functions like digestion, heart rate, and stress response. During early life, caregiving and environmental interactions influence this development. Responsive and nurturing care strengthens the vagus nerve, improving vagal tone, which supports self-soothing, emotional regulation, and social engagement. Over time, as the toddler's brain matures, the vagus nerve plays a larger role in helping them adapt to stress, manage emotions, and build healthy relationships.

The Nervous System



During adolescence, the vagus nerve continues to mature, playing a key role in regulating the parasympathetic nervous system, which helps manage stress responses, emotional regulation, and social engagement. As the brain develops, particularly the prefrontal cortex, the vagus nerve becomes more integrated with higher cognitive functions, enhancing emotional and social awareness. Adolescents with strong vagal tone (a measure of how well the vagus nerve functions) tend to have better emotional resilience, improved stress management, and stronger social connections, which are important for healthy emotional development.

The Nervous System



As a young adult, the vagus nerve continues to mature, refining its role in emotional regulation, stress management, and maintaining balance in the autonomic nervous system. During this stage, the prefrontal cortex, which is responsible for higher cognitive functions, becomes more connected to the vagus nerve, improving the ability to manage emotions and respond calmly to stress. This development strengthens the capacity for social engagement, emotional resilience, and overall well-being, as the vagus nerve continues to support communication between the brain and body.



Our **neuroception** is the subconscious process by which the **autonomic nervous system** evaluates and detects threats, danger, or safety in the environment. Our bodies adjust to what we detect and, once safety is determined, our bodies can relax.

What happens when consistent and safe connections are not available?

The autonomic nervous system chooses safety and survival over connection and will go into a fight, flight, freeze state. The more time you spend in nervous system dysregulation the harder it is to create a feeling of safety around others.

Aggressive Cues:

Tense jaw
Hard eyes
Furrowed brows
“I’m not safe”



Any signaling of hostility or threat can trigger your survival instincts and unresolved trauma from the past continues to show up in your present interactions.



Early attachment relationships play a crucial role in the development of the autonomic nervous system, as responsive and nurturing caregiving helps establish a balanced and regulated ANS. Stressful or traumatic experiences, especially in childhood, can impact the ANS, leading to patterns of over-activation (fight/flight) or under-activation (freeze). Repeated experiences shape how our nervous system responds to stress, safety, and social engagement.

The polyvagal system, developed by Dr. Stephen Porges, explains how the autonomic nervous system (ANS) regulates our responses to safety. There are three systems:

The ventral vagal system - associated with social engagement and feelings of safety

The sympathetic system - responsible for fight-or-flight responses

The dorsal vagal system - linked to shutdown or freeze responses

These pathways influence how we respond to stress, with the ventral vagal promoting calmness and connection, while the sympathetic and dorsal vagal systems activate in response to perceived threats.

Three Stages of a Threat Response

Stage 1: Social engagement



Have you ever experienced a threat (real or perceived) and knew exactly who to turn to? Seeking support and comfort from others when under distress can help regulate your nervous system, slowing down your heart rate and breath.

Three Stages of a Threat Response

Stage 2: Fight or Flight



In the fight-or-flight stage of survival the body prepares to either confront (fight) or escape (flight) from danger. Hypervigilance and anxiety set in. This triggers physical changes like increased heart rate, rapid breathing, and muscle tension. Adrenaline and cortisol are released, heightening alertness and preparing the body to respond swiftly to the perceived threat. This response is crucial for survival in dangerous situations.

Three Stages of a Threat Response

Stage 3: Freeze or Collapse



The freeze state of survival occurs when the autonomic nervous system activates the dorsal vagal response, causing a sense of immobilization or "shutting down" in the face of overwhelming danger. In this state, heart rate and breathing slow down, and a sense of numbness or disconnection can occur. It's an instinctive response designed to help the individual endure or escape life-threatening situations by appearing still or invisible to a threat.

I'm no longer in a place of danger so why do I keep reacting this way?

Exposure to danger, neglect, or unpredictable situations can create heightened survival responses. Over time, these patterns become ingrained as our autonomic nervous system adapts to protect us, even if the original threats no longer exist, leading to habitual fight, flight, or freeze reactions in everyday situations.



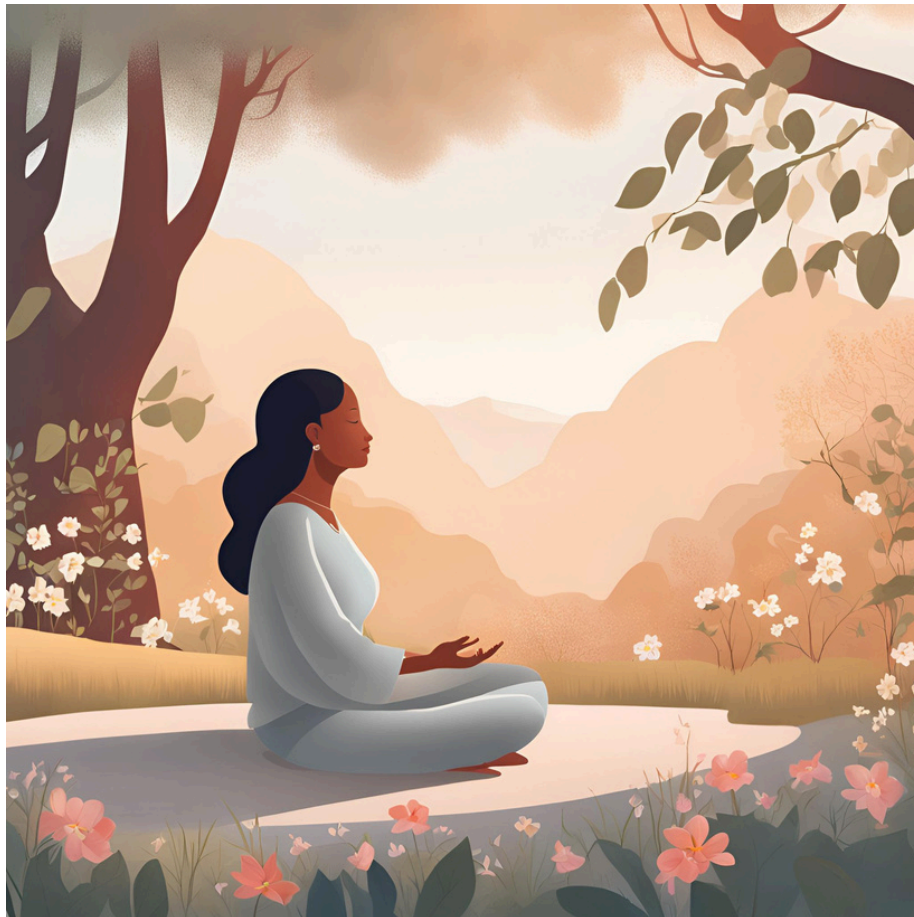


Our brains often can't distinguish between real and perceived threats because the same neural pathways activate in both situations. When we sense danger, whether it's an actual threat (e.g., a dangerous animal) or a perceived one (e.g., a stressful work situation), the amygdala triggers the fight, flight, or freeze response. This reaction is based on past experiences, memories, and learned patterns, which means even imagined or anticipated dangers can produce the same physiological responses as actual threats, making us react as if the danger is real.

Trauma is stored in the neural networks as intense sensory, emotional, and physiological memories that can be easily triggered by reminders of the traumatic event. When trauma occurs, the brain's amygdala (responsible for detecting threats) activates strongly, while the hippocampus (involved in processing memories) can become overwhelmed. This causes fragmented memories of the event to be stored in a raw, unprocessed form, making the trauma feel "alive" in the body. As a result, the neural networks maintain hypervigilance, and triggers can reactivate the trauma response, even long after the event.

The trauma response can be reversed or healed over time with appropriate treatment and support. You have the natural ability to heal yourself by retraining your brain. "Retrain the brain" means altering neural pathways to create new, healthier patterns of thinking, feeling, and responding. When someone experiences trauma, the brain's survival responses (fight, flight, freeze) can become deeply ingrained. Through therapeutic practices like mindfulness, EMDR, and cognitive-behavioral techniques, individuals can form new connections that reduce the intensity of these responses. This process helps the brain adapt and respond more calmly to triggers, leading to improved emotional regulation and resilience.

Additionally, mindfulness practices, self-care, and a supportive environment contribute to healing and building resilience.



Tools to Build Resilience

Autonomic Nervous System Mapping

Notice how you think and feel when you are in different states

Social Engagement:

- Who is with you?
- What feelings come up?
- What are you thinking?
- How are you behaving?



Listening to our body when we feel that we are in a “safe” or “calm” state can help us develop a relationship to our feelings, thoughts, and behaviors. If you’ve grown up in an unsafe environment, these feelings may feel unfamiliar.

Tools to Build Resilience

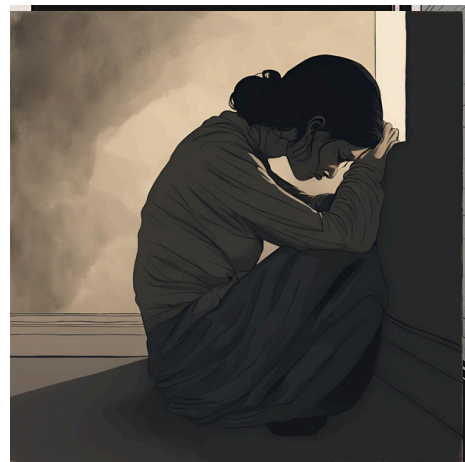
Autonomic Nervous System Mapping

This can be an awkward stage of growth. Learning how to trust yourself around others will require time to build new neural connections.

Fight or flight?



Freeze/dissociate?



- Who is with you?
- What is your body sensation?
- What feelings come up?
- What are you thinking?
- How are you behaving?

Tools to Build Resilience

Autonomic Nervous System Mapping

Name 5 objects:

Look around your space and name 5 objects. Focus on the color and shape of each object



Breathe:

Deep belly breaths, following your breath in and out of your body, counting the inhales and exhales

Stretch:

Notice what it feels like to release tension in your body. Bonus if you can stretch outside

